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Home Advantage: The preference for local residential real estate *

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Abstract

Do 'home-biased' residential real estate investors purchase and perform differently than those investors who look for opportunities further away? We identify a large sample of investors in the residential property market and measure the proximity of their purchase from their existing residential location. It is hypothesised that, in line with the results of home bias in other investment markets such as equities, there is a preference among residential real estate investors to buy locally and that this bias affects their returns. The home bias can be used to optimise housing market lending criteria and to inform housing investment policy. It should also be considered in household portfolio allocation decisions and has broad implications for how psychology affects financial decision-making.

JEL classification:

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1 Introduction

When buying a new house, individuals exhibit a preference for properties that are geographically close to their current address. Lower search costs, limits to mobility and familiarity may explain this phenomenon for owner-occupiers. However, a similar trend is observed for property investors: investment properties are typically purchased in the same area as the investor's own residence. This result is surprising given the foregone potential for diversification benefit and the relatively minimal search costs and mobility restrictions of investors. It also potentially exaggerates property investment concentration risks.

We explore this issue by analyzing the extent to which property investors in Australia prefer local real estate and examine several factors that explain this preference. Residential real estate investors in Australia are a large and growing segment of the housing market. The Reserve Bank of Australia (RBA) estimates that investors account for around 26 percent of residential real estate holdings.[1] Furthermore, there are concerns that increases in residential property investment increase risks to financial stability.[2] Our research presents timely information that may be used by regulators and lenders to better manage these risks.

The prior empirical research into the drivers of property location preference among investors is limited. While Goetzmann (1993) demonstrates the significant risk reduction to property investment portfolios from geographic diversification. remains a mystery that investors are not diversified? but advice not followed?. Another strand of research focuses on the price effects of being a local buyer. For

[1] 'Submission to the Financial System Inquiry,' Reserve Bank of Australia, March 2014. http://www.rba.gov.au/publications/submissions/financial-sector/financial-system-inquiry-2014-03/pdf/financial-system-inquiry-2014-03.pdf

[2] 'Financial Stability Review,' Reserve Bank of Australia, October 2017

example, Lambson et al (2004) find that non-local apartment buyers pay a premium relative to local buyers. They attribute this to non-locals' higher marginal search costs, higher information asymmetry, and behavioral biases. Ihlanfeldt and Mayock (2012) attribute the non-local premium to the relatively stronger bargaining power of local buyers. We extend the literature by considering the factors driving the preference for local real estate. Specifically, we demonstrate a link between property investors' location familiarity, sophistication and relative purchasing power, and their propensity to invest locally. To the best of our knowledge, we are also first to analyse property investors' location preferences in Australia.

We obtain a large, proprietary sample of residential property mortgage loan applications across Australia. The data sample comprises borrowers' characteristics including their current postcode, as well as the postcode of the newly property purchased. This allows identification of local and non-local buyers. We are also able to distinguish between borrowers who are owner-occupiers (mortgage applicants purchasing a property to reside in the property) and property investors (mortgage applicants purchasing a property to rent the property to a third-party tenant or to resell it). This is an important delineation. Owner-occupiers have lower spatial mobility than investors, due to personal situations such as employment, education and community connections. To avoid these confounding factors, our analysis focuses on the preferences of property investors.

We show that 68 percent of residential property investor purchases are local. That is, over two-thirds of investment properties are purchased in the locality in which the investor resides. Our results indicate that greater familiarity with an area, proxied by longer tenure at their current address and employment, increase the marginal investor's propensity to purchase locally. Further, we find that investor

sophistication has a mitigating effect on the preference for local property, reflecting increased awareness of the benefits of geographic diversification.

We explore possible rational explanations for investors' local property preferences. Following Clauretie and Thistle (2007) we test whether strong price appreciation in a buyer's current market gives them a purchasing power advantage in non-local markets. Contrasting with their results, we find investors are more likely to purchase locally when their local market has outperformed. In other words, they do not appear to use their greater purchasing power. We attribute this to possible momentum-chasing behavior and evidence of behavioral biases influencing residential real estate.

Residential real estate presents an interesting setting for behavioral economics research. Residential property is the largest financial decision, consumption good and concentration of wealth for most individuals; Flavin and Yamashita (2002). It should arguably follow that residential property purchase decisions are exercised with above average diligence. However, the presence of behavioral biases in the market is widely acknowledged. To explain the persistence of behavioral biases in residential real estate, Salzman and Zwinkels (2013) suggest that, '...Although many theoretical and empirical studies stress the presence and importance of behavioral biases, the awareness of cognitive limitations in the housing market is not wide spread...' (p.15). Our results may also relate to the well-document 'home bias' in equities markets. The equity market home bias refers to the observation of stock portfolios that excessively weight domestic securities over international securities (French and Poterba (1991)), and locally headquartered companies over companies with distantly located headquarters (Coval and Moskowitz (1999)). At first glance, our results appear to demonstrate the extension of a home bias to residential real

estate. However, issues with using home bias short.

