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Do the motivations behind home sales matter? Evidence from China's housing resale market

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ABSTRACT

Understanding seller motivations provides critical insights into housing market volatility and heterogeneous policy responses. Grounded in behavioral economics and life cycle theory, this study investigates how residential sellers' financial priorities influence transaction outcomes in China's resale housing market, with particular attention to policy interventions' moderating effects. Utilizing a unique transaction dataset encompassing 310,332 listings across 17 major Chinese cities (June 2016–October 2020), we establish three key findings: First, sellers driven by speculative and investment motives command 9 % and 4 % price premiums, respectively, while liquidity-constrained sellers accept 3 % lower transaction prices in exchange for 4 % faster sales. Second, sales motivations reflect cultural norms and demonstrate significant heterogeneity across seller demographics, housing segments and city locations. Third, exogenous shocks - particularly COVID-19 market contractions and Housing Purchase Restriction (HPR) policies - asymmetrically moderated motivational impacts: Short-term speculative motivation diminished due to dampening demand and price expectations while liquidity discounts intensified by 23 %, and long-term investment motivation was less affected, revealing loss aversion's differential operation across financial priorities. This study synthesizes adaptive expectations, cultural imperatives, and institutional shocks into a unified framework, advancing behavioral housing research while informing targeted policy design - suggesting that differentiated transaction taxes and liquidity facilities could more effectively balance market stability and household welfare than blanket restrictions.

1. Introduction

As the paramount repository of household wealth and nexus of intergenerational resource allocation, housing market and its price formation mechanism and transaction efficiency have been concerned by the academists and policy makers. While macroeconomic analyses have extensively documented interest rate effects (Case & Shiller, 2003) and policy transmission channels (Du & Zhang, 2015; Li & Xu, 2016), the microfoundations of market dynamics remain underexplored. In fact, the personal motives of home sellers and buyers also significantly affect the trading results through market expectations and behavioral heterogeneity (Hong & Ryu, 2023; Yang et al., 2017). Seminal behavioral studies reveal how market participates' adaptive expectations fuel price bubbles (Shiller, 2014) and how heterogeneous experiences distort listing decisions (Kuchler & Zafar, 2019). He & Xia (2020) based on behavioral economics theory, constructed a dynamic stochastic general equilibrium (DSGE) model to study the impact of heterogeneous purchase behaviors of fundamental investors and speculative investors on house price fluctuation, yet critical gaps persist in three dimensions: (1) the taxonomy of sales motivations distinguishing speculative urgency from liquidity compulsions, (2) the moderating role of seller demographics in motive formation, and (3) the micro-mechanisms through which regulatory shocks reconfigure behavioral priorities. Addressing these gaps is one of the keys to reveal the fluctuations in the housing market from seller-side and understand policy effects.

Following post-1998 privatization, China's urban housing market has experienced rapid development, and housing assets became the dominant investment vehicle to Chinese households (Sun et al., 2025). Housing price appreciation generates real estate investment opportunities with high returns (Zhao et al., 2016). The higher expected capital gains drive higher investment demand in housing market (Cao et al., 2018). In addition, China's real estate market is characterized by two

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unique features. One is that it is subject to stringent regulatory interventions. For example, The Home Purchase Restriction (HPR) policy was first proposed in 2010 and has since gradually expanded from Beijing to other major cities in China, limiting property acquisitions based on hukou (household registration) and prior ownership. Specifically, the HPR policy imposes restrictive requirements on the maximum number of homes purchased by local residents, and certain number of years of social security or tax payment certificate for non-local residents to purchase a house, directly reducing speculative opportunities by strengthening housing liquidity restrictions (Wang, Feng, et al., 2024). The other uniqueness is that it is shaped by sociocultural norms where homeownership is seen as a cornerstone of family stability (Wang & Qiu, 2024). Purchasing a house in China has become a prerequisite for marriage (Li & Wu, 2014). In the context of China, the promotion effect of homeownership on marriage formation is enormous - an increase of 66.02 % of the marriage rate relative to the average (Hu & Wang, 2020). Homeownership also symbolizes social status and reflects the political values embedded in urban China (Chen, Hardin, & Hu, 2020). The complexity of institutional and cultural background determines the diversity of transaction motives of micro subjects in China's residential market, which also provides a test field for the study of heterogeneous home selling motives.

Our study advances the literature through three conceptual innovations. Fundamentally, the dual nature of housing determines both home buyers and sellers are motivated by housing consumption and investment purposes (Deng et al., 2022). However, previous studies have not provided a detailed classification of the motivations for selling houses. Combining the attributes of housing, we establish a tripartite motivational taxonomy - speculative, investment and liquidity motives, and identify reasonable proxies for each of them to analyze their impact on housing transaction outcomes. The second innovation of this paper is that we endeavor to analyze the mechanism underlying housing sales motives. From the perspective of behavioral economics and psychology, individual behavioral motivation is closely related to individual heterogeneity and environmental differences. Based on the unique context of Chinese housing market, we primarily discuss the impact of individual characteristics, housing market segments, and city locations on the intensity of different sales motivations. By applying microdata, this paper documents new evidence about the sources of heterogeneous sales motivations among private housing owners for the literature. The third innovation of this study is that we also directly engage with the burgeoning literature on the impact of government intervention or housing policies on the behavior of market participants (Han et al., 2022; Lan et al., 2023; Ren & Liu, 2021). We provide a preliminary analysis of the impact of the Home Purchase Restriction (HPR) policy on home sellers' sale motives during the sample period. Through analyzing individual homeowners' responses to government intervention, this paper contributes empirical evidence of bounded rationality and further enhances our understanding of the micro-supply level reasons for the success or failure of housing interventions.

Methodologically, we employ a spatio-temporal autoregressive (STAR) model and a series of robustness checks to parse 310,332 resale transactions across 17 Chinese cities (2016–2020), and establish three principal findings. First, liquidity-constrained sellers transact at lower prices in a shorter period of time, while sellers with stronger speculative and investment motives have higher sales prices and premium rates. In particular, speculative sales can cause larger fluctuations in market prices. Second, motivation prevalence demonstrates significant heterogeneity across seller demographics, housing segments and city locations. Third, the implementation of the HPR policy has weakened the speculative and investment motives of the home seller, but strengthened the liquidity motive. In the market downturn, sellers with investment motives have more stable trading results, while liquidity discounts intensified. This suggests that identifying home sales motivations is pivotal to comprehending the housing market, both at the level of individual transaction outcomes and the operation of housing policies.

The subsequent sections proceed as follows: Section 2 presents a review of relevant literature, while Section 3 synthesizes behavioral housing theories with Chinese market particularities and proposes research hypotheses. Section 4 presents the empirical strategy. Section 5 presents the empirical results, followed by discussion in Section 6, and Section 7 concludes the study with policy implications.

2. Literature review

The study of transactional motivation occupies a critical nexus between behavioral finance and market microstructure theory, yet remains underdeveloped in housing economics due to persistent measurement challenges. Early research on seller behavior predominantly focused on financial calculus, treating housing transactions as rational responses to price signals. Seminal work by Glower et al. (1998) established that seller urgency - proxied by relocation timelines - reduced time-on-market (TOM) by 15–25 % but neglected motive heterogeneity. Subsequent studies differentiated investment motives (long-term wealth accumulation) from speculative motives (short-term arbitrage), revealing their asymmetric impacts: speculative sellers amplified price volatility through herding behavior (Shiller, 2014), while investment sellers stabilized markets during downturns by withholding supply (Case & Shiller, 2003). While financial markets research has pioneered motive classification frameworks - distinguishing valuation-driven from liquidity-constrained traders through experimental designs (Caginalp & Ilieva, 2008) and institutional account analysis (Alexander et al., 2007) - housing markets present unique complexities. The dual consumption-investment nature of residential property, coupled with infrequent transactions and opaque pricing mechanisms, necessitates specialized analytical frameworks that existing marketing-oriented sales motivation studies (Khusainova et al., 2018; Bullemore & Cristobal, 2018) fail to provide.

