Bubble or Not? Beijing Housing Prices

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Abstract
The Beijing housing market is highly important to the people and leaders of Beijing, China and the broader world for a variety of political, welfare and economic reasons. Is a bubble occurring in Beijing's housing market? The objective of this paper is to provide a foundation to assess the potential of a bubble/mispricing occurring in this market. This research used an overarching literature review-methodology to analyze the structural nature of the Beijing housing market, the market's history of bubbles and price levels and subsequent policy responses. The paper is structured in five parts. First, an introduction of the topic and its relevance. Second, a modern history of the creation of a market-based housing system in urban China and Beijing is presented. Third, an operational definition of a bubble is established and discussed. Fourth, the paper provides a chronological history of Beijing housing market bubbles and price levels through today via synthesizing literature on the topic. Fifth, using the analyzed studies and other sources, conclusions, future research and preliminary policy recommendations are discussed. It is hoped that this paper can serve as a contributing foundation for future research and guiding knowledge for policy and investment decisions.

Disciplines
Business | Real Estate
Bubble or Not? Beijing Housing Prices

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ABSTRACT: The Beijing housing market is highly important to the people and leaders of Beijing, China and the broader world for a variety of political, welfare and economic reasons. Is a bubble occurring in Beijing’s housing market? The objective of this paper is to provide a foundation to assess the potential of a bubble/mispricing occurring in this market. This research used an overarching literature review-methodology to analyze the structural nature of the Beijing housing market, the market’s history of bubbles and price levels and subsequent policy responses. The paper is structured in five parts. First, an introduction of the topic and its relevance. Second, a modern history of the creation of a market-based housing system in urban China and Beijing is presented. Third, an operational definition of a bubble is established and discussed. Fourth, the paper provides a chronological history of Beijing housing market bubbles and price levels through today via synthesizing literature on the topic. Fifth, using the analyzed studies and other sources, conclusions, future research and preliminary policy recommendations are discussed. It is hoped that this paper can serve as a contributing foundation for future research and guiding knowledge for policy and investment decisions.

KEYWORDS: Housing Prices, Beijing, Bubble
INTRODUCTION

“I can calculate the movement of the stars but not the madness of men.”

- Isaac Newton, after losing a large fortune upon the burst of the South Sea Bubble in 1720\(^1\)

“All that said, given the fundamental factors in place that should support the demand for housing, we believe the effect of the troubles in the subprime sector on the broader housing market will likely be limited, and we do not expect significant spillovers from the subprime market to the rest of the economy or to the financial system.”

- Ben Bernanke, Federal Reserve speech on May 17, 2007\(^2\)

Beijing housing prices have grown an average of 19.8% per year from 2006 to 2016 (Wu et al. 2016, 2). Is there a bubble in the Beijing housing market? While this dramatic price growth attracts our attention, growth alone is not sufficient evidence of a bubble or even mispricing. Nonetheless, this provides a place to ‘search’ for a bubble and is fascinating economic phenomenon to study.

The concept of identifying bubbles in Beijing housing was selected as a research topic for several reasons. The housing price levels and stability have substantial systemic and welfare implications in China, with regards to affordability and wealth. As of 2015, housing consisted of 70% of total real estate investment in China and 70% of Chinese household wealth is in residential property (Nomura Research Institute 2015; Xie and Jin 2015). Potential future falls in

\(^1\) Quotation source: http://www.telegraph.co.uk/finance/personalfinance/investing/10848995/How-not-to-invest-like-Sir-Isaac-Newton.html

\(^2\) Quotation source: https://www.federalreserve.gov/newsevents/speech/bernanke20070517a.htm
housing prices has large negative reverberations with regards to national growth and employment, savings and investment of households, the stability of the financial system and the legitimacy of the national government and Communist Party in the eyes of the people. Studying the history of American housing speculation and cycles over the last 250 years, Glaeser (2013) draws an important observation, stating that “these boom-bust cycles can generate significant social costs, primarily through ensuing financial chaos” and that “there may be advantages if bank regulators recognize the regular tendency of real estate values to mean revert after booms” (Glaeser 2013, 41). The housing market has a significant direct role in China’s economy. Private housing investment was 13.2% of urban investment in 2009 (Wu et al. 2012, 543). Private housing also represented 42.6% of building in 2009 and as of 2012, consisted of 5.7% of GDP, 14.3% of urban employment and 40% of consumption of domestic steel and lumber (Wu et al. 2012, 543). Real estate and construction in aggregate currently represent 20% of national GDP (BBC 2017). Meanwhile, current high prices pose affordability issues and associated popular discontent. High prices relative to income result in high burdens to purchase housing and service mortgages. Thus, the Chinese government faces a substantial and often opposing challenges of maintaining price stability, preserving wealth and seeking affordability. Academia, the media and financial markets have been heavily focused on housing prices in China post-2008, drawing many parallels to the American sub-prime housing boom and crash of the previous decade. The ability to meaningfully assess these prices provides advance insight to avoid potential issues, such as contagion to the financial system and broader economy, through instituting preventative policy.

Focusing on Beijing allowed for a feasible and specific focus of this topic. As well, Beijing, as a first-tier city (along with Shanghai, Guangzhou and Shenzhen), has experienced
some of the most dramatic housing price growth in China, making it a very interesting case. Additionally, as the political, educational and cultural capital of China, drivers of seemingly lasting demand, does Beijing’s real estate market operate fundamentally differently than that of other cities? Specific conclusions can be made about this urban market, as opposed to that of the entire country. My faculty advisor, Professor Daniel Raff, is very familiar with residential real estate in Beijing, and has written a paper on the subject entitled “Real Estate Prices in Beijing, 1644 to 1840.”

This research used an overarching literature review-methodology to analyze the structural nature of the Beijing housing market, the market’s history of bubbles and current predicament regarding a potential bubble. Regarding Chinese housing prices, Wu, Gyourko and Deng (2012) noted that there is “very limited data due to the fact that there has only been a truly private market in land and housing units since the late 1990s” and that “economics still does not provide a well-specified test for the presence of a bubble in any asset market” (Wu et al. 2012, 532). This is a useful and sobering remark from a trio of real estate economists who have collectively and independently published some of the most-cited and respected research of the past decade on Chinese housing prices. This paper does not seek to achieve the gargantuan task of attempting to recreate or improve the asset pricing, equilibrium (indifference between renting and buying), supply and demand or econometric models that were surveyed, which were created by teams of leading housing economists over multi-year periods.

Instead, value was attempted to be created by this paper via synthesizing a breadth and diversity of data and sources. It is hoped that this project can serve as a foundational review and source of context for economists seeking to understand Beijing housing prices and the innate idiosyncrasies of the market, such as the role of the government, regulation, land and most
importantly, what has been discovered and developed in the academic field to present times. The methodologies and findings aggregated, analyzed and synthesized in this paper provide a foundation for repeating, improving and creating future studies on Beijing housing prices and bubbles. As well, this paper’s compilation of the body of Beijing housing literature could provide information for decision-making of investors, lawmakers and regulators in China and abroad regarding bubbles. A small contribution is hoped to be made in the field and it was a pleasure to write this thesis. The assistance and feedback of the individuals on the cover page was much appreciated.

The paper is structured in four parts. First, a modern history of the creation of a market-based housing system in urban China and Beijing is presented. This discusses the transition of Chinese urban housing from being financed, developed and distributed via state-entities, effectively functioning as a welfare good, to today’s market-based system. An analysis of the housing market, policy, land, housing finance and the legal system is provided. Second, an operational definition of a bubble is established and discussed. Third, the paper seeks to answer the research question of whether a bubble exists in Beijing real estate. A chronological history of Beijing housing market prices and bubbles to today is created via analyzing literature on the topic. Fourth, using the prior analyzed studies and other sources, conclusions are synthesized and future research and preliminary policy recommendations are discussed.
MODERN HISTORY OF THE CREATION AND EVOLUTION OF BEIJING’S HOUSING MARKET

Chiang Kai-shek, President of the Republic of China from 1928 to 1949, introduced the 1930 Civil Code; the “Rights over Things” section established modern property rights in China (Zhang 2008, 5). However, the 1930 Civil Code was not applied to the country due to subsequent wars and social collapse: the Japanese occupation of 1931, subsequent war against Japan (1937-1945) and the Communist-Nationalist civil war that simultaneously occurred during the war with Japan and ended in 1949 (Bjorge 2011; Zhang 2008, 5). Following the establishment of the People’s Republic of China in 1949, the 1930 Civil Code was abolished as property rights were annulled under the new socialist system and nationalization occurred (Zhang 2008, 5).

From 1949 to 1978, housing was a welfare good in China’s centrally planned economy, where socialism was the foremost, sole ideology (Yang and Chen 2014, 15). Land was nationalized and virtually all urban housing in China was public rental housing (Yang and Chen 2014, 15). During this time, no land transactions existed and land use rights were allocated to a variety of state units; these rights were granted or distributed without term for virtually free (Yang and Chen 2014, 26). The state served as effectively “as a landlord and developer, solely responsible for housing provision, distribution and management” of public rental housing stock (Yang and Chen 2014, 15). For illustrative purposes, average rent during this period was 0.3 RMB per m² (Zhang 2000). This rent was a fixed variable, unassociated with income or economic growth (Yang and Chen 2014, 15). This individual rental expense approximate 1% of

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3 In 1949, the Nationalist Government moved into exile in Taiwan. Today, Taiwan retains the name “Republic of China” in their claim as the legitimate government of Mainland China. Chiang remained the leader of Taiwan until his death in 1975.