There are important implications of this research for housing market lending practice and regulation. The size of Australia's housing market and its interconnectedness to the financial system through bank lending channels links make it a potential source of systemic risk. Housing debt in Australia is disproportionately held by residential real estate investors, who are less incentivised to reduce their mortgage loan-to-value ratio,[3] and consequently at greater risk of negative equity events (RBA, 2014). Geographically concentrated investor markets resulting from the home bias could exacerbate this effect. The current research provides a platform for future research into this line of inquiry.

The remainder of this paper is structured as follows. In section 2 we review the home bias literature as it relates to both financial and real estate markets, and derive a set of hypotheses. In section 3 the research design and methodology are outlined. Section 4 describes the data sources and presents summary statistics. Section 5 presents the results of our analysis. Section 7 concludes.

2 Literature Review and Hypothesis Development

A broad theoretical and empirical literature examines the effect of local and non-local buyers on residential real estate prices. Theoretical models show that the costs associated with a property purchase are positively related to the geographical distance between the buyers current and prospective property. (Turnbull and Sir-

[3]This is due to the tax incentives in place in Australia for negative gearing and, to a lesser extent, discounts in capital gains; see .

mans), (Lambson et al). These costs primarily arise through higher search costs and asymmetric information for non-locals. Consequently, models relating buyer characteristics with property purchase prices predict that non-local buyers are relatively disadvantaged relative to local buyers.

In a study of commercial, multi-family apartment building transactions, Lambson et al. (2004) identify that geographically distant buyers pay, on average, 5.52 percent more than geographically proximate buyers.[4] The out-of-state buyer price premium is supported in studies by Chinloy et al. (2013) and Clauretie and Thistle (2007). Ling et al. (2016) demonstrate that buyer distance from property, whether in- or out-of-state, is positively linked to the transaction price, while earlier research by Miller et al. (1988) finds a significance price premium in purchases of single-family residential homes in Hawaii by Japanese investors from January 1986 to February 1988.

Chinloy et al (2013) make the distinction between local and non-local property buyers to assess the effect of local experience on purchase price. They find that the subset of experienced local investors, those with repeated transations in the same market, achieve purchase price discounts while inexperienced locals do not. Using data for the Atlanta housing market, Chinloy et al (@013) show that this experience-driven price discount is more important in explaining local and non-local differences than marginal search costs. These results indicate that the delineation of local and non-local buyers in prior studies is incomplete, and that heterogeneity among locals should be considered.

While these past studies show a price effect based on the buyer's relative distance to the property, the results are potentially limited by the various endogeneity

[4]Their sample covers sales in Phoenix from 1990 to 2002 that consists of approximately equal numbers of in-state (1,415) buyers and out-of-state (1,439) buyers.

problems that arises. For example, omitted variable bias arises if non-local buyers systematically prefer to purchase higher quality homes, where underlying quality is unobserved. Due to data limitations, even the most advanced hedonic model specification will fail to capture the true quality of a property.

Ihlanfeldt and Mayock attempt to address potential endogeneity arising from correlated omitted variables by comparing tax-assessed property value estimates with purchase prices. They argue that this variable is more strongly captures differences in housing quality.

there is also the issue of simultaneity, or reverse causality. buyers which expect to benefit more, are more likely to be influenced in this way in their decision to buy locally or non-locally.

In the present study, we expand the literature by considering how additional factors explain the property buyers' decision to invest locally or non-locally.

Further, the relative bargaining power of the buyer and seller, assuming no informational assymmetry, may explain the home bias. Ihlanfeldt and Mayock (2012) argue that in a thin market, such as real estate, distant buyers are in a weak position to local sellers. They empirically demonstrate, using a large sample of Florida housing transactions, a positive relationship between sale price and the distance of the buyers new home from their previous home.

An alternative explanation for home bias comes from the behavioral economics literature and attributes investor preferences for local assets to familiarity; Kilka and Weber (2000) and Fellner-Röhling and Maciejovsky (2003). Familiarity bias leads to overconfidence in beliefs about known situations, and under-estimation of risks. This is partly demonstrated in the estimation of investors expected domestic market returns in each of the countries studied by French and Poterba (1991), which

yields a relative optimism (pessimism) towards securities in the domestic (foreign) market. Seiler et al. (2013) and Seiler et al. (2008) present survey evidence of real estate owners that supports the presence of familiarity bias.