Emerging work in housing economics reveals three persistent knowledge gaps. First, the buyer-centric bias dominates current motivation research. Investigations into rental-purchase transitions (Du et al., 2017) and multi-property acquisitions (Huang et al., 2020) predominantly analyze demand-side drivers, neglecting how sellers' financial priorities shape supply dynamics. He & Xia (2020) more specifically divided housing demanders into speculators and fundamental investors, and explored how fundamental and speculative investments affect housing prices and economic fluctuations in a market with heterogeneous traders, though it also focuses on purchase decisions. Second, existing seller motivation typologies remain oversimplified. Seminal works by Springer (1996) and Glower et al. (1998) established binary classifications ("urgent" vs. "discretionary" sellers), failing to capture the investment-speculation continuum critical in modern housing markets. Third, behavioral mechanisms linking motives to outcomes are underspecified. With the recent popularity of behavioral economics theory in the field of real estate, more and more studies have begun to explain transaction results from the perspective of the psychological factors of market participants, which provide insights for us to observe the influence of sellers' sales motives on transaction results. For example, in the housing market cycle, the seller's loss aversion may lead to "reluctance to sell", resulting in an increase in the initial listing price and a decrease in transaction volume (Bracke & Tenreyro, 2021; Andersen et al., 2022). However, none of the above studies inadequately address how loss aversion differentially affects speculative holdouts versus liquidity fire sales. There remains a dearth of theoretical and empirical explanation regarding the impact mechanism of different sales motives on transaction behaviors and results.

Recent theoretical advancements highlight the urgency of addressing these gaps and provide us with important inspiration. Cheng et al. (2020) provides a theoretical framework to examine how the differences in seller motivation can potentially affect the distribution of home prices. Due to the lack of data on heterogeneous seller constraints, they did not directly empirically test the impact of different motivations of

sellers, but provide us with an enlightening perspective; that is, home sellers are likely to set different selling objectives based on their personal situations, and will end up receiving different transaction outcomes. Parallel empirical work by Deng et al. (2022) on Beijing's market pioneered motive classification by distinguishing between consumer sellers and investor sellers, and discovered that consumer sellers can achieve the price premiums without longer time on market due to their strategy of searching more intensively. They provide us with evidence of heterogeneous sellers in Chinese housing market, but only using "whether to sell the current sole property to finance the purchase of the next home" as a criterion to distinguish the two motivations is not accurate enough. In fact, many home sellers (unlike real investor sellers) sell houses to obtain sufficient liquidity in the short term, but not to purchase new homes. More importantly, they overlooked the impact of cultural drivers and policy interventions on transaction motivation. In Western contexts, liquidity motives were primarily linked to financial distress (Gryglewicz, 2011). By contrast, in some eastern countries like China, housing market reveals culturally-embedded liquidity pressures: most homeowners resisted divesting properties unless compelled by marital dissolution or intergenerational obligations (Li & Wu, 2014; Hu & Wang, 2019; Chen et al., 2020). This reflects social norms where housing symbolizes familial stability, making liquidation a "last resort". Housing policies such as Home Purchase Restrictions (HPR) in China, also create institutional dynamics absent in Western markets, influencing market participants' trading motivations and behaviors by facilitating lower housing market (Chang et al., 2024; Sun et al., 2021). This study addresses these gaps by offering a clearer classification of home sales motivations and examining how they interact with China's housing market institutions and individual demographic factors. These aspects also represent the study's contributions to the existing literature.

3. Background and theoretical predictions

3.1. Speculative and investment motives: fueling price cycles

China's housing market has undergone rapid transformation since the late 1990s, transitioning from a welfare-oriented allocation system to a market-driven economy (Chen & Wen, 2017; Zhang et al., 2016). According to data from the National Bureau of Statistics of China, between 1998 and 2022, average urban housing prices in China surged by over 460 %, with the average growth by 7 % annually. The wealth of the residential sector is closely linked to housing, and owner-occupied housing has become the main wealth carrier for most Chinese households (Li & Fan, 2020; Wang et al., 2020). Compared to the long-term sluggish stock market, housing investment seems to be a favorable investment channel with higher expected returns (Kong et al., 2021). Therefore, there is reason to believe that investment motive is one of the main motivations for housing market transaction entities. ***Investment motive*** is driven by long-term wealth preservation, particularly among middle-aged homeowners who view property as a hedge against inflation (Yannis & Stuart, 1994). In general, investment-oriented sellers exhibit lifecycle-consistent wealth preservation strategies. The investment motive of homeowners is manifested as cashing out capital gains by selling their homes (Deng et al., 2022). These sellers prioritize rental yields or future appreciation, often delaying sales unless market conditions align with profit targets (Bracke & Tenreyro, 2021), reflecting a loss averse mentality in housing sales (Andersen et al., 2022). According to the anchoring effect in behavioral economics, market players tend to fix their beliefs about the value of assets at a reference point (Beggs & Graddy, 2009), therefore, sellers usually refer to the prices of past purchases for pricing. The anchoring effect may be more pronounced for sellers with investment motives, as they are not willing to see a loss from the sale (Glaeser & Nathanson, 2017).

At the same time, the soaring housing prices in China also fostered speculative activities (Yang et al., 2017). Unlike investments, speculation often stems from the potential for financial benefit through short-term real estate resale (Lan et al., 2023). ***Speculative motives***, drawing on behavioral economics, arise from adaptive expectations. Sellers extrapolate past price trends into the future, leading to herd behavior (Shiller, 2014). The housing price escalation reflects not only urbanization-driven demand but also speculative behavior, where buyers and sellers anticipate perpetual capital gains. The buyer-side research in housing market has already showed that investors can drive up housing prices (Gao et al., 2020), while speculators play a significant role in pushing up housing prices and creating housing bubbles (Huang et al., 2024). According to the herd effect in behavioral economics (Hui et al., 2017), especially in markets where house prices are inherently high, the motivations for investment and speculation should be more pronounced, creating a spiral of house prices. Both investment buyers and speculative buyers will eventually turn to sellers, as excess capital gains can only be realized through the sale of housing assets. Therefore, this study proposes.

Hypothesis 1. Home sellers with investment or speculative motives achieve higher transaction prices and premiums. Investment and speculative motives are stronger in cities and segments with higher house prices.

3.2. Liquidity motives: cultural imperatives and lifecycle shocks

In addition to the soaring housing prices over the past few decades, what makes China's real estate market unique also includes the importance of housing to Chinese culture and family. Chinese traditional culture has the ideological power to promote the purchase of houses (Huang et al., 2020). Housing not only provides a place for family communication and emotional attachment, but also improves the quality of life of all family members (Wang & Qiu, 2024). Homeownership plays an important role in determining overall happiness and most Chinses households perceive property as a "necessity" (Zhang et al., 2018), leading to a reluctance to sell unless compelled by urgent liquidity needs. Lifecycle shocks, such as raising offspring, divorce, medical emergencies, or unemployment, force households to liquidate properties quickly (Fischer & Khorunzhina, 2019; Wei & Zhang, 2011; Zhang et al., 2021). This ***liquidity demand*** is generally urgent and largely attributable to the response to the sudden risk of asset reallocation as well as advance preparation for life in the future. For example, to fulfill daily or sudden liquidity needs, divorced individuals may choose to sell their original housing assets and acquire or lease dwellings of lower value as alternatives (Mikolai et al., 2019). Therefore, this study proposes.

