The Effect of Home Ownership on Consumption: Evidence from Housing Lotteries in China*

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Abstract

This paper studies the impact of home ownership on consumption by exploiting housing lotteries in China that randomize participants' eligibility to buy newly-built condos. Using bankcard transaction data, we find a sharp decline in homebuyers' consumption relative to non-homebuyers' in the first month after a lottery. In one year following a lottery, homebuyers reduce their spending on non-durable goods and services, and increase their expenditures on home-related durable goods. We find substantial heterogeneity in both consumption level and structure across homebuyers with respect to type of condo purchased (low- versus high-discount lottery condos), down payment size (small versus large), and property portfolio (owning versus not owning other properties). Overall, our findings suggest a renovation effect, an anticipatory pure wealth effect, and a liquidity effect of home ownership on consumption. Finally, evidence suggests that repeat lottery participants are less financially constrained.

Keywords: home ownership, consumption, lottery, home purchase channel, wealth effect, liquidity constraint

JEL Codes : D12, H31, R21, R28

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1. Introduction

As the most important component of aggregate demand, private consumption is greatly shaped by household wealth, and housing assets in particular account for a significant part of private consumption in many countries (for a review, see Badarinza, Campbell, and Ramadorai, 2016). In the past two decades, housing markets worldwide went through spectacular boom and bust cycles, which have drawn enormous attention from policy makers and researchers eager to more fully understand the link between housing demand and consumer spending. For example, researchers have studied how changes in housing prices, mortgage conditions, and access to home equity affect existing homeowners' consumption.[1] Nevertheless, research has yet to capture fully the effect of home ownership on consumption, mainly because of identification challenges and limited data availability associated with this type of research.

In a recent paper, Benmelech, Guren, and Melzer (2017) use an event study methodology to show a positive home purchase effect on home-related durable goods. While this paper strengthens identification by investigating the effect of home purchases across different consumption categories, this approach nonetheless faces a natural challenge—that unobservable factors confound both home purchase decisions and different trajectories across various goods and services.

An alternative approach has been to find exogenous shocks to home purchases. Sodini et al. (2023) advances this line of research by exploiting a privatization program in Sweden and finding a positive causal effect of home ownership on total consumption through the housing collateral channel. One important aspect of institutions underlies their findings: home equity borrowing is easily accessible for homebuyers in Sweden and other advanced economies. In contrast, such accessibility is not common in emerging economies because of underdeveloped and strictly regulated financial markets (Calza, Monacelli, and Stracca, 2007). Similar to the typical challenge faced in other areas of research (see, e.g., Baker et al, 2022), a lack of detailed consumption categories precludes an examination of the effect of home ownership on consumption structure.

With this paper, we explore this effect of home ownership on consumption anew by exploiting a quasi-experiment housing policy in China. The Chinese housing market provides an ideal setting for broadening our understanding of the causal impact of home ownership on consumption. First, it provides a natural setting to understand channels through which home

[1] See, for example, Lustig and Van Nieuwerburgh (2005), Mian, Rao, and Sufi (2013), Chetty, Sándor, and Szeidl (2017), Mian and Sufi (2011), Defusco, Johnson, and Mondragon (2020), Bernstein and Koudijs (2020), Leth-Petersen (2010), Agarwal and Qian (2017), and Sumit et al. (2022).

ownership can affect consumption other than the collateral channel. Home equity loans and mortgage refinancing products are both subject to stringent regulations in China. Chinese households typically can neither utilize their home equity to secure credit lines for consumption purposes nor refinance their existing mortgages to obtain cash for consumption.[2] Second, we exploit a novel quasi-experiment in the Chinese housing market that introduces a plausibly exogenous assignment of home ownership. To curb the overheating of its real estate market, the Shanghai Municipal Government started to limit prices of newly-built residential housing and required developers to implement lotteries for new home sales since 2017. The lottery system randomly ranks participants to determine their priority for buying a home. We apply a difference-in-differences approach that compares *within* each lottery the consumption of homebuyers and non-homebuyers both before and after a given lottery.[3]

We assemble a unique dataset to connect consumption dynamics and home purchase records. Bankcard transactions from China UnionPay serve as our main source of consumption data. UnionPay exclusively intermediates all domestic bankcard-based expenditures. The granularity of this data allows us to investigate patterns both in total consumption and across a wide spectrum of disaggregated categories. In addition, the high-frequency nature of this transaction data enables us to capture immediate and dynamic consumption responses to home ownership. We collect housing lottery information between August 2017 and August 2019 from the Shanghai Oriental Notary Public Office (hereafter, the notary office), which supervises all lotteries in Shanghai. We focus on housing lotteries in Shanghai because of its random allocation of home purchase eligibility by design, its strict supervision of the lottery process itself, and its earliest implementation of housing lottery policy, for which we will provide more detail in Section 2.2. Additionally, we leverage the distinct payment-related features of Shanghai's lottery policies to identify homebuyers among lottery participants.

For our main analysis, we focus on one-time lottery participants in lotteries that attract more participants than there are condos for sale. We investigate the dynamic effects of home ownership on conusmption using a sample that spans four months before and 12 months after a lottery.[4] Prior to a given lottery date, we observe that homebuyers' and non-homebuyer's

[2] See, for example, Deng, Liao, Yu, and Zhang (2021), Painter, Yang, and Zhong (2021), and Chen, Wang, Xu, and Zha (2021). We elaborate upon institutional background in Section 2.1.

[3] We note that lottery participants who win a high rank can choose to give up home purchases. We conduct a battery of tests to lend support to the validity of our empirical strategy in Section 4.2. For example, we show that results remain robust in lotteries with potentially low dropout rates.

[4] We provide a detailed explanation of our sample construction in Section 3. In Section 5.3.2, we conduct an event study for lotteries with fewer participants than the number of supplied condos. For repeat lottery participants, we examine their consumption behavior in Section 6.

consumption patterns exhibit parallel trends, lending support to the validity of our difference-in-differences design.[5] We observe a short-term decline in total consumption and nondurable goods and services of homebuyers in the first month after a lottery relative to non-homebuyers. Within one year after a lottery, we find a rebound in homebuyers' total consumption. Specifically, homebuyers increase their expenditures on durable goods, especially home-related, in one year after a lottery; this finding is similar to that in Benmelech, Guren, and Melzer (2017). Meanwhile, homebuyers' nondurable goods and services spending (e.g., leisure and neighborhood services) experiences a relative decline in one year after a lottery.

Apart from the parallel pre-trend test, we conduct a battery of validation tests for our difference-in-differences design. First, neither homebuyers' total consumption nor consumption subcategories differ significantly from those of non-homebuyers before a lottery. Second, when we relax our empirical specification by replacing card fixed effects with lottery fixed effects, we find quantitatively similar results. These two pieces of evidence point to similar time-invariant characteristics between homebuyers and non-homebuyers in the same lottery. Third, eligible homebuyers might give up home purchases; a concern, thus, is that unobservable factors may simultaneously drive such decisions to forego home purchases and post-lottery consumption. To alleviate this concern, we look at lotteries with different popularity levels, measured by a demand-to-supply ratio. We believe that participants in more popular lotteries tend to be less likely to forego home purchases, and we find similar estimates between more and less popular lotteries, thus alleviating the aforementioned concern.

Next, we investigate the underlying mechnisms. In addition to the renovation channel that leads to an increase in housing-related durable goods spending, we consider two parallel channels that could jointly determine the net effect of home ownership on consumption. The first one is a liquidity constraint channel, whereby homebuyers become more liquidity constrained when they allocate liquid assets to illiquid real estate assets. This channel predicts a reduction in homebuyers' consumption, especially on more adjustable margins. The second channel is a "pure" wealth channel. As opposed to a borrowing constraint relaxation, this channel operates through anticipated housing wealth appreciation that exceeds the discounted value of future housing consumption (e.g., Sinai and Souleles 2005; Buiter 2010; Berger, Guerrieri, Lorenzoni, and Vavra, 2017; Kaplan, Mitman, and Violante, 2020). The housing wealth appreciation originates from the lottery feature that condos are typically sold with a

[5] In addition, we show that homebuyers' and non-homebuyers' total consumption as well as consumption across various subcategories do not differ from each other statistically before a lottery.

discount. As lottery condos comprise a forward delivery model and become tradable usually more than one year after the lottery, the wealth effect that we examine is anticipatory in nature. That is, the expectation of an increase in housing wealth could cause a positive effect on consumption today, which is distinct from the pure wealth channel documented in the literature that focuses on actual housing price changes (e.g., Berger, Guerrieri, Lorenzoni, and Vavra, 2017; Kaplan, Mitman, and Violante, 2020).

We then test the three channels by exploring the heterogeneous effects along three dimensions. First, the liquidity constraint channel suggests that homebuyers who face greater liquidity constraints tend to spend less. To approximate liquidity constraints, we utilize down payment amounts. Within the same lottery, homebuyers who made smaller down payments must pay higher regular mortgage payments and are subject to tighter liquidity constraints than those who made larger down payments.[6] Second, the pure wealth channel suggests that the increase in consumption should be greater among homebuyers in lotteries with higher discounts. To examine this channel, we gather data from online real estate listing platforms on the transaction price per square meter of second-hand properties in Shanghai. The lottery discount is approximated by taking the difference between the average housing price of nearby second-hand properties and that of lottery condos. Third, we conjecture that homebuyers who already own other properties are more subject to the wealth effect and less subject to the liquidity constraint effect compared to those who do not have other properties at the time of a lottery. As existing homeowners have less demand for self-occupancy of a lottery condo, they can sell it whenever good resale opportunities arise and cash in the housing wealth gain. In addition, the down payment requirement imposed on existing homebuyers is higher than that imposed on first-time homebuyers in China. Thus, existing homeowners are more able to afford large down payments and bear smaller mortgage payments, indicating looser liquidity constraint.

Our results show that homebuyers in both high and low subsamples across all three dimensions increase home-related durable goods expenditures relative to non-homebuyers after a lottery, confirming the renovation channel of the home ownership effect. Moreover, homebuyers who made a small down payment, who bought a condo with lower discounts, or who do not own other properties reduce consumption on the more adjustable margin (i.e., nondurable goods and services) while maintaining their consumption on the less adjustable margin (i.e., automobiles and maintenance). In contrast, homebuyers who made a large down

[6] As we note in Section 5.2.1, lottery condos deliver housing forward rather than award completed structures. Thus, homebuyers who were paying rent before a lottery would continue to do so in the year after the lottery or even longer before they move into their lottery condos.

payment, who purchased a condo with a higher discount, or who owned other properties increase their consumption of both durable goods and non-durable goods and services relative to that of non-homebuyers. These findings suggest that home ownership also affects consumption through a positive anticipatory pure wealth channel and a negative liquidity constraint channel.

In addition, we consider two alternative explanations. The first alternative explanation is that upon winning a lottery, homebuyers may plan to start a family or have a child, which could alter their consumption patterns after the lottery. We find little change in homebuyers' spending related to wedding and baby caring services compared to that of non-homebuyers' spending after the lottery, suggesting that family planning is unlikely to be an alternative explanation for our findings. The second alternative explanation is that lottery participants may have a psychological/behavioral response upon winning or losing a lottery. We focus on lotteries that attract fewer lottery participants than supplied condos (hereafter, pseudo-lottery condos) for which participants should face little uncertainty regarding their home purchase plans and thus a minimal psychological impact. Our findings hold strong for our pseudo-lottery sample, thus providing evidence against the psychological channel. Overall, we believe that these tests, when combined with our heterogeneity tests, collectively help alleviate the concern that a single confounder other than home ownership can explain our findings.

We conduct several robustness checks for our main sample analysis. First, while the nature of our data only allows us to link home purchase to consumption via debit cards, we trace payments made by debit cards to credit cards, to "digital wallets" (for mobile payments), and to "leftover treasure" (for money market fund investments and mobile payments). We find little difference in homebuyers' transfers to these accounts relative to those of non-homebuyers after a lottery. Second, our results are robust when we exclude lottery losers who likely purchased second-hand housing after a lottery. Finally, we find similar results when we drop bankcards or transactions that include extremely large pre-lottery expenditures.

To better understand the consumption behavior of other lottery participants, we examine repeat lottery participants in the last part of our paper. Specifically, we focus on repeat lottery participants who do not buy a condo in the first lottery but purchase one in the second lottery (hereafter, *late homebuyers*). We compare their consumption patterns to those of repeat lottery participants who do not purchase a home in either the first or second lottery (hereafter, *repeat non-homebuyers*). We find a relative increase in late homebuyers' consumption after the lottery, suggesting that repeat lottery participants are less likely to be liquidity constrained compared to one-time lottery participants.

Our paper is broadly related to the literature that investigates the causal effect of home ownership on household-level economic outcomes[7] and more closely related to an emerging literature that links home ownership to consumption (e.g., Sodini et al., 2023; Benmelech, Guren, and Melzer, 2021). First, we explore a novel housing lottery program that generates random variations in home purchase eligibility. As this literature is fraught with endogeneity concerns, our paper explores a new source of identification for understanding the effect of home ownership in settings with similar types of economies.[8]

Second, we leverage real-time, granular bankcard transaction data to analyze the microeconomic behavior of household responses in consumption structure to changes in home ownership. The finding that home ownership encourages expenditures on home-related durable goods is consistent with the finding in Benmelech, Guren, and Melzer (2017). However, different from their finding, ours suggests that the impact of home ownership on consumption is not limited to a transaction effect on home-related durable goods spending. We show novel evidence that home ownership also impacts spending in other non-home-related goods and services categories. More broadly, our paper relates to the literature on two-good models that incorporate both nondurable goods consumption and housing commitments to understand macroeconomic phenomena (e.g., Grossman and Laroque,1990; Eberly, 1994; Flavin and Nakagawa, 2008; Chetty and Szeidl, 2007, 2016).

Third, our paper contributes to the literature that studies the effect of housing wealth on consumption. Previous research that studies the impact of housing price movements on consumption in developed economies has focused primarily on the collateral channel that operates through home equity extraction and borrowing constraint relaxation.[9] More recent research that studies the effect of home ownership on total consumption (Sodini et al., 2023) also highlights the housing collateral channel. As home equity extraction is not exploitable for households in China or those in heavily regulated financial markets, it renders the "pure" wealth channel more pertinent for understanding the effect of home ownership in those markets. In contrast to this effect as documented in the literature that investigates actual housing price

[7] For example, see Rohe and Stegman (1994), Rohe and Basolo (1997), Rossi-Hansberg, Sarte, and Owens (2010), Green and White (1997), Rossi and Weber (1996), Haurin, Parcel, and Haurin (2002), DiPasquale and Glaeser (1999) Di Tella, Galiant, and Schargrodsky (2007), and Autor, Palmer, and Pathak (2014). These papers mostly compare outcomes for owners and renters and use regression control to deal with endogeneity concerns.

[8] Though specific policy execution and initiatives may differ, implementing lotteries in housing programs is not uncommon in other countries (e.g., the Affordable Housing Program in San Francisco, the Home Ownership Scheme in Hong Kong). We provide more details in Section 2.2.

[9] Papers broadly related to the housing wealth effect that results from housing price fluctuations include Lustig and Van Nieuwerburgh (2005, 2010), Mian, Rao, and Sufi (2013), Adelino, Schoar, and Severino (2015), and DeFusco (2018).

fluctuations (e.g., Berger, Guerrieri, Lorenzoni, and Vavra, 2017; Kaplan, Mitman, and Violante, 2020; Deng, Liao, Yu, and Zhang, 2021), our paper explores an anticipated pure wealth effect that originates from lottery discounts and also from the forward-delivery nature of lottery condos.

Fourth, our paper contributes to the literature that investigates how consumers respond to changes in liquidity. [10] Consistent with the literature, our findings suggest an acute, immediate liquidity constraint in amplifying the negative effect of home ownership on nondurable goods and services. This is likely due to an increased mortgage burden that breaks cash-stream neutrality in Sodini et al. (2023) and causes homebuyers more hand-to-mouth (Kaplan and Violante, 2014; Kaplan, Violante, and Weidner, 2014).

Finally, this paper contributes to a growing literature that studies the economic consequences of China's housing market development and, more broadly, highlights the effect of home ownership in developing countries (Badarinza, Balasubramaniam, and Ramadorai, 2019).[11] The contribution of private consumption to China's gross domestic product (GDP) is catching up with that of investment in recent years. This shift coincides with a strong boom in household housing demand (Glaeser et al, 2017). Amid the government's attempts in recent years to curb the economy's reliance on the real estate sector, there is a growing worry about the potential negative effect on consumption and economic growth. Our paper foregrounds this debate by providing one of the first quasi-experimental analyses on the causal relationship between investment in home ownership and consumer spending in China. The heterogeneous effect of home ownership across consumption categories implies that housing policies could be felt differently across sectors. Equally important, our paper posits that housing policies can influence homebuyers' consumption decisions by shaping their expectations of housing wealth.

The remainder of our paper is organized as follows. We introduce the institutional background of the Chinese housing market and its housing lottery policy in Section 2. We describe our data and sample in Section 3 and explain our empirical design in Section 4. We present our main findings in Section 5. In Section 6, we investigate repeat lottery participants, and we then conclude this paper with Section 7.

[10] The literature that studies the effect of liquidity on consumption includes Bewley (1977), Gross and Souleles (2002), Agarwal and Qian (2014), Boar, Gorea, and Midrigan (2020), Aydin (2015), Ganong and Noel (2020), and Gross, Notowidigdo, and Wang (2020).

[11] Research on China's housing market include Gan and Yin (2010), Fang, Gu, Xiong, and Zhou (2016), Wei, Zhang, and Liu (2017), Chen, Liu, Xiong, and Zhou (2017), Gu, He, and Qian (2018), Deng, Liao, Yu, and Zhang (2021), Painter, Yang, and Zhong (2021), and Chen, Wang, Xu, and Zha (2021).

2. Institutional Backgrounds

In this section, we introduce the institutional background of the housing market in China and its housing lottery policy.

2.1. Housing Market in China

China's real estate market has undergone significant booms in the last three decades, propelled by its gradual transition from a workplace-based in-kind allocation system to a market-oriented system.[12] Real estate now makes up an exceptionally large portion of Chinese households' total wealth.[13] Due to the crucial role that housing plays in the macro economy, the primary goal of China's housing policies is to strike a balance between promoting macroeconomic growth and mitigating the rapid escalation of housing prices. As a result, both central and local governments adjust housing policies frequently to accommodate both economic and housing market dynamics.

Housing mortgages and home equity loans are subject to extensive regulations in China (Painter, Yang and Zhong, 2020; Deng, Liao, Yu, and Zhang, 2021; Chen, Wang, Xu, and Zha, 2021). Tight regulation of housing mortgages and home equity loans in China serves multiple purposes, including controlling housing market risks, promoting affordable housing, safeguarding financial stability, and aligning with the country's broader framework of financial regulations. These regulations contribute to a distinct mortgage market environment in China compared to that of developed countries for which lending practices are less regulated. Since 2007, the People's Bank of China (PBOC, the central bank of China) has prohibited commercial banks from issuing housing mortgage loans whose loan amount fluctuates with the property's appraised value and whose purpose is not specified. The PBOC also requires that purchasers of mortgaged property shall not use reassessed mortgage net value as collateral for additional loans or consumption credits before the loan is fully repaid.[14] While short-term borrowing on home equity with fully paid mortgaged property is possible, such funds are only accessible in emergencies or by small and medium-sized enterprise (SME) entrepreneurs in

[12] For example, in 2016, China's residential real estate market assets total $42.7tn, the largest in the world and just ahead of the US at $42.1tn. By 2020, this total is $62.6tn in China compared to $33.6tn in the US. See more details at http://finance.sina.com.cn/zl/china/2021-10-28/zl-iktzscyy2178849.shtml, https://www.savills.com/blog/article/219340/international-property/the-10-most-valuable-real-estate-markets-in-the-world.aspx. Also, see, Chen (2020) for a review of the history of Chinses housing policies since 1978.