Our first hypothesis conjectures that those investors that are less mobile are more likely to exhibit home bias due to familiarity. We predict a negative relationship between mobility and home bias. Investors that move more, and are more exposed to different markets, are more likely to invest non-locally.

Hypothesis 1 (H1)**.** *More mobile investors are more likely to invest non-locally than less mobile investors.*

Our second hypothesis expects that investor sophistication is negatively linked to the likelihood of a home bias in real estate purchases. More sophisticated investors have more experience and knowledge, and for that reason that may exploit a relatively stronger bargaining power and hold asymmetrical information for their advantage.

Part of the home bias literature also considers the role of investor sophistication. In equity markets it is shown that 'sophisticated' investors outperform less sophisticated investors; Grinblatt and Keloharju (2000). Graham et al. (2009) and Bose et al. (2015) demonstrate that the persistence of the home bias in equities markets is linked to investor education levels, while investor sophistication is shown to limit the impact of the home bias in equity markets; Karlsson and Nordén (2007) and Kimball and Shumway (2010). More sophisticated real estate investors may value a geographically diversified portfolio higher than non-sophisticated investors and may exhibit less home bias. In addition, more sophisticated investors may hold more information and have higher bargaining power due to their additional knowledge and experience.

Hypothesis 2 (H2)**.** *More sophisticated investors are more likely to invest non-locally than less sophisticated investors.*

Our third hypothesis considers a possible rational explanation for investors' decisions to purchase locally or non-locally, based on the relative performance of their current address housing market. If an investor's home property market has outperformed, they will have higher purchasing power in property markets that have underperformed relatively.

Hypothesis 3 (H3)**.** *Property investors have a lower propensity to purchase properties in the same locality as their current address when their current real estate market has outperformed.*

Support for this hypothesis would suggest that observed home bias may not be driven purely by behavioural biases, since it may result from investors being "priced out" of non-local markets due to poor price performance in their home market. An alternative view on this position is that investors in an outperforming market have "anchored" their price expectations higher than prevailing prices in relatively underperforming markets. Viewing the underperforming markets as cheap, they are more motivated to buy non-locally. We thus consider whether relative purchasing power can explain local and non-local property purchases. This argument is explored by Lambson et al. (2004) though the results are inconclusive.

We don't believe institutional barriers or incentives are important explanators of the residential real estate home bias for different regions within a country. The following section outlines the research design we take to test these hypotheses.

3 Research Design

In order to explore home bias, we must first define local and non-local property buyers. To make this distinction we determine whether the property buyer's postal address at the time of the mortgage application and the postal address of the property being purchased with the mortgage are in the same locality.[5] In this research, locality is determined by whether the Statistical Local Area (SLA) of the property purchased with the mortgage is the same as the SLA of the residential address of the mortgage applicant.[6]

To explore H1, we utilise the RIPL sample of mortgage applicants. We consider the following binary model for non-local housing purchases, where the mortgage borrower chooses to buy property locally or not. We assume that $y_i = 1$ if mortgage RIPL applicant i chooses to buy non-locally (in a different SLA) and $y_i = 0$ otherwise. We are interested in estimating the conditional probability of buying non-local housing property, $\mathbb{P}(y_i = 1 \mid I_i)$, as well as the determinants of this probability; where I_i is the information set at mortgage application time that contains market variables, borrower characteristics, and property characteristics. Specifically, we consider the Logit model of the form,

$$\mathbb{P}(y_i = 1 \mid I_i) = \mathbf{\Lambda}(\alpha + X_i'\beta + W_i'\gamma + Z_i'\delta) \tag{1}$$

[5] In our study, we assume that the property market to which an individual is 'home biased' is the locality in which they currently reside. It could be argued that individuals also have some knowledge of areas in which they work, or socialise. Due to data limitations, consideration of these alternatives is beyond the scope of this study.

[6] We use ABS SLA4 2011 `http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1259.0.30.001July%202011?OpenDocument`. For robustness, we also perform our analysis using postcodes and states and territories as the locality definition. Our results are qualitatively similar across all definitions. We do not have enough information to identify the exact residential address or the address of the property purchased with the mortgage, and can't therefore build a geographical distance variable. We could however consider geographical distance from different SLAs or different postcodes.

where $(\alpha, \beta', \gamma', \delta')'$ is an unknown coefficient vector; X contains market control variables; W includes borrowers' characteristics variables; Z includes specific investor buyer sophistication variables; and $\mathbf{\Lambda}(.)$ is the cumulative density function (cdf) of a logistic distributed random variable.