4 For context, on January 1, 1960, 0.3 Renminbi (RMB) was equivalent to 0.12 USD. Source: fxtop.com/currency-converter-past
an average worker’s annual income in the mid-1950s and was deducted directly by the individual’s employer from wages (Wang and Chen 1991). This nominal rent was insufficient to cover maintenance costs of urban housing stock (Yang and Chen 2014, 19). The role of construction, provision and maintenance of housing was assigned to state-owned work units and housing units (Yang and Chen 2014, 19). These work units (danwei) would be associated with employers, primarily public sector organizations or state-owned enterprises (Bjorklund 1986, 19)\(^5\). In contrast to the housing systems of the USSR and Eastern Europe, these state-owned housing units “played distinctive roles and served many economic, political and social functions” (Yang and Chen 2014, 19). These work units and other public employers received funds from the central government budget, then financed, constructed, owned and managed housing stock (Yang and Chen 2014, 19-20). Allocation of housing to workers and their families from the work unit included several factors: “occupational rank, years of working experience, number and ages of family members and the current amount of living space” (Yang and Chen 2014, 20; Kim 1987). Yang and Chen argue that this promoted a degree of inequality between and within work units, but this is not the focus of this topic.

By the 1950s and 1960s, housing began to become a substantial financial burden on the state (Yang and Chen 2014, 20). Given the extremely low rents, represented in both absolute terms per area and relative to income, this is not an unexpected phenomenon. In these two decades, the average annual state income from rents was one billion RMB and average annual state expenditures were 35 billion RMB\(^6\) (Yang and Chen 2014, 20; Cui 1991). The provision of housing was a substantial net drain on the state. Yang and Chen illustrate that this chasm

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\(^5\) For example, the local state-owned bicycle factory or steel mill would provide housing to its employees, among other community services.

\(^6\) This 35B annual expenditure was divided between 25B RMB on construction and 10B on housing stock maintenance.
between rental income and existing expenditures served as a disincentive for further investment by the state in housing, thus leading to the continuation and escalation of housing shortages. In urban China, living area per capita was 4.5 m$^2$ in the early 1950s and declined to 3.5 m$^2$ over the next 20 years (Yang and Chen 2014, 20; Liu 1998). This welfare system linking the provision of housing and employers created additional negative externalities, such as low labor mobility and targeted financial burdens on SOEs (Yang and Chen 2014, 20; World Bank 1992; Bian and Logan 1996).

In 1978, the Third Plenum of the 11th Central Committee witnessed the beginning of reform with a debate regarding reforming the role of national housing commencing (Yang and Chen 2014, 20). 1980, Deng Xiaoping, in intra-governmental debates, presented the notion of private sector involvement in housing, which led to pilot and trial reform projects being implemented in a variety of smaller cities (Yang and Chen 2014, 20-21). In these early reform attempts, rents were increased and public housing was sold, with the objective of providing “incentive for private housing consumption and to prompt public housing sales that would ensure a sufficient return on housing investments” (Yang and Chen 2014, 21). Given affordability issues of household actually being able to purchase their place of occupancy, coupled with attempting these marketization efforts in an absence of a financial market that could provide mortgages, these reform efforts mostly failed (Yang and Chen 2014, 21). In 1980 also, well before reform efforts, China’s “first private housing developer” was established in Shenzhen (Wu et al. 2012, 533).

In 1982, the preliminary stages of land reform commenced: Beijing and Shanghai witnessed the introduction of land use fees for industrial and commercial land, though residential land-use maintained the status quo (Yang and Chen 2014, 26). The concept of private usage and
rentals of land was further developed later in 1987 with the granting of land use rights in exchange for rent to foreign enterprises in Special Economic Development Zones (Yang and Chen 2014, 27; Ding 2003). Here, the important role of the urban, local government regarding land distribution emerges.

By 1986, government interest in housing reform heightened with the creation of the Housing System Reform Leading Group of the State Council; this body’s role was to “lead and coordinate the reform of the national housing system” (Yang and Chen 2014, 21). In tandem, the Land Management Bureau was created to serve a similar function for all land in the country, both rural and urban (Yang and Chen 2014, 21). 1986 witnessed the issuance of the first mortgage in China, which was funded by retail deposits (Yang and Chen 2014, 36). The beginnings of reform towards a market-system with housing as “commodity-based” began in 1988, as the State Council issued the “Implementation Plan for a Gradual Housing System Reform in Cities and Towns” (Yang and Chen 2014, 21). 1988 additionally witnessed the passing of the Land Administration Law of the PRC, which divided land use rights from ownership of land, thereby ushering in the possibility of further marketization (Yang and Chen 2014, 27). This further laid the foundation for the role of local governments in the sale of land use rights. The new phase of national housing reform was commenced in 1991 by the prior-created Housing System Reform Leading Group (Yang and Chen 2014, 21).

In 1991, a new land use system was created with two distribution methodologies: “allocation (huabo) and conveyance (churang)” (Yang and Chen 2014, 27). Allocation was the

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\text{Conveyence price} = \text{allocation price} + \text{conveyence fee}
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\text{Allocation price} = \text{expropriation} + \text{stipulated land fees}
\]

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\text{Conveyence fee} = f(\text{state and land user negotiation})
\]
status quo of the existing system, whereby land-use rights were granted at zero monetary cost to certain SOEs and non-profit users (Yang and Chen 2014, 27). The conveyance system marketed the widespread introduction of financial transactions in the transfer of use rights. Under this system, certain users, including SOEs, private companies, development corporations, as well as government agencies, could receive land from local governments at prices determined via private negotiation or auction (Yang and Chen 2014, 27).

The State Council, in 1994, ordered the creation of a “new urban housing system” that synthesized socialism and market-based mechanisms (Yang and Chen 2014, 21). The new system divided housing into two categories: “economic and affordable housing,” to be provided to low- and medium-income households at welfare-oriented prices and “commodity-housing,” to be provided to upper-income households at market-based prices (Yang and Chen 2014, 21). This decision also sought to alleviate the imbalance between rental income and government expenditures, with a clear recommendation for rents by the year 2000 to equal 15% of average household annual income of low income families (Yang and Chen 2014, 21). By the end of 1994, regulation on the two housing systems (affordable and commodity) was enacted under a government mandate “The Urban Economically Affordable Housing Construction Management Approach;” these regulations sought to lay the foundation for governing aspects of this new private housing market, such as construction and trading (Yang and Chen 2014, 21). The next year, the Housing System Reform Group, created in 1986, produced the “National Comfortable Housing Project Implementation Plan” to institute policies to supply affordable housing to certain groups (Yang and Chen 2014, 21-22)\(^8\). This affordable housing was still marketed at certain prices, in contrast to being market based, yet was determined relative to real and tangible

\(^8\) For example, the homeless and teachers were given special priority (Yang and Chen 2014, 22).
variables local incomes and the costs of construction; this was evidence of a departure from housing as a welfare good allocated by rank and years of service (Yang and Chen 2014, 22).

While a real housing market was being developed in the early 1990s, China’s housing system during this time nonetheless still featured work units, which “continued to dominate the housing provision scene” (Yang and Chen 2014, 22; Wang 2001). This period of reform could be considered as a “double-track” stage; the status quo of development and provision of housing by work units for their employees continued simultaneous to a variety of market-based reforms, such as state subsidization of purchases of public housing from current renters (Yang and Chen 2014, 22). To avoid the issues encountered during the aforementioned pilot reforms of the 1980s, such as a lack of affordability and an absence of financial markets serving as prohibitive factors for renters to purchase their homes, certain cities (and later the entire country) such as Shanghai created “public housing provident funds (PHFs)” to provide capital to would-be buyers (Yang and Chen 2014, 22).

The mid-1990s witnessed dramatic urbanization across China, with market-economy reforms driving people from rural areas to cities. This created additional housing policy issues, primarily the difficulty of housing substantial migrant populations; this also stimulated urban housing demand, thereby adding upward pressure to the later witnessed housing price issues (Chen, Guo and Yu 2011, 222). Migration resulted in several externalities, such as urban sprawl and slums (Chen, Guo and Yu 2011, 220). Additionally, reforms regarding the hukou system, which ties welfare benefits to one’s original place of residence and thereby discourages free internal migration, encouraged further migration and potentially reversed China’s prior-1990 issue of under-urbanization (Chen, Guo and Yu 2011, 221). The twinned concepts of urbanization and migration were witnessed with nationally, “the urban population increased by
over 50%” between 1996 and 2005 and as of 2009, “about one-third of the newly-built private housing units sold were purchased by migrants” (Wu et al. 2012, 534).

With 30.5% of public housing having been sold by the end of 1995, in 1998, the State Council accelerated market-based reforms, mandating that welfare housing allocation would be eliminated by the end of the year in place of “monetary distribution” (Yang and Chen 2014, 22-23, Zhang 1996). This decision under “The Resolution on Continuing Urban Housing System Reform, Accelerating Housing Development” was instituted at a scale and pace of reform in stark contrast to the gradual trials and developments over the past 20 years. As the work unit welfare distribution system was annulled, the ‘double-track’ phenomenon that had been occurring over the decade was officially terminated in full commitment to marketization.

Following the abolishment of the welfare system, mortgages were proliferated and became the main housing financing mechanism for Chinese (Yang and Chen 2014, 36). A deadline of January 1, 1999 was established for the SOEs and public work units to sell all of their housing stock on the open market; the units were thereafter prohibited from future employee housing development projects (Yang and Chen 2014, 23). The prior government efforts to encourage renters to purchase their housing from the state were accelerated at highly subsidized prices, with housing being offered to tenants at prices that amounted to direct construction cost or a state-determined “standard price” (Yang and Chen 2014, 23). This “standard price” was a function of the would-be purchaser’s income and employment tenure (Yang and Chen 2014, 23). This encouragement to purchase housing stock from the state and in the market materialized as both increasing the cost of renting via rent increases and reducing the barriers of purchasing via the creation of a “new housing finance system” to provide households with mortgages and providing Housing Funds to aid affordability (Yang and Chen 2014, 23). Nonetheless, the sale of publicly-
owned housing units still echoed welfare distribution. Additionally, citizens were encouraged to obtain housing through transactions on the newly-created market system.