Hypothesis 2. Home sellers with liquidity motives achieve lower transaction prices and shorter time-on-market (TOM). This effect is magnified among older or divorced individuals.

3.3. Policy disruption: the role of Home Purchase Restrictions (HPR)

China's housing market is also a "policy-driven arena", where regulatory interventions often reshape the behavior of market participants. The HPR policies, which restricted property purchases based on residency (hukou) and ownership quotas, suppressed speculative demand but inadvertently heightened liquidity pressures. A recent study revealed that a sudden decrease in future resale opportunities, triggered by China's two-stage resale restriction policy in the secondary housing market, directly reduces speculative activity and causes transaction prices and volume to fall significantly (Lan et al., 2023). To complement the research on housing market stakeholders' perceptions and responses to housing policies, Ren & Liu (2021) developed a cognitive-behavioral model and found that market participants' perception of housing intervention policy would engender lower housing price expectations, which in turn leads to the deferral of housing purchase or sale of self-owned properties. Other studies have shown that purchase restrictions can distort homebuyers' behavior, such as significantly

increasing the propensity for strategic divorce, distorting the household's job choices, and shifting speculative demand from HPR cities to non-restricted nearby towns (Alm et al., 2022; Sun et al., 2021). It is evident that market participants will interpret and respond to exogenous events such as government intervention in the housing market, thereby altering transaction motivations and decisions and ultimately affecting economic outcomes. The view of prospect theory, that is, loss aversion overrides profit motivation (Kahneman & Tversky, 1979), provides a reference for analyzing home sellers' motivations. In the context of purchase restriction, on the one hand, liquidity-motivated sellers will accelerate transactions and accept larger discounts to avoid further losses due to declining demand; On the other hand, HPR intensifies loss aversion among investment-motivated sellers. Sellers who would otherwise have short-term speculative motives may also be inclined to sell their homes early for a definite capital gain due to fears of falling demand and prices or in anticipation of stricter regulations in the future (Li et al., 2020). This also reflects the dynamic interaction that policy may drive sellers' motivations. Therefore, we can make the following assumptions about home sellers' sales motives in the face of housing policies.

Hypothesis 3. HPR policies affect housing transaction outcomes by weakening home sellers' speculative and investment incentives while amplifying liquidity incentives.

4. Methodology

4.1. Data source and variable setting

This research leverages the unique second-hand housing transaction datasets spanning 17 cities in China from June 2016 to October 2020. The sample cities come from three different geographical regions in China and are regionally representative in terms of socio-economic and housing market development levels[2] (the sample size for each city is shown in **Appendix Table A-1**). The data originates from the Real Data Center of the BEIKE Research Institute, which is affiliated with Lianjia brokerage firm, one of the largest real estate brokers in China. The datasets are enriched with housing transaction information, home sellers' attributes, and housing characteristics. The original databases encompass 455,646 transaction samples, from which we have obtained 310,332 samples by removing observations with missing information. The housing transaction information entails housing listing price, sale price, time on the market, and payment patterns of housing transactions. The home seller's characteristics encompass marital status, gender, and age. The housing attributes refer to the number of rooms, home age, home size, decoration status, housing types, floors, and whether the property is proximate to a subway or a school district.

Drawing upon research in finance and behavioral economics, price growth trends in the past can forecast future returns on housing sales (Kuchler & Zafar, 2019). Expectation affects housing price volatility, but adaptive expectation exerts a more pronounced impact on housing prices than rational expectation, which leads to speculation (Kuang, 2010; Burnside et al., 2016; Glaeser & Nathanson, 2017; Shiller, 2014). Therefore, this paper employs the relatively long-term house price growth trend to measure the investment motive of sellers, and the short-term house price fluctuation trend to measure the speculative motive. Specifically, we use the past three-year and three-month moving average growth rates of residential prices as proxies for home seller's ***investment motive*** and ***speculative motive***, respectively. The growth rates of residential sale prices are sourced from the Macroeconomic and Real Estate Database of the National Information Center.

Table 1 displays the summary statistics of the majority of variables (the definitions of variables are provided in **Appendix Table A-2**). The logarithms of average housing resale prices are 10.7 for the full sample, and the logarithms of average listing time on market (TOM) are 3.7. 86.8 % of the full sample are sold at a discount with an average discount of 7.2 %, and the average premium rate of the premium samples is 5.2 %. Full payment for the purchase of a home could engender transaction cost savings for the home seller (for instance, saving time and expenses incurred in the mortgage application process). In other words, if liquidity motives are more robust, home sellers are more inclined to demand cash payments from home buyers (He et al., 2017; Qu et al., 2021). Hence, we gauge the ***liquidity motives*** of home sellers by the prevalence of full payment from home buyers. Table 1 reports that 20 % of the total sample is paid in full. In order to exclude the impact of financing costs on the buyer's payment method preference and thus interfere with the test of the liquidity motive, the loan interest rate of more than 5 years is incorporated into the model. The interest rates are sourced from The People's Bank of China.

4.2. Identification strategy

To testify the hypotheses presented in Section 3, we basically build a housing hedonic model:

$$Y_{i,s,t} = \alpha + \beta_1 Specul_{i,t} + \beta_2 Invest_{i,t} + \beta_3 Liquid_{i,t} + \gamma Control_{i,t} + \delta_s + \mu_t + \varepsilon_{i,s,t} \quad (1)$$

Where $Y_{i,s,t}$ represents a housing transaction results vector of property i

Table 1
The summary statistics of variables.

Variables	Observation	Mean	St. Err.	Min	Max
lnP	310,332	10.746	0.634	8.104	13.187
lnTOM	310,332	3.701	1.426	0.000	7.497
discount (for discount sample)	269,368	0.072	6.307	0.000	0.940
premium (for premium sample)	40,964	0.052	7.692	0.000	0.979
Specul	310,332	0.482	1.031	−0.933	3.733
Invest	310,332	16.008	5.565	−0.586	27.351
Liquid	310,332	0.202	0.401	0	1
room	310,332	2.094	0.794	1	5
room_age	310,332	17.619	9.295	3	35
lnarea	310,332	4.311	0.392	2.708	6.739
seller_age	310,332	37.464	8.262	21	55
female	310,332	0.465	0.499	0	1
div_wid	310,332	0.124	0.330	0	1
school	310,332	0.459	0.498	0	1
subway	310,332	0.627	0.484	0	1
dec	310,332	0.950	0.218	0	1
vil	310,332	0.015	0.120	0	1
high	310,332	0.730	0.444	0	1
mr	310,332	4.874	0.069	4.650	4.900

Note: The dependent variables are *lnP*, *lnTOM*, *discount* and *premium*. *Specul* denotes the speculative motive of the home seller, measured by the growth rate of house prices over the past three months; *Invest* denotes the investment motive of the home seller, measured by the growth rate of house prices over the past three years; *Liquid* denotes the liquidity motive of the home seller, measured by the dummy variable of whether the buyer purchases the house in full payment. According to the relation between the transaction price and the listing price, we divide the sample into the discount group and the premium group, and calculate the discount rate of each sample for the discount group and the premium rate for each sample for the premium group, so as to avoid the interference of the systematic differences between the two groups on the regression results. Based on the Hedonic model, housing attributes and seller characteristics are taken as control variables.

