The Impact of Chinese Regulation of Limitation on Currency Transactions (LCT) on Sydney Housing Prices

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Abstract

Foreign capital and buyers are often blamed for pushing up housing prices and reducing the supply of affordable housing in Australia. We examine this issue by assessing the impact of Chinese macroprudential policies, such as the limitation on currency transactions (LCT), on Sydney housing prices. Using propensity score matching and difference-in-differences techniques, we find that the LCT policy issued by the People's Bank of China in 2017 had a strongly negative impact (about -3%) on housing prices in suburbs with larger concentrations of Chinese residents, which are measured by multiple cutoff points—hereafter, Chinese suburbs—in Sydney, Australia. The results are consistent with home bias abroad, which implies that Chinese capital for residential real estate overseas most likely flows to predominately Chinese neighbourhoods in the destination city. We also find evidence that the relationship between this Chinese macroprudential policy and overseas housing prices is more direct to Chinese suburbs, with little impact on housing prices outside Chinese neighbourhoods within the studied period.

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1 Introduction

Politicians and regulatory institutions often blame foreign buyers for pushing up Australian house prices. In recent years, wealthy Chinese have started to acquire Australian assets, mostly in residential real estate in Sydney and Melbourne. This has attracted the attention of academics, policymakers, and the media, with a public narrative whereby Chinese purchases are one of the main reasons for worsening housing affordability in Australia (Rogers et al., 2017; McPhee, 2021). Fears that Australians will be priced out of the housing market add fuel to anti-Chinese sentiment, which is not good for the Australia-China relationship. We contribute to this debate by empirically investigating the economic impact of Chinese macroprudential policies on local housing prices in Sydney, which is the largest capital city in Australia.

One of the main challenges in studying Chinese real estate purchases in overseas housing markets is distinguishing local Chinese from foreign Chinese buyers, because of a lack of homeowners' residency data. Local Chinese are those who are citizens or permanent residents of the country, and foreign Chinese are Chinese citizens, residents, students, or workers on temporary visas. In all circumstances, we should not blame purchases by local Chinese rather than foreign Chinese for worsening housing affordability in Australia, since local residents are entitled to buy whatever real estate suits their needs. However, the affordability issue can be complicated when investment demand between local and foreign Chinese are interrelated. For example, when local residents see that foreign demand is high, they may also buy into the

market. Casavecchia and Lee (2014) found a significant increase in sales to Chinese buyers in Sydney but no evidence that Chinese buyers paid more than local buyers. However, they did not distinguish local Chinese from foreign Chinese buyers in the study. Their findings contradict the norm whereby out-of-state or country buyers pay more for real estate (Lambson et al., 2004), which could suggest that the majority of Chinese buyers in Casavecchia and Lee's study are indeed local rather than foreign Chinese citizens. Chung (2017) surveyed more than 350 Chinese buyers from China, Malaysia, Singapore, and Australia and found that 78% of purchasers had migrated or were planning to migrate to Australia. Thus, the study casts doubt on the widespread belief that foreign Chinese buyers pushed up property prices in Sydney and Melbourne. Liu and Gurran (2017) discuss push and pull factors for Chinese investment in Australian housing based on interviews with Chinese developers and individual investors. However, little rigorous empirical work has investigated the economic relationship between Chinese investment and Australian housing prices.

Chinese regulation of foreign currency transactions starting from 1 July 2017 provides an ideal quasi-natural experiment that enables us to investigate the controversy, since the policy mostly affects Chinese citizens in overseas real estate purchases. The People's Bank of China (PBOC)—China's central bank—issued limitation on currency transactions (LCT) order No. 3 in 2016. The order makes it more difficult for Chinese citizens to get money out of China, which means that Chinese capital for housing investment overseas is extremely restricted, if not totally prohibited, under the order. Our main focus in this study is to investigate if there is a relationship between the Chinese policy and housing market investment in Sydney from a capital flight perspective. Our hypothesis is that the effect of the LCT policy should manifest differently across the international housing market and significantly affect housing prices in Chinese neighbourhoods overseas.

Our identifying assumption is based on home bias abroad, which is widely documented in cross-border investments, capital flight, portfolios, and migration location choices (e.g., Card and DiNardo, 2000; Card, 2001; Coval and Moskowitz, 2001; Saiz, 2007; Anderson et al., 2011; Laeven, 2012; Coeurdacier and Rey, 2013; Badarinza and Ramadorai, 2018; Schumacher, 2018; Gorback and Keys, 2020; Deng et al., 2021). The theory implies that cultural proximity is an important consideration for investors or immigrants when investing overseas or choosing their neighbourhoods abroad. Contemporary global real estate transactions are sophisticated, complex, and involve not only real estate transactions but also information about culture, visas, foreign investment rules, finance, and education systems (see Rogers et al., 2015). Similar cultural backgrounds and social networks can help bridge these cultural and linguistic gaps and lower information asymmetry in overseas real estate purchases. Thus Chinese capital for overseas real estate purchases is expected to flow to areas with a high percentage of Chinese residents in the local housing market, based on social network connections and other infrastructure in the neighbourhood such as Chinese shops, restaurants, real estate agents, legal/tax firms, favoured schools, and banks.

We thus apply a difference-in-differences (DID) method to examine the effect of the LCT policy in a quasi-natural experiment. In particular, if there is a relationship between the Chinese policy and housing market investment in Sydney, we would then expect this impact to be greater in suburbs with larger concentrations of Chinese residents (e.g., Badarinza and Ramadorai, 2018). In our DID specification, the first difference is for home sales between Chinese suburbs (treatment group) and non-Chinese suburbs (control group) using multiple cutoff points, and the second is for home sales before and after the implementation of the LCT policy. The DID specification will allow us to identify the treatment effect of the policy on Chinese capital in the Sydney housing market. In order to control for systematic differences between the control and treatment groups, we control for neighbourhood characteristics using

propensity score matching (PSM) to render selected Chinese and non-Chinese suburbs more comparable in our DID specification. We find that the average treatment effect due to the LCT policy in Chinese suburbs is about -3% and statistically significant.[1] However, there is limited or no impact on house prices in non-Chinese suburbs. Furthermore, the price discounts between Chinese and non-Chinese suburbs remain relatively constant during the post-policy period, indicating that the policy shock has a lasting and permanent nature, at least within the timeframe of our sample. Our findings hold up to alternative measures for Chinese suburbs, placebo tests, and confounding policy impacts.

Our paper is related to studies of Chinese investment in overseas housing markets. For example, Chang et al. (2018) documented that international housing price growth is associated with China's GDP, saving rates, and economic or political risks. More recently, Li et al. (2020) and Gorback and Keys (2020) showed that house prices grow faster in areas with high foreign-born Chinese populations in the United States. We contribute to this strand of the literature in two ways. First, we advance the study of foreign investment in the housing literature by documenting the economic effect of Chinese regulatory policy on overseas housing markets. In contrast to previous studies that use domestic policy changes such as foreign buyer taxes as an instrument for foreign demand shock (see Hartley et al., 2021), we take a demand shock from the source country that enables us to directly target and estimate the Chinese policy impact on overseas housing markets. Second, by revealing the price effect of Chinese policy shocks across different neighbourhoods, we shed light on the mechanism by which Chinese capital flows to major Australian capital cities such as Sydney. Consistent with the home bias abroad theory, which posits that cultural proximity and social networks are crucial considerations for

[1] Based on the average sale price of $1,155,000 in the Sydney housing market during the sample period, the economic loss due to the LCT policy was about $35,000 per homeowner on average in those defined Chinese suburbs.

overseas investment, we show that Chinese capital for overseas real estate investment is not spreading across Sydney; rather, it is mainly confined to local Chinese neighbourhoods.

The paper has important policy implications. Foreign residential investment, particularly of Chinese capital and by Chinese investors, is hotly debated in many countries because it is perceived as increasing local housing prices and exacerbating housing affordability for local residents. Zhou (2021) found that more than 80% of Australians blamed Chinese investors for rising house prices, even when the data show that foreign property investment had fallen to an all-time low due to Covid-19. This suggests that the public cannot distinguish whether real estate purchases are by local or foreign Chinese buyers. Therefore, our findings are particularly relevant to the policy dilemma regarding foreign investment and housing affordability problems in major Australian cities. Our empirical results suggest that the economic impact of Chinese capital and buyers on overseas housing markets is more direct to Chinese suburbs. Moreover, the implementation of the LCT policy has resulted in a lasting impact by restricting Chinese demand for overseas housing purchases. These findings challenge the prevalent public narrative that Chinese purchases push up housing prices and worsen housing affordability problems in major Australian capital cities such as Sydney. Since foreign buyers are only allowed to buy new housing units in Australia, one insight from this study is that building more new apartment units in non-Chinese suburbs might improve housing affordability and diversify foreign investment risk in the Australian housing market.