As witnessed in the early granting of land use rights, reforms were based on land use rights, with the state retaining ownership (Yang and Chen 2014, 26). In the Land Administration Law of 1998, residential land use right terms were determined at 70 years; rights were granted for industrial uses at a maximum of 50 years and for commercial at 40 (Yang and Chen 2014, 26). Until 2004, virtually all land was transacted via private negotiation; Beijing allotted 98.6% of parcels via negotiation by 2004 (Yang and Chen 2014, 27, Xie 2002). This opaque sale system produced a variety of negative externalities, such as high corruption and “low allocative efficiency” (Yang and Chen 2014, 27). However, 2004 marked the Ministry of Land and Resources and Ministry of Supervision’s joint decision regarding land-transaction methodology: all state-owned land designated for sale for development purposes was required to be sold through auction (Yang and Chen 2014, 27). According to Yang and Chen, his full-marketization featuring the auction mechanism was viewed to be more “fair and transparent” than the prior private negotiations. There were three auction types authorized: “tender (zhaobiao), oral (paimai) and listing auctions (guapai)” (Yang and Chen 2014, 27). Land sales became “local governments’ most important off-budget income source” and thus the decisions of local governments have had dramatic impacts on housing prices (Wu et al. 2012, 534).

By 2002, 80% of homes in urban China were privately owned by their residents (Yang and Chen 2014, 23; Wang 2001). The development of the housing market enabled more migrants to purchase housing; additionally, migrants from rural areas without urban hukous were unable to receive welfare housing, thereby providing upward pressure on private housing (Chen, Guo and Yu 2011, 222). However, in Beijing, among one of the most coastal and developed
“provinces,” the correlation between urbanization and the rapid increased in urban commodity prices was relatively low, due to the already high urbanization rate of Beijing (Chen, Guo and Yu 2011, 229).

High housing prices in 2005 prompted regulation from the government. Housing price levels and stability of house prices were first recognized by the state as a matter of responsibility in a directive referred to as the ‘old’ “Guo Ba Tiao” (Chen and Yang 2014, 29). Later that year, a further document was issued, called the ‘new’ “Guo Ba Tiao,” in order to enforce governmental regulations in the housing market; these regulations focused on curtailing demand for housing (Chen and Yang 2014, 29). 2005 thus witnessed three main housing-market policies. First, the People’s Bank of China increased “the preferential mortgage rate from 5.31% to [equal] the benchmark long-term interest rate of 6.12%” (Chen and Yang 2014, 29). Further mortgage rate restrictions were applied: discounts provided by commercial banks to borrowers were capped at 10% of the benchmark rate and in certain geographies that particularly witnessed dramatic housing price increases, minimum down payments were increased from 20% to 30% (Chen and Yang 2014, 29). The second measure was a sales tax of 5.5% of the gross-resale price levied on home owners “who resold their houses within 2 years of occupancy” (Yang and Chen 2914, 29). Finally, in order to reduce speculative activity, individuals who purchased housing units via “pre-sale” from developers were prohibited from reselling the units (Yang and Chen 2014, 29).

A variety of supply-side regulations were initiated by the government in 2006 to attempt to further reduce prices in the Chinese housing market. The government increased the construction of affordable housing to increase market supply (Yang and Chen 2014, 29). The

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9 In Chinese administrative geography, Beijing has the status equivalent to a province, directly under the rule of the national government, and the study by Chen, Guo and Yu (2011) was conducted using provinces. Physically, Beijing is surrounded on all sides by Hebei Province, but is a distinct legal entity.
“Guo Liu Tiao” directive was passed to increase the supply of small and medium-sized, affordable houses; the regulation stated that 70% of the floor area of “newly registered or constructed projects” must consist of housing units with floor areas less than 90 m$^2$ (Yang and Chen 2014, 29). 2006 also witnessed several regulations to reduce foreign investment demand: foreign organizations and individuals could not purchase apartments for their own use without meeting stringent guidelines$^{10}$ (Yang and Chen 2014, 29). Capital gains taxes of 20% during housing transactions were also applied, with a goal of reducing transaction volume that would put upward pressure on prices (Yang and Chen 2014, 30).

China enacted numerous efforts to reduce the property market post-2008 while simultaneously increasing access to affordable housing for certain segments of society. In November 2008, title deed taxes were reduced from 3% to 1% for individuals purchasing their first housing units less than 90 m$^2$; similarly, stamp duties for individuals selling or purchasing housing units (Yang and Chen 2014, 30). Additionally, to encourage holding of property and prevent speculative transactions, the waiting period of sales without taxation was increased to five years from two years (Yang and Chen 2014, 30). Various measures to tighten land supply were initiated, although seemingly contradictory to the objective of reducing prices for affordability purposes, although a higher percentage of land was allocated for subsistence housing and small, owner-resident housing unit projects, as noted by Yang and Chen. Using housing finance to quell demand, higher deposit rates and less favorable credit terms were introduced. In 2010, the government increased required mortgage down payments to reduce

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$^{10}$ The organization had to have a branch or representative office in China and the individual must have resided in China for at least a year for work or study (Yang and Chen 2014, 29).
speculative demand, with even harsher treatment for mortgages on second and third properties\textsuperscript{11}, as well, restrictions were placed on purchases by non-local residents and locals owning two or more housing properties (Yang and Chen 2014, 30). Benchmark mortgage rates were increased from 5.31 to 5.56% in October of 2010 (Yang and Chen 2014, 3). Additionally, 40% of total construction area was mandated to be allocated for affordable and moderate-sized units; this directive was included in the performance evaluations of local governments (Yang and Chen 2014, 29). Additionally, property tax experiments were introduced in Shanghai and Chongqing (Yang and Chen 2014, 29).

In addition to affordability, the continuous government concern regarding the housing market is rooted in the stability of the Chinese financial system. Mortgages are the primary financing method of housing and are predominantly provided by commercial banks (Yang and Chen 2014, 36). Although commercial banks are legally independent in China, the banking sector is dominated by four large state-owned banks (Industrial and Commercial Bank of China, Construction Bank of China, Agricultural Bank of China, Bank of China) (Yang and Chen 2014, 37). As of 2005, these banks transitioned from wholly state-owned entities to joint-stock corporations in “equitization” processes, that now exist as commercial banks (Yang and Chen 2014, 37). Fortunately, the banking system can in theory quickly initiate government lending and stimulus targets. It is important to note that Chinese real estate lenders have “dual goals” of profit and achieving political aims, given government ownership and/or control; lenders may “choose to lose money in order to advance particular important political aims” (Fung, Jeng and Liu 2010, 73).

\textsuperscript{11} Required down payments were increased to the according levels: 30% for first home mortgages, 40% for second homes and 50% for third homes (Yang and Chen 2014, 30).
In 2011, housing prices declined from these post-stimulus levels “due to monetary tightening and macro-prudential measures put in place by the government…[however they]…bottomed out in the first quarter of 2012 and ha[d] recovered…[by April 2013]” (Société Générale 2013). In 2014, declining home prices brought concerns about economic growth to the Chinese government, resulting in:

The People’s Bank of China implemented easing policies, such as reducing the size of down-payments needed on second mortgages, and pumped liquidity into the market. It cut reserve-ratio rates so banks could lend more to homebuyers (Aviva 2016).

Figure 1 below demonstrates this increase in lending.

*Figure 1: Chinese Bank Loans (Source: WSJ)*

Additionally, in order to spur economic growth through the housing industry, 2014 witnessed the China Securities Regulatory Commission allowing developers to sell bonds (Aviva 2016).

Following this re-emergence of stimulus, prices across urban China have continued to again dramatically increase and thus the Chinese government has attempted various policies to provide price stability and affordability, mostly through efforts of reducing ‘speculation.’ From
December 2010 to May 2016, new residential housing prices increased 40% and from May 2015 to May 2016 by 19% (Nowak 2016). From August 2015 to August 2016, Beijing housing prices rose by 23.5% (CNBC Reuters 2016; National Bureau of Statistics). At the end of 2016, the wealthiest man in China, Wang Jianlin, stated that the property market was in the “biggest bubble in history” and that “the government has come up with all sorts of measures – limiting purchase or credit – but none have worked” (CNBC Reuters 2016). On September 30, 2016, Beijing’s local government increased down payments for first-time buyers from 30% to 35%; as well, purchasing a second home requires down payments of at least 50% (CNBC Reuters 2016). This has resulted in falling transaction volumes in Beijing (Da Silva 2017). First tier cities have seen a 0.1% decline in prices in November of 2016; the prior year had witnessed growth rates of between 3% and 4% (Global Insolvency). On December 29, 2016, Beijing’s mayor announced that the government will “make sure… [2017 new home price will]… not increase” and increased access to land for developers, promising a “guarantee that there will be no month-on-month increases in house prices (Zheng and Zhen 2016; Da Silva 2017). Efforts have been made to reduce access to debt for land purchasing for developers, in order to reduce purchasing power and thus the growth of land and housing prices, yet an unintended potential consequence of this policy is reduction of new housing supply (Financial Times 2017). Other tightening policies include limitations on non-Beijing residents purchasing property in the capital and an announcement of a value-added tax in property and construction industries (Fong and Wei 2016; Zhen 2016). As well, in Beijing, the government has prohibited the sale of housing advertised with forecasted rates of return (BBC 2017). Real estate fixed asset investment has fallen to represent 7.9% of China’s 2016 GDP; while perhaps comforting as an indication of less froth and a more diverse and balanced economy, a slower real estate market growth slows overall Chinese
economic growth and thus income growth – an expectation of current Chinese home buyers (Sheehan 2017). Figure 2 below summarizes this price growth.

Figure 2: Chinese New Home Prices (Source: WSJ 2016)

Simple statistics explain the rapid emergence and growth of private housing in China and provide an interesting summary of the introduction of the market. In 1986, private housing nationwide represented 13% of all annual housing created (Wu et al. 2012, 533). 1993 and 2006 respectively, private housing represented 33% and 72% of supply creation, signaling the eventual dominance of private housing creation (Wu et al. 2012, 534). Of course, this dramatic increase comes with physical space annually supplied by the private housing market, “from about 25 million m$^2$ in the mid-1980s to nearly 500 million m$^2$ in 2007” (Wu et al. 2012, 534). China has undergone a tremendous transition from housing as a welfare good to a commodity in today’s market system, coupled with a decade and a half of dramatic price growth and conflicted government objectives of achieving price stability/wealth preservation, affordability and economic growth.