[13] The ratio of Chinese households that own at least one house is as high as 89%; of these households, 77% of their net wealth is locked in housing (2015 China Household Finance Survey).

[14] There was wide media coverage regarding the prohibition of home-equity-based loans and refinancing of mortgages. See for example http://fgcx.bjcourt.gov.cn:4601/law?fn=chl359s458.txt&dbt=chl.

urgent need of liquidity. Overall, households rarely extract home equity for consumption purposes (Deng, Liao, Yu, and Zhang, 2021). Households are also prohibited from refinancing original mortgage debts or from using a cash-out refinance for consumption purposes. In recent years, the government has further tightened regulation designed to monitor and curb the practice of using consumption loans to finance home purchases. Finally, there is no secondary market for mortgage loans through securitization (e.g., via mortgage-backed securities) in China (Fang and Feng, 2018). In sum, unlike the case in developed economies, the collateral channel through which home ownership can affect household consumption is largely irrelevant in the Chinese housing market.

The housing lottery that we examine in this paper aims at curbing soaring housing prices following a two-year loosening of monetary and housing policies. Shanghai was the first city to implement this housing lottery policy; as China's financial center and the largest metropolis in terms of GDP, Shanghai has instituted various aforementioned forms of housing regulations, which are usually viewed as having nation-wide policy implications. Starting from October 2016, the Shanghai Municipal Government began limiting the prices of newly-built residential housing by exercising tighter approval of pre-sale certificates that developers are required to obtain for newly-built housing sales.[15] In some cases, developers in Shanghai were required to submit a recorded price in the pre-sale certificate that was 20% lower than the originally planned price. Additionally, the number of pre-sale certificates issued was also significantly reduced.[16] For example, in the second half of 2017, the total issuance number of pre-sale certificates dropped to less than 20, compared to 104 issued from January to July 2017. These measures indicate authorities' deliberate effort to cool down the housing market.

2.2. Housing Lotteries

The tight control over the price and supply of newly-built housing through pre-sale certificates spurred a surge in demand for new homes in Shanghai. To cope with this excessive demand, the government required developers to implement lotteries for the sale of all newly-built housing units. In August 2017, the Shanghai Notary Association released a series of adjustments to the sale process for newly-built residential housing, which mandated that lotteries be implemented.[17]

[15] Normally, a recorded price should be submitted as part of an application for a pre-sale certificate. The actual selling price, in principle, should not exceed the recorded price by more than 5%. These certificates have long served as a crucial tool for the Ministry of Construction to administer and regulate sales of new residential housing.
[16] More details can be found at https://sh.ihouse.ifeng.com/news/2017_11_30-51304891_0.shtml.
[17]More details of policy rules can be found at https://sh.ihouse.ifeng.com/news/2017_11_30-51304891_0.shtml.

Under the lottery system, each participant is assigned a random number that determines one's position in a queue for purchasing a condo. Those who draw a small number in the lottery (i.e., a high ranking) get to buy a home, while those who draw a large number (i.e., a low ranking) do not. Importantly, to participate in a lottery, interested buyers must make a tender deposit and submit a proof of asset in the form of bank deposits to a developer. The amount of this tender deposit can vary across developers and is refundable if a home is not purchased in the end. Lottery participants must submit a proof of asset to demonstrate that they have set aside sufficient funds to purchase a home. Other cities (e.g., Chengdu, Hangzhou, Xi'an) gradually followed suit and implemented various forms of lottery policies of their own.

In Appendix Figure A.1, we illustrate the lottery of Financial Street Rongfu compound (金融街融府) located in Jing'an, which is an inner ring district in Shanghai. The compound was registered for a lottery sale from July 6, 2018 to July 14, 2018. Interested homebuyers were required to pay a tender deposit of 0.8 million RMB and provide proof of assets worth no less than 1.5 million RMB in the form of bank deposits. The lottery was conducted on July 26, 2018, and the outcome was disclosed by the notary office to the public on the same day. Compared to 293 condos supplied, there were 544 lottery participants. Following the lottery, those who successfully secured a home made a down payment and completed a mortgage application over the next two months. Participants who did not purchase a home had their tender deposits refunded. Homebuyers meanwhile obtained property ownership certificates at the end of 2019.

Although housing lotteries have been implemented in several cities in China, Shanghai provides a more feasible and advantageous setting than other cities for us to examine the causal impact of housing lotteries on consumption. First, the lottery policy in Shanghai has a unique feature that enables us to identify lottery participants and homebuyers in the UnionPay database. Both the tender deposit required for lottery participation and the down payment required for home purchase must be made exclusively with debit cards, rather than cash or other means. In contrast, in other cities (e.g., Chengdu), developers may not require a tender deposit or mandate debit card payments, making it impossible to identify lottery participants and homebuyers in the UnionPay database. Second, housing lotteries in Shanghai are closely supervised, ensuring minimal fraud and thus the integrity of causal inference.[18] In contrary, other cities have

[18] Lottery participants are prohibited from transferring or selling purchase eligibility to other interested buyers who lose in a lottery. Furthermore, developers are not permitted to set conditions that favor their own employees, sales agents, or other buyers. Developers are also prohibited from retaining condos for personal use or for other channels of sales. See more details related to Shanghai lotteries at https://www.sohu.com/a/227357902_115362.

reported instances of exploitation and rent-seeking due to loopholes in their lottery systems.[19] Third, housing lotteries in Shanghai feature a random allocation of home purchase eligibility by design, ensuring an equal chance for participants in the same lottery. However, some cities (e.g., Wuhan, Hangzhou) reserve higher ranks for lottery participants who are first-time homebuyers, creating potential differences between treatment and control groups; in addition, these cities may only recommend rather than mandate the implementation of housing lotteries, leading to selection biases.

While housing lottery programs are not uncommon outside China, the housing lottery program that we investigate in this paper is presumably by far the least restrictive and most widely rolled out within any country. For example, San Francisco implements lotteries in the Affordable Housing preference program to accommodate a growing number of San Francisco tenants being displaced directly through evictions and indirectly because of rapid rent increases.[20] Hong Kong also carries out lottery policies as part of its Home Ownership Scheme;[21] one of the eligibility criteria for this specific lottery is that applicants must not own or co-own any domestic property in Hong Kong. Unlike these programs that typically target low- and middle-income families, the lottery program that we analyze in this paper is open to families across all income brackets, allowing us to investigate the effect of home ownership on a wider spectrum of households.

3. Data and Sample

We use two main data sources in this paper. The first is lottery information obtained from the notary office's official website. The second is consumption data obtained from China UnionPay.

Immediately after the housing lottery, the notary office publishes de-identified information of a lottery's outcome on its official website. This information includes the developer's name, the number of condos for sale, and the number of lottery participants. We collect this information for all lotteries in Shanghai between August 2017 and August 2019.[22] To measure the price discount, we complement our data with the web-based information on

[19] See news report on lottery fraud (e.g., in Xi'an): https://m.jrj.com.cn/madapter/finance/2018/06/14232324683088.shtml.
[20] See https://sfmohcd.org/how-lottery-works for the Affordable Housing Program in San Francisco.
[21] See https://www.scmp.com/news/hong-kong/society/article/2168854/record-number-applicants-scramble-affordable-hong-kong-flats for the Home Ownership Scheme in Hong Kong.
[22] Since 2020, the Shanghai government has adopted a point-based system for housing lotteries, which requires interested participants to satisfy a minimum level of points. Points are calculated based on homebuyers' marriage status, property ownership in Shanghai, length of time paying into the social security fund, etc. Our sample period does not cover these lotteries.

transaction prices per square meter of lottery condos and nearby pre-owned properties. Specifically, we obtain transaction prices from Fangtianxia and Lianjia, two leading commercial sales and lettings listing websites for residential housing in China.

We obtain consumption data for the period between January 2016 and December 2019 from China UnionPay. Under the PBOC's approval, UnionPay was founded in 2002 as a state-owned financial service corporation and operates as an association for China's bankcard industry. UnionPay intermediates all bankcard-based transactions in China, including those using both debit and credit cards. It transfers funds electronically in a Point-of-Sale (POS) network and links Automatic Teller Machines (ATMs) of all Chinese banks across the country. The primary data that we use in this paper consist of anonymized bankcard transactions, including location, time, value, and merchant category. There are two significant advantages for using UnionPay data. First, its high-frequency nature allows us to examine immediate consumption responses following the lottery. Second, the granularity of transaction data enables us to look into consumption patterns across various categories.

In constructing our analysis sample, the anonymization of both lottery outcomes and bankcard owners poses two challenges. The first challenge is identifying lottery participants in the UnionPay database, and the second is classifying lottery participants as either homebuyers or non-homebuyers. We address these two challenges by exploiting a unique feature of the lottery policy, which mandates that tender deposits and down payments must be exclusively made through debit cards using POS machines provided by real estate developers. This feature ensures that tender deposits and down payments are recorded in the UnionPay database. We first match developers' names obtained from the notary office with merchant names in the UnionPay database. Next, we identify lottery participants if the tender deposit is paid to the developer within eight weeks before the lottery date. To separate homebuyers from non-homebuyers, we examine debit card transactions corresponding to down payments made to the developer within eight weeks after the lottery.[23] We restrict our main analysis to lotteries for which the number of participants exceeds the supply of available condos. We also focus on individuals who participate in the lottery only once in our sample period, so we may avoid confounding effects of non-homebuyers purchasing homes later in another lottery.[24] Finally, we drop inactive debit cards (i.e., those without any transaction records in one year before the

[23] We impose a conservative eight-week window to identify lottery participants and homebuyers, as developers usually ask for payments of tender deposits (down payments) within a month before (after) a lottery.

[24] Including repeat lottery participants may also lead to a potential problem that arises from early-treated subjects acting as controls later in a staggered difference-in-differences design (Baker, Larcker, and Wang, 2022). Doing so also complicates the pre-trend analysis.

lottery). Aside from our main analysis in Section 5.3.2, we also conduct an analysis of individuals who participate in pseudo-lotteries that feature fewer participants than supplied condos. In Section 7, we examine the consumption patterns of repeat lottery participants.

Our final sample includes 47 lotteries and 7,725 debit cards (4,404 homebuyers and 3,321 non-homebuyers). We aggregate each card's transactions at the monthly level for a window of four months before and twelve months after the lottery date. In Figure 1, we present the geographical and time-series distributions of these lotteries in Panels A and B, respectively. Lottery locations are scattered around Shanghai, and the number of lotteries peaks in 2018.

We present our summary statistics in Table 1. Panel A presents the mean, standard deviation, minimum, and maximum of the raw levels of different consumption categories for four months before and twelve months after a lottery. Total expenditure (*Total*) is the sum of all consumption, excluding real-estate transactions and tax payments. We find that total consumption averages 6,448 RMB per month. Given that the average household size in Shanghai is 2.49 in 2017 (CEIC), we estimate consumption per capita to be between 2,579 (i.e., 6,448/2.49) and 6,448. When we compare this range with consumption levels in government surveys, we find that it is largely aligned with the range implied by survey figures (between 3,316 and 4,828), indicating that our bankcard-based consumption is representative of individuals' consumption activities.[25]

One caveat of the data is that we conduct our analysis at the card level due to cardholders' de-identified information. For example, individuals might hold multiple debit and credit cards, thus preventing an accurate aggregation of total consumption at the individual level. The policy carried out by the PBOC mitigates this concern. Since December 2016, one cardholder can have only one debit card associated with the primary account at a bank.[26] Also, the fact that the Chinese credit card market only constitutes a small fraction of the bankcard market makes this issue less of a concern.[27] We are also aware of the increasing popularity of mobile payments in China during our sample period. Although we cannot trace transactions made via mobile payment accounts or credit cards, we are still able to keep track of aggregate money flow from debit cards to these accounts, including debit card payments to digital wallets (*Transfer to*

[25] See more survey details at http://www.gov.cn/guoqing/2019-02/13/content_5365290.htm. The average household consumption in Shanghai is 12,022 RMB per month (2017 China Household Finance Survey), and consumption per capita is 3,316 RMB per month (2017 Shanghai Municipal Government Survey). These figures suggest that consumption per capita is between 3,316 and 4,828 (i.e., 12,022/2.49).

[26] One can open other accounts under the same bank, although limited functions exist (e.g., wealth management, transfer).

[27] By the end of 2015, the total number of cards issued was 5.442 billion, of which debit cards comprised 5.010 billion and credit cards comprised 432 million. The average number of credit cards per person is 0.29. Even among big cities in Beijing and Shanghai, the number of credit cards per person is 1.34 and 1.01, respectively.

digital wallet), to leftover treasure (*Transfer to leftover treasure*), and to credit cards (*Transfer to credit cards*); we categorize digital wallets and leftover treasure as mobile payment accounts.[28] We then sum up the transfers to digital wallets, leftover treasure, and credit cards payments and add this amount to sum payments to financial institutions such as insurance companies, stock brokers, and ATM machines; by doing so, we construct financial transactions (*Finance*) as a separate category. Table 1 shows that transactions to mobile payment accounts (45%) and credit cards (12%) represent a major proportion of financial transactions. Furthermore, we exclude *Finance* from *Total* and generate a new variable *Total* (*excl. finance*). We find that *Total* (*excl. finance*) and *Finance* expenditures split total consumption roughly equally (3,310 and 3,090 RMB per month, respectively).

Next, we split *Total (excl. finance)* into transactions on nondurable goods and services (*Nondurable goods & services*) and durable goods (*Durable goods*). As shown in Table 1, monthly average expenditure on durable goods (1,731RMB) is comparable to nondurable goods and services consumption (1,739RMB). To analyze specific patterns, we examine subcategories such as *leisure*, *neighborhood services*, *grocery stores & supermarkets*, and *travel* within the category of nondurable goods and services. For durable goods, we focus on subcategories such as *home decorations & furniture* and *automobiles & maintenance*. We provide detailed definitions of various consumption categories in Appendix 1.

When comparing the average and the standard deviation of monthly spending, we find that the consumption data are highly skewed. We first winsorize our variables at 1% for both the bottom and top ends of the distribution to minimize concerns about outliers. We then take the natural logarithm of one plus consumption for various consumption categories. We present our summary statistics of these transformed variables in Panel B of Table 1. In Section 6.3, we also show that our results are robust when we exclude transactions or cards with extreme values of consumption.

4. Empirical Methodology

In this section, we describe our empirical strategy and discuss its validity.

[28] AliPay and WeChat Pay are two major mobile payment apps used in China. A bankcard holder can transfer money from bankcards to these two apps. Digital wallet is used only for mobile payment. Leftover treasure meanwhile can be used for both mobile payments and investments in money market funds, which normally offer higher interest rates than demand deposits or term deposits in China.

4.1. Specification

We conduct a standard difference-in-differences (DiD) analysis that uses Equation (1) to compare consumption trajectories between homebuyers (treatment) and non-homebuyers (control) within the same housing lottery before and after a lottery. Specifically, we examine the dynamic changes in consumption responses for a period spanning four months before and twelve months after a lottery date.

$$LnC_{i,t} = \sum_{t=-4}^{-2} \beta_{1,t}\ Homebuyer_i \times Month_{l,t} + \sum_{t=1}^{12} \beta_{1,t}\ Homebuyer_i \times Month_{l,t} + \sum_{t=-4}^{-2} \gamma_{1,t}\, Month_{l,t} + \sum_{t=1}^{12} \gamma_{1,\tau}\, Month_{l,t} + \alpha_i + YearMonth\ FE + \varepsilon_{i,t} \quad (1)$$

where i, l , and t denote bankcard, lottery, and month relative to the lottery date, respectively. $Homebuyer_i$ is a dummy variable that equals one if card i makes a home purchase in lottery l. We classify relative months into four months before the lottery date ($t = -4\ to -1$) and 12 months after the lottery date ($t = 1\ to\ 12$), and then create 16 month dummies (i.e., $Month_{l,t}$) to indicate these months relative to the lottery date. We set the month prior to the lottery ($t = -1$) as the reference month for comparison. We also control for card fixed effects (α_i) to ensure that our results are not confounded by unobservable individual characteristics. Since we exclude repeat lottery participants in our sample, we believe that controlling card fixed effects is sufficient to ensure that we compare homebuyers and non-homebuyers within the same lottery. We include calendar year-month fixed effects to capture responses to changes in macroeconomic conditions. Standard errors in all regressions are clustered at the lottery level. $\beta_{1,t}$ $(t = 1\ to\ 12)$ is our main coefficient of interest, which estimates the effect of home ownership on consumption in month t before and after the lottery.

The housing lottery setting holds at least two advantages for identifying the causal impact of home ownership on consumption. First, the design compares lottery participants within the same lottery who likely share similar preferences for location, construction quality, housing price, and related characteristics. Second, housing lotteries by design generate a random assignment of home purchase eligibility, thus mitigating concerns over self-selection due to confounding factors (e.g., personal wealth, life-cycle consumption adjustments) (Aguiar and Hurst, 2013).

4.2. Validity of the Empirical Design

In this subsection, we conduct analyses that help validate our DiD design. The estimate of $\beta_{1,t}$ $(t = 1\ to\ 12)$ can be interpreted as causal, if the dependent variables for treated and non-treated groups follow parallel trends in the absence of the treatment. Although this assumption is not directly testable, we can still find evidence in its favor by showing the parallel trends in months before a lottery. Following Equation (1), we report estimates of $\beta_{1,t}$ $(t = -4\ to - 2)$ in Table 2 and plot them in Figure 2. Consistent with our assumption, we observe that the trends of both groups are parallel in the four months leading up to a lottery date. The parallel trends are further reinforced when we examine different consumption categories, as shown in Figures 3 and 4.

A concern may arise when eligible participants in a lottery voluntarily withdraw from a home purchase plan, which could happen for various reasons (e.g., remaining condos for eligible homebuyers do not match their preferences). If dropout decisions are influenced by unobservable factors that also affect post-lottery consumption, then our estimates could be biased. We consider two types of unobservable factors that could impact causal inference: (1) time-invariant household characteristics and (2) events correlated with lottery participation.

We start by investigating the first type of omitted variables. As we do not observe the characteristics of lottery participants, we test whether any systematic differences exist in homebuyers' and non-homebuyers' consumption before a lottery. Table 2 compares the consumption of homebuyers to that of non-homebuyers in the same lottery in the months *before* the lottery. We estimate coefficient θ in the following regression in which we control for lottery fixed effects (ρ_l) and calendar year-month fixed effects:

$$LnC_{i,t} = \mu + \theta\ Homebuyer_i + \rho_l + YearMonth\ FE + \varepsilon_{i,t} \qquad (2)$$

The insignificant estimates in Panel A, Table 2 suggest that homebuyers' total consumption on average does not differ significantly from that of non-homebuyers. Neither do we observe significant differences across various consumption subcategories in Panels B and C of Table 2. In an unreported test, we repeat our analysis using lottery fixed effects instead of card fixed effects in Euquation (1). If unobservable characteristics that drive consumption changes are substantially different between homebuyers and non-homebuyers, then we should expect results for which we control lottery fixed effects to differ from results for which we control card fixed effects. However, our results show quantitatively similar results between

these two approaches. These two pieces of evidence support that time-invariant characteristics are unlikely to be significantly different between these two groups prior to the lottery.