The paper proceeds as follows. Section 2 provides a brief background on foreign home ownership and issues related to Chinese demand for Australian homes, capital flight, and the LCT policy. Section 3 presents the research design, Section 4 describes the data, and Section 5 discusses the empirical results. Section 6 concludes.

2 Background

2.1 Foreign home ownership in Australia

In Australia, foreigners are only allowed to buy new dwellings or vacant residential land, which requires approval by the Foreign Investment Review Board (FIRB) and payment of an application fee of between AU$5,000 and AU$90,000.[2] Temporary residents (such as students or individuals on working visas) must obtain FIRB approval to purchase an existing dwelling. These purchasers are not permitted to lease out the property and must sell the property when they leave Australia.

Although tax rules are different in each state, foreign homebuyers generally have to pay more than domestic homebuyers. For example, foreign homebuyers in New South Wales (NSW) must pay an additional surcharge purchaser duty and land tax on top of the purchase price. In addition, foreign homeowners are subject to an annual vacancy fee—commonly referred to as the 'ghost tax'—for homes or investment properties vacant for at least half a year. When it comes to sales, foreign homeowners need to pay 12.5% capital gains tax on the total price without exemptions.

2.2 Chinese demand for Australian homes

According to Juwai, an online Chinese real estate portal, education is the chief motivation for Chinese residents who purchase real estate abroad (Juwai, 2015); that is, they buy their children a place to live while they are studying overseas. Other factors include immigration, retirement, a holiday home, or investment. Australia's open economy, multicultural society, high-quality tertiary education, English language, attractive lifestyle, and liberal political system has attracted many overseas Chinese buyers; Australia is second on the list of Chinese favourite countries for real estate after the United States (Rapoza, 2014). Like many other

[2] FIRB data are based on the value and number of approvals granted, which do not necessarily lead to actual purchases. The Australian Treasury (2014) estimates that only around 35% of approved sales are actually sold to foreign buyers or temporary residents.

migrants, Chinese in Australia congregate in metropolitan areas such as Sydney and Melbourne and form their ethnic communities in urban settlements. These Chinese communities maintain close connections to China and play a key role in bringing business, international students, and capital into Australia.

Contrary to the public narrative, the proportion of foreign-owned housing stock in Australia is small. Using FIRB approval data, Gradwell (2017) estimates that foreigners own up to 4% of Australia's housing stock and account for about 7%-13% of total sales each year.[3] Of all FIRB approvals in 2015-16, Chinese buyers purchased about 30%; thus foreign Chinese owned real estate in Australia is quite marginal relative to locally owned stock. One noticeable impact of foreign buyers in the housing market is that they provide a stimulus to local residential construction activities and increase new housing supply (Gauder et al., 2014), which is consistent with Australia's foreign investment framework (Gradwell, 2017).

2.3 Capital flight and the LCT policy

Chinese capital flight for overseas real estate is accomplished through various channels. Chinese who live overseas can easily get access through their savings in China and spend it overseas using AliPay, WeChat, or UnionPay. For the large sums of money required for real estate purchases, people may pool their relatives' or friends' credit cards or request that family members transfer money to their overseas accounts. Sometimes Australian-Chinese use underground banks to deal with foreign exchange or hold properties on behalf of foreign citizens. For example, a 32-year-old Australian-Chinese spent AU$37 million buying six

[3] According to NSW government data, foreign citizens accounted for about 11% of home purchases in 2016. However, only about 2% of NSW homebuyers paid the foreign buyer surcharge duty in 2016, which means most 'foreigners' are Australian permanent residents or dual citizens. The 2020/2021 border restrictions due to \Covid-19 have further reduced foreign buyers' overall market share, which falls to 4% in new property markets (Wakelin, 2021).

luxury houses around Beauty Point in Sydney in just over 2 years, with financial support from private Chinese investors (Chenoweth et al., 2019).

On 30 December 2016, the PBOC published 'Administrative Measures on Reporting for Large-Value Transactions and Suspicious Transactions in Financial Institutions' (PBOC, 2016). Under the order, which took effect on 1 July 2017, Chinese banks tightened their procedures for validating and authenticating personal foreign currency exchange. The foreign currency conversion quota is capped at US$50,000 per person per annum, and purchasing foreign property is explicitly prohibited. The order signals China's determination to crack down on illegal behaviours such as money laundering.

Although detailed capital flow data are hard to find, the LCT order undoubtedly makes it harder and riskier for Chinese to move capital abroad in real estate purchases.[4] For example, Chinese overseas foreign direct investment (OFDI) in Australia declined from a 10-year peak of US$11.5 billion in 2016 to US$2.4 billion in 2019 (KPMG and University of Sydney, 2020). The Australian property market also witnessed changes. FIRB data show that China's commercial and residential real estate investment declined significantly from its high of AU$31.9 billion in 2015-16 to AU$6.1 billion in 2018-19 (Wakelin, 2021). A real estate agent specialising in Sydney CBD high-end dwellings popular among Chinese buyers observed that they dominated the market between 2013 and 2017, but purchased only one or two properties in 2018 (Hall, 2020).

3 Empirical estimation strategies

[4] Those who bought homes before the LCT policy can bring additional money from mainland China as long as the total amount of annual currency conversion is under USD50,000. For large sums, they can make the transfer through virous channels, as discussed in Section 2.3.

3.1 Difference-in-differences (DID) estimation

We carry out the policy analysis with pooled cross-sections to evaluate the impact of China's limitation on foreign currency transactions in the Australian housing market. We apply a standard DID method to examine the causal effect in a natural experiment, in which the LCT policy is an exogenous event to the domestic Australian housing market. The control group is home sales in suburbs with low or zero percentages of Chinese, which we assume are not affected by the LCT policy. The treatment group is home sales in suburbs with a high percentage of Chinese. Compared with other DID designs with heterogeneous treatment effects and variation in treatment timing in two-way fixed effects linear regression specifications (e.g., Callaway and Sant'Anna, 2021; Goodman-Bacon, 2021), our DID identification is in a canonical format with two periods and two groups. The LCT treatment is a one-off and does not vary over time. Our baseline DID model is as follows:

$$\ln(P_{jst}) = \beta_0 + \delta_0 LCT_t + \beta_1 Chinese\ Suburb_{js} + \delta_1 LCT_t \cdot Chinese\ Suburb_{js} + X_j + L_s + m_t + a_j + \varepsilon_{jt} \quad (1)$$

where P_{jst} is the *j*th property's sale price in suburb *s* at time *t*. LCT_t is a dummy denoting the policy of limitation on currency transactions, which equals 1 for sales after 1 July 2017 and 0 otherwise, and $Chinese\ Suburb_{js}$ is a binary variable that equals 1 if the property is in a Chinese suburb and 0 otherwise. Chinese suburbs are measured by the percentage of Chinese population in the suburb over a preset threshold such as at the 5%, 10%, or 15% level; X_j is a set of time-invariant controls for covariates of property characteristics, including the number of bedrooms and bathrooms, car space and garaging, land area and property type (house or unit). L_s is the suburb's amenities, including driving time to the CBD and population density in suburb *s*; m_t denotes year fixed effect; a_j is location fixed effect at local government area (LGA) level; and ε_{jt} is the error term.

In the above equation (1), the intercept β_0 captures the average logarithm of the property sale price in the control group (non-Chinese suburbs) before the LCT policy change, and the coefficient β_1 reflects the price effect of Chinese suburbs before the policy change. The coefficient δ_0 measures the average price change due to the LCT policy for all home sales during the sample period. The coefficient δ_1 measures the average treatment effect of the policy on housing values in Chinese suburbs, assuming that houses in both Chinese suburbs and non-Chinese suburbs did not appreciate at different rates for other reasons. We discuss and control for other possible confounding policy impacts or factors in Section 5.4.