Beyond the prior mentioned divided roles of the central government (ownership) and local governments (land sales), the ‘state,’ while able to efficiently direct policy and mobilize
resources, is not all-powerful. For example, ‘houses with few property rights’ (*xiao chanquan fang*) have proliferated across China. These unregulated developments often emerge on former agricultural land, as a means of absorbing excess demand, and do not provide their owners with property title or the ability to legally recognize of rental income; most important, they have been consistently declared to be illegal by the central government, yet still exist on a substantial scale (Y.C. Zhang 2008; X. Wang 2013).

**WHAT IS A BUBBLE?**

To begin, it is important to define what a bubble is and create a working formal definition. The following is an overview of important literature in an attempt to define a bubble.

Siegel (2003) elucidates several interesting definitions. Quoting Kindleberger (1978), Siegel defines a bubble as “an upward price movement over an extended range that then implodes” (Siegel 2003, 11). Contextually, Kindleberger also states that:

A bubble may be defined loosely as a sharp rise in the price of an asset or a range of assets in a continuous process, with the initial rise generating expectations of further rises and attracting new buyers – generally speculators interested in profits from trading in the asset rather than its use or earnings capacity (Kindelberger, 1978, 16; Siegel 2003, 11-12).

Siegel summarizes Kindelberger, noting that:

This definition implies that a high and growing price is unjustified (not related to ‘earnings capacity’) and is fed by ‘momentum’ investors who buy with the sole purpose of selling quickly to other investors at a higher price (Siegel 2003, 12).

This ‘justification’ is of asset prices is determined by levels of fundamentals, i.e “those economic factors such as cash flows and discount rates that together determine the price of any asset” (Siegel 2003, 12).
Siegel then references Rosser (2000):

A speculative bubble exists when the price of something does not equal its market fundamentals for some period of time for reasons other than random shocks. [Fundamental] is usually argued to be a long-run equilibrium consistent with a general equilibrium (Rosser, 2000, 107; Siegel 2003, 12).

Continuing Siegel, we can agree that:

The price of any asset is the present value of all future expected cash flows. Ultimately this means that to define a bubble there must be an implication that either (1) the expectation of the cash flows, or (2) the rate used to discount these cash flow expectations is not rational, given a ‘reasonable’ range these variables could realise at the time the expectations are made (Siegel 2003, 12).

He states that ‘reasonable’ is problematic, noting that price-to-earnings (P/E) ratios prior to the 1929 crash were “not at all unreasonable” (Siegel 2003, 12). Given the resulting Great Depression, the expectations implied by these stocks were incorrect in the short- and medium-term, but nonetheless the result from the Depression “did not necessarily make them [P/E ratios] irrational” (Siegel 2003, 12).

Siegel further emphasizes that asset prices are

[J]ustified not only by cash flows in the next few years, but cash flows in the next few decades… [C]ash flows 20 and 30 years later did in fact justify stock values in 1929 (Siegel 2003, 12).

How and when can we apply the term ‘bubble’ if we must wait for an indefinite length of time to observe long-run cash flows? Siegel introduces an “operational definition of an asset market bubble” (Siegel 2003, 13). He believes that

[O]ne must wait a sufficient period of time to see how the future plays out before anyone can identify a bubble. If, after this time period has been reached, the realised asset return is more than two standard deviations from the expected return, then one can call the asset price movement a bubble (Siegel 2003, 13).
An example outside property prices with this operational definition is presented by Siegel. He does not define the September 1929 collapse in the Dow Jones Industrial Average as a bubble (Siegel 2003, 21). The Dow “fell from 381.17 at the end of August 1929 to 41.22 in July 1932, or 89%” (Siegel 2003, 21). Nonetheless, based on subsequent decades of strong cash flows and returns, the oft-cited stock-market crash was not a bubble. In contrast, Siegel attests that the “meteoric rise and then collapse of Internet stocks from 1998 through 2001” is a bubble (Siegel 2003, 21). An index of Internet stocks that was 200 on September 30, 1998 [R]ose to 1350.6 on 10 March 2000 before plunging to 121.74 on 31 May 2002 and even lower subsequently. The nearly seven fold rise and then more than 90% fall in the index is dramatic… Over this time period, seven of the 20 stocks fell more than 99% from their peak price (Siegel 2003, 21).

Using Siegel’s consideration of long-term returns and cash flows, could Internet stocks perform at a level that would not classify their crash in 2001 as a bubble? Siegel believes this is “highly unlikely” (Siegel 2003, 23). Assuming that the stock market returned 7% annual nominally from March 2000 – March 2030, internet stocks would have to return an average of 17% annually until March 2030 to “realize the same return as the rest of the market” (Siegel 2003, 23). It is important to note that “[n]o industry or group of stocks has achieved such an excess return over such a long period” (Siegel 2003, 23). In real estate and housing, ‘cash flows’ are rent and ‘return’ can be measured as inclusive of the cash flows from rents and the realized price growth of the assets.
ANALYSIS AND SYNTHESIS OF BEIJING HOUSING PRICE LITERATURE

This section reviews, analyses and synthesizes literature regarding the concept of a housing bubble in Beijing. There are several purposes of this exercise. First, the structural nature of Beijing residential real estate market can be better understood. The structural mechanisms of demand and supply, particularly regarding the variables and concepts of monetary policy, down payment/ownership regulations, mortgage system, land policy and markets, migration and urbanization can better be analyzed. Second, the history of the market is elaborated through the use of these papers, such as price growth over time and suspected times of bubbles. Third, and perhaps most importantly, methodologies to assess risk and bubbles in Beijing’s housing market are explored. A variety of papers are presented with differing methods and results. The following papers are chronologically presented and are representative of certain distinct methodologies. Some recent and high-quality pieces of literature, such as “The Great Housing Boom of China” by Chen and Wen of the Federal Reserve Bank of St. Louis (2016) provide interesting methodologies and conclusions, but were not selected for addition due to not providing a specific analysis of the Beijing market, but rather of China overall; this would be like lumping New Mexican and New York real estate markets in one model.

Hui and Yue, in “Housing Price Bubbles in Hong Kong, Beijing and Shanghai: A Comparative Study,” investigated if there was an existence of bubbles in Beijing and Shanghai 2003. The authors period of study occurred in the early years of full-marketization. The authors used econometric methodologies in their study. In their literature review, they echo the difficulties of determining intrinsic value of an asset, via future cash flows, terminal value and discount rate, due to “the absence of data extending infinitely into the future” (Hui and Yue 2006; Peng and Hudson-Wilson, 2002; Stiglitz 1990; Flood and Hodrick 1990). Thus, they focus
on intrinsic value in relation to macroeconomic variables: “the existence of price bubbles can be implied by the relationship between real estate prices and macroeconomic variables (Hui and Yue 2006, 302). At the time of research, “little or no similar vigorous academic work ha[d] been done on housing price bubbles” for Hong Kong, Beijing and Shanghai (Hui and Yue 2006, 302).

For Beijing, Hui and Yue considered several variables. For price, they used the city’s monthly housing price index for new property (BJHPI), which began at 1,000 in November 1994 and is constructed based on sales transaction prices. The authors also considered the “stock of vacant new dwellings (VAC), which is an indicator of market equilibrium,” the disposable income of households in urban areas, the city’s local GDP and the Shanghai stock price index (Hui and Yue 2006, 303). In theory, “there should be strong positive correlations between housing prices and variables such as GDP and disposable income, strong negative correlations between housing prices and the stock of vacant new dwellings” (Hui and Yue 2006, 304). However, Hui and Yue observed “strong positive correlation between housing price and vacant new dwellings in Beijing,” which services as “circumstantial evidence of [a] housing price bubble” (Hui and Yue 2006, 304). If strong negative correlation between housing prices and income or GDP were found, this similar evidence would be found.

In order to further understand the “casual relationships between housing prices and market fundamentals,” the authors employed Granger Causalities testing (Hui and Yue 2006, 306). Their model found that housing prices in Beijing “are to an extent based on the growth of disposable income,” thus implying some rationality that fits the theoretical model to the period’s housing boom (Hui and Yue 2006, 309). Regarding the casual relationship between prices and GDP in general, they authors found them to be “ambiguous,” due to the presence of lurking and associated variables, such as “expectations of future economic growth” (Hui and Yue 2006, 309).
In the case of Beijing, the authors did not find a casual relationship (Hui and Yue 2006, 310). Regarding vacancies and the stock market (for which “the housing market could be taken as a substitute” for), they found that in Beijing, “vacant units Granger causes housing prices without a feedback” and housing prices “Granger cause the stock price index without the feedback…. [i.e.] the course of housing stock prices in Beijing… is not closely related to the movement of the stock price index” (Hui and Yue 2006, 310-311).

Hui and Yue next used Generalized Impulse Response Analysis to study the effect of shocks on the model variables; in an improvement to the prior used Granger Causality test, this methodology “may indicate whether the impacts are positive or negative, and whether such impacts are temporary or long-term” (Hui and Yue 2006, 311-312). With regards to housing prices in Beijing, their analysis determined a minimal sensitivity to the short run expectations of people, negative effects from disposable income (“[t]he only possible explanation is that housing prices [were]… not increasing quite in parallel with disposable income”) and a minimal response to GDP (Hui and Yue 2006, 312). As hypothesized, the “accumulated responses to vacant dwellings… and the stock price index are both negative” (Hui and Yue 2006, 313). They did not find a positive wealth effect from housing price booms in Beijing, but understanding the response from housing prices to vacancy, with regards to speculative activity, they found a positive response (Hui and Yue 2006; 313). They noted that all of the cities had substantially different relationships between their housing prices on the Shanghai stock index. Future studies could consider different investment avenues (e.g. WMPs, overseas, Shenzhen).

In their supply and demand analysis, the authors find that Beijing’s housing prices of 2003 were virtually equal to theoretical prices created from economic fundamentals, with the
theoretical price Beijing slightly higher than that observed (Hui and Yue 2006, 316). Thus, they state that in fact no housing bubble did exist in Beijing at the time of study.