To investigate events that may confound lottery participation, we exploit the rich spectrum of spending categories. Among these categories, we focus on expenditures related to family planning (e.g., marriage, childbirth), as owning a property is traditionally seen as a prerequisite for starting a family in China (Wei, Zhang, and Liu, 2017). In particular, we examine subcategory spending on wedding consultation and baby-related expenses. In Figure 8, we show evidence that homebuyers do not significantly increase their expenditures on these categories compared to non-homebuyers in one year after the lottery. This suggests that family planning decisions are unlikely to confound the impact of home ownership on consumption.

Finally, to address concerns about eligible participants withdrawing from home purchases, we examine whether our main results hold for more popular lotteries. We conjecture that participants who participate in more popular lotteries are less likely to give up their purchase eligibilty. When we conduct a robustness test in Section 5.3.2 by spliting our sample lotteries above and below the median ratio of the number of supplied condos over the number of participants, we find that our result still holds for more popular lotteries in which concerns over withdrawing are minimal. We also show that homebuyers in less popular lotteries for which dropout concerns are greater exhibit similar consumption patterns as those in popular lotteries.

Collectively, our evidence suggests that $\beta_{1,t}$ in Equation (1) can be interpreted as the causal impact of new home ownership on consumption.

5. Results

5.1. Baseline Results: One Year into Home Ownership

In Table 3, we present our estimates from Equation (1). In Columns (1) and (2), we present results for total consumption and total consumption excluding finance, respectively. Correspondingly, we plot estimated DiD coefficients from Equation (1) in Figure 2, represented by blue solid circles. The insignificant coefficients on $Month_{l,t} \times Homebuyer$ ($t = -4\ to -2$) in Table 3 and Figure 2 for the months leading up to the lottery support the parallel trend assumption of our DiD design. In one month immediately following the lottery, homebuyers' consumption declines 16% relative to that of non-homebuyers' consumption (Column (1) Table 3). Starting from the sixth month after the lottery, homebuyers' consumption is noticeably higher than that of non-homebuyers, although the coefficients are

not precisely estimated. In Column (2) in Table 3, we find similar consumption patterns when we exclude finance from total consumption.

To understand total consumption difference at a more granular level, we look into dynamic differences between homebuyers and non-homebuyers with respect to nondurable and durable goods consumption. We present our results in Columns (3) and (4) of Table 3, and we plot the corresponding DiD coefficients in Panel A of Figures 3 and 4. We find that the relative contraction in total consumption in the first month is primarily driven by a significant 16% decline in nondurable goods and services spending. In contrast, as shown in Panel A of Figure 4 and in the last column in Table 3, we find little change in homebuyers' durable goods expenditures relative to those of non-homebuyers in the short run after the lottery. When examining consumption changes beyond the first month, we find that the relative surge in total consumption since the sixth month is mainly driven by significant increases in expenditures on durable goods. Column (4) presents significant relative increases ranging from 19% to 29% for homebuyers' durable goods spending. On the other hand, homebuyers' nondurable goods and services spending, on average, does not change significantly compared to that of non-homebuyers in the same period. It is important to note that the insignificant coefficients on $Month_{l,t}$ across different consumption categories in Table 3 suggest that both the relative decrease in nondurable goods and services and the relative increase in durable goods are not driven by non-homebuyers.

To investigate how homebuyers and non-homebuyers adjust their respective consumption portfolios, we look more closely into the subcategories. In Panels B to E of Figure 3, we present the dynamic changes across various subcategories of nondurable goods and services consumption, including leisure, neighborhood services, grocery stores and supermarkets, and travel. We present our corresponding coefficients estimated from Equation (1) in Table 4. Specifically, we find a significant decline of 6.5% and 8.7% in spending on leisure in the two months immediately following the lottery. We also observe sizable and persistent spending reductions on neighborhood services as well as grocery stores and supermarkets among homebuyers relative to that of non-homebuyers. On contrary, there is no significant difference in travel spending trends between homebuyers and non-homebuyers.

We further investigate subcategories of durable goods, specifically home decorations and furniture as well as automobiles and maintenance; we present our results in Figure 4 and Table 5. We find that about half a year after the lottery, homebuyers significantly increase their expenditures on home decorations and furniture compared to those of non-homebuyers (Panel

B Figure 4). During months when these increases are significant, the magnitude ranges from 4%-8% per month (Column (1) Table 5). Additionally, Panel C of Figure 4 shows a significant increase in spending on automobiles and maintenance, starting from the fourth month after the lottery. We provide figures for other subcategories of consumption in Appendix Figure A.2 and find insignificant changes along these dimensions.

Collectively, our findings demonstrate that homebuyers reduce their spending on non-durable goods and services in the short run. In the longer-term, home ownership has more complicated effects on consumption structure. One year after purchasing a home, homeowners increase their expenditures on home-related durable goods while reduce their consumption of some types of nondurable goods and services.

5.2. Mechanisms

In this section, we investigate our mechanisms and discuss alternative explanations. We posit that home ownership could affect consumption through three main channels.

First, home purchase could stimulate expenditures on home-related durable goods (Benmelech, Guren, and Melzer, 2017), which we label as the *renovation* channel. Increases in expenditures on home decorations and furniture in Panel B, Figure 4 and in Column (2), Table 5 lend support to this channel.

The second channel is a *pure wealth* channel whereby home ownership enables wealth accumulation when housing wealth appreciation is worth more than the discounted value of future housing expenditures. The pure wealth channel could encourage an overall increase in spending even in the absence of the collateral (Berger, Guerrieri, Lorenzoni, and Vavra, 2017; Kaplan, Mitman, and Violante, 2020; Deng, Liao, Yu, and Zhang, 2021). Distinct from the literature that focuses on consumption responses to *actual* housing price changes, wealth gain in our setting is largely *anticipatory*. Due to the forward-delivery nature of lottery housing in Shanghai, it could thus take more than a year to obtain a certificate of property ownership to make property tradable. As the price of lottery housing in our setting is typically considered below the fair market price, homebuyers expect a windfall gain of housing wealth upon purchasing a home. Thus, the pure wealth channel in our setting stimulates consumption among households that anticipate higher housing prices.

The last channel we consider is a *liquidity constraint* channel, whereby purchasing a home could impose a tighter liquidity constraint on homebuyers for related reasons (e.g., commitment to long-term mortgage payments). Additionally, the high transaction costs of adjusting illiquid housing assets in the wake of an adverse shock can further amplify

homebuyers' liquidity constraints (e.g., Flavin and Nakagawa, 2008; Chetty and Szeidl, 2007, 2016). As a result, homebuyers may choose to cut their consumption, especially on more adjustable margins, i.e., nondurable goods and services.

In the context of Chinese financial markets, the collateral channel is deemed inconsequential, as we discussed in Section 2.1. It is worth noting that, when applicable, the collateral channel predicts a positive effect of home ownership on consumption, as increased home equity can serve as collateral for households against which they can borrow (e.g., Lustig and Van Nieuwerburgh, 2005, 2010; Mian, Rao, and Sufi, 2013; Adelino, Schoar, and Severino, 2015; DeFusco, 2018).

The positive effect from the renovation channel and the anticipatory pure wealth channel, when combined with the negative effect from the liquidity constraint channel, collectively shapes total consumption and consumption across various subcategories. The renovation channel predicts an increase in home-related durable goods expenditures; meanwhile, the pure wealth channel could positively influence overall consumption (both durable and nondurable), and the liquidity constraint channel has an opposite effect on consumption, especially nondurable goods and services consumption. As a result, homebuyers who are influenced by these channels to a varying extent may exhibit heterogeneity in their consumption responses to home ownership. In this section, we leverage such heterogeneity to better understand the aforementioned channels by differentiating homebuyers along three dimensions: size of down payment, size of lottery discount, and ownership of other properties.

5.2.1. Down Payment

As previously mentioned, lottery condos are typically not fully completed at the time of purchase and require further renovation, decoration, and ventilation (i.e., airing out of toxic chemicals). Consequently, homebuyers cannot immediately move into lottery housing after winning the lottery. As a result, homebuyers who are renters will continue to incur rental expenses while also shouldering additional mortgage payments. Within the same lottery, homebuyers who made a smaller down payment face a higher housing commitment in terms of future mortgage payments. Consequently, they may experience a tighter liquidity constraint compared to those who can afford a larger down payment. All else equal, we posit that, among homebuyers in the same lottery, the liquidity effect should be more pronounced for those who made a smaller down payment.

To explore this idea, we split homebuyers into two groups based on whether their down payment is above or below the median level of down payments made by all homebuyers in the

same lottery. Using Equation (1), we compare the consumption of homebuyers with high (low) down payments to that of non-homebuyers in the same lottery and plot the difference-in-differences coefficients in blue (red) lines in Figure 5.

In Panel A, we find that homebuyers with high down payments gradually increase total consumption relative to that of non-homebuyers since the fifth month after the lottery. In contrast, homebuyers with small down payments do not increase total consumption. If anything, they decrease consumption in the first month following the lottery.

In Panel B, we show that both groups of homebuyers significantly decrease their nondurable goods and services consumption compared to that of non-homebuyers in the first month after the lottery. This suggests that even homebuyers who made a large down payment reduce their adjustable margin of consumption in the short run. Moreover, homebuyers with a smaller down payment experience a persistent decline in their consumption of nondurable goods and services.

In Panel C, we find that homebuyers with high down payments significantly increase their expenditures on durable goods relative to those of non-homebuyers, starting from the third month after the lottery. However, homebuyers with low down payments do not experience significant changes in durable goods spending. To further examine the home purchase channel, we examine home-related durable goods more closely in Panel D. We find that homebuyers in both subsamples increase their spending on home decorations and furniture relative to that of non-homebuyers after the lottery, with similar increases observed across the two groups. In addition, as shown in Panel E, home ownership also results in an increase in spending on automobiles and maintenance for homebuyers who made larger down payments. Interestingly, despite reducing their spending on nondurable goods and services, homebuyers with smaller down payments do not decrease their spending on automobiles and maintenance.

In summary, our findings suggest that the renovation channel induces both groups of homebuyers, regardless of their down payment size, to increase home-related durable goods expenditure. Homebuyers with smaller down payments reduce their spending on nondurable goods and services but not automobiles and maintenance. This evidence indicates that homebuyers prioritize reducing consumption in categories that are more adjustable. In contrast, homebuyers with larger down payments do not reduce their consumption on these same margins, resulting in an overall increase in total consumption.

5.2.2. Lottery Discount

All else equal, the pure wealth channel predicts a more pronounced positive effect of home ownership on consumption for homebuyers who participate in lotteries that offer a larger discount. It is important to note that anticipated gains in housing wealth, rather than actual housing price increases themselves, drive this effect. Therefore, we expect to observe an uptick in consumption among homebuyers who purchase a high-discount condo before the condos become tradeable.

To measure the wealth gain or discount of lottery condos, we calculate the difference between the average housing price of nearby second-hand residential properties and the average transaction price of lottery housing. We gather data on transaction prices per square meter of second-hand properties and lottery condos from Lianjia and Fangtianxia, two prominent online property listing platforms in China. For each lottery, we calculate average transaction prices for nearby second-hand properties that are within a one-kilometer radius of the lottery condo and sold in half a year before the lottery. We further split the lotteries in two groups based on whether the discount falls above or below the median level across all lotteries. We then conduct our analysis following Equation (1) for each subsample and plot our DiD coefficients in blue (red) lines for the high- (low-) discount lottery subsample in Figure 6.

In Panel A, Figure 6, we show a significant increase in total consumption for homebuyers relative to that of non-homebuyers in high-discount lotteries since the fourth month following the lottery. In contrast, homebuyers' consumption in low-discount lotteries decreases slightly relative to that of non-homebuyers. In Panel B, changes in nondurable goods and services exhibit a more pronounced divergence. Homebuyers in high-discount lotteries significantly increase their spending on non-durable goods and services relative to that of non-homebuyers, starting from the fifth month of the lottery. In contrast, homebuyers in low-discount lotteries decrease their consumption significantly in such areas since the first month of the lottery.

With respect to durable goods (Panel C), we find that both groups of homebuyers increase their spending. In Panel D, we find that after the lottery, homebuyers in both groups increase their spending on home decorations and furniture relative to that of non-homebuyers in the same lottery. However, this increase is more pronounced for homebuyers in the high-discount subsample than those in the low-discount subsample. Furthermore, Panel E illustrates that home purchase also stimulates spending on automobiles and maintenance for homebuyers in high-discount lotteries. Meanwhile, homebuyers in low-discount lotteries do not significantly increase or decrease spending on automobiles and maintenance.

Taken together, our findings suggest that the renovation channel causes both types of homebuyers in high- and low-discount lotteries to increase their expenditures on home-related durable goods. Due to lower expected wealth gains in low discount lotteries, homebuyers reduce their spending on nondurable goods and services, which is the more adjustable margin. In contrast, homebuyers who experience greater expected wealth gains increase such consumption as well as increase their spending on automobiles and maintenance.

5.2.3. Multiple Home Ownership

In this subsection, we examine heterogeneous effects of home ownership on consumption with respect to ownership of other properties at the time of lottery. Homebuyers who already own other properties should have less need for self-occupancy in lottery housing, making them more likely to sell theirs lottery condos when good resale opportunities arise and cash in their housing wealth gain. In addition, homebuyers who own other properties are subject to a substantially higher minimum down payment requirement[29] than are first-time homebuyers in China, implying a smaller housing commitment in the long run. Thus, we conjecture that the wealth effect should be stronger and that the liquidity constraint effect should be less for homebuyers who own other properties compared to first-time homebuyers.

To test this idea, we divide lottery participants into two subsamples based on whether they own other properties at the time of the lottery. We identify ownership of other properties by tracing participants' historical payments that are indicative of other home ownership (i.e., property maintenance fees) in the 12 months before the lottery. For each subsample, we plot the DiD coefficients estimated from Equation (1) in blue (red) for those who have (no) other properties. We present our results in Figure 7.

We find that among lottery participants who own other properties, homebuyers experience significant increases across all subcategories of consumption. In contrast, for the other subsample of lottery participants, there is little difference between homebuyers' and non-homebuyers' total consumption, as shown in Panel A. Moreover, Panel B shows that homebuyers who do not own other properties decrease their consumption of nondurable goods and services. Panels C-E in Figure 7 show that homebuyers who own other properties significantly increase spending on durable goods (e.g., home decorations and furniture, automobiles and maintenance). While homebuyers who do not own other properties also increase spending on these margins, the effects for this group are milder.

[29] In Shanghai, the down payment rate is 35% for first-time homebuyers and 50-80% for second-time homebuyers, depending on property characteristics.

Taken together, for all three of our cross-sectional analyses, we observe a consistent positive change in spending on home-related durable goods across all subsamples of homebuyers, thus supporting the renovation channel. Furthermore, homebuyers who face a looser liquidity constraint and experience greater wealth gains increase expenditures on both nondurable goods and services and durable goods. In contrast, homebuyers who face a tighter liquidity constraint and a smaller wealth effect reduce their spending on nondurable goods and services, but not on the less adjustable margin (e.g., automobiles and maintenance). The substantial heterogeneity in responses that we observe across different consumption categories and across difference types of homebuyers reaffirms the effect of the pure wealth and liquidity constraint channels.

5.3. Alternative Channels

In this subsection, we consider two alternative explanations: family planning around home purchases and psychological responses.

5.3.1. Family Planning around Home Purchase

Homebuyers may have plans to get married or start a family. Consequently, family planning in relation to home purchases can confound the aforementioned channels through which home ownership affects consumption.

If homebuyers plan to start a family after the lottery, they should increase spending on those categories compared to non-homebuyers. To invesitigate this possibility, we take advantage of the granularity of our consumption data. Specifically, we examine marriage consultation services as well as baby-related spending. We compare those spending items between homebuyers and non-homebuyers by following Equation (1) and plot the DiD coefficients in Figure 8. We find that in both panels, our DiD estimates are very small in magnitude and not signifincatly different from zero in the year after the lottery. Our results, therefore, refute family planning as the main driver of changes in consumption patterns following home purchases.

5.3.2. Psychological Responses

Participating in a lottery causes uncertainty with respect to home purchases and may lead to a short-term psychological response, which we call the *lottery* effect. Winning a lottery may cause excited homebuyers to boost their consumption as a way to celebrate their success. In contrast, losing a lottery may discourage non-homebuyers, causing them to reduce consumption or encourage retaliatory consumption.

We find evidence against such an interpretation. First, the relative consumption *reduction* in nondurable goods and services happens in the first month after the lottery. Moreover, this lockstep negative impact is not driven by non-homebuyers. Second, the lottery effect cannot provide a unifying explanation for the heterogeneous effects of home ownership on different subcategories of consumption. Third, for homebuyers who we expect are more likely to be subject to a positive lottery effect (e.g., those without other properties and in more popular lotteries)[30], we find that they instead reduce their consumption after the lottery.

To further examine the short-term lottery effect, we look at lottery events in which the number of condos for sale is more than the number of lottery participants (i.e., *pseudo-lotteries*). In Figure A.3, we show the geographical and time series distribution of pseudo-lotteries. The locations of these pseudo-lotteries are scattered around Shanghai, and they become more prevalent since the end of 2018. When participants sign up for a pseudo-lottery, they face little uncertainty in terms of home purchases and thus are unlikely subject to a lottery effect. We use Equation (3) to conduct an event study for homebuyers of pseudo-lottery condos by estimating their consumption patterns four weeks before and after the lottery; Equation (3) is estimated over a short period, because the psychological effect typically does not last long (Guryan and Kearney, 2005; Haisley, Mostafa, and Loewenstein, 2008).

$$LnC_{i,t} = \sum_{\tau=1}^{4} \gamma_{1,t}\, Week_{l,t} + \alpha_i + Year\ Week\ FE + +\varepsilon_{i,t} \quad (3)$$

Variable definitions follow Equation (1). We create four week dummies (i.e., $Week_{l,t}$, $t = 1$ to 4) to indicate one to four weeks after the lottery date. The period before the lottery is set as reference weeks for comparison. $\gamma_{1,t}$ is our main coefficient of interest, which estimates the effect of homeownership on consumption in week t before and after the lottery.

We demonstrate in Table A.1 that homebuyers participating in pseudo-lotteries reduce total consumption and other primary categories during the first week following the lottery. The decline in total consumption is statistically significant, with a decrease of 19% in the first week following the lottery. Similarly, total consumption excluding finance shows a significant reduction of 14%, while nondurable goods and services consumption decreases by 9.8%. Furthermore, columns (4) in Table A.1 indicates a notable decrease in spending on durable goods. These findings affirm the overall negative impact of homeownership on pseudo lottery homebuyers even when the lottery effect is minimal.

[30] See Section 6.2 for a detailed explanation of this test.