Suppose the policy has a causal impact on Chinese overseas real estate purchasing behaviour. We would expect overseas housing prices to decrease, predominantly in local Chinese suburbs through the home bias abroad transmission mechanism discussed in Section 1. Thus, we expect that the coefficient δ_1 is negative and statistically significant. If the LCT policy has a market-wide impact across the whole city, we should also observe a negative and statistically significant coefficient on δ_0.

3.2 Propensity Score Matching (PSM)

One potential limitation in a natural experiment is that the control and treatment groups are not randomly assigned. To control for any systematic differences between groups, we apply a PSM technique to match Chinese suburbs with non-Chinese suburbs to make them more comparable. Smith and Todd (2005) point out that the PSM is a potentially useful econometric tool, but it is susceptible to the estimators chosen. To minimise this potential problem with PSM, we include all available suburb demographic variables in the PMS analysis. The results are then compared with the DID results using a full sample for a robustness check. See Appendix A for a detailed description of how we match Chinese suburbs with non-Chinese suburbs.

3.3 Comparing pre-treatment trends

A potential challenge to the DID strategy in equation (1) is that differential price changes between the control and treatment groups may be driven by preexisting differences in the time trends of each group. Although we rely on the PSM technique to address concerns about comparability between the control and treatment groups, the PSM analysis itself may not be sufficient to address the potential threat to our DID identification (Smith and Todd, 2005). To compare pre-treatment trends, we follow Moser and Voena (2012) and estimate price trends in the control and treatment groups before the policy change by restricting the sample to pre-LCT years. Specifically, we use the following equation to assess the preexisting trends.

$$\ln(P_{jst}) = \alpha_0 + \alpha_1 Year_{qt} \cdot Chinese\ Suburb_{js} + \alpha_2 Year_{qt} + X_j + L_s + a_j + \varepsilon_{jt} \qquad (2)$$

where $Year_{qt}$ is a vector of quarter-year dummies from 2016Q1 to 2017Q2. The vector of coefficients α_2 measures the price trend of the control group before the LCT policy change, while the price trends of the treatment group are captured by $\alpha_1 + \alpha_2$.

4 Data

4.1 Sample period, residential sales, and property characteristics

Sydney is the largest capital city in Australia, with a Chinese population of about 550,000 according to the 2021 census. We expect our results from Sydney to be applicable to other major cities in Australia and worldwide. Our sample period is from January 2016 to December 2018—about 1.5 years on each side of the LCT policy change in July 2017. This is mainly because we need to balance sales on each side of the policy period in our DID specification. If the sample period is too short, the model may suffer from anticipation and lagged effects in the policy analysis, given that the LCT was announced in December 2016. If it is too long, the model may have confounding policy impacts. We check the anticipation/lagged effect together with possible cofounding policy impacts in this study, and report the results in Section 5.4.

Residential property sale data are provided by the Rozetta Institute (formerly the Securities Industry Research Centre of Asia-Pacific (SIRCA)) on behalf of CoreLogic. The data cover residential sales in the Sydney metropolitan area before and after the LCT policy change in July 2017. For each property transaction, the information includes property ID, transaction data, contract price, suburb, postcode, property type (house or unit), and property characteristics, including land area, the number of bedrooms and bathrooms, and car space. These property characteristics serve as control variables in equation (1). We obtain 90,945 balanced residential sales covering 672 suburbs during the sample period. Summary statistics of residential property sales are presented in Panel A of Table 1.

<Insert Table 1 about here>

4.2 Suburb demographics and Chinese suburbs

Summary suburb statistics are presented in Panel B of Table 1. Suburb population profile data are obtained from the Australian Bureau of Statistics (ABS) 2016 census. The suburb data allow us to identify Chinese suburbs and perform PSM to control for sample selection bias in a natural experiment.

The ABS census data include rich information on each suburb's population and housing, including population, ethnicity, age, sex, marital status, education, employment, religious affiliation, family income, household size, dwelling structure, housing tenure, and mortgage or rent payment. On average, the Chinese population is about 3.6% in the Sydney metropolitan area, varying from zero to 38% in a given suburb. Further analysis suggests that the distribution of the Chinese population is skewed toward suburbs with no or few Chinese. In other words, the Chinese population congregates in some particular suburbs in Sydney rather than spreading out across the city.

In this study, the local Chinese population is calculated based on the number of people in Australia who were born in mainland China on the Census night and a suburb is treated as a Chinese suburb if its Chinese population (excluding Hong Kongers and Taiwanese) is more than 5%, 10%, or 15%. In a similar study, Gorback and Keys (2020) classify those postcodes with at least 5.7% foreign-born Chinese residents as the treatment indicator for Chinese neighbourhoods. Distribution of the Chinese population in Sydney suburbs is reported in Table 2. Panel A shows that of 672 suburbs in the entire sample, 527 (about 78%) have a Chinese population of less than 5%; 80 (about 12%) have a Chinese population between 5% and 10%; and 39 (about 6%) have a Chinese population between 10% and 15%. In the 2016 census, 26 suburbs (about 4%) have a Chinese population of more than 15%. Panel B of Table 2 presents the results for the PSM matched sample. In total, there are 570 matched suburbs based on the PSM analysis. The maximum percentage of Chinese is less than 25% in the matched sample, compared with 40% in the entire sample. PSM matched samples have significantly fewer Chinese suburbs in the matched sample. More details on the similarities/differences between treatment and non-treatment suburbs are presented in Table 8 of Appendix A. The results of the unmatched sample in Table 8 show that compared with non-Chinese (control) suburbs, Chinese (treated) suburbs have a higher percentage of people who are new immigrants, have tertiary education, speak English and other languages, are renting, have occupied private dwellings, and have high family incomes, mortgage and rent payments; Chinese suburbs also have a lower median age, percentage of Australian citizens, and residents who are married de facto. Both Chinese and non-Chinese suburbs are similar in the percentage of full-time employment, household size, and owning outright. Apart from suburb demographics, Chinese suburbs often locate close to the city centre with good public transport, schools, and local Chinese shops and restaurants.

<Insert Table 2 about here>

5 Results

5.1 Parallel tests

Figure 1 shows the temporal profile of the calculated price indices between the control and treatment groups based on equation (2) for the entire sample period. It clearly displays converging price trends in the control and treatment groups prior to the implementation of the LCT policy. Notably, price differences close to the policy change during the pre-treatment period indicate an anticipation effect stemming from the policy announcement. With the LCT policy being publicly announced six months ahead of its implementation, property prices in treatment suburbs exhibited a decline in anticipation of reduced demand. This decline can also be attributed to the gradual tightening of Chinese bank regulations on foreign real estate purchases preceding the policy's enactment. Furthermore, Figure 1 also highlights that the average treatment effect remains constant in the post-treatment period for the control and treatment groups. This suggests a more permanent impact on treatment suburbs resulting from the implementation of the policy, at least during the sample period. Detailed analysis of the anticipation and lagged effects can be found in Section 5.4 of our research.

<Insert Figure 1 about here>

Following Moser and Voena (2012), we plot the estimated coefficients for quarter-year dummies in equation (2) and 95% confidence intervals between control and treatment suburbs in Figure 2. The test reveals no systematic differences in pre-trends across Chinese and non-Chinese suburbs, and thus our DID identification largely satisfies the pre-trend analysis.

<Insert Figure 2 about here>

5.2 Results of the DID regression

Panel A of Table 3 shows OLS estimation results for the LCT policy on the Sydney housing market, based on a full sample, using a binary variable to measure the Chinese

population in suburbs at 5%, 10%, and 15%. Column (1) shows that the average treatment effect of the LCT policy (i.e., the interaction term of Chinese suburbs*LCT) on housing prices is negative (-0.031) and statistically significant, which suggests that the policy has caused an additional 3.1% price drop in Chinese suburbs, provided that houses in both Chinese and non-Chinese suburbs did not appreciate at different rates for other reasons after controlling for housing characteristics, location amenities, and year effects. The estimated Chinese suburb fixed effect not due to the LCT policy is positive (0.021), which implies that the average housing price in Chinese suburbs is about 2.1% higher than prices in non-Chinese suburbs. The LCT effect on all housing prices is small (0.007) and statistically insignificant at the 1% level. The results in columns (2) and (3) largely support our main findings in column (1), and show that the treatment effect increases with a local Chinese population and the LCT policy dummy is statistically insignificant and close to zero. These results are in line with our identification assumption on home bias abroad, which suggests that Chinese capital associated with overseas housing investment is concentrated rather than spread out across a city.