In December 2010, an IMF Working Paper by Ahuja et al. was published entitled “Are House Prices Rising Too Fast in China?” The paper primarily studied the growth of housing prices and associated lending in 2009, i.e. in post-global financial crisis China. During this time, “[p]rice-to-rent ratios rose to new highs” and “price-income ratios also started to rise, reversing the declining trend that had been in place since the middle of the decade” (Ahuja et al. 2010, 3). The authors attempt to investigate this concern regarding prices of Chinese housing through comparison to fundamentals.

Their first methodology is to “estimate China’s long-term equilibrium property prices using panel data at city level for 35 cities” (Ahuja et al. 2010, 9). Their dynamic OLS model features the demand (“real lending interest rate, population density, and real GDP per capita”) and supply (land prices) drivers of housing prices in China, as well as “stock prices to capture the potential co-movement between equity and real estate prices” (Ahuja et al. 2010, 9). In their robustness test, they included construction costs and other drivers of demand (“e.g. the number of hotels and schools”), finding them to be statistically insignificant, but did not assess the quality and future expectations of other social amenities, such as universities and healthcare.

From their panel regression, they found that “long-term equilibrium house price trajectories” are significantly determined by “real income per capita, real mortgage interest rate, wealth levels…, past land prices and degree of urbanization/migration into the cities” (Ahuja et al. 2010, 11). These finding will help improve future regressions. Their findings from this panel regression,

12 They represented wealth levels from “the market capitalization of the Shanghai Composite stock exchange index” and urbanization/migration levels through “city-level population density” (Ahuja et al. 2010, 11).
using data from Q1 of 2000 to Q4 of 2009, suggest that Beijing housing prices post-2006 “appear[ed] to be out of line with long-term fundamentals” (Ahuja et al. 2010, 11).

Second, they compared housing market prices to “those suggested by asset pricing relationships;” in Beijing, as well as other markets, they were able to collect rent and price data from the “mass market segment” and “high-end market” at a sufficient scale (Ahuja et al. 2010, 9). The theory of their asset model, in of course “frictionless equilibrium,” assumes that an individual or family would be indifferent between renting or buying a house, due to the “‘no arbitrage’ condition that guarantees that the annual market rent is equal to the annual cost of owning a property” (Ahuja et al. 2010, 11-14).

Where:

\[
R_t = \text{Annual market rent}
\]

\[
P_t^* = \text{Benchmark house price}
\]

\[
U_t = \text{Annual total cost of home ownership expressed in terms of cost per monetary unit of house value}
\]

\[
r_t^{rf} = \text{Risk free long term interest rate}
\]

\[
w_t = \text{Property tax rate}
\]

\[
\tau_t = \text{Income tax rate}
\]

\[
r_t^m = \text{Mortgage interest rate}
\]

\[
\delta_t = \text{Maintenance costs as a fraction of home value}
\]
\[ E_t g_{t+1} = \text{Expected annual capital gains} \]

\[ \rho_{t\tau} = \text{Additional risk premium} \]

So:

\[ U_t = r_t^f + w_t - \tau_t (r_t^m + w_t) + \delta_t - E_t g_{t+1} + \rho_{t\tau} \]

They note that identifying a misalignment between housing prices and market rent and other fundamentals “is only a sufficient (and not necessary) condition for detecting a misalignment from slow-moving fundamentals in housing markets” and that “[s]erious misalignment tends to become apparent after a substantial and typically abrupt price decline” (Ahuja et al. 2010, 14). A possible issue could occur when prices and rents co-move upwards, which makes “it appear as if actual prices are consistent with the benchmark prices,” giving possibility of corrections for both (Ahuja et al. 2010, 14). Their findings observed that in the luxury segment, house prices in Beijing “were more than 10 percent away from benchmark levels in 2010H1, an indication that they may be in the early stages of excessive prices growth,” yet the authors note that tightening policies introduced in April 2010 appear to have been appropriate and had some preliminary impact by the time of publication (Ahuja et al. 2010, 17). The authors have an optimistic view of overall policy efficacy and efficiency, stating that housing price deviations from the benchmark are short-lived, both due to market reaction and policy; Beijing deviations halve within one to two quarters (Ahuja et al. 2010, 17). Credit tightening policies in 2007\textsuperscript{13} attempted to reduce house prices, and did so successfully in many other parts of China, but only reduced the pace of price growth in the Beijing market; the authors

\textsuperscript{13} Implemented policies: lending rate was increased (from 0.85 to 1.1 of the benchmark rate), down payment was increased for second homes (from 30% to 40%) (Ahuja et al. 2010, 17).
note that the “lending rate did not appear to rise by enough to effect an increase in the real long-
term lending rate” (Ahuja et al. 2010, 17-18). An interesting future study would be to track
down-payment and leverage ratios. In order to reduce the price-to-rent ratio, the authors
recommend policy of increasing the real interest rate in Beijing, because the market features
relatively low user cost/relatively high benchmark price-to-rent ratio, i.e. “the lower the user
cost, the higher sensitivity of the rent multiple to changes in interest rates” (Ahuja et al. 2010,
18). In Beijing mass market housing, the user cost is 2%, so a 1% increase in the real interest
rate would correspond to a negative 33% change in the benchmark price-to-rent (Ahuja et al.
2010, 18). This does not reflect a bubble, but rather price risk. The authors state that the level of
mortgage-to-nominal GDP growth rates of other countries (US, UK, France, Spain, Australia,
New Zealand), which began at high levels, was far higher than that of China between 2004 and
2007; however, this ratio has grown “surge[d]” between 2008 and 2009 and is important to
continue to monitor (Ahuja et al. 2010, 20). Further analysis could include developer debt and
household and developer debt from ‘shadow banks.’

In 2012, Wu, Gyourko and Deng published a highly-cited paper entitled “Evaluating
conditions in major Chinese housing markets.” The annual housing price growth in Beijing of
around 20% per year is “suggestive” of the existence of a bubble, but of course not sufficient to
understand “the riskiness of current Chinese house prices and whether there is likely any
fundamental mispricing” (Wu et al. 2012, 532). The importance of their study was
methodology; due to absence of sufficient and robust data, because “there has only been a truly
private market in land and housing units since the late 1990s,” they discarded the widely-
attempted research methodologies in the field of creating a “formal structural model of supply
and demand for housing” (Wu et al. 2012, 532). Instead, the authors sought to employ diverse
data to understand the market’s risk in three methods. First, they studied land prices in Beijing, creating “the first constant quality land price series” for a Chinese market;” as expected, price growth was phenomenal (“eight-fold increase since 2003” and “prices nearly tripled since the end of 2008 [until 2010]) (Wu et al. 2012, 532). These results importantly found that as of 2010, land represented approximately 60% of housing value and in Beijing, “prices are about 27% higher when a central government-owned SOE [state-owned enterprise] wins a land auction,” thus having a role in driving up prices (Wu et al. 2012, 532). Second, they found that the price-to-rent ratio has increased in Beijing from 26.4 in 2007 to 45.9 in 2010; the authors infer that such pricing is because “home buyers are assuming quite large capital gains on their homes” yet shy from making “a blanket claim of mispricing” (Wu et al. 2012, 533). As well, price-to-income ratio in Beijing was at a record level as of 2010 (Wu et al. 2012, 533). Third, they employed a “back-of-the-envelope calculation” comparing net new housing units created relative to net change in number of households, finding that Beijing had “experienced at least modest supply shortfalls” over the decade studied, which was some explanation for an escalation of housing prices (Wu et al. 2012, 533). They summarize these findings with the high dependence and expectation of future price growth is difficult to sustain and poses systematic risks; as well, supply and demand data can be improved by seeking clarity on “very large internal migration flows and limited data on long—run supply conditions in these markets” (Wu et al. 2012, 533).

The authors conclude noting that “[e]conomics does not have good predictive models of bubbles, and we could not provide a definitive test with our limited data, in any event” (Wu et al. 2012, 540). Continuing the difficulty of assessing mispricing with any certainly, the authors cite Shiller’s claims of “irrational exuberance in 2005, 2006 and 2008 in the American housing markets that were countered with the housing price models in 2005 of “equally prestigious
researchers” (Wu et al. 2012, 541). Due to high expectations of continuing future growth fueling high current prices, “only modest declines in expected appreciation are needed to generate large drops in house values” (Wu et al. 2012, 541). Beijing, a believed to be a housing market with supply that is more inelastic because “supply growth has not does not appear to have met demand over a period of years is more,” likely to experience the interactive cycle of high price increases and sustained “overoptimism” (Wu et al. 2012, 531; Glaeser, Gyourko and Saiz 2008; Wu et al. 2012, 541). This potential inelasticity could be modelled in future studies. The authors believe that the variety of demand-side policies that in attempting to reduce prices are ambiguous in outcome and have potential negative social welfare results; in contrast, they are in support of housing creation and resolving “the conflict of interest between central and local governments… given the local governments’ high dependency on land revenue” (Wu et al. 2012, 542).

Fang, Gu, Xiong and Zhou (2015), in “Demystifying the Chinese Housing Boom” created a price index for urban China from 2003 to 2013. The authors state that because of the relatively short existence to today of the housing market in China, “there are relatively few repeat home sales available for building Case-Shiller type repeat housing indices,” so they constructed their index of house prices from 2003 to 2013 using “sales over time of new homes within the same developments, which share characteristics and amenities” (Fang et al. 2015, 1). As the housing market in China matures, it would be valuable to construct a future index using repeat home sales.

With some degree of optimism, they qualify Chinese housing price appreciation in contrast to that witnessed in Japan and the United States for several reasons. One, 30% down payments for Chinese mortgages protect banks “from mortgage borrowers’ default risk even in the event of a sizable housing market meltdown of 30 percent… mak[ing] a U.S. style subprime
credit crisis less likely in China” (Fang et al. 2015, 2). Two, while in the Japanese (late 1980s) and American (mid-2000s) bubble cases disposable income growth was modest, the “enormous income growth rate” of households in China from 2003 to 2013 averaged 9% nationally an 6.6% in First Tier cities (Fang et al. 2015, 2). This provides a degree of safety and rationality in the market. Three, home price growth in China has not priced out access to low-income households for housing; the authors determined this by “mapping the incomes of these marginal home buyers [the bottom 10% of borrowers] into the income distribution of the urban population[s]” and found that they were in the 25th percentile in First Tier cities (Fang et al 2015, 3). However, the high home prices, coupled with high down payments that attempt to reduce speculation in the market have posed “financial burdens in buying homes” to many Chinese. (Fang et al. 2015, 3). For example, the price-to-income ratios in First Tier cities have been over 10, meaning that it takes 10 times a household’s annual disposable income to be able to afford a house; from this, a down payment between 30-40% requires three to four times an annual income and “another 45 percent of its annual income to service the mortgage loan” (interest and paying the loan) (Fang et al. 2015, 3). However, “a high expected income growth rate renders the aforementioned financial burdens temporary” (Fang et al. 2015, 3-4).