6. Robustness Checks

6.1. Substitution with Other Payment Approaches

As the nature of our data only allows us to construct consumption based on debit cards, a concern arises that homebuyers and non-homebuyers may use different payment methods in the long run. For example, homebuyers may substitute debit card payment with alternative payment methods (e.g., credit card and mobile payments) in ways that differ from non-homebuyers after the lottery. While it is difficult to find a specific reason for this behavior, we nonetheless track the flow of payments from debit cards to credit cards and mobile payment accounts. Regarding the latter, we distinguish debit card payments from digital wallets (for mobile payments only) and leftover treasure (for both money market fund investments and mobile payments). Specifically, we compare such payments between homebuyers and non-homebuyers by following Equation (1) and plot the DiD coefficients in Figure 9.

We find that the difference in transfers from debit cards to credit cards (Panel A) and to leftover treasure (Panel C) between homebuyers and non-homebuyers does not change significantly after the lottery. In Panel B, we find that homebuyers' payments from debit cards to digital wallets do not differ significantly from that of non-homebuyers; if anything, some slight decreases occur. Taken together, we do not find significant changes through alternative payment approaches following home purchases.

6.2. Popular Lotteries

As we discussed in Section 4.2, although the assignment of the home purchase sequence is random, homebuyers might give up home purchase eligibility. To address the endogeneity concern associated with voluntary dropout, we conduct an additional validation test by splitting our sample based on lottery popularity. We conjecture that participants in more popular lotteries are less likely to give up their purchase eligibility than those in less popular lotteries. We define a lottery as popular (unpopular) if the ratio of participants to supplied condos is above (below) the sample median. We re-estimate Equation (1) for both subsamples and present our results in Appendix Figure A.4.

For the subsample of more popular lotteries in Panel A, we find similar DiD coefficients compared to those in our main results, which suggests that our results still hold when withdrawing concerns are minimal. In Panel B, we show that homebuyers in less popular lotteries (i.e., where dropout is a greater concern) exhibit similar consumption patterns as do

those in popular lotteries. This finding indicates that dropout decisions unlikely drive differences in post-lottery consumption between homebuyers and non-homebuyers.

6.3. Other Robustness Tests

We conduct two additional robustness tests and report our results in Appendix A.5.

First, our main sample consists of only one-time lottery participants; however, lottery losers may nonetheless seek to buy properties in the secondary housing market for which lotteries are not required. Since including these lottery participants in our control group might contaminate our estimates, we alleviate this concern by excluding non-homebuyers who likely purchased a second-hand home after the lottery from our control group. We identify post-lottery second-hand home purchases by tracking non-homebuyers' tax payments and real-estate transactions after the lottery. Specifically, in Panel A of Appendix Figure A.5, we drop non-homebuyers who made tax payments exceeding 50k RMB and real-estate transactions in the 12 months after the lottery (5% of lottery participants). In Panel B, we loosen the threshold of such tax payments to 10k RMB (7% of lottery participants). In both panels, we find results comparable to our main findings.

A second concern regarding our analysis is that our estimates could be driven by some outliers, for we observe some large value transactions even after we winsorize our data. To further alleviate this concern, we conduct two additional robustness checks. We exclude extremely large observations of monthly total spending that exceed 500k RMB (Panel C) and drop cards over the sample period that have an average monthly consumption greater than 500k RMB (Panel D). Both panels show that our results remain robust.

7. Repeat Lottery Participants

In previous sections, we have focused on one-time lottery participants. In this section, we examine the behavior of multiple lottery participants, as we believe they are the more active players in housing lotteries. Concerns have been raised about the consequences of housing speculation among repeat lottery participants who go after underpriced lottery housing, worrying that such conduct could distort the intentions of the lottery policy. On the other hand, repeat lottery participants may include those with genuine housing needs (e.g., first-time homebuyers). By examining the consumption responses of repeat lottery participants, we can uncover their characteristics and derive wider implications of housing lottery policies.

In Appendix Table A.2, we provide a summary of different types of participants. Overall, we find that 25% of lottery participants took part in at least two lotteries.[31] Among 5,190 lottery participants who bought a condo in their first lottery, 4,404 or 84.9% exited the lottery market afterwards. In contrast, 3,321 out of 5,250 non-homebuyers exited from the lottery market after their first lottery, which represents a lower fraction of 63.3%. In addition, 11.8% of non-homebuyers in the first lottery joined a pseudo-lottery in the future, similar to 10.5% of homebuyers in the first lottery who did the same.

To investigate the consumption behavior of repeat lottery participants, we focus on homebuyers who did not buy a condo in the first lottery but bought one in the second lottery (hereafter, *late homebuyers*).[32] To understand the home ownership effect on repeat lottery participants, we compare *late homebuyers* with individuals who take part in at least two lotteries and do not purchase a home in either lottery (hereafter, *repeat non-homebuyers*). Specifically, we restrict our comparison to *late homebuyers* and *repeat non-homebuyers* who participated in the same second lottery following Equation (1) and plot our DiD coefficients in Figure 10.

We find that *late homebuyers* do not cut nondurable goods and services after the lottery compared to *repeat non-homebuyers*. Furthermore, they significantly increase their total consumption, especially that of expenditures on durable goods, such as home decorations and furniture. The positive result from repeat lottery participants contrasts with an immediate consumption cut in nondurable goods and services in our main sample by one-time lottery participants. Combined with the fact that repeat lottery participants must set aside tender deposit for a longer period than one-time participants, our results suggest that the former are less likely to face liquidity constraints than are the latter.

Our findings raise concerns regarding the potential displacement of financially constrained lottery participants with more patient, repeat ones in the housing market. A policy implication, therefore, is that housing lottery programs that do not restrict the eligibility of participants based on economic status may result in affluent individuals taking advantage of the system.

8. Conclusion

In this paper, we study the effect of home ownership on consumption by exploiting housing lotteries that randomly assign the eligibility of home purchases in Shanghai.

[31] Because only as few as 7% of lottery participants took part in more than two lotteries, we focus on their first two lotteries for ease of analysis.

[32] As fewer than 0.5% of investors bought a condo in two lotteries, we do not discuss their consumption changes.

Employing a difference-in-differences methodology, we compare the consumption of homebuyers and non-homebuyers both before and after a lottery.

We observe a sharp decline in homebuyers' consumption relative to that of non-homebuyers in the first month following a lottery, as homebuyers reduce their spending on the more adjustable margin (i.e., non-durable goods and services). One year into home ownership, homebuyers' total consumption increases slightly. While they increase their spending on home-related durable goods, they continue to decrease spending on some types of nondurable goods and services.

We then show substantial heterogeneity in the effect of home ownership on consumption responses across different lottery participants. We find that homebuyers who made a smaller down payment, who bought a low-discount lottery condo, and who own no other properties at the time of a lottery, experience a more persistent decline in total consumption during the first year after the lottery. These individuals redirected their spending from nondurable goods and services towards home-related durable goods. In contrast, homebuyers who made a larger down payment, who bought a high-discount lottery condo, and who owned other properties at the time of a lottery increased total consumption as well as spending on both margins of nondurable goods and services and durable goods one year into home ownership. Thus, our findings confirm the renovation channel. That said, the extent to which home ownership affects homebuyers' consumption structure depends on the relative strength of the pure wealth and liquidity constraint channels.

Our paper yields important policy implications. First, in heavily regulated financial markets in the absence of the collateral channel, our paper suggests that the "pure" wealth channel can generate a sizable impact on household consumption. In addition, our paper confirms the anticipatory wealth channel, which suggests that the impact of housing wealth on consumption does not necessarily rely on actual housing price fluctuations but also expectation. Second, as renovation, pure wealth, and liquidity channels can all work together to affect households' consumption, our paper makes note of the heterogeneous impacts of housing programs on the targeted population. Third, as noted earlier in our paper, consumption has become increasingly important in driving China's economic growth in recent years, which is accompanied with a strong housing demand. Our research suggests that housing demand can have asymmetric impacts on different sectors through its effect on consumption: while it could encourage demand for durable goods, it may also discourage demand for nondurable goods and services. Finally, our paper helps extend our understanding of housing lottery programs

themselves. Importantly, housing lottery programs that do not regulate the eligibility of participants may be exploited by wealthy homebuyers and, in so doing, fuel wealth inequality.

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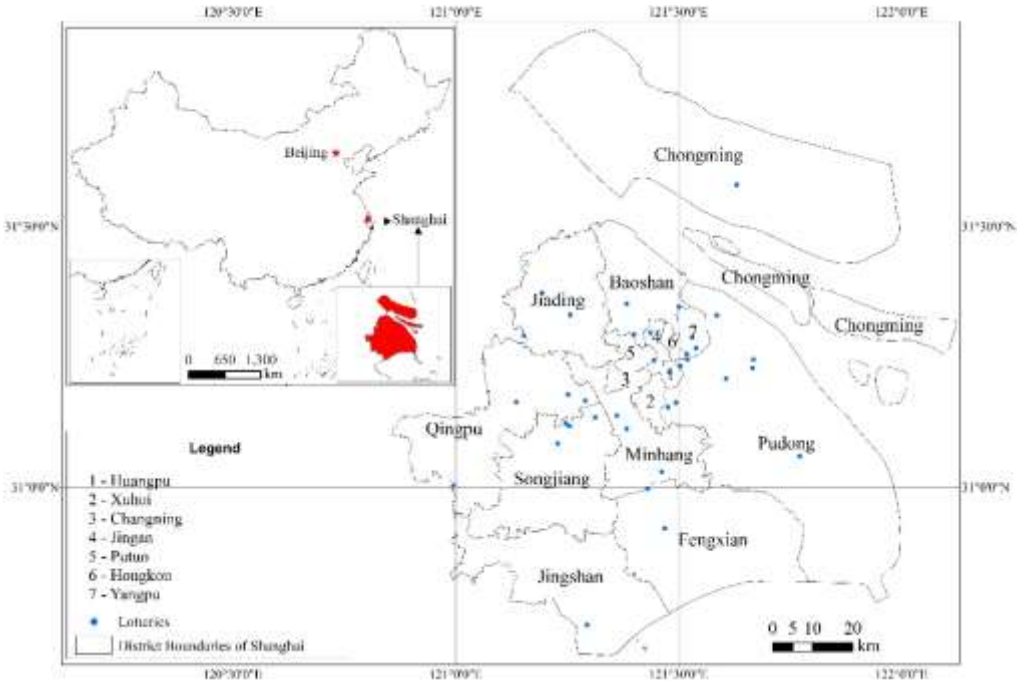
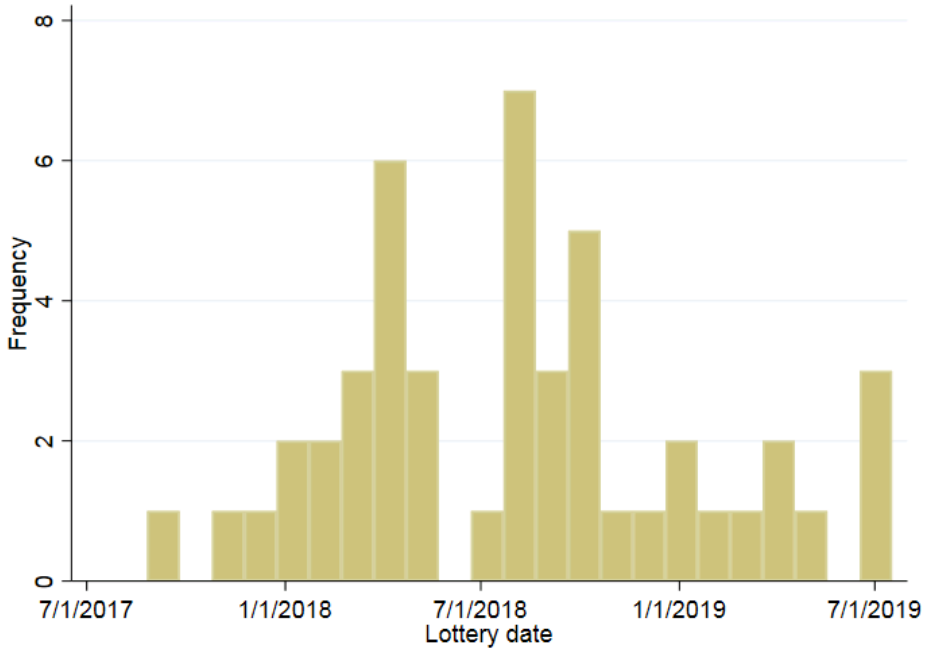
Figure 1: Lotteries in Shanghai



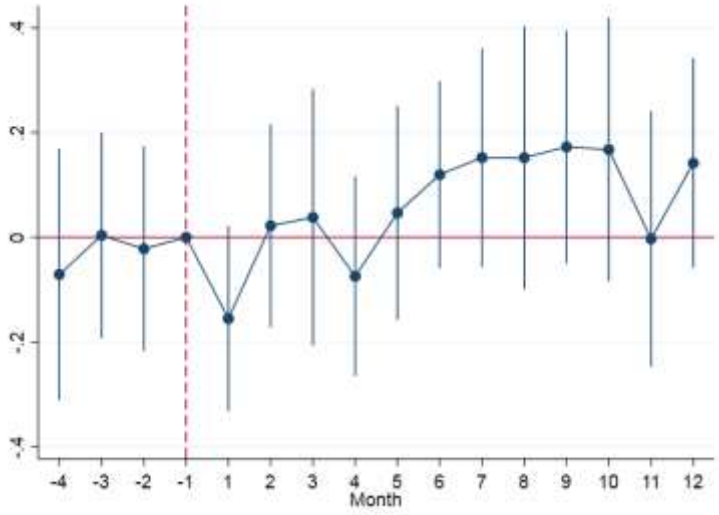
A. Housing lottery location



B. Housing lotteries over time

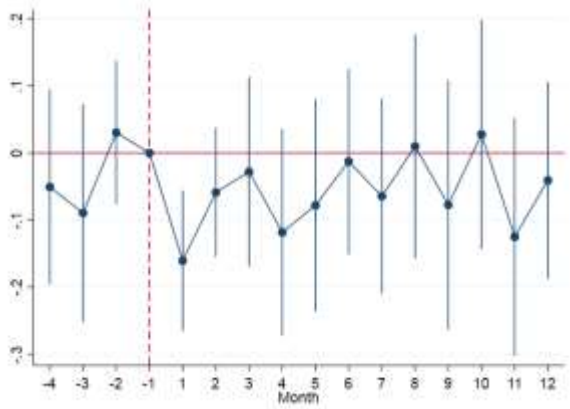
The figures show the geographical location and time distribution of lotteries with more participants than supplied condos in Panels A and B, respectively.

Figure 2: Dynamic Impacts of Home Ownership on Total Expenditures

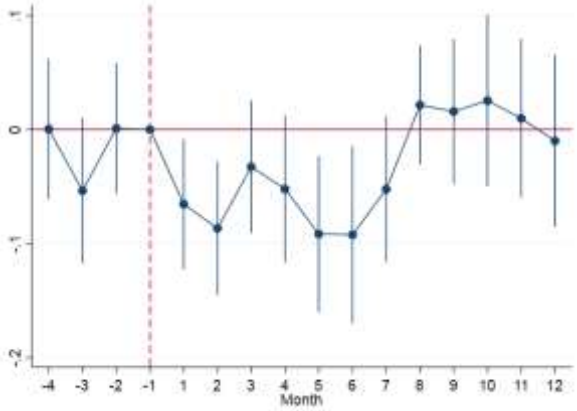


This figure plots the difference-in-differences coefficients in Equation (1). The coefficients compare the logarithms of total monthly spending (excluding estate and tax) between homebuyers and non-homebuyers who participated in the same lottery. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue solid circles represent estimated coefficients. The blue solid vertical lines indicate 90 percent confidence intervals.

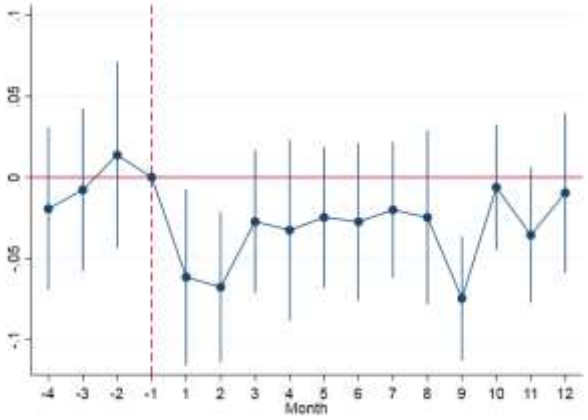
Figure 3: Dynamic Impacts of Home Ownership on Nondurable Goods and Services



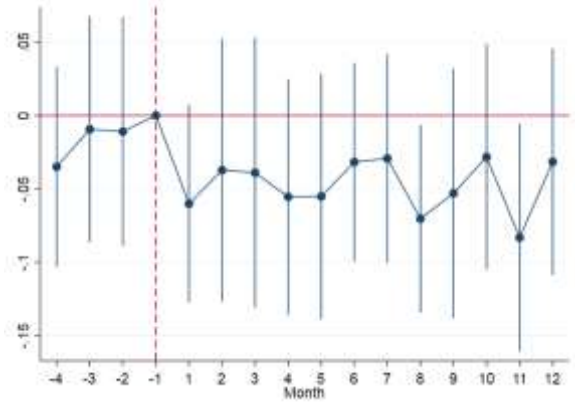
A. Nondurable goods and services



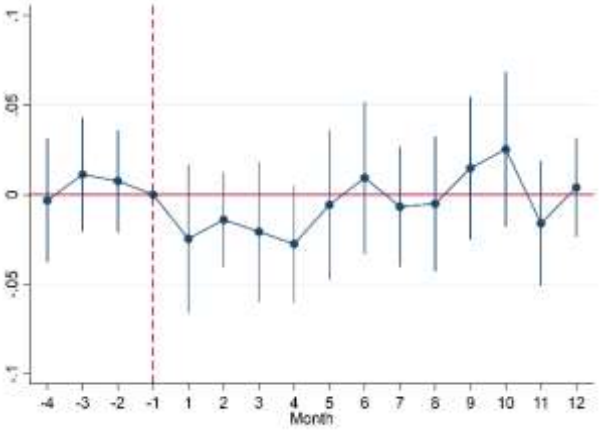
B. Leisure



C. Neighborhood services



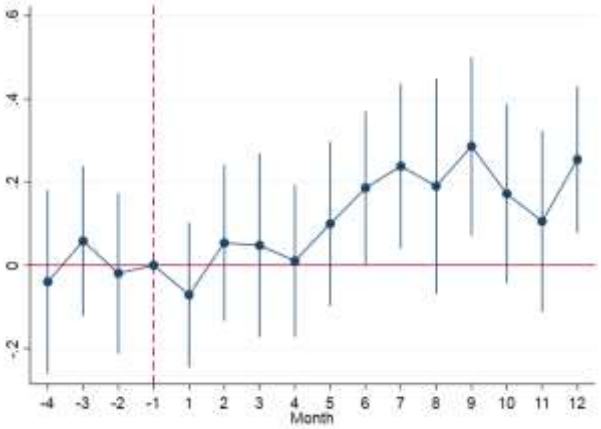
D. Grocery stores and supermarkets



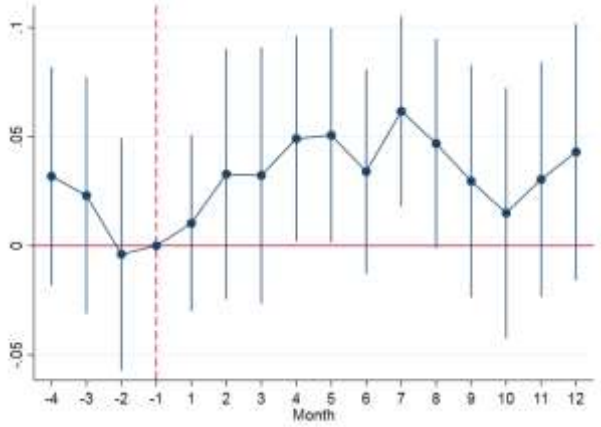
E. Travel

The figures compare nondurable goods and services consumption, as well as associated subcategories between homebuyers and non-homebuyers. The subcategory of nondurable goods and services is displayed in the subtitle of each subplot. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue solid circles represent estimated difference-in-differences coefficients in Equation (1). The blue solid vertical lines indicate 90 percent confidence intervals. The consumption outcomes in all estimates are in logarithms.