<Insert Table 3 about here>

Property characteristics and location amenities are important in controlling for systematic differences between the control and treatment suburbs. The number of bedrooms, bathrooms, car spaces, garages, and land area are all positive and statistically significant in determining housing prices. Meanwhile, unit prices are lower than house prices, and location amenities such as driving time to CBD and population density are also important factors in the hedonic price model.

5.3 Propensity score matching results

As explained in the empirical estimation section, we use suburb demographic characteristics to predict whether a suburb is a Chinese suburb in a logistic regression and

conduct a nearest neighbour search based on the calculated propensity scores. See Appendix A for a detailed description of the PSM matching approach. In total, there are 570 matched suburbs in the PSM analysis (see Panel B of Table 2 for the distribution of Chinese suburbs in the matched sample).

Panel B of Table 3 shows results based on the PSM technique. Column (4) shows results when the percentage of Chinese in a suburb is over 5%. Meanwhile, columns (5) and (6) show results based on the Chinese population of more than 10% and 15%, respectively. PSM results in panel B show an average treatment effect of -0.026 in column (4), -0.031 in column (5), and -0.095 in column (6). The small average treatment effect in columns (4) and (5) and the large treatment effect in column (6) suggest that the LCT policy effect is more salient in Chinese suburbs when the percentage of Chinese in a suburb is high.[5] All other variables are as expected. Overall, the PSM results support our main findings that the economic impact of LCT is negative and significant on housing values in Chinese suburbs, and has little effect in non-Chinese suburbs in the Sydney housing market.

5.4 Confounding policy impacts and anticipation and lagged effects

To curb rapidly increasing housing prices, the Australian government imposed many restrictions on foreign ownership in Sydney and Melbourne. For example, the NSW government introduced a 'foreign persons' duty and land tax surcharge from 21 June 2016. In addition, the federal government imposed an annual vacancy fee from 2017 on foreign-owned Australian residential properties that are vacant for more than half a year. We note that these foreign purchase restrictions apply to all foreign buyers, although they arguably aim to deter Chinese housing investment.

[5] However, it should be noted that the sample size of the treatment group in column (6) is small. As shown in Table 2, only 3 suburbs had a Chinese population over 15% of all 570 PSM matched suburbs.

To alleviate these confounding issues, we carry out a subsample analysis by restricting the sample to 3 or 6 months before and after the LCT policy change. The idea is to isolate the impact of the policy from other confounding factors by using sales that are close to and around the time of the policy shock. As long as no other policies affected the treatment group during the refined period, our DID identification strategy using the LCT as a quasi-natural experiment is valid. Note that confounding factors that affect both groups do not affect the estimated treatment effect in our DID specification.

We use the Chinese population (≥ 5%) in Panel A of Table 2 to define a Chinese suburb in the subsample analysis[6] and report the results in Table 4. Average treatment effects from the restricted 3-month subsample are between -0.009 and -0.017 in Panel A of Table 4, while average treatment effects from the 6-month subsample are between -0.011 and -0.014 in Panel B of Table 4. Between the unmatched and matched results, the PSM-matched results provide some statistical evidence to support our main findings, particularly for the 6-month matched sample in Panel B. Column (4) shows that the overall LCT policy effect on the Sydney housing market is close to zero and statistically insignificant, average home prices in Chinese suburbs are 2.8% higher than those in non-Chinese suburbs, and the LCT policy results in an additional 1.4% price discount in those Sydney suburbs. The relatively weaker results in the subsample analysis, compared with the full sample analysis in Table 3, could be due to the fact that the anticipation effect (e.g., Figure 1 shows that prices declined before the policy came into effect as a result of an expected drop in demand in treatment suburbs) is expected to be stronger close to the time of the policy change, and a 3- or 6-month period is too short for the market to respond to the given policy shock (the lagged effect) because buying foreign real estate is

[6] The LCT policy most likely causes property sales in affected Chinese suburbs to increase and then drop in the immediate pre- and post-policy periods. Given a small number of suburbs with a Chinese population greater than 10% or 15% and a short sample period, the results are noisy when we use a higher percentage, such as 10% or 15%, for a Chinese suburb in the subsample analysis.

complex and requires a lot of advance planning, financial arrangements, visa requirements, and market research.

<Insert Table 4 about here>

5.5 Placebo test

A potential concern is that other unobservable factors may have caused house prices in Chinese suburbs to decrease more after July 2017. To address this question, we use Sydney suburbs with no or very few Chinese in a placebo treatment to test the Chinese policy effect. If unobservable factors caused the price drops in Chinese suburbs, suburbs in Sydney with few or no Chinese residents should have experienced a similar price decrease. Column (1) of Table 5 shows the results of the placebo test using Sydney suburbs with a Chinese population of less than 1% as a placebo. We find that the coefficient on the LCT policy variable is 0.01 and statistically insignificant at the 5% level, which means the policy had no price effect on Sydney's non-Chinese suburbs. Thus, the placebo treatment effect supports our DID identification assumption that the LCT policy effect is more evident in Chinese suburbs, with little or no impact on house prices in non-Chinese suburbs.

<Insert Table 5 about here>

We also perform a general placebo test to check whether our results might be driven by a random correlation between explanatory variables other than the treatment of Chinese suburbs. Specifically, we randomly assign the same share of Chinese suburbs (20%) to treatment and re-estimate the baseline regressions of equation (1) 50 times.[7] If non-Chinese factors have driven our results, we will expect a similar price drop in the placebo test. Column (2) of Table 5 reports the average coefficients of equation (1) based on simulations. It shows that the LCT

[7] The share of Chinese suburbs in which the Chinese population is more than 5% is about 20%. See Table 2 for the distribution of Chinese suburbs.

dummy, placebo suburb dummy, and treatment effect between the LCT and placebo suburbs are close to zero and statistically insignificant. These results indicate that our findings are not driven by random correlation across suburbs. Of 50 simulations, only three are significant (at the 1% level).[8]

5.6 Alternative measures for Chinese suburbs

To address the concern that our findings are due to the misclassification of Chinese suburbs, we use a market consensus measure of the top 10 Sydney suburbs with the most Chinese residents from the 2020 Sydney Suburb Reviews (2020) in our baseline model.[9] We also use the top 10 suburbs for Chinese property buyers in 2018 for a robustness check.[10] The results are presented in Table 6, which shows that the average treatment effect is about an additional 3.5%-4.2% price discounts in these top 10 Chinese suburbs. The results support our main findings in Table 3, particularly for suburbs with a Chinese population of more than 15%.

<Insert Table 6 about here>

5.7 Controlling for time trends in main regions

To account for potentially different time trends across treated and untreated suburbs, we further group the Sydney metropolitan area into five main regions based on the Greater Sydney Region Plan and include interaction terms between year dummies and each main region.[11] The

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[8] Simulation placebo treatment results are too large to report in this paper, but are available on request from the authors.

[9] The top 10 Chinese suburbs are Haymarket, Carlingford, Chippendale, Zetland, Chatswood, Ultimo, Eastwood, Rhodes, Burwood, and Hurstville.

[10] The top 10 suburbs for Chinese buyers are Sydney, Sydney Olympic Park, Parramatta, Edmondson Park, Chatswood, Macquarie Park, Epping, West Ryde, Potts Point, and Mosman.

[11] The Sydney metropolitan area is divided into western, central, eastern, northern, and southern regions. The western region includes the Blue Mountains, Hawkesbury, Penrith, Camden, Campbelltown, Fairfield, Liverpool, and Wollondilly local government areas; the central region includes Blacktown, Cumberland, Parramatta, and The Hills local government areas; the eastern region includes Bayside, Burwood, Canada Bay, Inner West, Randwick, Strathfield, Woollahra, Waverley, and City of Sydney local government areas; the northern region includes Hornsby, Hunters Hill, Ku-ring-gai, Lane Cove, Northern Beaches, Mosman, Willoughby, Ryde, and North Sydney local government areas; and the southern region includes Georges River, Canterbury-Bankstown, and Sutherland local government areas.

results are reported in Table 7, and indicate that our estimates are robust when controlling for regional time trends.