However, are such income growth expectations feasible? Regarding cross-country growth rates, “regression to the mean is the single most robust and empirically relevant fact;” the mean of 2%, with a standard deviation of 2%, suggests that continuation of China’s past economic growth beyond around two decades “would be an extraordinary event” (Fang et al. 2015, 4; Pritchett and Summers 2014). Thus, future income growth expectations may have to be reduced in the future, which would reduce price-to-income ratios and “present… an important source of
risk to the housing market” (Fang et al. 2015, 4). Figures 3 and 4 provide illustration of price growth.

*Figure 3: Housing Prices in Beijing vs. Purchasing Power (Source: Fang et al. 2015, 55)*

Note: “PI” is Fang et al. 2015’s constructed housing price index for Beijing; “per capita GRP” is per capita gross regional product (i.e. value of urban area’s output); “per capita DI (urban)” refers to per capita disposable income.

*Figure 4: Housing Prices in Beijing Relative to Broader China (Source: Fang et al. 2015, 58)*

Note: “PI” is Fang et al. 2015’s constructed housing price index for Beijing; “NBS 70-City Index” and “NBS Average Price Index” are official price time series created by China’s National Bureau of Statistics
The authors note that the growth in China’s economy since the 1980s has been coupled with high savings rates (Fang et al. 2015, 4; Yang, Zhang and Zhou 2013). This growth in income has resulted in wealth with few investment outlets; capital controls inhibit access to international capital markets, the Chinese equity markets are small (2013 market capitalization was below 20 trillion RMB) and the bond markets are “even smaller” (Fang et al. 2015, 4). Thus, bank deposit accounts, even as “real one-year deposit rate averaged only 0.01 percent in 2003-2013,” and high-priced property have materialized as the only feasible avenues for savings (Fang et al. 2015, 4-5). An interesting future study would create scenarios where housing purchases are only made for household consumption (i.e. to be immediately occupied) and in corporate real estate transactions, with household investment being channeled into more WMPs and both domestic/foreign asset managers and capital markets.

What is this interaction between housing in China and markets? During the global financial crisis of 2008 and 2009, Chinese housing prices remained strong (10% declines in First Tier cities and growth in Second and Third Tier cities), whereas domestic equities overall fell 60% in 2008 (Fang et al. 2015, 5). The authors explain this by theorizing that Chinese households believe the government would rescue the housing market at all costs, due to the observed “frequent policy interventions by the central governments” and the fact that local governments highly depend on land sales flows (Fang et al. 2015, 5).

Fang et al. 2015 “take[s] a more balanced stand” between Chow and Niu (2014), who concluded that “rapid housing price growth can be well explained by the force of demand and supply,” and the level of concern voiced by Deng et al. (2014b) (Fang et al. 2015, 5).

Wu, Gyourko and Deng (2016) in “Evaluating the Risk of Chinese Housing Markets: What We Know and What We Need to Know” studied the supply and demand constructs that
their 2012 paper did not thoroughly analyze. They identified that Beijing’s 19.8% average annual price growth between 2006 and 2016 is attributable to the growth of land prices, as opposed to construction costs; the city experienced an annual growth in land values of 27.5% between 2004 and 2016 (Wu et al. 2016, 2). This growth in land prices is indicated below in Figure 5.

Figure 5: Real Residential Land Price Constant Quality Index (Source: Wu et al. 2016, 42).

They do qualify the growth level by noting “the appreciation in China coming off a very low base” and national real compounded GDP growth of 10% annually between 2004 and 2014. (Wu et al. 2016, 14). The authors expect future supply of housing units to fall, due to a significant drop in “land sales by local governments to private residential developers” from 2013 onwards, with “transactions volumes down by half or more” (Wu et al. 2016, 2). They find that in Beijing, “growth in households demanding housing units has outpaced new construction since the turn of the century” by about 10% from 2001 to 2016 (Wu et al. 2016, 2,4). In studying the indifference between renting and buying a unit, the “implied expected appreciation rate” in Beijing as of 2014 was 7.3% (Wu et al. 2016, 24). In many of the other large Chinese cities, this expected appreciation rate – that was implied in a variety of “reasonable” scenarios – was often
below historical growth and thus reflects highly optimistic buyers (Wu et al. 2016, 24). However, given that in all “reasonable assumption” cases for Beijing, implied expected growth is lower than historical data, does this indicate low “housing market price risk” (Wu et al. 2016, 24)? In fact, the risk is extremely high. Beijing “show[s] no evidence of oversupply;” yet the risk of the market is demonstrated in price-to-rent ratios; for example, using a user cost model, Beijing’s ratio of 50 implies that “a modest one percentage point drop in expected appreciation (or increase in interest rates) would result in a drop in prices of about one-third” (Wu et al. 2016, 2). Additionally, “price-to-income ratios are extraordinarily high in China;” for perspective, while Beijing’s ratio is above 10, American domestic mortgage underwriters view a ratio over 3 “potentially problematic” (Wu et al. 2016, 25). We can view debt service relative to income being high in the country and are aware of the necessity of “future income growth… to the health of China’s housing markets” Wu et al. 2016, 25-26). Considering price risk via price-to-rent and price-to-income is an important measurement, but again, is not an indication of mispricing or a bubble. Figure 6 and 7 illustrate the price-to-rent and price-to-income ratios of Beijing.

*Figure 6: Quarterly Price-to-Rent in Beijing (Source: Wu et al. 2016, 50)*

![Figure 6: Quarterly Price-to-Rent in Beijing](image-url)
Regarding market risk, the authors conclude with emphasizing the high price risk in Beijing; due to the high price-to-rent ratios, only a small “downward shift in expectations,” “negative shock in terms of a policy intervention” or economic growth slowdown would dramatically reduce prices (Wu et al. 2016, 30). While “there appears to be substantial equity in the Chinese residential housing system,” future study could include the concept of “hidden leverage” (i.e. debt that is not observed conventionally and contributes to risk levels) in the housing market (Wu et al. 2016, 30).

One of the most recent comprehensive papers on the possibility of a real estate bubble in overall Chinese housing is by Glaeser, Huang, Ma and Shleifer (2016). Their analysis of the causes of supply and demand of Chinese housing is structured in comparison to the American housing boom and subsequent crash between 2000 and 2010. While the American housing cycle had substantial impacts on wealth and financial stability, price change figures seem far more subdued than in the Chinese case: “real prices of U.S. homes grew by 5 percent per year between
1996 and 2006, and then declined by 6.4 percent per year between 2007 and 2012” whereas in Chinese Tier 1 Cities, “real prices grew by 13.1 percent annually from 2003 to 2013” (Glaeser et al. 2016, 2; Federal Housing Finance Agency; Fang et al., 2015). Housing prices doubled in China between 2007 and 2014, although have displayed “moderation” for the past two years (Glaeser et al., 2016, 4; Chivakul et al., 2015). This provides an initial ‘smoke’ to investigate.

Glaeser et al. begin with a demand-side study to bubbles in the Chinese housing market. They note several social and cultural aspects that define home buyers in China, with markings of stability: overall home ownership of 90% and 55% for those under 35 (65% and 37% respectively in the U.S.), middle-aged demographic that is often “saving for retirement or for their children’s marriage” (67% of new home buyers in the U.S. between 2005 and 2007 were under 35) (Glaeser et al. 2016, 13; National Association of Realtors; Chamon and Prasad, 2010). A general theme of Chinese buyers of homes, whether of primary occupancy or investment/generational properties, is that they are families with high cash savings rates motivated for long-term stores of value and gain in an economy that is “difficult to invest,” as opposed to highly-leveraged, short-term speculators (Glaeser et al. 2016, 13-14). Regarding this lack of leverage, by the end of 2015, Chinese household debt-to-GDP was sub-40%; in Q1 2008, the same figure in the U.S. was 99% (Glaeser et al. 2016, 14-15).

The authors further assess whether this housing demand is “speculative” and thus is likely or not to warrant a future bubble by using the classic model of comparing current asset prices with the discounted streams of future earnings/dividends, which in housing is of course rental streams (Glaeser et al. 2016, 15; Shiller 2000). However, the authors were unable to find sufficient rental data to construct such an analysis. A future research project would be collecting rental data and using this analysis method if possible. They importantly consider valuations:
using price to income ratios, finding that in 2016, the price of a 90 m² apartment in Shanghai or Beijing is “more than 25 times average household income” (Glaeser et al., 2016, 3). Regarding prices-to-income, Chinese ratios are “quite high by global standards” (Glaeser et al. 2016, 16; Fang et al. 2015). However, Glaeser et al. qualify the implied conclusions of the figure by stating that future income growth, especially in a high growth economy, can justify current prices; this is major issue implicit with the study of bubbles and their definition in general\(^\text{14}\). The authors hypothesize that beyond the cost of housing construction and land, urban amenities\(^\text{15}\) may also be a rational motivation for demand\(^\text{16}\); nonetheless, because of uncertainty about such amenities, future income and future interest rates, price-to-rent and price-to-income ratios are not useful tools for judgment (Glaeser et al. 2016, 16).