[2] Based on the standards of the National Bureau of Statistics, the sample covers 10 eastern, 4 central, and 3 western cities. Based on the Communiqué of the Seventh National Population Census in 2020, the sample includes 6 cities with a population of more than 10 million, 10 cities with a population of 5 million to 10 million, and 1 city with a population of less than 5 million. Stratified sampling ensured proportional economic representation.

in city s at time t, including the housing resale prices, TOM, discount rates (for discount sample) and premium rates (for premium sample). $Specul_{i,t}$, $Invest_{i,t}$ and $Liquid_{i,t}$ stand for the speculative, investment and liquidity motives of the home seller to sell the property i. $Control_{i,t}$ is the vector of the housing attributes and home seller characteristics when property i is transacted at time t. We focus on β_1, β_2 and β_3, which reflect the influence of the sales motivations on the housing transaction results. δ_s and μ_t are vectors of city-fixed effects and time-fixed effects, respectively. $\varepsilon_{i,s,t}$ is the error term.

We further add the interaction terms between the HPR policy dummy and the home sales motivations in the model to test the impact of policy impact on the behaviors of home sellers:

$$Y_{i,s,t} = \alpha + \beta_1 Specul_{i,t} + \beta_2 Invest_{i,t} + \beta_3 Liquid_{i,t} + \beta_4 HPR_{i,s,t} + \varphi_1 Specul_{i,t} \times HPR_{i,s,t} + \varphi_2 Invest_{i,t} \times HPR_{i,s,t} + \varphi_3 Liquid_{i,t} \times HPR_{i,s,t} + \gamma Control_{i,t} + \delta_s + \mu_t + \varepsilon_{i,s,t} \quad (2)$$

in which $HPR_{i,s,t}$ is the binary dummy that equals 1 if property i is sold in the city s where HPR policy has been implemented at time t. $Specul_{i,t} \times HPR_{i,s,t}$, $Invest_{i,t} \times HPR_{i,s,t}$ and $Liquid_{i,t} \times HPR_{i,s,t}$ are interaction terms between the HPR policy and home seller's speculative, investment and liquidity motives, respectively. We focus on coefficients of φ_1, φ_2 and φ_3, which captures the influence of the policy on home seller's sales motives.

Since the price decisions of individual home owners may be influenced by the pricing information of previous transactions adjacent to the property, the error terms of the traditional hedonic model could involve correlation from the spatio-temporal dimension. Drawing on existing research on micro-transactions in the housing market (Liu & van der Vlist, 2019; Qu & Huang, 2024), we adopt spatio-temporal autoregressive model (STAR) as an alternative to the standard hedonic model to provide more precise results. The error term in Model (1) undergoes an autoregressive error process to elucidate correlated errors as:

$$\varepsilon = W\varepsilon + \epsilon \quad (3)$$

where W represents the $(n \times n)$ vector of the spatial weighting matrix with temporal dimension to retain previously sold properties as the possible neighbors to the target property. ϵ is the white noise. Integrating Model (3) into Model (1), the housing transaction outcome can be specified as:

$$Y = WY + (\beta - W\beta)X + \epsilon \quad (4)$$

In which Y is $(n \times k)$ vector composed by k influencing factors with β as its corresponding coefficient vector. The optimal number of neighbors can be identified by calculating and ranking Euclidean distance between every pair of the target property and previous transactions using MATLAB, based on Pace et al. (2000).

5. Empirical results

5.1. Main results

We commence with the impact of sales motivation on transaction outcomes. As discussed previously, we primarily focus on the growth rates of past housing prices, as proxies for speculative and investment motives of the home seller, and the full payment by the buyer, as an indicator of the liquidity motive of the seller. Adhering to the empirical strategy in Section 4, for each specification, we include spatial temporal lags, control variables and fixed effects of time trend and city.

The STAR model results are enumerated in Table 2. All three motivations for home sellers have a significant impact on transaction prices, discounts, and premiums. Speculative and investment motives have a positive impact on housing resale prices and premiums, aligning with prior studies from the perspective of the home buyers (He & Xia, 2020).

Table 2
The results of sales motives and housing transactions.

Dependent variable	(1) *lnP*	(2) *lnTOM*	(3) *discount*	(4) *premium*
Specul	0.092***	−0.054	−0.087***	0.086***
	(0.008)	(0.062)	(0.033)	(0.031)
Invest	0.023***	−0.002	−0.038**	0.042**
	(0.001)	(0.005)	(0.018)	(0.019)
Liquid	−0.026***	−0.036***	0.007**	−0.002**
	(0.001)	(0.006)	(0.003)	(0.001)
Intercept	10.049***	−1.995	−23.329**	−2.009
	(0.143)	(2.231)	(10.255)	(3.887)
N	310,332	310,332	269,368	40,964
R^2	0.929	0.234	0.267	0.021
ρ	YES	YES	YES	YES
Control variables	YES	YES	YES	YES
City FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES

Note: The robust standard errors are clustered on the community in the parentheses. *, **, *** denote 10 %, 5 % and 1 % statistical significance, respectively. ρ refers to the spatio-temporal lags, which are obtained within each city. All the models include control variables for home seller characteristics and housing attributes. The fixed effects of time trend and city are controlled.

More specifically, according to columns (3) and (4), for every 1 percentage point in the growth rate of house prices over the preceding three months, the premium rate increases by 8.6 percentage points and the discount rate declines by 8.7 percentage points. The coefficient corresponding to the investment motive also indicates a similar pattern, but the degree of influence is weaker. This result reveals that both the seller's speculative motive based on short-term market sentiment and the investment motive based on medium and long-term market expectations will bring prosperity to the housing market, but there are more irrational factors in the speculative motive, which will lead to greater volatility in the market, which is consistent with our Hypothesis 1. Conversely, full payment is negatively associated with housing resale prices, time-on-market of home sellers and premium rate, but positively correlated with price discounts, which corroborates the liquidity motive of home sellers. Specifically, after controlling for mortgage costs, full payment will reduce transaction prices by 2.6 %, shorten time to market by 3.6 %, amplify seller's discount rates by 0.7 percentage points, and reduce premium rates by 0.2 percentage points compared to buyer loans to purchase a home. This capital gain forfeiture represents a sacrifice made by the home seller in order to obtain liquidity in the short term, which verifies our Hypothesis 2. The above results reveal salient differences between the three sales motivations in housing transactions.

5.2. Robustness checks

In order to improve the accuracy of the preliminary results, robustness checks are conducted in this paper. First, we adjust the width of the time window for house price growth to remeasure speculative and investment motives. The sensitivity analysis in Table 3 shows that the closer the time distance, the more pronounced the impact of speculative motive on the outcomes of housing transactions. Short-term price growth in the housing market will strengthen the speculative motive for home sellers, which in turn will push the expectation of house price growth into reality. Among sellers driven by investment motives, the past five years' house price growth has a strong, yet fading, positive effect on transaction prices and premiums. This suggests that the market information which effectively guides their transactions is confined to a relatively recent period.

Table 4 shows the results of our robustness test of the liquidity motive. We select two alternative metrics for home sellers' liquidity motive. First, by extracting the listing text of each property, the sample with the word "urgent sale", which directly reflects the urgency of the seller to sell, is screened out as a representative of high liquidity motive. However, in reality, it is possible that sellers want to retain some

Table 3
Change time window widths for speculative and investment motives.