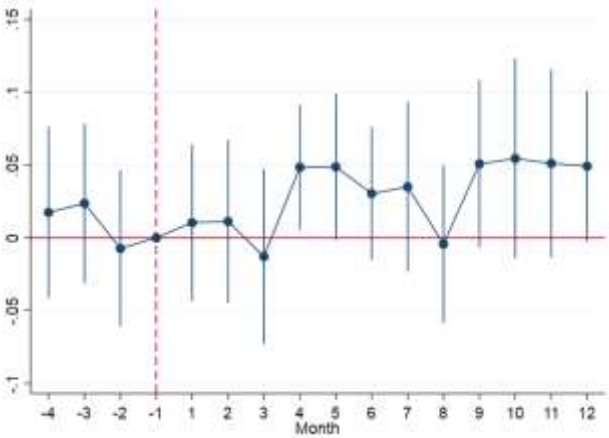
Figure 4: Dynamic Impacts of Home Ownership on Durable Goods Expenditure



A. Durable goods



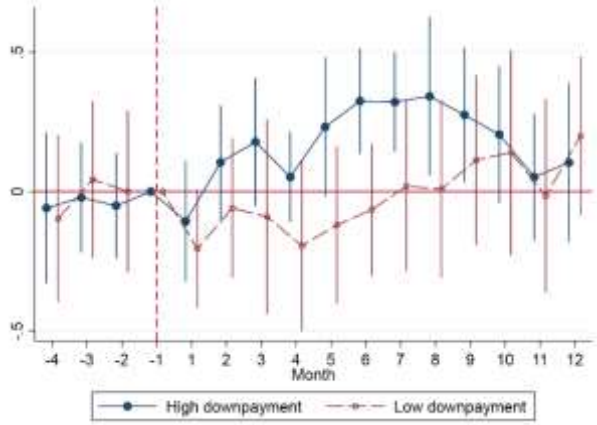
B. Home decorations and furniture



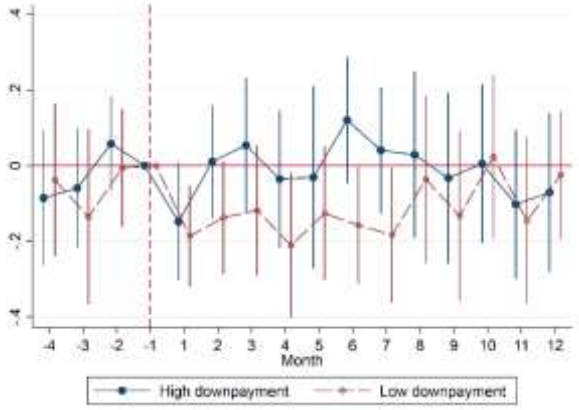
C. Automobiles and maintenance

The figures compare durable goods consumption and associated subcategories between homebuyers and non-home buyers. The subcategory of durable goods consumption is displayed in the subtitle of each subplot. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue solid circles represent estimated difference-in-differences coefficients in Equation (1). The blue solid vertical lines indicate 90 percent confidence intervals. The consumption outcomes in all estimates are in logarithms.

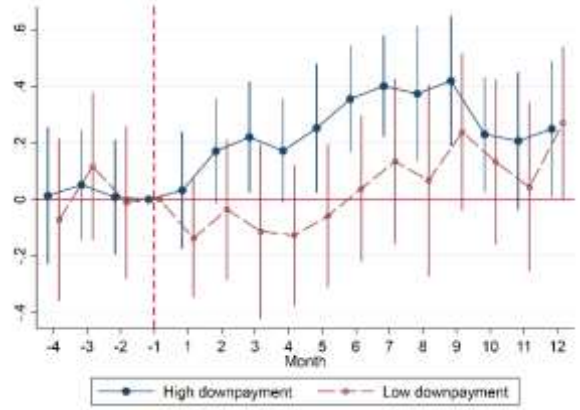
Figure 5: Heterogeneity: Down Payment Size



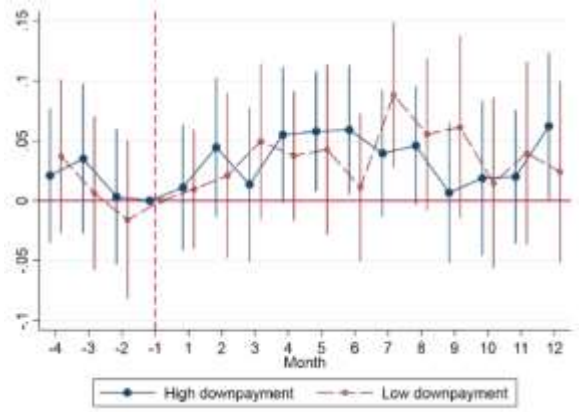
A. Total expenditures



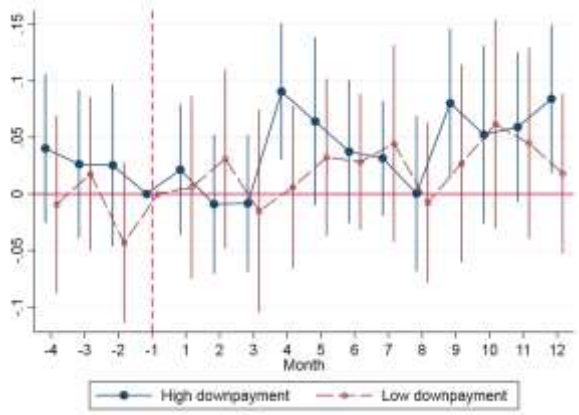
B. Nondurable goods and services



C. Durable goods



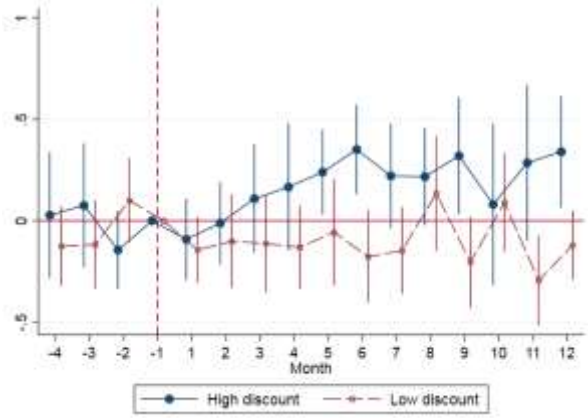
D. Home decorations and furniture



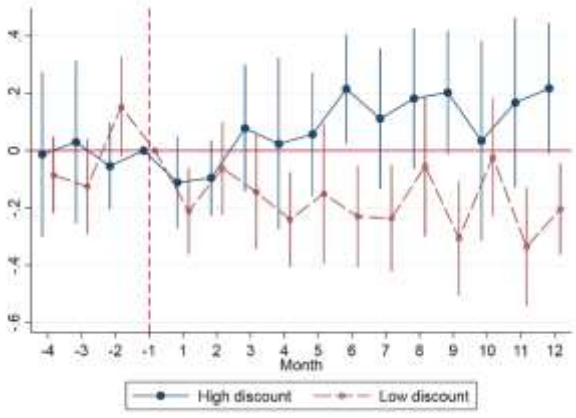
E. Automobiles and maintenance

This figure presents the heterogeneous effects of home ownership on consumption across lottery participants who made different levels of down payments. Within each lottery, we split homebuyers into two subsamples depending on whether they made a down payment above or below the median level of all down payments of the same lottery. We then separately compare consumption dynamics of homebuyers with high (low) down payments to non-homebuyers in the same lottery. The subcategory of consumption is displayed in the subtitle of each subplot. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue solid (red) dots represent difference-in-differences coefficients in Equation (1) by comparing homebuyers and non-homebuyers who pay high (low) down payments. The solid vertical lines indicate 90 percent confidence intervals. The consumption outcomes in all estimates are in logarithms.

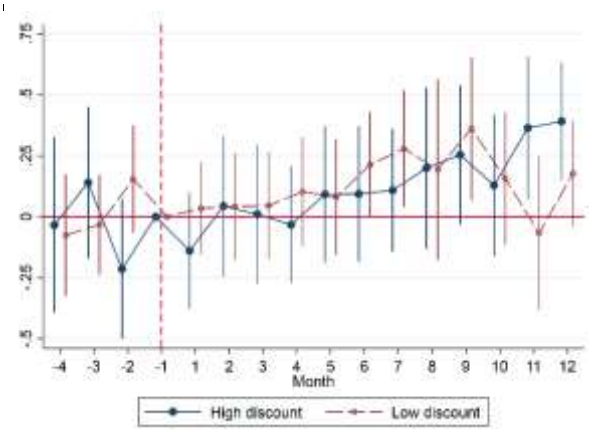
Figure 6: Heterogeneity: Lottery Housing Price Discount



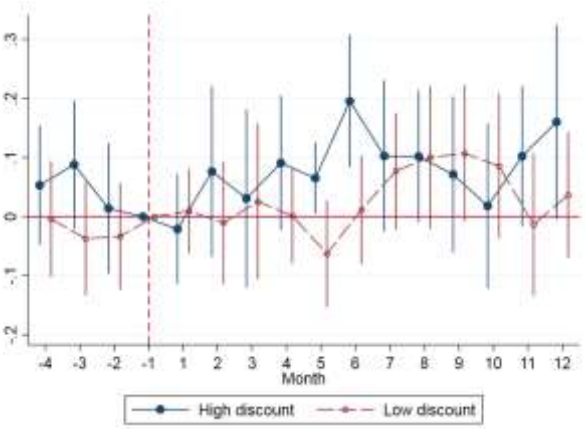
A. Total expenditures



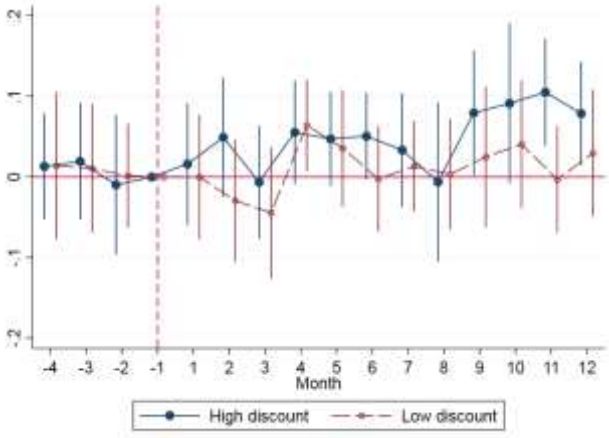
B. Nondurable goods and services



C. Durable goods



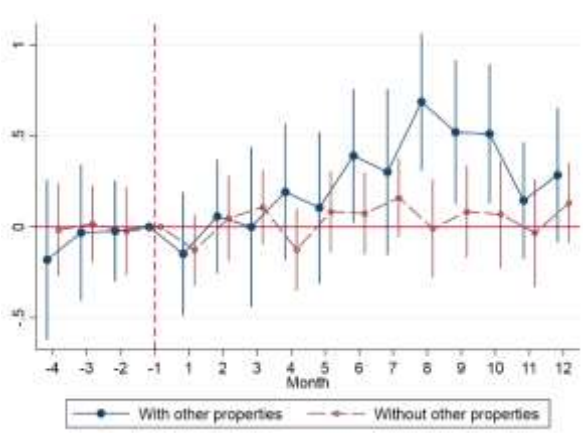
D. Home decorations and furniture



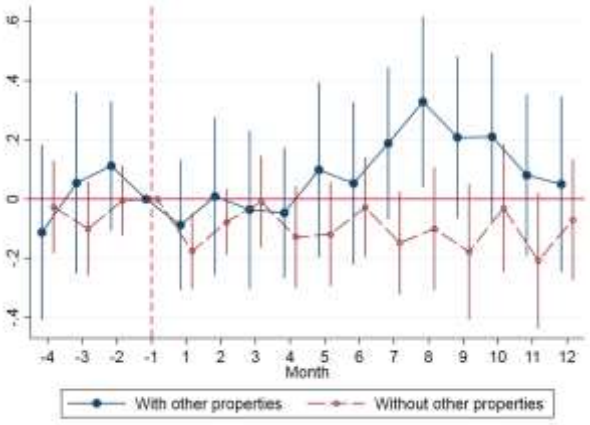
E. Automobiles and maintenance

This figure presents the heterogeneous effects of home ownership on consumption across lottery participants, subject to different levels of lottery housing discounts. We split lotteries into those above and below the median housing price discount. The subcategory of consumption is displayed in the subtitle of each subplot. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue (red) solid circles represent difference-in-differences coefficients in Equation (1) by comparing homebuyers who purchased high-discount (low-discount) lottery condos and non-homebuyers in the same lottery. The solid vertical lines indicate 90 percent confidence intervals. The consumption outcomes in all estimates are in logarithms.

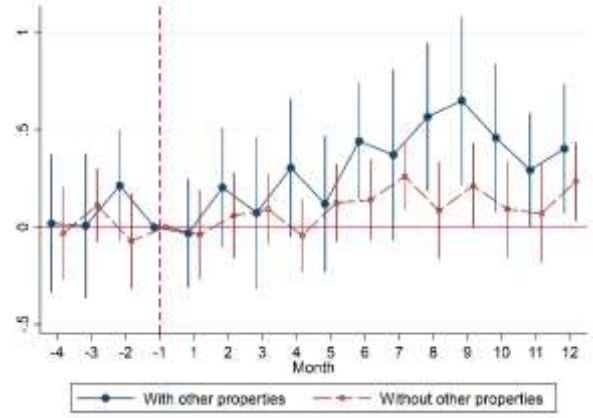
Figure 7: Heterogeneity: With Versus Without Other Properties



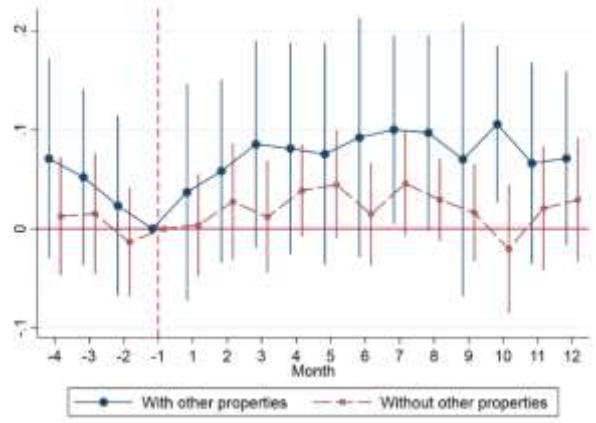
A. Total expenditures



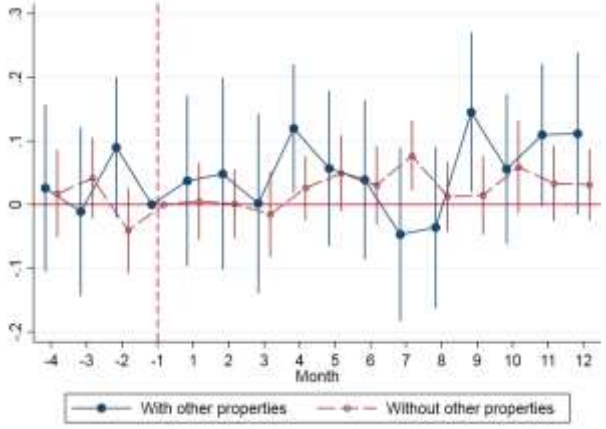
B. Nondurable goods and services



C. Durable goods



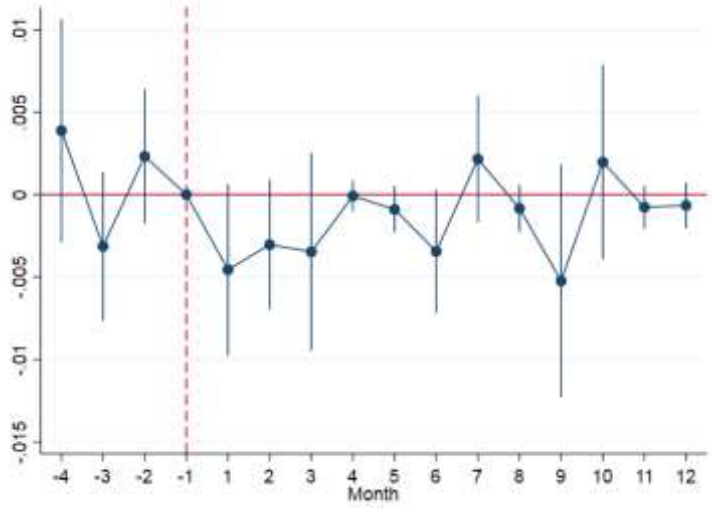
D. Home decorations and furniture



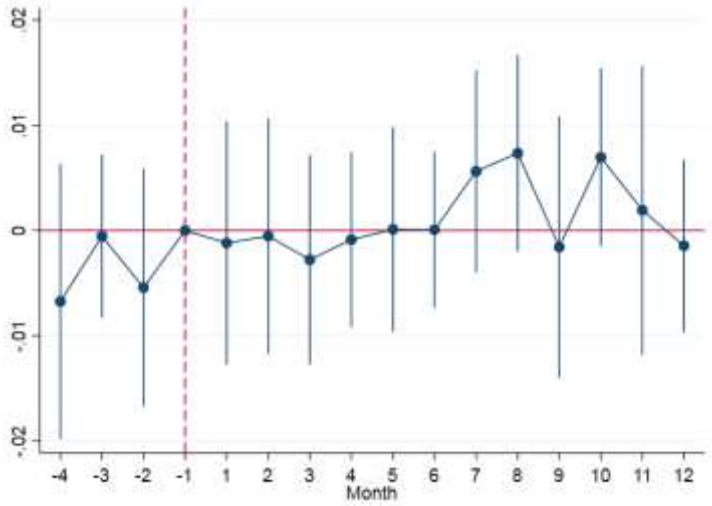
E. Automobiles and maintenance

This figure presents the heterogeneous effects of home ownership on consumption across lottery participants with and without other properties before the lottery. The subcategory of consumption is displayed in the subtitle of each subplot. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue (red) solid circles represent difference-in-differences coefficients in Equation (1) by comparing homebuyers and non-homebuyers who (do not) own other properties at the time of the lottery. The solid vertical dashed lines indicate 90 percent confidence intervals. The consumption outcomes in all estimates are in logarithms.