<Insert Table 7 about here>

6 Conclusion

In this study, we analyse the effect of a Chinese macroprudential policy on the Sydney, Australia, housing market. In particular, we examine how the policy's economic mechanism affects Chinese and non-Chinese neighbourhoods differently across the city. Our identification relies on home bias abroad, which implies that Chinese investment in overseas residential real estate purchases is most likely to occur in local Chinese neighbourhoods due to cultural proximity and social networks.

Using China's strict limitation on currency transactions from 1 July 2017 in a quasi-natural experiment, we find a strongly negative relationship between this Chinese policy and housing prices in Chinese suburbs, with little market-wide effects outside Chinese suburbs in Sydney during the studied period. This result is robust to controlling for alternative measures of Chinese suburbs, placebo tests, propensity score matching between Chinese and non-Chinese suburbs, and to using a subsample analysis to alleviate various confounding policy impacts in the DID analysis.

Our results have important policy implications. The claim that foreign demand pushes up property prices in Australia appears frequently in the media and is taken to be credible by the public. However, such claims lack rigorous empirical evidence. We show that the economic impact of Chinese investment in one overseas housing market is quite direct to Chinese suburbs. In addition, we demonstrate that the LCT policy has a more permanent impact on Chinese housing demand overseas. In other words, the impact is not a short-run negative adjustment

that diminishes over time. Therefore, the public narrative whereby Chinese capital and Chinese investors have pushed up housing prices and exacerbated housing affordability problems in major Australian capital cities such as Sydney is overstated. One insight from this research is that building new housing units in non-ethnoburbs (such as non-Chinese suburbs) might diversify foreign investment risk (such as from China) and, as a result, improve housing affordability in Australia.

The limitations of this research stem from the constraints of the timeframe that is being examined and the availability of data, particularly the absence of homebuyers' residency data. As a result, we take a broad-brush approach to investigate the relationship between the Chinese policy and housing market investment in Sydney at suburb level, based on home bias abroad. Future analysis of buyers' residence data will provide further insights into the relationship between foreign investment and local housing affordability problems. Additionally, conducting a time series analysis with an extended dataset will enable a more comprehensive assessment of the temporal impact of the policy.

Appendix A: Propensity Score Matching

We follow four steps in PSM testing, as follows. First, we choose the covariates that predict a suburb is Chinese or non-Chinese based on the suburb's demographic data in the 2016 census. We then categorize all suburbs into two types: Chinese suburbs (CS=1) and non-Chinese suburbs (CS=0), using the median of Chinese population in a suburb (1.57%) in the Greater Sydney area as the cutoff value to define this binary variable—i.e., CS=1 if its Chinese population in a suburb >1.57% and CS=0 otherwise.

Second, we employ a logistic model to investigate the impact of these covariates on Chinese location choices. Logit results show that most coefficients are statistically significant, which suggests that these covariates affect the likelihood of a suburb's being a Chinese suburb or not.[12]

Third, we calculate the suburb's propensity score ($\log(p/1-p)$) using the predicted probability (p) of being a Chinese suburb and conduct a nearest neighbour search. For each suburb in the Chinese suburb group, we choose a corresponding suburb in the non-Chinese suburb group whose propensity score is closest to that of the Chinese suburb. Following Garnefeld et al. (2019), we carry out a balance test of covariates across different types in the matched sample. We (1) test whether the difference in matching covariates between different types of suburbs is still statistically significant after matching and (2) calculate the 'percentage reduction in bias' statistic for each match variable based on Rosenbaum and Rubin (1983).

Fourth, results of PSM matching are reported in Table 8 and Figure 3. Table 8 shows that the PSM has significantly reduced the difference in terms of neighbourhood characteristics

[12] Results of the logit model are available upon request.

between Chinese suburbs and non-Chinese suburbs after matching, and Figure 3 shows the standardised bias in percentage across covariates between the matched and unmatched suburbs. The results show that our PSM matching effectively reduces bias across suburb characteristics. The top five variables that significantly reduce the bias between matched and unmatched suburbs are the percentages of people who (1) speak English and other languages, (2) speak other languages at home, (3) are new immigrants, (4) stayed at a different address 5 years previously, and (5) have a tertiary education.

<Insert Table 8 here>

<Insert Figure 3 here>

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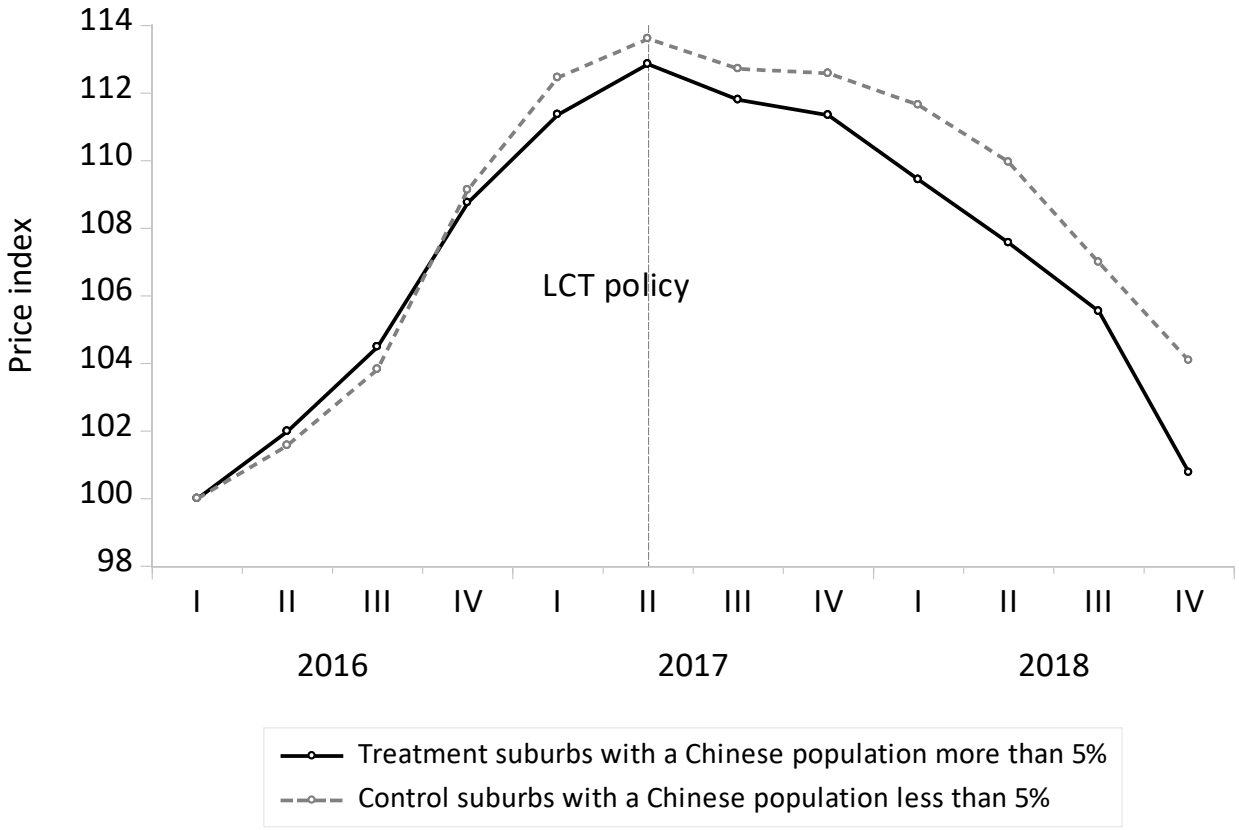
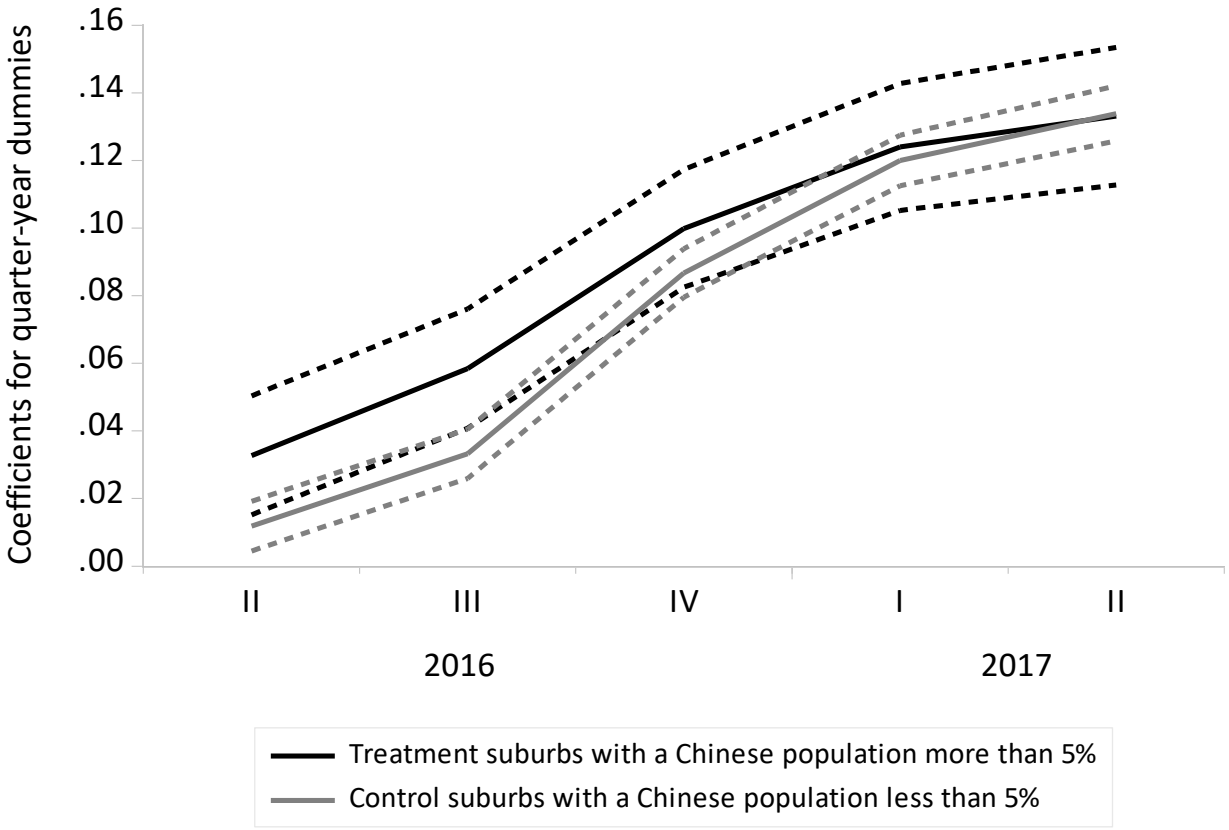
Figure 1: Calculated price indices for control and treatment suburbs over the sample period