The variable of interest to address H1 included in W, which proxy for mobility and familiarity, are the time in years a residential property investor (RIPL) has spent living in her/his current address and employed in her/his current employment. We expect a statistically significant negative sign for the coefficients of these two proxies for mobility, as the probability of investing non-locally should be smaller the less mobile residential investors are, or the more years they have lived at the current address and worked at their current employment. A negative statistically significant relationship between mobility and non-local investment would support the familiarity bias explanation.

The variables of interest included in W to test H2 which proxy for financial sophistication are the following: whether the investor holds shares and the value held in shares; whether the investor already received rent income at the time of applying for an investment property loan; and whether they held a previous mortgage, and its size. We expect investors purchasing a property who already receive rent/board income to be real estate investors and have experience in the housing market. Similarly, those who have held a prior mortgage have experience in the mortgage market and are more sophisticated at the time of financing their investment with a mortgage. Real estate investors who also hold shares exhibit relative diversification, and therefore more sophistication. Previous work use the level of educational attainment or the occupation as a financial literacy proxy; see XXX We do not have information on borrower's educational level but can control for cer-

tain property investors' occupations, such as professionals, managers, small business proprietors and self-employed.

In studies of behavioural bias and investor characteristics, proxies for investor sophistication are found to attenuate the size of biases. Calvet et al. (2009) document an inverse relationship between 'financial mistakes' and financial wealth, education and, to a lesser degree, disposable income. This follows work by Dhar and Zhu (2006) that links investor wealth, income and professional employment with less biased investment decisions. They argue that in addition to the expected greater financial literacy of these individuals, they are also more likely to access professional outside financial advice. As another proxy for investment sophistication we have built a dummy variable that identifies whether residential investors invest in properties above the all-property median property price for the given SLA.

To test H3, we construct a variable that compares changes in property price indexes at each SLA. We define out-performance in an SLA's housing market if we observe the SLA's property price index change is in the highest 50 percent of all SLAs across a state. We measure the index changes at lags of 3-, 6-, 12-, 24- and 36-months. Our Indicator variables equal $I_k = 1$ if the SLA return (measured as change in median all-property index price) over the prior k months is above the state-wide median SLA return (that is, in the top half of SLAs by return), at the $k = 3$, 6, 12, 24, and 36 months.

4 Data background

The primary data used in this study is sourced from a major bank in the Australian mortgage market. The dataset comprises 1,149,484 residential mortgage applica-

tions from owner-occupiers and property investors for the period 1 January 2003 to 31 May 2009.[7] Of this sample, property investors account for approximately 21 percent of all observations. ABS reports that total housing investment in authorised deposit institutions (ADIs) represented 26 percent of all residential housing purchases during the sample period.[8] Figure 1(a) shows the proportion of residential real estate investors in our sample over time, representing around one third of all mortgage applicants; seasonality, particularly financial-year tax effects, seems prominent. The bank has provided extensive information it collects on borrower and loan characteristics in the mortgage application process which will be incorporated into our analysis.[9]

Although the sample period is somewhat outdated, it fits the research needs as it excludes periods when investors' access to mortgages was treated differently to other individuals' access to housing finance. From the early 2000s investor and homeowner mortgages were treated the same, and the interest rates offered by banks were not differentiated based on the loan purpose. However, between December 2014 and July 2018 the Australian Prudential Regulatory Authority (APRA) introduced lending restrictions on investor mortgage loans; APRA put in place a 10 percent cap on real estate investor lending growth, and had the authority to intervene if an individual bank exceeded 10 percent growth in investor lending over a 12-month period.[10] Before that time, banks also developed stricter underwriting standards