Figure 8: Alternative Channels: Marriage and Child-related Expenditures



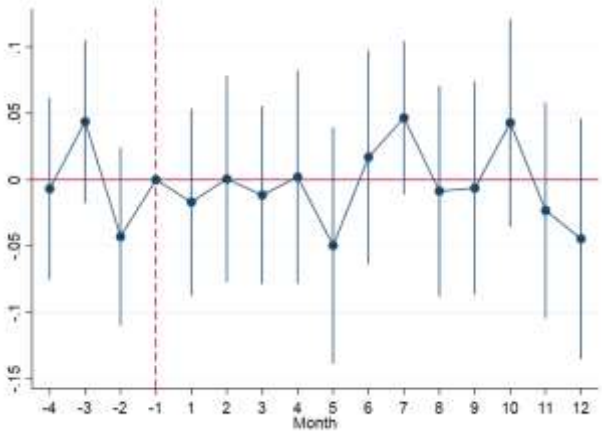
A. Marriage consultation services



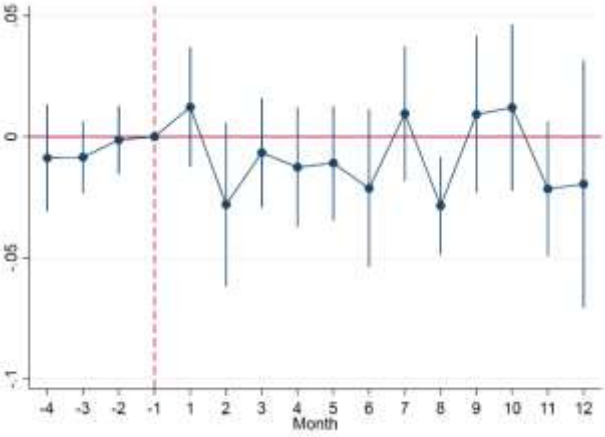
B. Baby-related expenditures

This figure presents the effect of home ownership on monthly consumption in marriage consultation services and baby-related expenditures in Panels A and B, respectively. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue solid circles represent estimated difference-in-differences coefficients in Equation (1). The blue solid vertical lines indicate 90 percent confidence intervals. The consumption outcomes in all estimates are in logarithms.

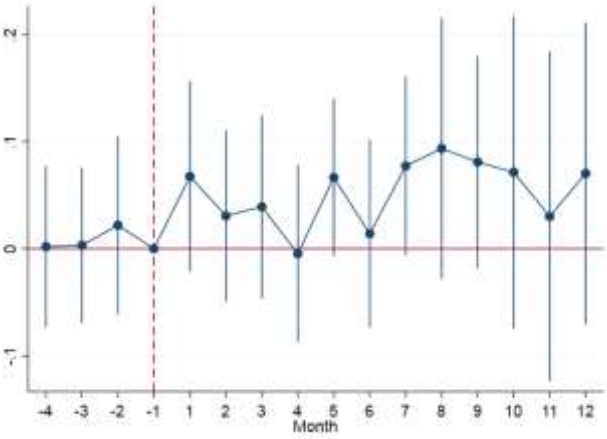
Figure 9: Alternative Channels: Other Payment Methods



A. Credit card payments



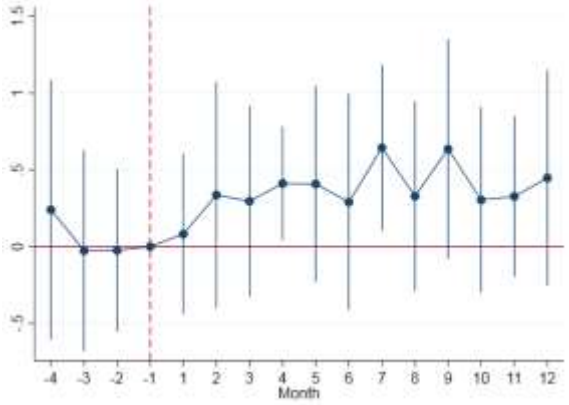
B. Digital wallets



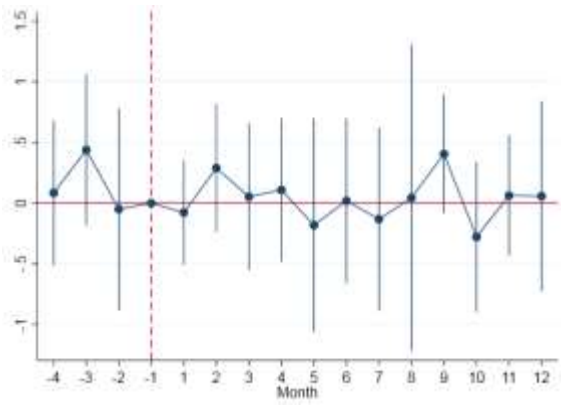
C. Leftover treasures

This figure presents the effect of home ownership on consumption via alternative payment methods. Panel A plots the transfers to credit cards, and Panels B and C show the transfers to digital wallets and leftover treasures, respectively. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue solid circles represent estimated difference-in-differences coefficients in Equation (1). The blue solid vertical lines indicate 90 percent confidence intervals.

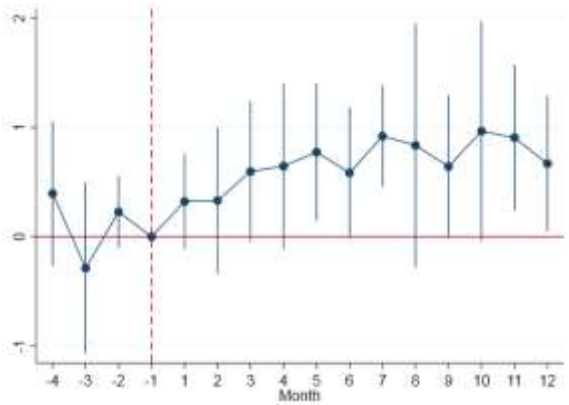
Figure 10: Repeat Lottery Participants: Late Homebuyers versus Repeat Non-homebuyers



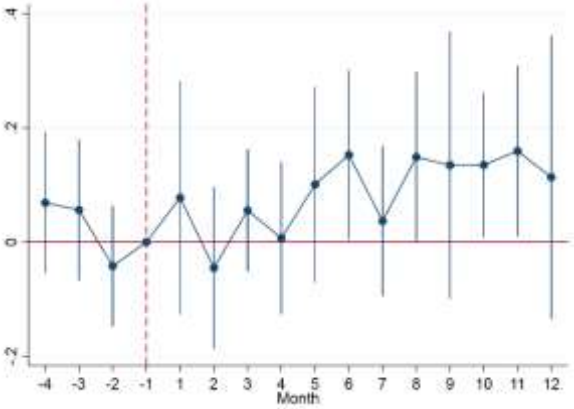
A. Total expenditures



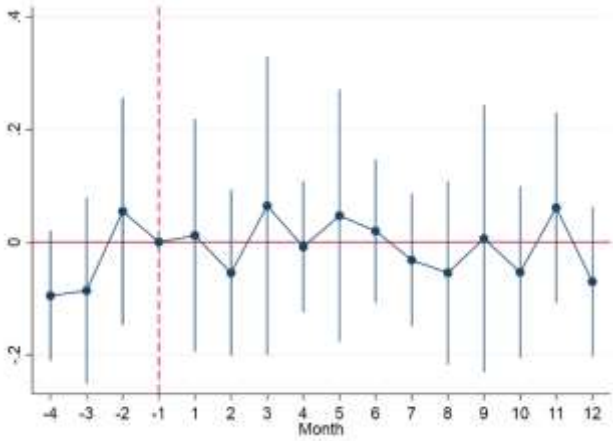
B. Nondurable goods and services



C. Durable goods



D. Home decorations and furniture



E. Automobiles and maintenance

The figures show the consumption difference between repeat lottery participants who did not buy a condo in the first lottery but bought a condo in the second lottery (late homebuyers) and repeat non-homebuyers who appeared in late homebuyers' second lottery and did not buy a condo in either the first or the second lottery. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue solid circles represent estimated difference-in-differences coefficients in Equation (1). The blue solid vertical lines indicate 90 percent confidence intervals. The consumption outcomes in all estimates are in logarithms.

Table 1: Summary Statistics

	(1) N	(2) Mean	(3) S.d.	(4) Min	(5) Max
Panel A Consumption Levels					
Total expenditures	115,958	6,448.36	26,353.19	0	681,137
Total (excl. finance)	115,958	3,310.49	18,581.38	0	651,556
Finance	115,958	3,089.78	17,166.96	0	600,000
Transfer to digital wallet	115,958	20.95	752.39	0	851,82
Transfer to leftover treasure	115,958	1359.98	14164.96	0	890,567
Credit cards	115,958	361.22	2,162.76	0	17,679
ATM	115,958	429.49	2,291.16	0	80,300
Nondurable goods & services	115,958	1739.35	10459.15	0	380,840
Leisure	115,958	390.84	6,661.87	0	633,840
Neighborhood services	115,958	225.22	5,768.24	0	478,748
Grocery stores & supermarkets	115,958	206.17	2,607.92	0	208,251
Travel	115,958	73.89	1966.52	0	168,000
Durable goods	115,958	1730.69	17783.06	0	910,500
Home decorations & furniture	115,958	632.52	22724.73	0	2,000,000
Automobiles & maintenance	115,958	790.01	16654.55	0	784,660
Panel B: Logarithm of Consumption Levels					
Ln(Total)	115,958	3.37	4.04	0	13.43
Ln(Total (excl. finance))	115,958	2.20	3.45	0	13.39
Ln(Finance)	115,958	1.68	3.40	0	13.3
Ln(Transfer to digital wallet)	115,958	0.06	0.58	0	11.35
Ln(Transfer to leftover treasure)	115,958	0.41	1.88	0	13.70
Ln(Credit cards)	115,958	0.40	1.79	0	9.75
Ln(ATM)	115,958	0.75	2.32	0	11.29
Ln(Nondurable goods & services)	115,958	1.77	3.14	0	12.85
Ln(Leisure)	115,958	0.30	1.46	0	13.36
Ln(Neighborhood services)	115,958	0.13	0.97	0	13.08
Ln(Grocery stores & supermarkets)	115,958	0.39	1.56	0	12.25
Ln(Travel)	115,958	0.11	0.81	0	12.03
Ln(Durable goods)	115,958	0.68	2.18	0	13.72
Ln(Home decorations & furniture)	115,958	0.08	0.88	0	14.51
Ln(Automobiles & maintenance)	115,958	0.11	1.01	0	13.57

The table presents the summary statistics of lottery participants' monthly consumption within four months before and 12 months after the lottery. Our sample includes lotteries with more lottery participants than the number of supplied condos from 2017 to 2019. Panel A summarizes consumption levels by various categories, and Panel B presents summary statistics of the logarithm of one plus consumption by various categories. See Appendix 1 for more detailed definitions. All variables are winsorized at the top and bottom 1%.

Table 2. Pre-lottery Differences in Consumption between Homebuyers and Non-homebuyers

Panel A: Total and Finance-related Consumption

	(1)	(2)	(3)	(4)	(5)
Dep. var.:	Total expenditures	Total (excl. finance)	Finance	Mobile payment accounts	Credit cards
Homebuyer	0.033	0.065	0.0023	0.040	-0.00011
	(0.064)	(0.065)	(0.061)	(0.035)	(0.042)
N	23,175	23,175	23,175	23,175	23,175
R^2	0.024	0.026	0.01	0.017	0.012

Panel B: Non-durable Goods and Services

Dep. var.:	Nondurable goods & services	Leisure	Grocery stores & supermarkets	Neighborhood services	Travel
Homebuyer	0.077	0.036	0.042	0.027	-0.0046
	(0.054)	(0.03)	(0.028)	(0.021)	(0.0012)
N	23,175	23,175	23,175	23,175	23,175
R^2	0.032	0.0080	0.015	0.005	0.0058

Panel C: Durable Goods

	(1)	(2)	(3)
Dep. var.:	Durable goods	Home decorations & furniture	Automobiles & maintenance
Homebuyer	-0.0065	-0.023	0.00086
	(0.034)	(0.021)	(0.0019)
N	23,175	23,175	23,175
R^2	0.0082	0.0094	0.0021
Lottery FE	Yes	Yes	Yes
YearMonth FE	Yes	Yes	Yes

This table examines the differences in monthly consumption and subcategories (in logarithms) between homebuyers and non-homebuyers within four months before the lottery. We report estimated coefficients θ following Equation (2). We take the logarithm of one plus monthly consumption or various categories as outcome variables. See Appendix 1 for more detailed definitions. $Homebuyer$ is an indicator variable that equals one if the card has ever made a home purchase after the lottery, and zero otherwise. We control for lottery fixed effects and calendar year-month fixed effects. Standard errors are clustered at the lottery level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 3: Housing Lottery and Consumption

	(1)	(2)	(3)	(4)
Dep. Var.:	Total expenditures	Total (excl. finance)	Nondurable goods & services	Durable goods
$Month_{l,-4} \times Homebuyer$	-0.022	0.059	0.03	-0.019
	(0.12)	(0.078)	(0.064)	(0.12)
$Month_{l,-3} \times Homebuyer$	0.0038	0.071	-0.09	0.058
	(0.12)	(0.11)	(0.097)	(0.11)
$Month_{l,-2} \times Homebuyer$	-0.071	0.071	-0.051	-0.04
	(0.14)	(0.1)	(0.087)	(0.13)
$Month_{l,1} \times Homebuyer$	-0.16	-0.11	-0.16**	-0.071
	(0.11)	(0.077)	(0.062)	(0.10)
$Month_{l,2} \times Homebuyer$	0.022	-0.018	-0.059	0.054
	(0.12)	(0.09)	(0.057)	(0.11)
$Month_{l,3} \times Homebuyer$	0.038	0.024	-0.028	0.048
	(0.15)	(0.11)	(0.084)	(0.13)
$Month_{l,4} \times Homebuyer$	-0.075	-0.0033	-0.12	0.010
	(0.11)	(0.1)	(0.092)	(0.11)
$Month_{l,5} \times Homebuyer$	0.047	0.074	-0.078	0.10
	(0.12)	(0.1)	(0.094)	(0.12)
$Month_{l,6} \times Homebuyer$	0.12	0.097	-0.013	0.19*
	(0.11)	(0.1)	(0.082)	(0.11)
$Month_{l,7} \times Homebuyer$	0.15	0.059	-0.064	0.24**
	(0.12)	(0.1)	(0.087)	(0.12)
$Month_{l,8} \times Homebuyer$	0.15	0.14	0.0099	0.19
	(0.15)	(0.11)	(0.099)	(0.15)
$Month_{l,9} \times Homebuyer$	0.17	0.047	-0.077	0.29**
	(0.13)	(0.13)	(0.11)	(0.13)
$Month_{l,10} \times Homebuyer$	0.17	0.12	0.028	0.17
	(0.15)	(0.12)	(0.1)	(0.13)
$Month_{l,11} \times Homebuyer$	-0.0031	-0.036	-0.13	0.11
	(0.15)	(0.13)	(0.11)	(0.13)
$Month_{l,12} \times Homebuyer$	0.14	0.069	-0.041	0.25**
	(0.12)	(0.098)	(0.087)	(0.11)
$Month_{l,-4}$	-0.03	-0.041	-0.033	0.011
	(0.11)	(0.077)	(0.061)	(0.1)
$Month_{l,-3}$	-0.097	-0.12	0.044	-0.05
	(0.13)	(0.11)	(0.092)	(0.10)
$Month_{l,-2}$	-0.051	-0.14	0.045	-0.00035
	(0.2)	(0.15)	(0.14)	(0.16)
$Month_{l,1}$	-0.064	-0.017	0.0041	-0.027
	(0.12)	(0.081)	(0.067)	(0.11)
$Month_{l,2}$	-0.24	-0.066	-0.077	-0.19
	(0.16)	(0.11)	(0.083)	(0.15)
$Month_{l,3}$	-0.40*	-0.20	-0.23	-0.23

	(0.24)	(0.17)	(0.15)	(0.2)
$Month_{l,4}$	-0.39	-0.23	-0.24	-0.24
	(0.28)	(0.22)	(0.19)	(0.23)
$Month_{l,5}$	-0.49	-0.23	-0.22	-0.42
	(0.3)	(0.23)	(0.2)	(0.26)
$Month_{l,6}$	-0.64	-0.34	-0.37	-0.48
	(0.41)	(0.3)	(0.28)	(0.34)
$Month_{l,7}$	-0.6	-0.25	-0.36	-0.44
	(0.47)	(0.35)	(0.32)	(0.37)
$Month_{l,8}$	-0.65	-0.33	-0.42	-0.47
	(0.52)	(0.37)	(0.35)	(0.42)
$Month_{l,9}$	-0.77	-0.31	-0.45	-0.60
	(0.61)	(0.45)	(0.4)	(0.49)
$Month_{l,10}$	-0.85	-0.39	-0.58	-0.61
	(0.67)	(0.48)	(0.46)	(0.54)
$Month_{l,11}$	-0.64	-0.28	-0.46	-0.47
	(0.71)	(0.5)	(0.47)	(0.57)
$Month_{l,12}$	-0.97	-0.52	-0.72	-0.71
	(0.83)	(0.6)	(0.55)	(0.64)
Card FE	Y	Y	Y	Y
YearMonth FE	Y	Y	Y	Y
N	115,958	115,958	115,958	115,958
R^2	0.35	0.34	0.36	0.32

This table presents results from estimating Equation (1) by comparing monthly consumption between homebuyers and non-home buyers for four months before and 12 months after the housing lottery. $Homebuyer$ is an indicator variable that equals one if the cardholder made a home purchase after the lottery, and zero otherwise. For each lottery, $Month_{l,t}$ is a dummy variable equal to one if it is monthly t relative to the lottery date of lottery l. The dependent variables in Columns (1) to (4) include total expenditures, total expenditures excluding financial transactions, nondurable goods and services expenditures, and durable goods expenditures, respectively. The consumption outcomes in all estimates are in logarithms. See Appendix 1 for more detailed definitions. All columns include card fixed effects and calendar year by month fixed effects. Standard errors are presented in parentheses and clustered at the lottery level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4: Housing Lottery and Nondurable Goods and Services Consumption