Dependent variable	*lnP*	*lnTOM*	*discount*	*premium*
a. *Specul*$_{1m}$	0.136***	−0.124	−0.187***	0.121***
	(0.028)	(0.077)	(0.056)	(0.039)
b. *Specul*$_{2m}$	0.117***	−0.108*	−0.121***	0.099***
	(0.015)	(0.060)	(0.036)	(0.035)
c. *Specul*$_{4m}$	0.090***	−0.057	−0.076**	0.087***
	(0.010)	(0.061)	(0.036)	(0.031)
d. *Specul*$_{5m}$	0.075***	−0.051	−0.066**	0.065
	(0.007)	(0.060)	(0.031)	(0.046)
e. *Specul*$_{6m}$	0.063***	−0.043	−0.067	0.078*
	(0.007)	(0.075)	(0.045)	(0.041)
a. *Invest*$_{1y}$	0.035***	−0.021	−0.046*	0.052*
	(0.006)	(0.016)	(0.025)	(0.029)
b. *Invest*$_{2y}$	0.031***	−0.004	−0.047**	0.048**
	(0.002)	(0.005)	(0.020)	(0.021)
c. *Invest*$_{4y}$	0.021***	−0.002	−0.037**	0.039**
	(0.002)	(0.005)	(0.017)	(0.020)
d. *Invest*$_{5y}$	0.016***	0.007	−0.028*	0.030
	(0.003)	(0.005)	(0.015)	(0.021)
e. *Invest*$_{6y}$	0.009	0.010	0.015	0.022
	(0.007)	(0.008)	(0.018)	(0.025)

Note: The robust standard errors are clustered on the community in the parentheses. *, **, *** denote 10 %, 5 % and 1 % statistical significance, respectively. *Specul*$_{1m}$, *Specul*$_{2m}$, *Specul*$_{4m}$, *Specul*$_{5m}$, *Specul*$_{6m}$ denote the speculative motive measured by the average house price growth rate over the past 1, 2, 4, 5 and 6 months, respectively. *Invest*$_{1m}$, *Invest*$_{2m}$, *Invest*$_{4m}$, *Invest*$_{5m}$, *Invest*$_{6m}$ denote the investment motive measured by the average house price growth rate over the past 1, 2, 4, 5 and 6 years, respectively. The results of each row represent the regression coefficients corresponding to speculative motive and investment motive in different transaction outcomes models. For example, the results of the row a. *Specul*$_{1m}$ represent the coefficients of speculative motive, as measured by the growth rate of house prices over the past month, in the models of *lnP*, *lnTOM*, *discount* and *premium*, respectively. All the models include control variables, spatio-temporal lags and the fixed effects of time trend and city.

Table 4
Alternative indicators for liquidity motive.

Dependent variable	*lnP*	*lnTOM*	*discount*	*premium*
a. *Liquid*$_{urgent\ sale}$	−0.067***	−0.101***	0.051***	−0.037*
	(0.015)	(0.036)	(0.012)	(0.021)
b. *Liquid* $_{price\ adjust}$	−0.035***	−0.044*	0.023*	0.012
	(0.011)	(0.025)	(0.013)	(0.009)

Note: The robust standard errors are clustered on the community in the parentheses. *, **, *** denote 10 %, 5 % and 1 % statistical significance, respectively. *Liquid*$_{urgent\ sale}$ and *Liquid*$_{price\ adjust}$ are the alternative indicators of the liquidity motive. *Liquid*$_{urgent\ sale}$ is measured by the dummy variable of whether the listing text of the property contains the keyword "rush sale", while *Liquid*$_{price\ adjust}$ is measured by the average number of times the seller adjusts the listing price during the listing period. The results of each row represent the regression coefficients corresponding to the liquidity motive in different transaction outcomes models. For example, the results of the row a. *Liquid*$_{urgent\ sale}$ represent the coefficients of liquidity motive in the models of *lnP*, *lnTOM*, *discount* and *premium*, respectively. All the models include control variables, spatio-temporal lags and the fixed effects of time trend and city.

bargaining power and do not want to disclose their liquidity constraints to buyers, and we find that only 7 % of the samples directly indicated the urgency of the sale in the listing text. Therefore, this indicator is only used as a supplementary measure of full payment. The other alternative metric for liquidity motive is by calculating the average number of times the listing price is adjusted by the seller during the listing period, which also reflects the seller's price adjustment rates. Driven by high liquidity needs, sellers frequently adjust prices based on market demand. This behavior reflects their ongoing revision of price and transaction time expectations while also functioning as a clear signal of selling urgency to buyers. (Albrecht et al., 2016). The results in Table 4 are consistent with those in Table 2. Both indicators reflect a significant negative impact of liquidity motive on house sales prices and TOM. Properties marked as "urgent sale" have a 5.1 percentage points higher discount rates than other properties, but have 10.1 % shorter time on the market. During the listing period, the average number of price adjustments was increased once a day, the transaction price was reduced by 3.5 %, the time on market was shortened by 4.4 %, and the discount rates was increased by 2.3 percentage points. These findings bolster the robustness of our model and results.

5.3. Heterogeneity analyses

To further explore the influence mechanism of the sales motivation on the outcomes of housing transactions, we conducted a series of heterogeneity analyses. As alluded to in Section 3, sellers at varying stages of the life cycle or marital status may confront divergent reasons for disposing of residential properties, thus we can reasonably speculate that the intensity of their sales motivation should be not uniform. Additionally, certain literature elucidates that owing to the subtle influence of personality, social culture and other factors, there exists diversity in the decision-making process of liquidating assets between men and women. Therefore, it is also reasonable to presume that gender will likewise impact the intensity of the motivation to sell a dwelling, ultimately leading to differences in transaction outcomes.

The models incorporating the interaction terms of sales motivations and seller attributes in Table 5 reflect the heterogeneity in the degree of sellers' sales motivations on housing transaction results. From the results in column (3) and (4), female sellers show stronger investment motives but weaker speculative motives, which reflects their less risk appetite and a greater preference for long-term capital gains from housing assets. Consistent with gender economics, female sellers have a "defensive investment" strategy (Borghans et al., 2009). Their reluctance to speculate reflects risk aversion shaped by longer financial horizons and asset scarcity (Neelakantan & Chang, 2010; Wang et al., 2022). From the life cycle theory, women's earnings peaked earlier, but declined after due to caregiving duties (Bacher, 2024). Middle-aged female sellers tend to maximize their gains on housing assets to offset future income declines. This finding is consistent with prior research (Anderson et al., 2021; Goldsmith-Pinkham & Shue, 2023; Tsai, 2018), which shows that gendered differences in risk aversion, loss aversion, and expectations shape real estate preferences; the resulting price gaps arise from differing property demands and risk preferences rather than negotiation prowess. As shown in column (5) and (6), compared to the average level, divorced and widowed sellers have stronger liquidity motives, with 5.1 % lower sales prices and 6.8 % quicker sales when the transaction is full payment. According to Becker's (1973, 1974) theory of marriage, marital status is a rational decision aimed at maximizing utility between single and married, while divorce imposes asset reallocation costs (Becker, 1981). Liquidating housing - often the largest shared asset - resolves post-split financial emergencies (Browning et al., 2013). The division of property, relocation of residence, and constraints of liquidity brought about by the breakdown of marriage or the death of a partner have become a strong support for the sale of a house based on the liquidity motive, aligning with prior studies (Mikolai et al., 2019). Moreover, column (7) and (8) show that sellers over the age of fifty have a stronger investment motive but weaker speculative and liquidity motive than the average. As discussed in Section 3, the life cycle hypothesis postulates that upon entering late middle age, households have typically accumulated significant wealth. This reduces their need for liquidity, which is then replaced by a growing emphasis on precautionary savings for retirement. (Zhang et al., 2021). For Chinese families, parents also have a strong inheritance incentive to accumulate wealth for their children (Wang, Feng, et al., 2024), therefore, the investment attribute of housing is enhanced. These findings provide evidence of the importance of individual characteristics in the formation of home sales motivation and transaction outcomes.