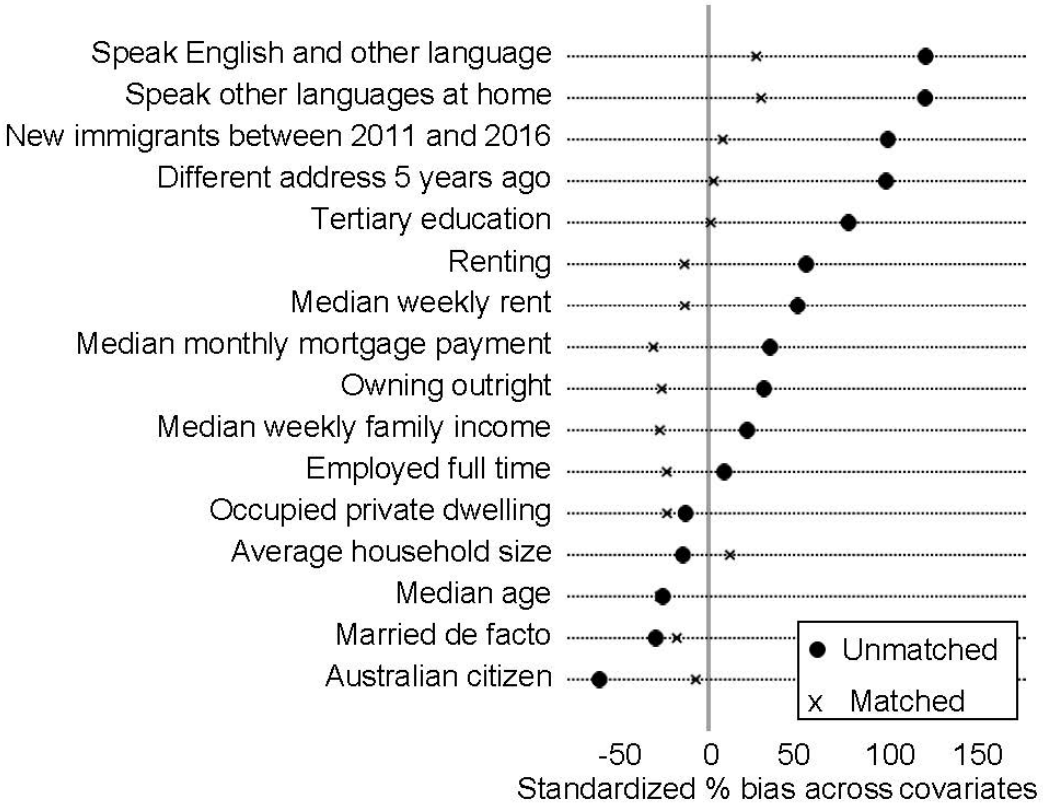
This figure depicts the quarterly price indices for property sales between the control and treatment groups based on equation (2), during the January 2016 and December 2018 period.

Figure 2: Estimated coefficients for quarter-year dummies over the pre-policy period



This figure plots the estimated coefficients for quarter-year dummies in equation (2) and their 95 per cent confidence intervals between the control and treatment suburbs before the LCT policy change in July 2017.

Figure 3: Results of PSM bias reduction



This figure decipts the standardised bias in percentage across covariates between the matached and unmatched suburbs. See Appendix A for detailed descriptions of the PSM procedures.

Table 1: Summary statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Obs.
	Panel A: sale statistics					
Sale price (AUD)	1,155,355	900,000	5,120,000	355,000	729,176	90,945
No. of bedrooms	3.151	3.000	6.000	1.000	1.066	90,945
No. of bathrooms	1.728	2.000	4.000	1.000	0.739	90,945
No. of car spaces	1.642	2.000	5.000	1.000	0.753	90,945
No. of lockup garage	1.525	1.000	4.000	0.000	0.685	90,945
Land area (sqm)	1,215	656	19,600	67	1,793	90,945
Property type (house -0, unit-1)	0.382	0.000	1.000	0.000	0.486	90,945
	Panel B: suburb statistics					
Chinese population (%)	3.59	1.61	38.13	0.00	5.49	672
Tertiary education (%)	5.41	4.91	43.27	0.00	4.12	672
Australian citizen (%)	80.96	84.46	100.00	0.00	12.30	672
Married de facto (%)	6.30	5.25	26.32	0.00	3.74	672
Employed full time (%)	30.98	31.10	75.00	0.00	7.38	672
Speak English and other languages (%)	21.37	17.71	100.00	0.00	16.18	672
Speak other languages at home (%)	30.27	25.29	100.00	0.00	21.06	672
Different address 5 years ago (%)	6.28	4.34	47.50	0.00	6.76	672
New immigrants between 2011 and 2016 (%)	5.75	3.91	46.23	0.00	6.53	672
Owning outright (%)	10.53	10.79	50.00	0.00	4.57	672
Renting (%)	9.88	8.02	33.91	0.00	6.86	672
Occupied private dwelling (%)	32.46	31.97	54.52	0.00	6.15	672
Median age (years)	38.33	38.00	72.00	0.00	6.23	672
Average household size (no. of person)	2.82	2.90	3.90	0.00	0.51	672
Median weekly rent (AUD)	467.62	450.00	1,500.00	0.00	180.13	672
Median monthly mortgage payment (AUD)	2,342.77	2,349.50	5,200.00	0.00	665.77	672
Travel time to CBD (minute)	37.47	36.00	152.00	0.00	18.76	672
Population	6,455	4,469	47,176	3.00	6,589	672

Area (sq km)	8.18	2.74	524.00	0.10	26.09	672

This table presents summary statistics for the main variables used in the analysis. Residential property sale data in Panel A is provided by the Rozetta Institute (formerly Securities Industry Research Centre of Asia-Pacific (SIRCA)) on behalf of CoreLogic, covering the Sydney metropolitan area between 2016 and 2018. The suburb profile data in Panel B are sourced from the 2016 census, while travel distance and area data are sourced from Google Maps.