	(1)	(2)	(3)	(4)
Dep. Var.:	Leisure	Neighborhood services	Grocery stores & supermarkets	Travel
$Month_{l,-4} \times Homebuyer$	0.00098	0.013	-0.011	0.0076
	(0.034)	(0.034)	(0.046)	(0.017)
$Month_{l,-3} \times Homebuyer$	-0.054	-0.0082	-0.0094	0.011
	(0.038)	(0.03)	(0.046)	(0.019)
$Month_{l,-2} \times Homebuyer$	0.00031	-0.02	-0.034	-0.0032
	(0.037)	(0.03)	(0.041)	(0.021)
$Month_{l,1} \times Homebuyer$	-0.065*	-0.062*	-0.06	-0.025
	(0.034)	(0.032)	(0.04)	(0.025)
$Month_{l,2} \times Homebuyer$	-0.087**	-0.068**	-0.037	-0.014
	(0.035)	(0.028)	(0.053)	(0.016)
$Month_{l,3} \times Homebuyer$	-0.033	-0.028	-0.039	-0.021
	(0.035)	(0.026)	(0.055)	(0.023)
$Month_{l,4} \times Homebuyer$	-0.052	-0.033	-0.055	-0.028
	(0.038)	(0.033)	(0.048)	(0.02)
$Month_{l,5} \times Homebuyer$	-0.092**	-0.025	-0.055	-0.0057
	(0.041)	(0.026)	(0.05)	(0.025)
$Month_{l,6} \times Homebuyer$	-0.092*	-0.028	-0.031	0.0094
	(0.046)	(0.029)	(0.04)	(0.025)
$Month_{l,7} \times Homebuyer$	-0.052	-0.021	-0.029	-0.0067
	(0.038)	(0.025)	(0.042)	(0.02)
$Month_{l,8} \times Homebuyer$	0.021	-0.025	-0.070*	-0.0051
	(0.031)	(0.032)	(0.038)	(0.022)
$Month_{l,9} \times Homebuyer$	0.016	-0.075***	-0.053	0.015
	(0.038)	(0.023)	(0.051)	(0.024)
$Month_{l,10} \times Homebuyer$	0.025	-0.0066	-0.029	0.025
	(0.045)	(0.023)	(0.046)	(0.026)
$Month_{l,11} \times Homebuyer$	0.0098	-0.036	-0.083*	-0.016
	(0.041)	(0.025)	(0.046)	(0.021)
$Month_{l,12} \times Homebuyer$	-0.01	-0.01	-0.031	0.004
	(0.045)	(0.029)	(0.046)	(0.016)
$Month_{l,-4}$	-0.0047	-0.026	0.058	-0.0066
	(0.022)	(0.022)	(0.035)	(0.018)
$Month_{l,-3}$	0.05	-0.017	0.085	-0.0016
	(0.033)	(0.03)	(0.053)	(0.023)
$Month_{l,-2}$	0.069*	-0.00073	0.091	-0.0017
	(0.04)	(0.033)	(0.073)	(0.029)
$Month_{l,1}$	0.023	0.021	-0.025	0.0076
	(0.03)	(0.029)	(0.031)	(0.025)
$Month_{l,2}$	0.0054	0.0053	-0.085*	-0.0026
	(0.041)	(0.028)	(0.049)	(0.028)
$Month_{l,3}$	-0.076	-0.041	-0.12*	-0.012

	(0.052)	(0.034)	(0.062)	(0.042)
$Month_{l,4}$	-0.087	-0.049	-0.14**	-0.034
	(0.064)	(0.05)	(0.065)	(0.042)
$Month_{l,5}$	-0.10	-0.065	-0.11	-0.048
	(0.067)	(0.051)	(0.085)	(0.055)
$Month_{l,6}$	-0.11	-0.053	-0.18*	-0.053
	(0.089)	(0.056)	(0.10)	(0.06)
$Month_{l,7}$	-0.15*	-0.068	-0.22*	-0.05
	(0.085)	(0.069)	(0.12)	(0.062)
$Month_{l,8}$	-0.24**	-0.051	-0.23*	-0.057
	(0.097)	(0.082)	(0.13)	(0.077)
$Month_{l,9}$	-0.22*	-0.045	-0.26	-0.072
	(0.11)	(0.09)	(0.16)	(0.085)
$Month_{l,10}$	-0.29**	-0.091	-0.36**	-0.091
	(0.12)	(0.10)	(0.17)	(0.096)
$Month_{l,11}$	-0.26*	-0.077	-0.30	-0.067
	(0.14)	(0.10)	(0.19)	(0.10)
$Month_{l,12}$	-0.29*	-0.088	-0.38*	-0.085
	(0.15)	(0.12)	(0.21)	(0.11)
Card FE	Y	Y	Y	Y
YearMonth FE	Y	Y	Y	Y
N	115,958	115,958	115,958	115,958
R^2	0.32	0.23	0.26	0.25

This table presents results from estimating Equation (1) by comparing monthly consumption between homebuyers and non-homebuyers for four months before and 12 months after the housing lottery. $Homebuyer$ is an indicator variable that equals one if the cardholder made a home purchase after the lottery, and zero otherwise. For each lottery, $Month_{l,t}$ is a dummy variable equal to one if it is monthly t relative to the lottery date of lottery l. The dependent variables from Columns (1) to (4) include expenditures on leisure, neighborhood services, grocery stores and supermarkets, and travel, respectively. The consumption outcomes in all estimates are in logarithms. See Appendix 1 for more detailed definitions. All columns include card fixed effects and calendar year by month fixed effects. Standard errors are presented in parentheses and clustered at the lottery level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Housing Lottery and Durable Goods Consumption

	(1)	(2)
Dep. Var.:	Home decorations & furniture	Automobiles & maintenance
$Month_{l,-4} \times Homebuyer$	-0.0044	-0.0073
	(0.032)	(0.032)
$Month_{l,-3} \times Homebuyer$	0.023	0.024
	(0.032)	(0.033)
$Month_{l,-2} \times Homebuyer$	0.031	0.017
	(0.03)	(0.035)
$Month_{l,1} \times Homebuyer$	0.0099	0.01
	(0.024)	(0.032)
$Month_{l,2} \times Homebuyer$	0.032	0.011
	(0.034)	(0.033)
$Month_{l,3} \times Homebuyer$	0.032	-0.013
	(0.035)	(0.036)
$Month_{l,4} \times Homebuyer$	0.049*	0.048*
	(0.028)	(0.026)
$Month_{l,5} \times Homebuyer$	0.050*	0.049
	(0.029)	(0.03)
$Month_{l,6} \times Homebuyer$	0.033	0.03
	(0.028)	(0.027)
$Month_{l,7} \times Homebuyer$	0.061**	0.035
	(0.026)	(0.035)
$Month_{l,8} \times Homebuyer$	0.046	-0.0043
	(0.029)	(0.032)
$Month_{l,9} \times Homebuyer$	0.029	0.051
	(0.032)	(0.034)
$Month_{l,10} \times Homebuyer$	0.015	0.054
	(0.034)	(0.041)
$Month_{l,11} \times Homebuyer$	0.03	0.051
	(0.032)	(0.038)
$Month_{l,12} \times Homebuyer$	0.042	0.049
	(0.035)	(0.031)
$Month_{l,-4}$	0.033	0.018
	(0.026)	(0.026)
$Month_{l,-3}$	-0.02	-0.03
	(0.029)	(0.034)
$Month_{l,-2}$	-0.021	-0.022
	(0.032)	(0.04)
$Month_{l,1}$	-0.0082	0.0037
	(0.02)	(0.024)
$Month_{l,2}$	-0.032	0.0048
	(0.028)	(0.035)
$Month_{l,3}$	-0.038	0.054
	(0.032)	(0.046)
$Month_{l,4}$	-0.042	0.029

	(0.039)	(0.048)
$Month_{l,5}$	-0.054	0.037
	(0.043)	(0.056)
$Month_{l,6}$	-0.019	0.019
	(0.048)	(0.068)
$Month_{l,7}$	-0.042	0.045
	(0.058)	(0.076)
$Month_{l,8}$	-0.033	0.063
	(0.069)	(0.087)
$Month_{l,9}$	-0.018	0.07
	(0.077)	(0.099)
$Month_{l,10}$	-0.011	0.052
	(0.085)	(0.1)
$Month_{l,11}$	-0.038	0.06
	(0.093)	(0.12)
$Month_{l,12}$	-0.039	0.075
	(0.1)	(0.13)
Card FE	Y	Y
YearMonth FE	Y	Y
N	115,958	115,958
R^2	0.14	0.12

This table presents results from estimating Equation (1) by comparing monthly consumption between homebuyers and non-homebuyers for four months before and 12 months after the housing lottery. $Homebuyer$ is an indicator variable that equals one if the cardholder made a home purchase from the lottery during the sample period, and zero otherwise. For each lottery, $Month_{l,t}$ is a dummy variable equal to one if it is monthly *t* relative to the lottery date of lottery *l*. The dependent variables from Columns (1) to (2) include expenditures on decoration and furniture, and automobiles and maintenance, respectively. The consumption outcomes in all estimates are in logarithms. See Appendix 1 for more detailed definitions. All columns include card fixed effects and calendar year by month fixed effects. Standard errors are presented in parentheses and clustered at the lottery level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Appendix 1: Variable Definitions

Variable Name	Definition
Total expenditures	Total expenditures excluding tax payments and real estate transactions
Total (excl. finance)	*Total expenditures* minus finance-related expenditures
Nondurable goods and services	Neighborhood services, grocery and supermarkets, clothes, leisure, travel, accommodations, restaurants, commercial services, education, food retail, social organizations, educational services
Neighborhood services	Beauty shops and barbershops, funeral and interment services, laundry services, interior cleaning services, marriage consultant and escort services, photography studios, parking lots, photo developing services, public utilities
Leisure	Telecommunication services, computer network/information services, TV services, internet cafés, country club and private golf courses, mobile touring cars and camping sites, performance and ticket services, healthcare and hairdressing spas, tourism sites and exhibitions, aquariums, dancing halls, billiards, bowling alleys, lottery sales, arcade games and game places, cinemas, sports and entertainment camping, message shops, amusement parks, circuses, commercial stadiums, sports clubs and courses
Grocery and supermarkets	Varieties of grocery and convenience stores
Clothes	Clothes shops
Travel	Railway transportation, highway transportation, taxi services, airliners, airport services, bus and metro transportation, toll charges, ship and cruise route services
Durable goods	Decoration & renovation, home appliances & furniture, personal electronics, medical equipment, automobile, jewelry
Home decorations and furniture	Buildings, project and measurement services, landscaping and horticultural services, drapery, curtains, interior decoration shops, wall furnaces, hardware shops, timber and various building materials shops, glass, paint coatings, wallpaper retail shops, lawn services, garden articles shops, furniture, household appliances
Automobiles and maintenance	Automobiles, camping and touring car dealers, travel trailers, entertainment automobile dealers, motorcycle stores and dealers, mobile touring car distributors, automobile parts stores, auto tire dealers, automobile sales service shops

Finance expenditures	Credit card payments, Transfer to digital wallets, Transfer to leftover treasures, foreign currency exchanges, stock brokers, over-the-counter cash, automatic teller machines, insurance
Transfer to digital wallets	Bank transfers to balance accounts of mobile payment accounts
Leftover treasures	Bank transfers to investment accounts of mobile pay accounts
Credit card payments	Transfers to credit cards
Marriage consultation services	Marriage consultant and escort services
Baby-related expenditures	Child care services (including pre-school education), infant and child garment shops

Figure A.1: A Lottery Example: Financial Street Rongfu

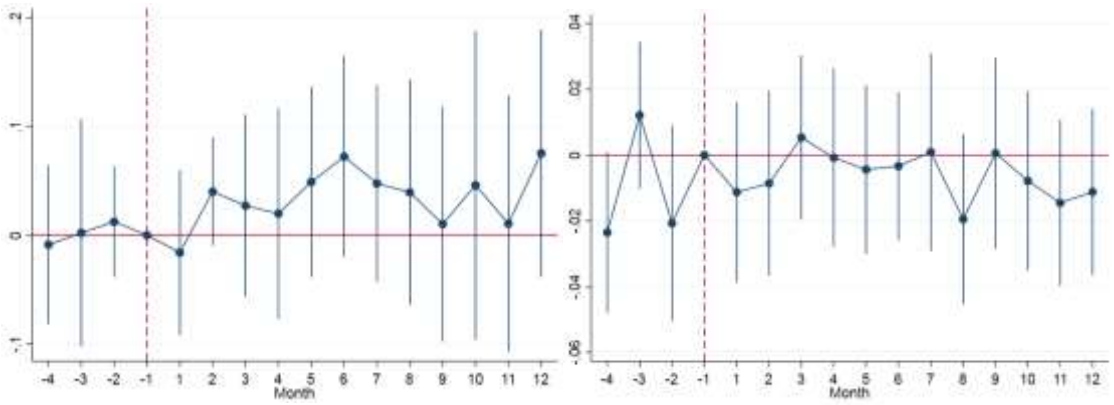
A. Location

排序结果顺序号	姓名	身份证件号码	认购编号
23	周*龙等二人	321025********8835	R00580
24	张*原	341204********0015	R00488
25	从*	321084********0047	R00125
26	徐*	310110********4480	R00460
27	林*捷	310107********2514	R00208
28	朱*	310110********4274	R00060
29	邹*霆等二人	310108********1533	R00001
30	汤*栋	310104********2852	R00579
31	沈*琳	310230********1469	R00104
32	陈*	310110********4614	R00242
33	王*菱	310113********1940	R00307
34	张*进	321102********6335	R00475
35	周*成	420102********1023	R00160
36	何*军	320924********2932	R00069

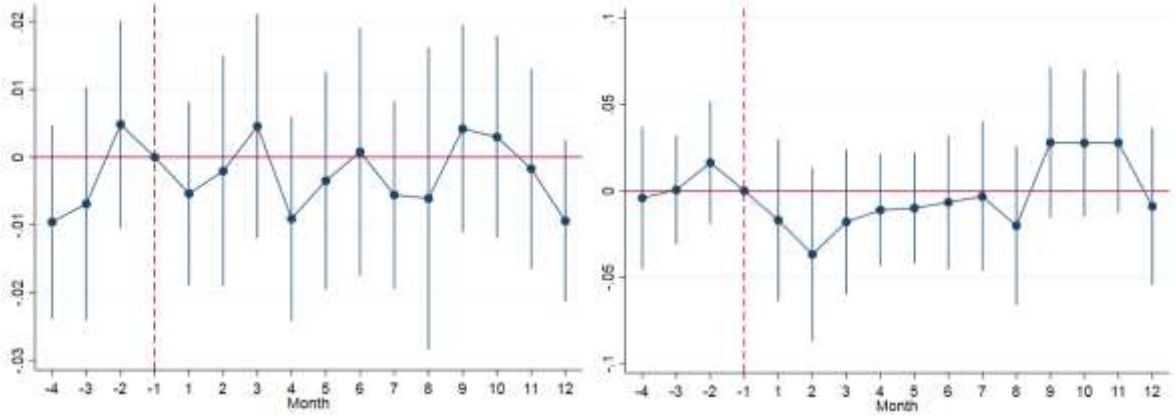
B. Lottery outcomes

Figure A.1 illustrates an example of a newly-built residential housing lottery: that of Financial Street Rongfu. Panel A shows the location of the compound in a map (marked in red). Panel B shows the lottery outcomes disclosed online on July 26, 2018. The four columns present ranking numbers, partially anonymized names, partially anonymized social IDs, and lottery participation identifiers, respectively.

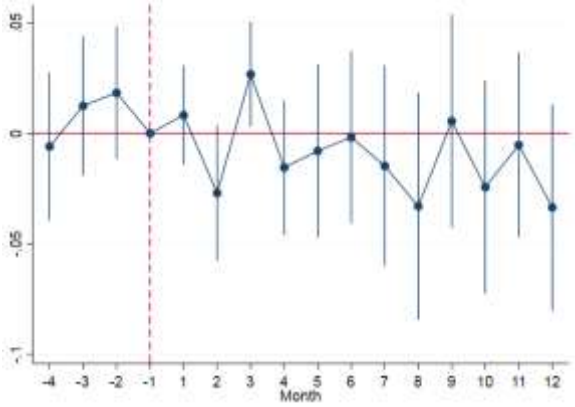
Figure A.2: The Impact of Housing Lottery on Other Consumption Categories



A. Restaurants B. Social organization



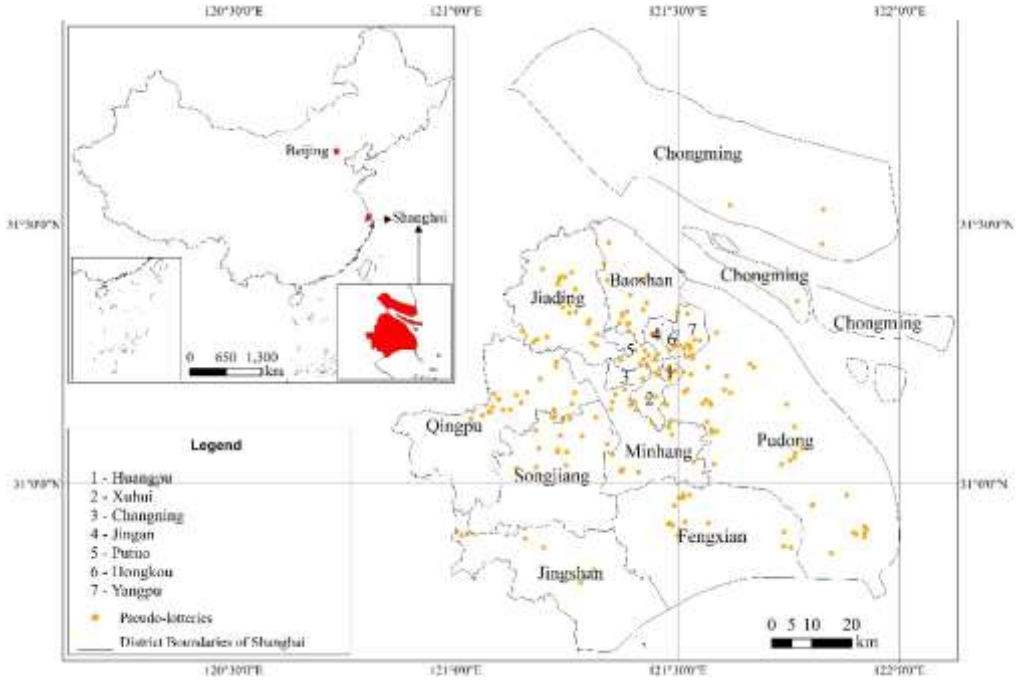
C. Jewelry D. Insurance



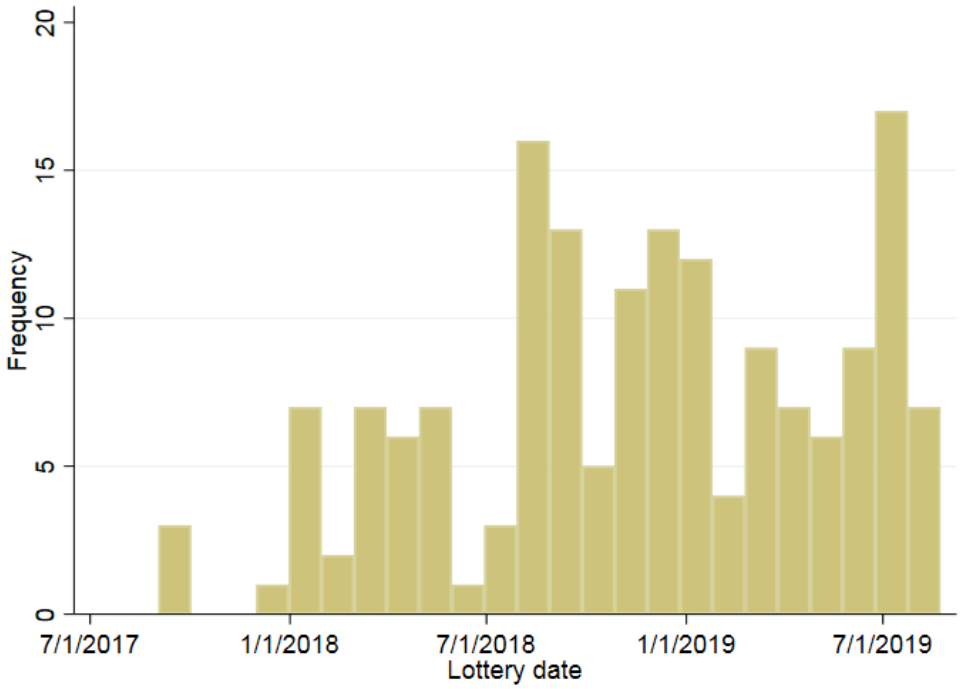
E. Education service

This figure presents the effect of home ownership on the logarithm of total weekly consumption via alternative payment methods. Each subcategory is listed in the subtitle below each plot. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue solid circles represent estimated difference-in-differences coefficients in Equation (2). The solid vertical lines indicate 90 percent confidence intervals.