In addition to the impact of life-cycle-based seller characteristics on

Table 5
Heterogeneity analysis: by seller characteristics.

Sample	Full sample		Female sellers		Divorced or widowed sellers		Sellers over the age of 50	
Dependent variable	(1) *lnP*	(2) *lnTOM*	(3) *lnP*	(4) *lnTOM*	(5) *lnP*	(6) *lnTOM*	(7) *lnP*	(8) *lnTOM*
Specul	0.092***	−0.054	0.043***	−0.012	0.011	−0.037	0.022**	−0.054
	(0.008)	(0.062)	(0.009)	(0.029)	(0.008)	(0.056)	(0.011)	(0.053)
Invest	0.023***	−0.002	0.069***	0.010**	0.017***	−0.007	0.053***	0.012**
	(0.001)	(0.005)	(0.011)	(0.005)	(0.005)	(0.006)	(0.009)	(0.006)
Liquid	−0.006***	−0.036***	−0.010***	−0.021***	−0.051***	−0.068***	−0.004**	−0.017***
	(0.001)	(0.006)	(0.003)	(0.006)	(0.012)	(0.013)	(0.002)	(0.007)
N	310,332	310,332	144,304	144,304	38,481	38,481	44,237	44,237
R^2	0.929	0.234	0.873	0.221	0.821	0.297	0.901	0.233

Note: The robust standard errors are clustered on the community in the parentheses. *, **, *** denote 10 %, 5 % and 1 % statistical significance, respectively. All the models include control variables, spatio-temporal lags and the fixed effects of time trend and city.

the sales motives, there are also systemic differences in different housing market segments. Table 6 shows the sales motives of sellers in villa and school zone housing markets. As shown in column (3) and (4), compared with ordinary market, sellers in villa market have stronger investment and liquidity motives, while less speculative motivations. One possible reason is that villa market is a thinner market with limited pool of potential buyers and more stable prices, making it more suitable for long-term investment rather than short-term speculation (Sass, 1988). When home-owners are short of liquidity, they can also sell their villas to replace with lower value homes, but due to the feature of thin market, they need a larger price discount and a longer waiting time to sell smoothly. On the other hand, the sales of school zone property are mainly motivated by speculation and investment, especially the speculative motive is significantly stronger than the average, as reported in column (5) and (6). This also reflects another characteristic of China's housing market, that is, the linkage between educational resources and housing tenure distorts property values, and drives higher prices and more irrational factors in the school zone housing market.

Table 7 reports the results grouped by city locations. The speculative and investment motives of home sellers are diminishing sequentially in the eastern, central, and western regions, similar to the trend of the average housing prices, which also supports the herd effects and Hypothesis 1 we proposed in Section 3. In addition, we consider the impact of the overall market situation on the motivation of home sellers. Table 8 shows that after the outbreak of the Covid-19, the speculative and investment motives of sellers in the housing market have weakened, but the liquidity motivation has increased significantly. The economic recession caused by the pandemic has had a profound impact on the supply and demand of the housing market, and has also amplified the loss aversion of market participants (Hayunga & Pace, 2017). Homeowners seeking capital gains tend to delay sales during a market downturn to avoid losses, which helps stabilize the market. Conversely, for those with urgent liquidity needs, market uncertainty intensifies their pressure to sell, compelling them to accept a larger price discount.

5.4. The impact of HPR on home sales motives

The aforementioned analysis indicates the heterogeneous sales motivations of home sellers exert disparate impacts on transaction outcomes. The ensuing query is whether this effect undergoes alteration under divergent market conditions stemming from policy intervention.

As discussed in section 3, housing policy is a pivotal factor influencing housing transactions, both from the vantage of individual conduct and market results. The HPR policy is designed to curb housing speculation and the housing price bubble (Du & Zhang, 2015; Somerville et al., 2020; Sun et al., 2017), and it is the most widely debated housing policy in China. In reality, the HPR policy has provoked some fictitious divorces in China, in the sense that households attempted to acquire additional houses for speculative purposes (Tang & Liang, 2016). This reflects that policy shocks in the housing market may alter the transaction motivations and behavior of market participants. Unfortunately, there is scant empirical evidence regarding the impact of HPR on sellers' motives to dispose of their properties. Consequently, this paper considers the HPR policy as an exogenous demand shock to home sellers and constructs the interaction of HPR and the sales motivations base on Model (2) in Section 4 to examine the policy's impacts on housing transaction outcomes.

The enumeration of HPR samples and non-HPR samples tallies 289,033 and 21,299, respectively. The logarithm of the mean transaction price of the HPR samples is 10.7, which exceeds that of the non-HPR samples, and the average discounts of the HPR samples is 7.2 %, which is inferior to that of the non-HPR samples. One-fifth of the HPR samples is sold by full payment, and this proportion is more elevated in the non-HPR samples, reaching 22.7 %. Detailed sample distribution and summary statistics of the HPR and non-HPR samples are provided in Appendix Table **A-1** and Table **A-3**.

As shown in Table 9, the HPR exerts a markedly adverse impact on housing sales prices. Specifically, the HPR constrains a segment of the demand for housing acquisitions, and the average transaction price is 18 % lower after the implementation. This reveals the costs borne by home

Table 6
Heterogeneity analysis: by housing segments.

Sample	Full sample		Villas		School zone houses	
Dependent variable	(1) *lnP*	(2) *lnTOM*	(3) *lnP*	(4) *lnTOM*	(5) *lnP*	(6) *lnTOM*
Specul	0.092***	−0.054	0.031*	−0.039	0.115***	−0.047*
	(0.008)	(0.062)	(0.018)	(0.048)	(0.027)	(0.025)
Invest	0.023***	−0.002	0.046***	−0.011	0.087***	−0.003
	(0.001)	(0.005)	(0.005)	(0.029)	(0.011)	(0.008)
Liquid	−0.006***	−0.036***	−0.024***	−0.027***	−0.017	−0.021**
	(0.001)	(0.006)	(0.007)	(0.010)	(0.031)	(0.010)
N	310,332	310,332	4655	4655	142,442	142,442
R^2	0.929	0.234	0.854	0.217	0.902	0.227

Note: The robust standard errors are clustered on the community in the parentheses. *, **, *** denote 10 %, 5 % and 1 % statistical significance, respectively. All the models include control variables, spatio-temporal lags and the fixed effects of time trend and city.

Table 7
Heterogeneity analysis: by city locations.

Sample	Eastern cities		Central cities		Western cities	
Dependent variable	(1) *lnP*	(2) *lnTOM*	(3) *lnP*	(4) *lnTOM*	(5) *lnP*	(6) *lnTOM*
Specul	0.103***	−0.076**	0.066***	−0.093	0.037**	−0.077
	(0.015)	(0.036)	(0.010)	(0.059)	(0.018)	(0.050)
Invest	0.057***	−0.013*	0.035***	0.007*	0.017***	−0.004
	(0.002)	(0.007)	(0.002)	(0.004)	(0.003)	(0.021)
Liquid	−0.004**	−0.042***	−0.011***	−0.026***	−0.009***	−0.031***
	(0.002)	(0.007)	(0.001)	(0.004)	(0.002)	(0.008)
N	262,221	262,221	25,749	25,749	22,362	22,362
R^2	0.926	0.233	0.853	0.200	0.849	0.189

Note: The robust standard errors are clustered on the community in the parentheses. *, **, *** denote 10 %, 5 % and 1 % statistical significance, respectively. All the models include control variables, spatio-temporal lags and the fixed effects of time trend and city.