Table 2: Distributions of the Chinese suburbs in Sydney

	Panel A: Full Sample		Panel B: PSM Matched Sample	
Chinese population	Count	Percent	Count	Percent
[0, 0.05)	527	78.42%	496	87.02%
[0.05, 0.1)	80	11.90%	62	10.88%
[0.1, 0.15)	39	5.80%	9	1.58%
[0.15, 0.2)	12	1.79%	2	0.35%
[0.2, 0.25)	7	1.04%	1	0.18%
[0.25, 0.3)	3	0.45%		
[0.3, 0.35)	2	0.30%		
[0.35, 0.4)	2	0.30%		
Total	672	100.00%	570	100.00%
Mean		3.59%		2.39%
Median		1.57%		1.32%

This table represents the distribution of Chinese suburbs in Sydney. Panel A presents the results based on all suburbs. Panel B presents the results based on the PSM matched suburbs. The Chinese population in a suburb is calculated as the percentage of people from Mainland China (excluding Hong Kong and Taiwan) over the total number of people in the suburb. [0, 0.05) represents a Chinese population equal to or more than zero but less than 5% in a suburb.

Table 3: OLS regressions of China's limitation on currency transactions on the Sydney housing market

	Panel A: Full sample						Panel B: PSM matched sample					
	(1)		(2)		(3)		(4)		(5)		(6)	
	> 5%		>10%		>15%		>5%		>10%		>15%	
Dependent variable: log of sale price												
Constant	13.661	***	13.667	***	13.684	***	13.616	***	13.627	***	13.627	***
	(0.016)		(0.017)		(0.017)		(0.019)		(0.019)		(0.019)	
LCT dummy (post=1, pre=0)	0.007	**	0.002		0.000		0.002		-0.003		-0.003	
	(0.003)		(0.003)		(0.003)		(0.003)		(0.003)		(0.003)	
Chinese suburbs (yes=1, no=0)	0.021	***	0.015	***	0.068	***	0.032	***	0.018	**	0.043	**
	(0.003)		(0.003)		(0.005)		(0.003)		(0.009)		(0.018)	
Chinese suburbs*LCT	-0.031	***	-0.033	***	-0.050	***	-0.026	***	-0.031	**	-0.095	***
	(0.003)		(0.005)		(0.007)		(0.004)		(0.014)		(0.025)	
Log number of bedrooms	0.426	***	0.426	***	0.425	***	0.426	***	0.426	***	0.426	***
	(0.004)		(0.004)		(0.004)		(0.005)		(0.005)		(0.005)	
Log number of bathrooms	0.167	***	0.167	***	0.167	***	0.170	***	0.170	***	0.170	***
	(0.003)		(0.003)		(0.003)		(0.003)		(0.003)		(0.003)	
Log number of car spaces	0.076	***	0.076	***	0.077	***	0.068	***	0.068	***	0.068	***
	(0.003)		(0.003)		(0.003)		(0.003)		(0.003)		(0.003)	
Log number of garages	0.070	***	0.069	***	0.069	***	0.068	***	0.068	***	0.068	***
	(0.005)		(0.005)		(0.005)		(0.005)		(0.005)		(0.005)	
Log land area (sqm)	0.018	***	0.018	***	0.018	***	0.023	***	0.023	***	0.023	***
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
Property type (unit=1, house=0)	-0.350	***	-0.350	***	-0.349	***	-0.329	***	-0.329	***	-0.329	***
	(0.003)		(0.003)		(0.003)		(0.003)		(0.003)		(0.003)	
Log driving time to CBD (minutes)	-0.151	***	-0.152	***	-0.155	***	-0.157	***	-0.159	***	-0.159	***
	(0.004)		(0.004)		(0.004)		(0.004)		(0.004)		(0.004)	
Suburb population density (per sq km)	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
LGA fixed effects	yes		yes		yes		yes		yes		yes	

Year fixed effects	yes	yes	yes	yes	yes	yes
No. of sales	90,945	90,945	90,945	75,806	75,806	75,806
No. of LGA	32	32	32	31	31	31
No. of suburbs	672	672	672	570	570	570
Adj. R-squared	0.806	0.806	0.806	0.811	0.811	0.811

This table presents the DID analysis of the LCT policy effect on house prices in Sydney Chinese suburbs. Panel A is based on property sales in all Sydney suburbs, and Panel B is based on matched PSM sample. The OLS regression is as follows: $\ln(P_{jst}) = \beta_0 + \delta_0 LCT_t + \beta_1 Chinese\ Suburb_{js} + \delta_1 LCT_t \cdot Chinese\ Suburb_{js} + X_j + L_s + m_t + a_j + \varepsilon_{jt}$, where P_{jst} is the *j*th property's sale price in suburb *s* at time *t*; LCT_t is a dummy denoting the policy of limitation on currency transactions which equals one for sales after 1 July 2017 and zero otherwise; $Chinese\ Suburb_{js}$ is a binary variable equal to one if the property is in a Chinese suburb and zero otherwise. Chinese suburbs are measured by percentages of Chinese population in the suburb over a pre-set threshold such as at a 5, 10 or 15% level; X_j is a set of time-invariant control for covariates of property characteristics, including the number of bedrooms and bathrooms, car space and garaging, land area and property type (house or unit); L_s is the suburb amenities including driving time to the CBD and population density in the suburb *s*; m_t denotes year fixed effect; a_j is the location fixed effect at a Local Government Area (LGA) level; and ε_{jt} is the error term. Standard errors of estimates based on the White cross-section covariance are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4: OLS results of subsample analysis

	Panel A: [-3, +3] months				Panel B: [-6, +6] months			
	(1)		(2)		(3)		(4)	
	Unmatched		Matched		Unmatched		Matched	
Dependent variable: log of sale price								
LCT dummy (post=1, pre=0)	-0.012		-0.012		-0.002		-0.003	
	(0.009)		(0.010)		(0.007)		(0.007)	
Chinese suburbs (>median=1, otherwise=0)	0.008		0.007		-0.004		-0.004	
	(0.007)		(0.007)		(0.005)		(0.005)	
Chinese suburbs*LCT	-0.028	***	-0.031	***	-0.029	***	-0.033	***
	(0.008)		(0.008)		(0.006)		(0.006)	
Property characteristics	yes		yes		yes		yes	
Suburb characteristics	yes		yes		yes		yes	
LGA fixed effects	yes		yes		yes		yes	
Monthly time trend	yes		yes		yes		yes	
No. of sales	13,911		11,417		29,247		24,255	
No. of LGA	32		31		32		31	
Adj. R-squared	0.821		0.826		0.816		0.821	

In this table we replicate our main estimation results in Table 3, using subsamples based on property sales 3 or 6 months before and after the LCT policy change. Columns (1) and (3) are for sales using unmatched suburbs. Columns (2) and (4) are for sales using PSM matched suburbs. Standard errors of estimates based on the White cross-section covariance are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: OLS regressions with Placebo treatments

	Non-Chinese suburbs (<1%)		Randomly assigning Chinese suburbs	
Dependent variable: log of sale price				
Constant	13.619	***	13.669	***
	(0.043)		(0.016)	
LCT dummy	0.010	*	-0.003	
	(0.005)		(0.003)	
Placebo (randomly assigning 20% of suburbs to treatment)			0.002	
			(0.002)	
Placebo*LCT			0.001	
			(0.004)	
Log number of bedrooms	0.400	***	0.426	***
	(0.009)		(0.004)	
Log number of bathrooms	0.195	***	0.167	***
	(0.005)		(0.003)	
Log number of car spaces	0.048	***	0.076	***
	(0.005)		(0.003)	
Log number of garages	0.071	***	0.069	***
	(0.008)		(0.005)	
Log land area (sqm)	0.040	***	0.018	***
	(0.003)		(0.001)	
Property type (unit=1, house=0)	-0.236	***	-0.350	***
	(0.006)		(0.003)	
Log driving time to CBD (minutes)	-0.218	***	-0.153	***
	(0.010)		(0.004)	
Suburb population density (per sq km)	0.000		0.000	***
	(0.000)		(0.000)	
LGA fixed effects	yes		yes	
Year fixed effects	yes		yes	
No. of sales	23,299		90,945	
No. of LGA	18		32	
Adj. R-squared	0.818		0.807	