Figure A.3: Pseudo-lotteries in Shanghai



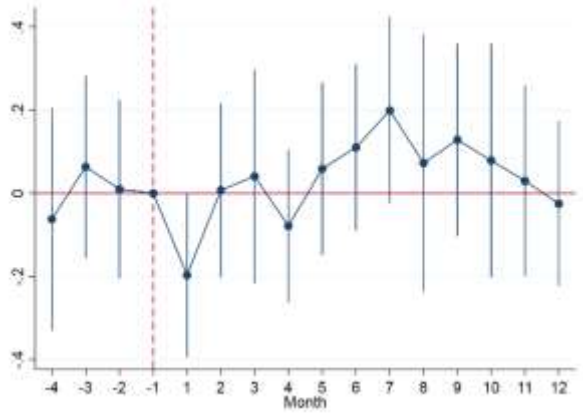
A. Locations



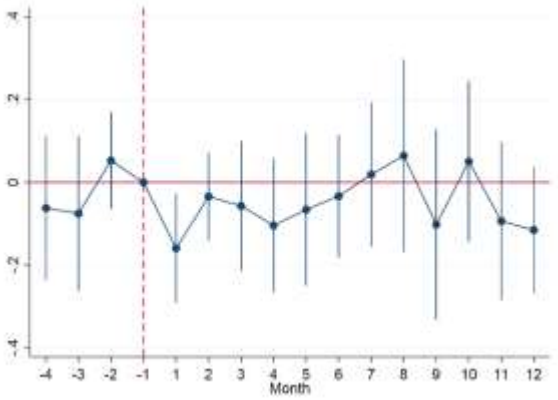
B. Housing lotteries over time

The figures show the geographical and time distributions of pseudo-lotteries with fewer participants than supplied condos in Panels A and B, respectively.

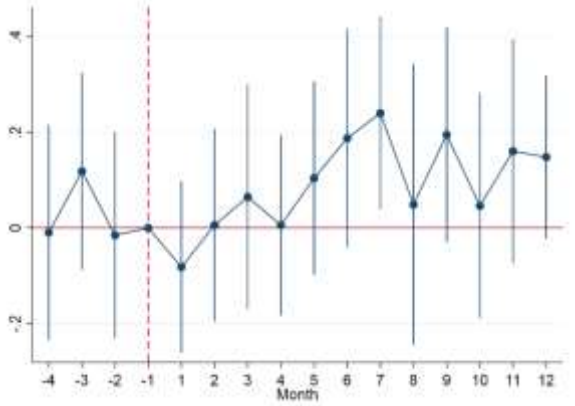
Figure A.4: Popular vs Unpopular Lotteries



Total expenditure

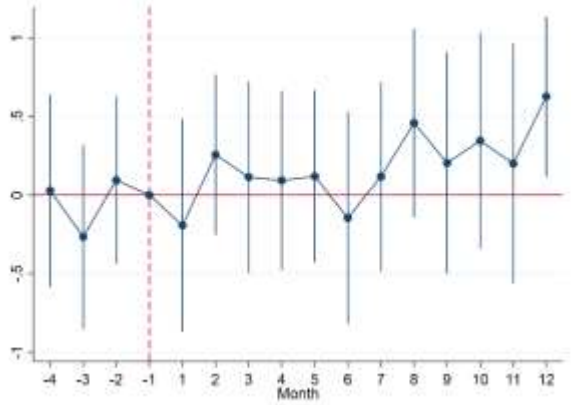


Nondurable goods and services

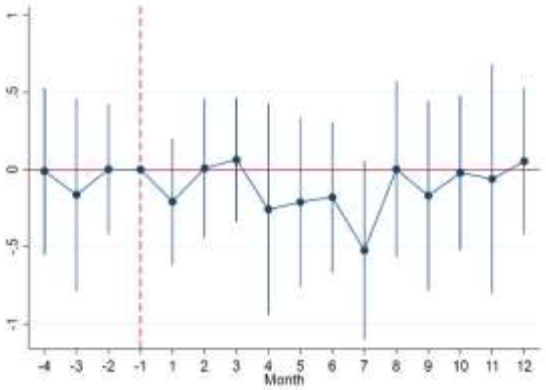


Durable goods

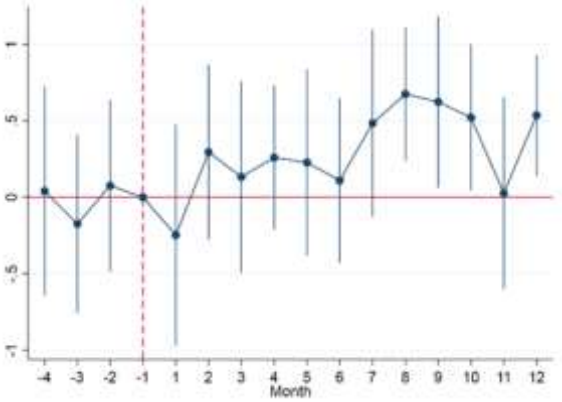
A. Popular lotteries



Total expenditure



Nondurable goods and services

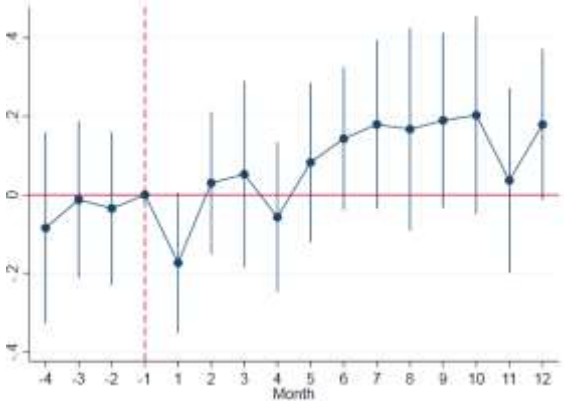


Durable goods

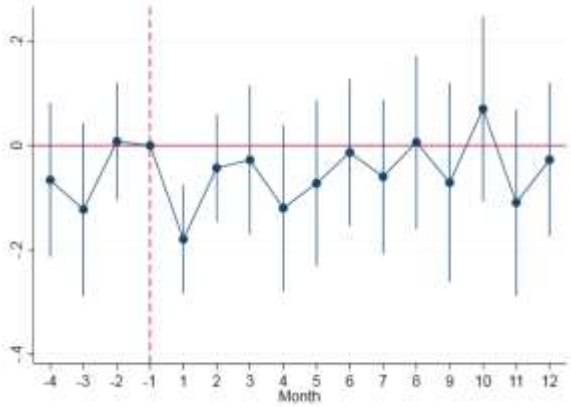
B. Unpopular lotteries

This figure presents the heterogeneous effects of home ownership across lottery participants in lotteries with different levels of popularity. We define a lottery as popular (unpopular) if the ratio of participants to supplied condos is above (below) the sample median. The blue solid dots represent the difference-in-differences coefficients following Equation (1) for popular lotteries in Panel A and unpopular lotteries for Panel B, respectively. The subcategory of consumption is displayed in the subtitle of each subplot. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The solid vertical lines indicate 90 percent confidence intervals.

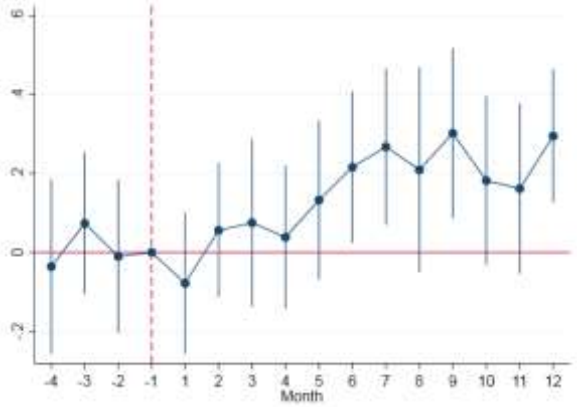
Figure A.5: Robustness Checks



Total expenditure

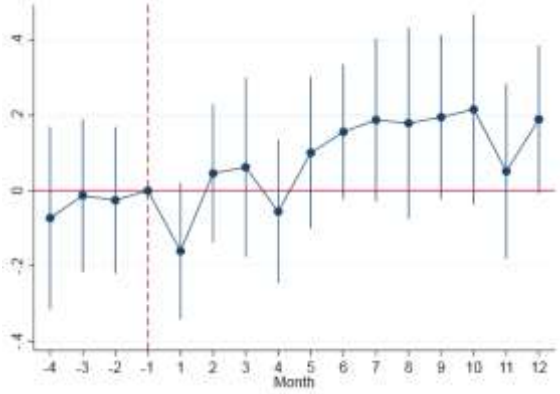


Nondurable goods and services

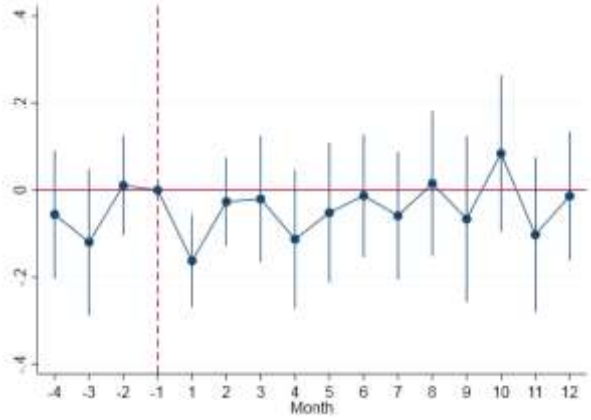


Durable goods

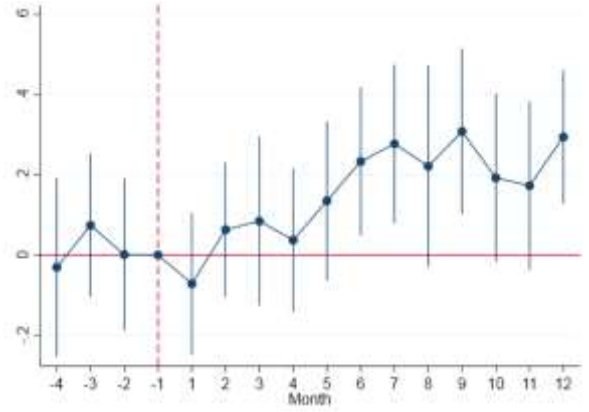
A. Exclude tax > 50k RMB



Total expenditure

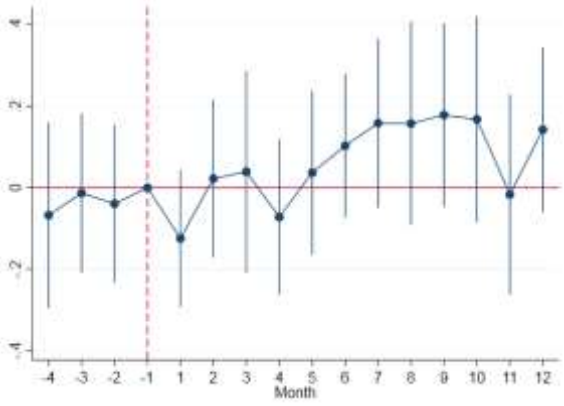


Nondurable goods and services

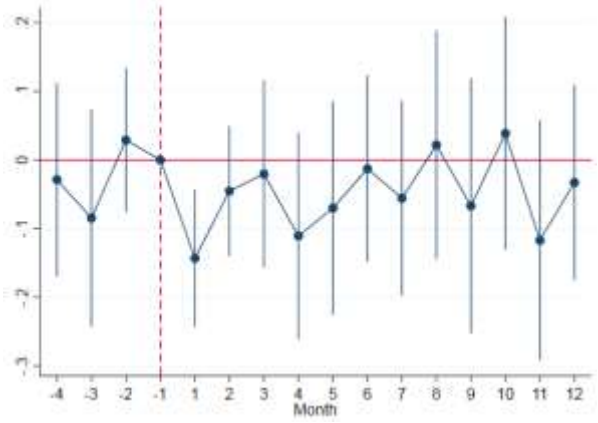


Durable goods

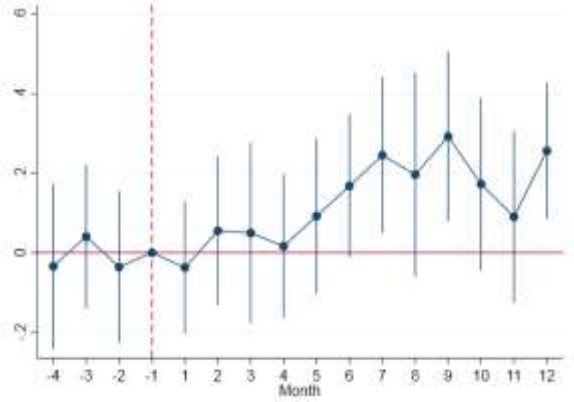
B. Exclude tax > 10k RMB



Total expenditure

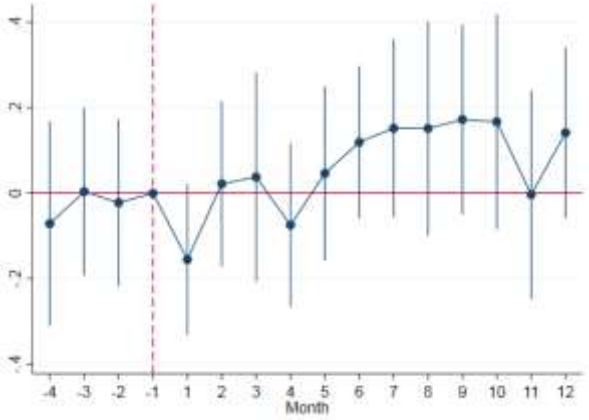


Nondurable goods and services

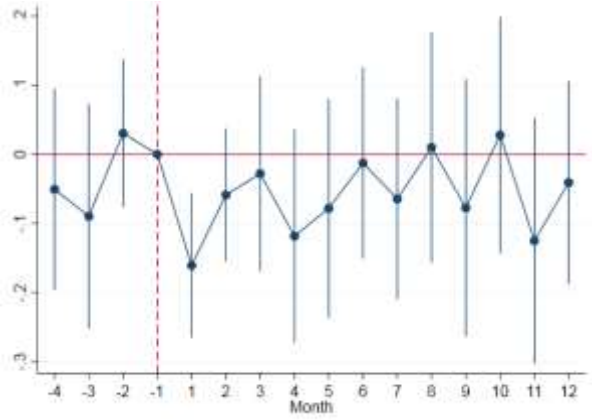


Durable goods

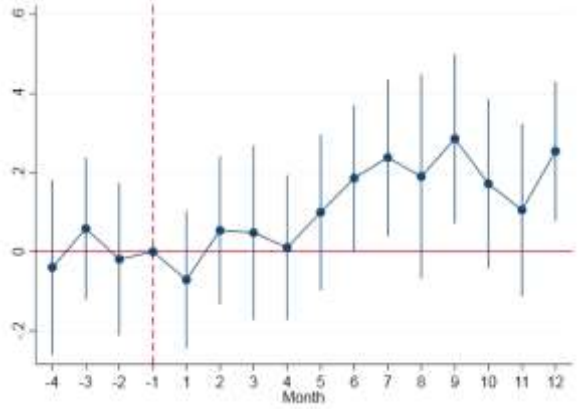
C. Exclude large transactions



Total expenditure



Nondurable goods and services



Durable goods

D. Exclude cards with large average transaction

This figure presents results of our robustness checks. Panels A and B show difference-in-differences estimates based on a sample excluding homebuyers in the control group who possibly purchased a second-hand property after the lottery. In Panel A (B), we identify these homebuyers through tax payments above 50k (10k) RMB and real-estate transactions within 12 months after the lottery. Panels C and D exclude monthly observations with extreme large expenditures (greater than 500k RMB) and cards with an extreme large average monthly expenditure (greater than 500k RMB), respectively. The subcategory of durable goods consumption is displayed in the subtitle of each subplot. The sample spans four months before and 12 months after the lottery date. The reference month is the month before the lottery, indicated by red vertical dashed lines. The blue solid circles represent estimated difference-in-differences coefficients following Equation (1). The solid vertical lines indicate 90 percent confidence intervals.

Table A.1: Alternative Channels: An Event Study Based on Pseudo-lotteries

Dep. var.	(1) Total expenditures	(2) Total (excl. finance)	(3) Nondurable goods & services	(4) Durable goods
After1 × Homebuyer	-0.19***	-0.14***	-0.098***	-0.063***
	(0.028)	(0.024)	(0.021)	(0.013)
After2 × Homebuyer	-0.054	-0.022	-0.0092	-0.022
	(0.035)	(0.028)	(0.023)	(0.018)
After3 × Homebuyer	-0.015	0.030	0.019	0.0035
	(0.037)	(0.032)	(0.028)	(0.018)
After4 × Homebuyer	-0.051	-0.016	-0.0069	-0.019
	(0.043)	(0.038)	(0.033)	(0.022)
Card FE	Y	Y	Y	Y
YearWeek FE	Y	Y	Y	Y
N	110,536	110,536	110,536	110,536
R^2	0.39	0.42	0.44	0.29

This table shows the weekly consumption of homebuyers who participated in lotteries in which the number of condos for sale is more than the number of lottery participants. We compare the consumption (in logarithm) within four weeks before and after the housing lottery by estimating Equation (4). $After_j$ is a dummy variable equal to one if it is week *j* after the lottery date for each lottery. The dependent variables from Columns (1) to (5) include total expenditures, total expenditures excluding financial transactions, financial transactions, nondurable goods and services expenditures, and durable goods expenditures, respectively. See Appendix 1 for more detailed definitions. All columns include card fixed effects and calendar year-week fixed effects. Standard errors are presented in parentheses and clustered at the lottery level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table A.2: Repeat versus Non-repeat Lottery Participants

First lottery	Second lottery
Homebuyers (5,190)	Exit (4,404)
	Homebuyers (41)
	Non-homebuyers (101)
	Pseudo-lottery (544)
Non-homebuyers (5,250)	Exit (3,321)
	Homebuyers (624)
	Non-homebuyers (687)
	Pseudo-lottery (618)

In this table, we provide the numbers of different types of participants (in brackets). *Homebuyers* refers to those who bought a home in the lottery, and *non-homebuyers* refers to those who did not. *Exit* refers to those who did not participate in a second lottery. *Pseudo-lottery* refers to those seeking home purchase opportunities in a lottery in which the number of condos for sale is more than the number of lottery participants.