Table 8
Heterogeneity analysis: before/after the COVID-19.

Sample	Before COVID-19 (pre-2020)		After COVID-19 (post-2020)	
Dependent variable	(1) *lnP*	(2) *lnTOM*	(3) *lnP*	(4) *lnTOM*
Specul	0.102***	−0.072**	0.046***	−0.035
	(0.008)	(0.033)	(0.020)	(0.139)
Invest	0.050***	−0.003	0.026**	−0.004
	(0.001)	(0.004)	(0.013)	(0.012)
Liquid	−0.006***	−0.038***	−0.089***	−0.077***
	(0.002)	(0.007)	(0.029)	(0.013)
N	278,610	278,610	31,722	31,722
R^2	0.927	0.231	0.843	0.197

Note: The robust standard errors are clustered on the community in the parentheses. *, **, *** denote 10 %, 5 % and 1 % statistical significance, respectively. All the models include control variables, spatio-temporal lags and the fixed effects of time trend and city.

Table 9
The HPR impact on sales motives and housing transaction.

Dependent variable	*lnP*	*lnTOM*	*discount*	*premium*
Model	(1)	(2)	(3)	(4)
Specul	0.114***	−0.049	−0.184***	0.322
	(0.033)	(0.056)	(0.073)	(0.196)
Invest	0.024***	0.017	−0.070***	0.025***
	(0.002)	(0.016)	(0.003)	(0.008)
Liquid	−0.005***	−0.040*	0.009*	−0.018**
	(0.001)	(0.024)	(0.005)	(0.009)
HPR	−0.179***	−0.342	−1.561	−0.097
	(0.040)	(0.309)	(1.366)	(0.434)
Specul × *HPR*	−0.010***	−0.096	1.097	0.491
	(0.003)	(0.269)	(1.238)	(0.324)
Invest × *HPR*	−0.004*	0.020	−0.002	−0.051*
	(0.002)	(0.017)	(0.075)	(0.028)
Liquid × *HPR*	−0.027***	−0.005	0.226**	−0.612
	(0.005)	(0.025)	(0.111)	(0.391)
N	310,332	310,332	269,368	40,964
R^2	0.907	0.184	0.256	0.020

Note: The robust standard errors are clustered on the community in the parentheses. *, **, *** denote 10 %, 5 % and 1 % statistical significance, respectively. All the models include control variables, spatio-temporal lags and the fixed effects of time trend and city. The focal independent variables are the interaction terms between the dummy variables of HPR policy and sales motives of home sellers.

sellers for the policy. This paper further elucidates the mechanism underlying the policy's impact. The coefficients of the HPR and sales motive interactions demonstrate that the speculative and investment motives of home sellers are attenuated, while the liquidity motive is augmented subsequent to the commencement of the HPR policy. This result validates Hypothesis 3. Specifically, the positive effect of housing price appreciation in the speculative motive on sales prices diminishes by 1 %. For full payment transactions, there is a further 2.7 % reduction in sales prices and another 23 percentage points increase in discounts, reflecting that sellers are willing to relinquish more profits for liquidity in a market with purchase restrictions. The trade-off between capital gains and liquidity from home sellers is more pronounced amidst reduced demand and negative market sentiment caused by HPR. Fearful of future restrictions, speculators and liquidity-driven sellers prefer to sell quickly at a discount, whereas long-term investors experience a smaller impact from the policy due to their more stable decision-making and transaction patterns. This reflects the differentiated results of loss aversion between sellers seeking short-term liquidity and sellers seeking long-term capital gains under the policy shock. The purchase restriction policy has triggered two countervailing market behaviors. On one side, it creates "distress sales" where liquidity-driven sellers (e.g., multi-home owners requiring short-term capital) must offer price discounts, illustrating the interplay between speculative and liquidity motives. On the other side, it leads to a "reluctance to sell" among long-term investors, who respond to weakened price growth expectations by holding assets—a trend evident in first-tier cities, where second-hand housing listings have declined by 10 %–30 %. The results in Table 9 also show the potential consequence of purchase restriction that exacerbates market inequality through the transfer of gains and losses between short-term liquidity-oriented sellers and long-term investment-oriented sellers.

6. Discussion

This study advances the understanding of housing market dynamics by systematically dissecting seller motivations—speculative, investment, and liquidity motives—and their heterogeneous impacts on transaction outcomes, which enriches the relevant studies (Springer, 1996; Glower et al., 1998; Cheng et al., 2020; Deng et al., 2022). While prior research has acknowledged the role of seller urgency in price discounts (Springer, 1996) or adaptive expectations in price cycles (Shiller, 2014), our findings reveal critical nuances. First, unlike Glower et al. (1998), who treated seller motives as monolithic, we demonstrate that investment motives (long-term wealth preservation) and speculative motives (short-term arbitrage) exert divergent effects: speculative sellers amplify price volatility through herd behavior, while investment-motivated sellers stabilize markets by delaying sales during downturns. Second, our identification of liquidity motives as a dominant driver of rapid, discounted sales aligns with He et al. (2017) but extends their work by linking liquidity pressures to cultural norms (e.g., homeownership as familial duty) and lifecycle shocks (e.g., divorce), which are uniquely salient in China's context.

Our study also bridges behavioral economics with institutional analysis and unearths some issues that deserve further discussion. For instance, while Kuchler & Zafar (2019) emphasized experience-based expectations in Western markets, we show that in China, cultural constraints and policy shocks reshape adaptive expectations. The cultural

norms in China profoundly shape home sellers' liquidity motives, creating a unique behavioral framework where property liquidation is often viewed as a last resort rather than a financial strategy (Li & Wu, 2014; Hu & Wang, 2019; Chen et al., 2020). Rooted in Confucian familism, housing symbolizes intergenerational legacy and familial stability (Liu et al., 2022), making sellers psychologically resistant to divestment unless compelled by critical life shocks, as seen when divorced or widowed sellers urgently accept 5 % price discounts to secure cash. On the other side, our results underscore the dual-edged nature of housing policies. While HPR successfully curbed speculative transactions (Lan et al., 2023), it may inadvertently intensify liquidity motives among vulnerable groups such as divorced or elderly sellers, and exacerbate price discounts and market segmentation between homeowners holding target for short-term and long-term. In addition, our theoretical analysis also suggests that there exists a shifting between homeowners' motivations under policy shocks, especially short-term speculative motivations shift toward liquidity motivations, due to loss aversion and increased expectations of future uncertainty. This coexistence echos Wang et al. (2023)'s finding that policy uncertainty truncates investment horizons and challenges binary motive classifications in Western literature, e.g. Springer (1996) and Glower et al. (1998).