Glaeser et al. move to consider the role of supply on housing prices. The authors emphasize the presence and danger of high vacancies in the Chinese housing market, at around 20 billion ft², defining vacancy as “both completed units unsold by developers, and purchased units that remain unoccupied” (Glaeser et al., 2016, 2). They state that “elastic supply is a better assumption than fixed supply for many Chinese cities today,” which poses an unforeseen risk to housing investors (Glaeser et al. 2016, 17). With regards to supply, construction costs are a small portion of the sales prices of Chinese homes, at below 30% in “typical” cities and 15% in “top tier cities” (Beijing, Shanghai, etc.) (Glaeser et al. 2016, 18). Taxes and high land costs bridge much of this difference, especially due to Chinese building code regarding floor-area ratios (FARs); China’s low FARs make land costs more expensive to developers and thus home

\(^{14}\) For example, Siegel (2003) believes that future returns of American equities did not classify the 1920s run-up and subsequent crash in 1929 as a bubble-burst.

\(^{15}\) Particularly in Beijing, with educational, governmental, health care and entertainment amenities.

\(^{16}\) The work on urban demand for housing by Inman (Wharton) could be applied to China and Beijing, albeit with local adjustment.
buyers, due to mandating relatively low “built floor space” to the entire land of a parcel, which results in forced “vacant land left around buildings” (Glaeser et al. 2016, 18; Cai et al. 2016).

Using this information, Glaeser et al. then attempt to predict future Chinese house prices using the following equilibrium condition:

\[
N = \text{Size of the potential urban population}
\]

\[
1 - F(Y*) = \text{Share of population with the income above the cutoff value of } Y \\
* , i.e. home owners
\]

\[
\text{Total demand for housing} = N(1 - F(Y*))
\]

\[
P* = \text{Equilibrium housing price}
\]

Assuming that the willingness to pay for housing in China will eventually equal 10 times income\(^{17}\):  

\[
P* = 10Y*
\]

\[
\text{Housing Supply} = N \times (1 - F(P* /10)
\]

In order to predict prices, the authors estimated the following variables: “future distribution of income [they assume that real urban income growth in the next 20 years will be 5% a year, half the rate of growth witnessed in the past 10 years], the growth in the potential

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\(^{17}\) “[H]igh by U.S. standards but not unusual in Europe… we assume that all individuals with local income above one tenth of the price (P) are willing to live in the location” (Glaeser et al. 2016, 19).
urban population [for First Tier cities, due to urbanization, they assume that population growth will be higher than national growth] and growth in the housing stock [current occupied housing stock plus inventories plus vacancies plus new completion of housing stock in a variety of scenarios]” (Glaeser et al. 2016, 20-21).

Housing property prices are justified by future returns. This equilibrium model suggests that in First Tier cities, a “3% annual real return is quite difficult to achieve,” as yearly real incomes must be a minimum of 6-7% (“which is very optimistic”) and “new supply close to zero” (Glaeser et al. 2016, 22). Regarding supply, if supply continues at the levels between in the past decade, “returns will be minimal or negative unless income growth turns out to be spectacular,” thus reverting housing to justified equilibrium levels. This is a clear indication of expected future falling prices, unless there is a dramatic limitation of housing supply or rise of incomes. Future studies could be conducted into acquiring more precise population, income and supply estimates, especially modelling urbanization trends and FAR regulations.

Regarding optimism of Chinese buyers, as an aside, Glaeser individually has a fascinating paper (2013) regarding the history of real estate speculation. Optimistic expectations, which can be grounded in historical performance, of buyers are “strongly associated” with rising prices. In his paper, Glaeser notes that:

[T]he high prices paid during the boom and the low prices paid during the bust are typically compatible with reasonable models of housing valuation and defensible beliefs about future price growth. The farmers in Iowa in 1910 had experienced 15 years of rising real wheat prices and 40 years of rising wheat yields. High land prices were understandable. Manhattan’s builders in 1929 could justify their land purchases based on current office rents and reasonable capitalization rates (Clark and Kingston, 1930). Distinguished real estate economists (Himmelberg, Mayer and Sinai, 2005) examined price-to-rent ratios in 2004 and argued that they seemed reasonable given plausible expectations about future price growth and current capital costs (Glaeser 2013, 3).
Glaeser et al. (2016) conclude stating that China displays many indications of a housing bubble, but due to the aforementioned reasons of limited leverage held by long-term home buyers, the backdrop of urbanization and an empowered Chinese central government with power in the banking sector and ability to quell or buy-up excess supply, a collapse is “far from certain” (Glaeser et al. 2016, 23). An interesting further study would be to analyze the fall-out that a potential price collapse of a bubble would cause, such as on employment in the construction industry and on the stability of the financial system.

CONCLUSIONS, FUTURE RESEARCH AND POLICY RECOMMENDATIONS

The methodologies of these papers vary: econometric models, assessments of ‘surface-level’ price risk via a variety of ratios, equilibrium (indifference between renting and owning), asset pricing models and supply and demand models.

Overall, we cannot conclusively state whether or not there is a bubble in Beijing housing prices. In the analyzed literature, with the exception of Hui and Yue (2006) regarding 2003 prices, not a single study definitively presented or refuted the existence of a bubble. In summary, current methodologies can detect high price levels and associated risk, but only time can tell regarding the existence of a bubble. For example, the growth of income and rents over the next decade could provide justification for current prices now. Several following commonalities drawn from the studied literature are presented as supporting this conclusion.

First, the results of different methodologies, that are highly and equally sound and rigorous, can often be at odds with each other. Reasonable changes in assumptions can result in substantially different verdicts. Moreover, the results of some methodologies require having to
‘wait and see,’ such as bubble detection using asset pricing, as it is dependent on future returns. Conclusions from even a single model can completely reverse with the emergence of several years of future data. Wu et al. (2012) noted that “economics still does not provide a well-specified test for the presence of a bubble in any asset market” (Wu et al. 2012, 532).

Second, Chinese housing and other economic data is often limited, flawed and most challenging, of such a short duration. Bias can arrive in data due to reliance on government collection and creation of indices. China has a history of data misrepresentation at varying levels of government, due to the incentive system for officials. Beijing’s housing market does not have an observable history of extensive cycles, simply due to having been fully liberalized for under 20 years. This poses the question of what is ‘normal,’ especially given that the housing market’s era of existence is directly coupled with the total transition of China’s economy. One can understand how difficult it would be to analyze New York property prices today with less than 20 years of potentially flawed data, meanwhile the United States was shifting from a centrally controlled economy to the current economy. As well, the Chinese rental and second-hand housing markets are not as developed as those in the United States.

Third, the substantial housing and land price growth in Beijing over the past 15 years is a fascinating phenomenon, but not does not prove mispricing or a bubble. Construction costs and taxes are generally not seen to be an important or meaningful driver of prices, but rather the growth of land prices and buyer expectations. As mentioned by Wu et al. (2012), as supply growth has not risen to meet demand growth in Beijing, the market is potentially more inelastic and this is an important factor behind housing and land price growth in the city. More research needs to occur on this aspect.
Fourth, while this price growth has been coupled with a growth of incomes and GDP, indicators such as price-to-income and price-to-rent are extremely high and present evidence of high price risk. It is unknown if incomes will continue to rise to justify such prices. Buyers are often highly optimistic, as they have been rewarded by over the past decade and a half with phenomenal returns; past returns have been a meaningful prediction of future returns in many of the models that were studied. With these high price levels, in user cost models, small downward adjustments in future price expectations can have very large negative effects on current prices. This poses future affordability issues as well.

Fifth, price risk that could materialize in a drop in prices has consequences for economic activity and household wealth. Falling prices would result in less incentive for new construction, which would slow economic growth, reduce land purchases that are important for urban funding and reduce construction employment. There are also systemic risks to the banking sector. However, the ‘savior’ role that the government would execute to preserve the economy, jobs and the housing and banking sectors is unclear and would be at a larger, unprecedented level from 2008-2009. Beijing households currently face large debt services on these properties. However, high equity cushions and savings rates provide some degree of assurance.

The first part of this section will seek to create a foundation for future research. These ideas are drawn from the review of these and other studies about real estate bubbles. This future research could occur as a ‘comprehensive’ study on the subject or improvements into specific areas.

Hui and Yue (2006) could be repeated with updated data and refined methodologies. Their strong econometric framework could be an addition to many of the highly-cited papers and also provides value as a stand-alone research paper. Their Granger Causality tests and
Generalized Impulse Response Analysis was highly rigorous. In addition to another almost decade and a half of data, other considerations could be featured, such as new investment alternatives for Chinese households (such as wealth management products [WMPs], the inclusion of the Shenzhen stock market and overseas real estate) and re-run the correlations and causations with new data on price, vacancy, GDP, income, interest rates, etc. The presence of a bubble both now and over the past 15 years could be studied.

Much of the reviewed literature employs adjectives such as ‘dramatic,’ ‘high,’ ‘substantial,’ etc. and presents figures that are undoubtedly large on an absolute basis regarding price growth, but with additional econometric methods, this housing price growth can be better assessed and understood in the context of determining the formation of a bubble.

Examples of new econometric bubble detection methods include those of Stöck et al. (2010). The authors review several of the existing methods of bubble identification, such as price amplitude (PA), total dispersion (TD), average bias (AB), Haessels $R^2$ ($HR^2$) and duration (DUR). They nonetheless believe that none of the measures mentioned sufficiently meet the following conditions:

(i) relate the fundamental value and price, (ii) be monotone in the difference between fundamental value and price, and (iii) be independent of the total number of periods and the absolute level of fundamental value (Stöck et al. 2010).

Thus, the Stöck et al. (2010) present two new measures that meet these three criteria in order to identify mispricing in the context of a bubble. They believe that by using the following measures, “mispricings/overvaluations can be compared across different market designs and treatments with different parameter settings” (Stöck et al. 2010). The first is Relative Absolute Deviation (RAD), “which measures the average level of mispricing” and builds on TD. RAD
overcomes TD’s “dependence on the number of periods and on the absolute level of FV by normalizing with these variables” (Stöck et al. 2010). The second is Relative Deviation (RD). This measure “is similar to RAD,” but utilizes raw price deviations as opposed to absolute price deviations (Stöck et al. 2010). RD is similar to AB, but “uses (volume-weighted) mean prices instead of median prices and divides the resulting number by $|FV_{\bar{\text{FV}}}|$ to become independent of the level of FV” (Stöck et al. 2010). They believe this is a straightforward method of identification, with RAD or RD values of 0.5 indicating an overvaluation by 50% (Stöck et al. 2010). Based on its construction, RD can result in over- and undervaluation scenarios potentially cancelling each other out (Stöck et al. 2010). This problem can generally be detected if there are substantial discrepancies between RD and RAD outputs (Stöck et al. 2010).