In this table we present results of placebo test. Column (1) shows the results of using Sydney suburbs with a Chinese population of less than 1% as a placebo. For column (2), we randomly assigned 20% of all suburbs in the Sydney metropolitan area as a Chinese suburb and re-estimate the basic regression of equation (1) 50 times. The reported coefficients and standard errors in column (2) are the average results of simulations. Standard errors of estimates based on the White cross-section covariance are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6: OLS regressions of top 10 Chinese suburbs

	Top 10 Chinese suburbs		Top 10 Chinese buyers	
Dependent variable: log of sale price				
Constant	13.679	***	13.661	***
	(0.017)		(0.017)	
LCT dummy (post=1, pre=0)	-0.002		-0.001	
	(0.003)		(0.003)	
Chinese suburbs (yes=1, no=0)	0.050	***	0.079	***
	(0.007)		(0.008)	
Chinese suburbs*LCT	-0.035	***	-0.042	***
	(0.010)		(0.011)	
Log number of bedrooms	0.426	***	0.426	***
	(0.004)		(0.004)	
Log number of bathrooms	0.167	***	0.167	***
	(0.003)		(0.003)	
Log number of car spaces	0.076	***	0.076	***
	(0.003)		(0.003)	
Log number of garages	0.069	***	0.069	***
	(0.005)		(0.005)	
Log land area (sqm)	0.018	***	0.018	***
	(0.001)		(0.001)	
Property type (house-0, unit-1)	-0.349	***	-0.350	***
	(0.003)		(0.003)	
Log driving time to CBD (minutes)	-0.155	***	-0.150	***
	(0.004)		(0.004)	
Suburb population density (per sq km)	0.000	***	0.000	***
	(0.000)		(0.000)	
LGA fixed effects	yes		yes	
Year effects	yes		yes	
No. of sales	90,945		90,945	
No. of LGA	32		32	
Adj. R-squared	0.806		0.806	

In this table, we present the results of using alternative measures for Chinese suburbs. Column (1) is based on a market consensus of the top 10 Sydney suburbs with the most Chinese residents from 2020 Sydney Suburb Review, including Haymarket, Carlingford, Chippendale, Zetland, Chatswood, Ultimo, Eastwood, Rhodes, Burwood and Hurstville. Column (2) is based on the top 10 Sydney suburbs for Chines buyers in 2018, including Sydney, Sydney Olympic Park, Parramatta, Edmondson Park, Chatswood, Macquarie Park, Epping, West Ryde, Potts Point and Mosman. Standard errors of estimates based on the White cross-section covariance are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7: OLS regressions controlling for time trends at main regions

	Panel A: Full sample						Panel B: PSM matched sample					
	(1)		(2)		(3)		(4)		(5)		(6)	
	> 5%		>10%		>15%		>5%		>10%		>15%	
Dependent variable: log of sale price												
Constant	13.671	***	13.679	***	13.696	***	13.622	***	13.635	***	13.635	***
	(0.017)		(0.017)		(0.017)		(0.019)		(0.019)		(0.019)	
LCT dummy (post=1, pre=0)	0.007	**	0.002		0.000		0.002		-0.003		-0.003	
	(0.003)		(0.003)		(0.003)		(0.003)		(0.003)		(0.003)	
Chinese suburbs (yes=1, no=0)	0.021	***	0.015	***	0.067	***	0.031	***	0.017	*	0.042	**
	(0.003)		(0.003)		(0.005)		(0.003)		(0.009)		(0.018)	
Chinese suburbs*LCT	-0.030	***	-0.032	***	-0.047	***	-0.025	***	-0.027	*	-0.091	***
	(0.004)		(0.005)		(0.007)		(0.005)		(0.015)		(0.025)	
Property characteristics	yes		yes		yes		yes		yes		yes	
Suburb characteristics	yes		yes		yes		yes		yes		yes	
LGA fixed effects	yes		yes		yes		yes		yes		yes	
Year fixed effects	yes		yes		yes		yes		yes		yes	
Region*year effects	yes		yes		yes		yes		yes		yes	
No. of sales	90,945		90,945		90,945		75,806		75,806		75,806	
No. of LGA	32		32		32		31		31		31	
Adj. R-squared	0.806		0.807		0.807		0.811		0.811		0.811	

In this table, we replicate Table 3 by adding additional control for time trends in main regions. The Sydney metropolitan area is divided into five main regions based on the Greater Sydney Region Plan, which include western, central, eastern, north and south regions. The time trends among each region were controlled by the interaction terms between regions and year dummies. Standard errors of estimates based on the White cross-section covariance are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Propensity score matching outcomes

Variable	Sample	Treated mean	Control mean	Bias (%)	Bias reduction (%)	t-test	t-test p value	Variance (treated) / Variance (control)
Tertiary education (%)	Unmatched	0.068	0.040	72.6		9.48	0.000	3.12*
	Matched	0.055	0.055	1.1	98.5	0.19	0.852	0.28*
Australian citizen (%)	Unmatched	0.777	0.844	-56.6		-7.40	0.000	1.47*
	Matched	0.821	0.829	-6.6	88.3	-1.05	0.296	1.02
Married de facto (%)	Unmatched	0.058	0.068	-27.4		-3.58	0.000	0.9
	Matched	0.056	0.063	-16.5	39.8	-1.73	0.084	0.62*
Employed full time (%)	Unmatched	0.313	0.307	8.1		1.06	0.288	0.62*
	Matched	0.31	0.326	-21.7	-167.3	-2.36	0.019	0.57*
Speak English and other language	Unmatched	0.294	0.132	112.6		14.72	0.000	1.46*
	Matched	0.244	0.208	24.7	78.0	2.79	0.005	0.67*
Average household size	Unmatched	2.784	2.853	-13.3		-1.74	0.082	0.66*
	Matched	2.831	2.774	11.1	17.0	1.13	0.259	0.50*
Different address 5 years ago	Unmatched	0.091	0.034	92.0		12.02	0.000	5.07*
	Matched	0.06	0.059	2.6	97.2	0.44	0.657	0.76*
Speak other language at home	Unmatched	0.406	0.197	112.3		14.68	0.000	1.08
	Matched	0.356	0.305	27.3	75.7	2.86	0.004	0.59*
Median weekly rent	Unmatched	506.29	424.13	46.2		6.04	0.000	0.75*
	Matched	494.92	516.83	-12.3	73.3	-1.47	0.141	0.70*
Median age	Unmatched	37.638	39.111	-23.7		-3.11	0.002	0.48*
	Matched	38.653	40.224	-25.3	-6.7	-3.05	0.002	0.39*
Median monthly mortgage payment	Unmatched	2445.1	2234.1	31.9		4.17	0.000	0.64*
	Matched	2471.7	2661.1	-28.6	10.2	-3.16	0.002	0.56*
New immigrants 2011-2016	Unmatched	0.084	0.03	93.0		12.15	0.000	6.28*
	Matched	0.055	0.051	7.4	92.1	1.33	0.184	0.95
Owning outright	Unmatched	0.102	0.108	-12.0		-1.57	0.117	0.59*
	Matched	0.11	0.119	-21.6	-80.0	-2.30	0.022	0.42*

Renting	Unmatched	0.115	0.082	50.6		6.62	0.000	1.18
	Matched	0.099	0.107	-12.5	75.3	-1.29	0.196	0.56*
Occupied private dwelling	Unmatched	0.333	0.316	28.7		3.76	0.000	0.64*
	Matched	0.328	0.343	-24.3	15.4	-2.50	0.013	0.50*
Median weekly family income	Unmatched	2231.9	2083.5	20.0		2.62	0.009	0.85
	Matched	2273.7	2461.2	-25.3	-26.3	-2.74	0.006	0.69*

In this table, we present the PSM outcomes. * if variance ratio outside [0.81, 1.24] for unmatched sample and [0.78, 1.28] for matched sample. See Appendix A for detailed descriptions of the PSM procedures.