Three limitations warrant attention and future research. First, endogeneity between seller motives and price outcomes remains a concern, although a series of robustness methods (e.g., STAR, sensitivity analysis and proxy variables) were employed. Future studies could leverage randomized surveys for home sellers or quasi-experiments, such as sudden policy reversals that affect sellers' behavior or risk appetite, but do not directly affect the housing market, to isolate causal pathways. Second, home sales motivations are treated as static in this study, yet sellers' priorities may shift with market cycles or personal circumstances, as the result in Table 8 shows. Information on the listing price revisions and survey data on sellers' motivations may help facilitate further dynamic analysis. Moreover, although this paper theoretically analyzes the possible overlap between different motivations, it is not empirically tested due to the limited availability of data. Longitudinal tracking of sellers (e.g., a period of time after the HRP implemented) could capture temporal variations. How buyers' motivations interact with sellers' motivations to shape the outcome of negotiations in the housing market can also be included in the future study. Future studies could explore this interplay through paired survey data of buyers and sellers or by analyzing negotiation details from brokerage records, offering deeper insights into the price formation process. Finally, external validity is constrained by the sample's focus on 17 Chinese cities. The inclusion of richer research regions, or even cross-country comparisons, could test the universality of our framework.

7. Conclusions and policy implications

This study unravels the intricate interplay between seller motivations, policy interventions, and transaction outcomes in China's housing resale market. By distinguishing speculative, investment, and liquidity motives, we demonstrate that micro-level seller behavior is not merely a reflection of market fundamentals but a product of adaptive expectations, cultural imperatives, and regulatory shocks. Employing the housing resale data in China's 17 cities from June 2016 to October 2020, key findings in this study reveal that speculative and investment motives drive self-reinforcing price cycles through herd behavior and price anchoring, while liquidity motives—amplified by lifecycle shocks and cultural norms—lead to rapid, discounted sales. Critically, the Home Purchase Restriction (HPR) policy exacerbates liquidity pressures, while curbing speculation.

These insights carry significant theoretical and policy implications. Theoretically, our integration of behavioral economics with institutional analysis advances a framework for understanding housing markets as dynamic systems shaped by motivational heterogeneity and policy feedback loops. Practically, such heterogeneous motives underscore the need for policies tailored to local market conditions and seller demographics. The findings call for nuanced, tiered regulations that balance speculative control with liquidity safeguards, and the persistent motive-policy interactions underscore the need for dynamic regulatory frameworks that adapt to evolving behavioral responses. First, to control the fluctuations brought by investment and speculative motivations, a stratified housing policy system should be built to relax resale restrictions in oversupplied markets, but retain them in speculative zones. Second, establish a liquidity protection net to offer emergency tax credits or targeted subsidies for distressed sellers. Third, strengthen sentiment monitoring in the housing market and track "urgent sales" listings in real time to trigger localized stimulus and mitigate expectation-driven market freezes.

Future research could employ longitudinal designs to track motive evolution and expand research scope to test the universality of these mechanisms. Ultimately, as housing markets globally grapple with speculative bubbles and affordability crises, acknowledging the behavioral and institutional roots of seller decisions is paramount to designing resilient, equitable policies.

CRediT authorship contribution statement

Yiqi Huang: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation. **Weida Kuang:** Writing – review & editing, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix

Table A-1
Sample Size Distribution

City	Region	With HPR policy	No HPR policy	Total Sample Number
Beijing	Eastern	192,100	0	192,100
Zhengzhou	Central	13,218	0	13,218
Shenzhen	Eastern	11,079	0	11,079

(*continued on next page*)

Table A-1 (*continued*)

City	Region	With HPR policy	No HPR policy	Total Sample Number
Hangzhou	Eastern	11,009	0	11,009
Tianjin	Eastern	10,863	644	11,507
Nanjing	Eastern	10,311	914	11,225
Shanghai	Eastern	7227	0	7227
Wuhan	Central	7054	0	7054
Suzhou	Eastern	5253	0	5253
Xi'an	Western	4183	0	4183
Shenyang	Eastern	3994	0	3994
Jinan	Eastern	3610	1800	5410
Hefei	Central	3599	0	3599
Qingdao	Eastern	3417	0	3417
Changsha	Central	1878	0	1878
Chengdu	Western	238	740	978
Chongqing	Western	0	17,201	17,201
Total		289,033	21,299	310,332

Table A-2
The Definitions of Variables

Variables	Definitions
lnP	The natural logarithm of housing unit resale price per square meter
lnTOM	The days from housing listing time to housing transaction time
discount	The magnitude by which the transaction price is lower than the listing price
premium	The magnitude by which the transaction price is higher than the listing price
Specul	The moving average growth rates of residential prices in the past 3 months (%)
Invest	The moving average growth rates of residential prices in the past 3 years (%)
Liquid	Dummy of full payment by the homebuyer values 1, 0 otherwise
room	Total number of bedrooms
room_age (year)	Total years the property has been built
lnarea	The natural logarithm of housing construction area
seller_age	Home seller's age registered at the real estate brokerage firm
female	Dummy of female home seller values 1, 0 otherwise
div_wid	Dummy of divorced or widowed home seller values 1, 0 otherwise
school	Dummy of the distance between the traded property and the top school districts within 1 km values 1, 0 otherwise
subway	Dummy of the distance between the house and the subway station within 1 km values 1, 0 otherwise
dec	Dummy of the houses with decoration values 1, 0 otherwise
vil	Dummy of the villa houses values 1, 0 otherwise
high	Dummy of the houses in the top floor values 1, 0 otherwise
mr	The mortgage rates over 5 years

Table A-3
The Summary Statistics of HPR/Non-HPR Samples

Panel A: HPR Sample (N_{all} = 289,033, $N_{discount}$ = 250,881, $N_{premium}$ = 36,771)				
Variables	Mean	St. Err.	Min	Max
lnP	10.700	0.585	8.104	13.187
lnTOM	3.722	1.424	0.000	7.497
discount (for discount sample)	7.177	6.298	0.000	0.940
premium (for premium sample)	5.140	7.635	0.000	0.980
Specul	0.489	1.056	−0.933	3.733
Invest	16.240	5.393	2.396	27.351
Liquid	0.200	0.400	0	1
room	2.077	0.785	1	5
room_age	18.137	9.222	2.5	35
lnarea	4.327	0.392	2.708	6.739
seller_age	37.579	8.213	21	55
female	0.462	0.499	0	1
div-wid	0.129	0.335	0	1
school	0.483	0.500	0	1
subway	0.624	0.484	0	1
dec	0.960	0.196	0	1
vil	0.015	0.121	0	1
high	0.730	0.444	0	1
mr	4.875	0.067	4.650	4.900
Panel B: Non-HPR Sample (N_{all} = 21,299, $N_{discount}$ = 18,458, $N_{premium}$ = 2734)				
Variables	Mean	St. Err.	Min	Max
lnP	9.700	0.524	8.272	11.947

(*continued on next page*)

Table A-3 (*continued*)

Panel B: Non-HPR Sample (N_{all} = 21,299, $N_{discount}$ = 18,458, $N_{premium}$ = 2734)				
Variables	Mean	St. Err.	Min	Max
lnTOM	3.720	1.452	0.000	7.088
discount (for discount sample)	7.560	6.427	0.000	0.920
premium (for premium sample)	5.422	8.427	0.000	0.953
Specul	0.385	0.574	−0.533	3.300
Invest	12.858	6.774	−0.586	20.164
Liquid	0.227	0.419	0	1
room	2.324	0.874	1	5
room_age	10.593	7.184	2.5	35
lnarea	4.398	0.389	2.996	6.295
seller_age	35.904	8.760	21	55
female	0.499	0.500	0	1
div-wid	0.069	0.253	0	1
school	0.135	0.341	0	1
subway	0.669	0.471	0	1
dec	0.815	0.389	0	1
vil	0.014	0.117	0	1
high	0.731	0.444	0	1
mr	4.857	0.085	4.650	4.900

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