Glaeser et al. (2016) provided an excellent housing price equilibrium framework, which could be improved upon with acquiring more precise population, income and supply estimates, especially modelling urbanization trends and FAR regulations. Ultimately, even with correct theoretical models, imperfect inputs skew relationships and results. While projections of urbanization, population and income are not necessarily the focus of real estate economists, complementary studies by specialists creating better projections would allow for more precise pricing forecasting and ultimately better calculations of ‘justification’ of such pricing.

As mentioned in the synthesis of the body of literature, an extremely important area to research is the potential fall-out of that would occur with a sudden and substantial fall in the price of Beijing housing. This was repeatedly brought up by Wu, Gyourko and Deng, as well, Gyourko emphasized the need to study this topic in discussion with the author of this paper. The impact on employment and economic activity, the banking sector, family welfare, government stability, equity and debt markets, etc. should be studied, potentially through running scenario
analysis. Investment in housing is extremely important for the Chinese economy; for example, “[i]n 2009, gross capital formation contributed over 90% of China's GDP growth, greatly offsetting the negative impacts of the decrease in net exports that occurred during the global recession,” as well as the statistics cited in the introduction (Wu et al. 2012, 543). There is motivation and potential comparison from the American sub-prime crisis in the last decade. How is this similar and different to the American experience? What role would the Chinese government serve to preserve the economy and the housing, construction and financial sectors? What can the government do and what can they not do? Some important considerations and distinctions include that Chinese buyers have large equity levels relative to sub-prime American borrowers, but questions arise such as enforcement of required down payments and the fact that “a large enough price drop can wipe out any amount of equity” (Wu et al. 2012, 543). What possible scenarios could occur when banks and developers are partially government owned? What will be the mandated or chosen role of local governments and SOEs before and after a potential burst? What is the effect of local governments that are motivated by the sale of land use rights to fund their expenditures? Deng state that “a substantial drop in housing or land prices may increase the risk level of local government debt” (IMF 2016). While there is little in the way of clear confirmation or denial of mispricing or bubble activity by any of the highly-cited China housing economists, there is certainly vocalization of price risk. Scenario analysis of the potential fallout would be important for monetary, fiscal and stability policy in China today, as well as investment decisions by households and institutions.

Additional areas of research can include analyzing the role of shadow banking to finance both development and purchase of property in order to attempt to find hidden debt in the system, such as that of developers and property investment funds or unregulated mortgages. For
example, “[o]ff-balance sheet funding accounted for 15.7 percent of the country’s total corporate financing by the end of March [2017], up from 15 percent at the end of last year, PBOC data show” (Bloomberg 2017). Other scenarios to study include the impact of future hukou reform, currency liberalization with regard to offshore investment and privatization. As the market matures, creating a sort of Case-Shiller home price index with repeat home sales would be important; currently, most indices rely on new sale properties. With land, how will the Chinese housing market structurally change if land use right durations are extended or curtailed or land ownership becomes privatized? What will be the impact on housing prices? How likely is future land reform to happen and what are possible scenarios?

An interesting tangential topic to Beijing housing prices would be to study the price histories, valuations and market activity of related securities. For example, given concerns of slowing growth, unsustainable credit expansion and housing surplus, many international institutional investors have purchased Chinese credit-default swaps (which function as insurance contracts on debt and rise in value as the probability of default increases) or short-sold the stocks of banks and real estate developers, as well as bet on the yuan to fall (Whittall, Cui and Trivedi 2015). For example, noted short-seller Jim Chanos (who shorted Enron prior to the firm’s collapse) has been short a broad of China-related securities; additionally, via options, shorting the yuan has become a “popular trade” multi-year recent trade for American and European hedge funds (Forgione 2014; Graham 2016). Although Chinese “markets are often driven by emotions and sentiment,” valuations of securities related to housing could be studied in comparison to those of different countries prior to large housing price corrections (Whittall, Cui and Trivedi 2015).
Insights from behavioral economics could be applied to understanding how Chinese households make housing purchase decisions, as well as speculators, especially in the context of demand-side regulation. For example, many of the prior cited papers make use of equilibrium models that determine the implied levels of certain variables for household to be indifferent between renting and purchasing property. However, aside from economists, humans in general are more likely to make decisions using far more simplified or unorthodox mental models. It is important to consider the impact of emotion, culture, limited data and personal/unorthodox frameworks regarding investment and economics on making purchases. Paul Krugman, in trying to understand how the American sub-prime housing crisis was ‘missed’, referenced a lack of such behavioral analysis by economists and market participants preceding the financial crisis (NYT 2009). While not necessarily behavior economics, a consideration for demand models could include the role of urban amenities in Beijing. This makes for more effective government policy.

Further research can be constructed as comparative case studies of the housing markets in economies that experienced some of the tremendous change and transitions that China witnessed: high economic growth, creation of a new market-based economy, creation of a new housing market, high urbanization and internal migration, etc.

High housing prices pose issues of affordability and can be a component of a potential housing bubble. The aftermath of housing bubbles can have disastrous impacts on household wealth, the financial system and the broader economy. Government can thus serve a role in mitigating such issues.

Policy recommendations are a difficult and nuanced subject. Over the past year, as mentioned in the Introduction, the national and local government has been attempting to reduce
Beijing housing prices via increasing down payments, restricting certain buyers, providing affordable housing, limiting financing for developers (as a means of limiting financial leverage) and implementing prices through higher mortgage rates (Bloomberg 2017 and Introduction sources). These efforts, mostly targeting demand, are generally intended to limit overleveraged ‘speculation’ that is believed to contribute to higher prices.

Demand-side policies seem to have limited abilities to sustainably curb price increases. Further measures to reduce ‘speculation,’ such as restrictions, higher down payments and interest rates for owning multiple homes and capital gains taxes for ‘short-term’ or ‘investment’ holdings, could be implemented, but with selective caution. First, efforts by Hong Kong to reduce demand with increased taxation have been unsuccessful, with property price indices nonetheless reaching record highs (Balfour 2017). However, due to the current lack of any widescale property taxes, implementation of property taxes in Beijing and Mainland China beyond the pilots could be another avenue to curb demand and provide stable revenues to local governments that are generally independent of land prices. Second, measures that reduce access to financing and housing for primary residences, especially for middle and lower class households, must be avoided at all costs if affordability is a goal of the government. Third, the efficacy of monetary policy should be considered before implemented. Using 250 years of American real estate speculation as a case study, “[l]ow interest rates rarely seem to drive price growth” (Glaeser 2013). Liberalizations of investment opportunities for Chinese households, such as in international markets, could divert capital from purchasing housing stock and thus reduce demand. For example, the People’s Bank of China’s efforts “promote the use of the yuan overseas” could provide further investment opportunities for Chinese investors beyond domestic housing units (Xie, Chen and Lei 2017). Given that on average, SOEs pay 27% more for land in
urban auctions, more oversight needs to be provided from the central government to reduce this upward pressure (Wu et al. 2012, 532). Wu et al. 2012 also suggest that perhaps a ‘too-big-too-fail’ mentality is in place in the housing market. This is a perspective held by many who buy houses in Beijing. But is such infallibility realistic? Perhaps a large brush is being applied by believers, as while the central government does have an exceptionally high degree of central control to execute policy and mobilize resources, nonetheless, short-term and long-term incentives and willingness to co-operate vastly vary between what we consider ‘state’ entities, such as at the various levels of government and SOEs (which can all be wholly or partially owned by a variety of national, provincial, local governments and funds) (Brødsdgaard 2017). The ‘government’ is not all-powerful. Buyer education regarding price risk could be disseminated.

Regarding supply, further policy co-ordination between local governments and the central government regarding land sales and thus housing prices must occur (Wu et al. 2012, 542). National priorities, such as increasing access to supply for affordable housing, may be at odds with local priorities of maximizing revenue from land (via quantity and type of land released on the market). Further creation of housing stock and efficient urban planning, especially in seemingly highly inelastic cities such as Beijing and the surrounding region of Hebei Province, must be encouraged; this can include further welfare housing or incentives and ease of process for developers to create more units. Possibilities include the creation of “more megacities sprinkled throughout the country…to relieve the pressure on the provision of housing and other amenities in the big cities” (IMF 2016). For example, on April 1, 2017, the Chinese government announced the creation of a “economic zone” outside of Beijing, in order to move “some of the non-capital functions away from Beijing,” which could reduce demand for housing
in Beijing (Pham and Yu 2017). However, the impact of such a decision is unclear and could have side effects of drawing populations from other provinces to the greater Beijing area. The Canadian cities of Vancouver and Toronto have recently committed to the construction of affordable housing stock amid soaring local prices, as has New York City (Cardoso and Annett 2017, Bagli 2017)\textsuperscript{18}. Land should continue to be consistently supplied to create stable prices and clear market expectations. Reducing access to financing reduces the ability of developers to create more units, so lending restrictions should not be explored. An unfortunate side effect of attempting to reduce leverage of developers has been the move of developers to seek financing via shadow banking. What can be done? Government policy should seek to stop driving potential borrowers out of the accounted-for financial system, but instead encourage all borrowing to be done in the open, albeit at rates that compensate for the level of risk. This avoids the issue of unaccounted-for “hidden leverage” (Wu et al. 2016, 30). An example of such unaccounted-for liabilities include “cross-guaranteed loans,” where borrowing entities guarantee the loans of other entities, thus liable in the case of the other company’s default; companies do not include such commitments on their balance sheets (Bloomberg(b) 2017). Efforts by the People’s Bank of China to “further open up stock and bond markets” will promote transparency, as international investors will demand such disclosures (Xie, Chen and Lei 2017).

\textsuperscript{18} Vancouver’s rise in price is much attributable to demand from Chinese investors. While perhaps negligible, what is the effect of Vancouver property prices and regulation on those of Beijing? And vice versa?
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