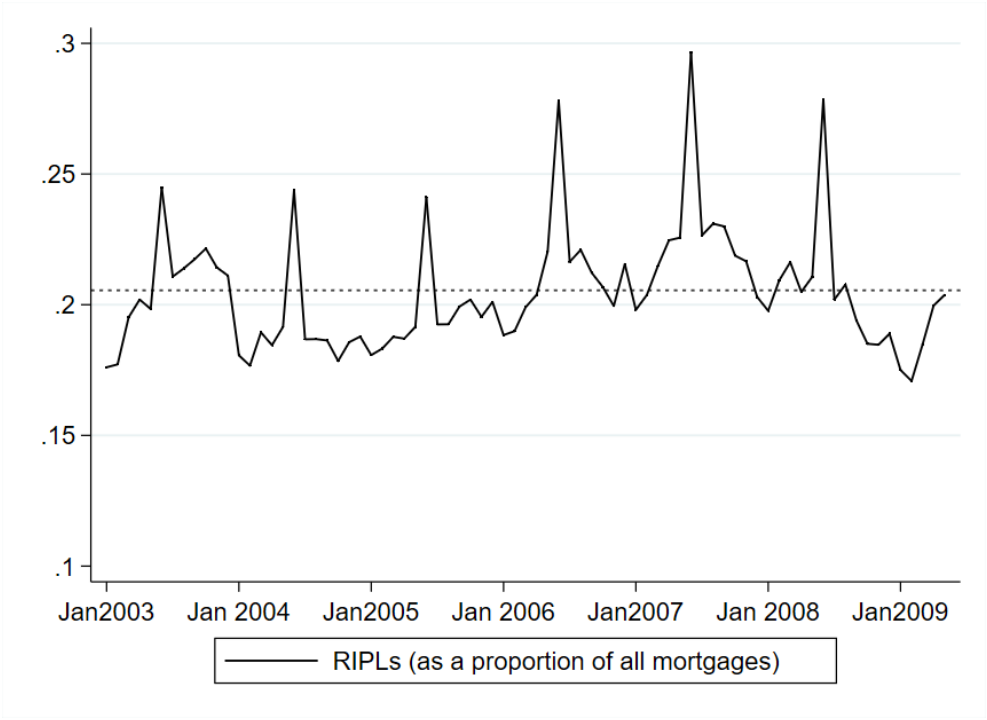
[7] Unfortunately this dataset can not be updated due to data restrictions from the source bank.

[8] ABS, Housing Finance, Australia, August 2018, 5609 Table 12, `http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5609.0August%202018?OpenDocument`.

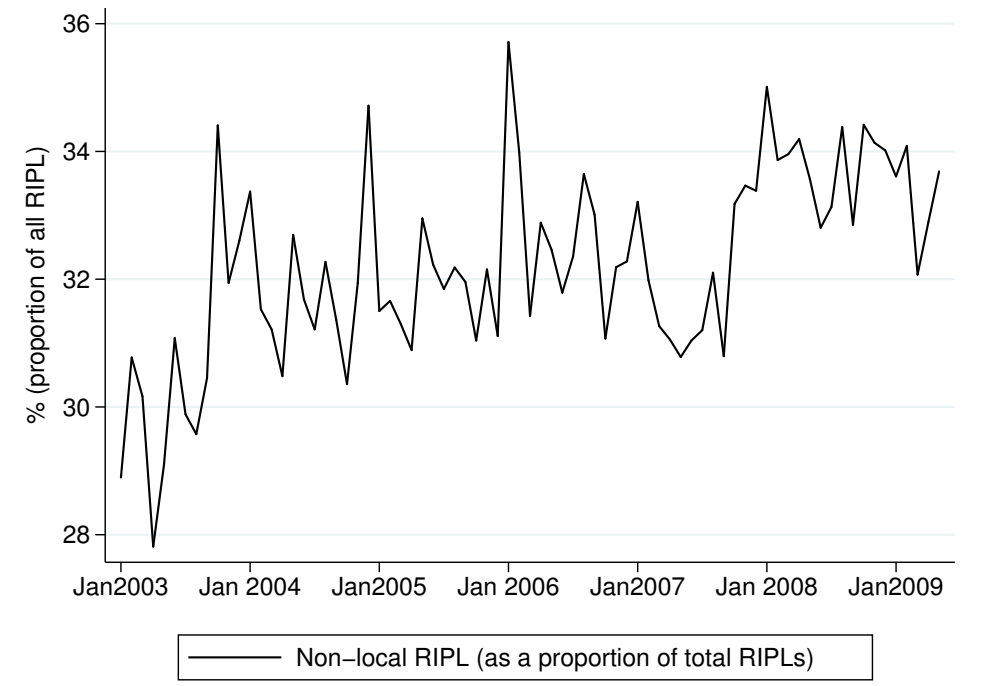
[9] A detailed description of the institutional setting for housing loans in Australia and this dataset is provided in Dungey et al. (2018).

[10] Additional macro-prudential measures were enacted in April 2017 which capped interest-only lending at 30 percent of all new loans issued. Real estate investors purchasing property with a mortgage in Australia have incentives to select interest-only loans due to the negative gearing tax scheme.

Figure 1: RIPLs over time.



(a)



(b)

for investor loans, raised investor interest rates and required bigger deposits (lower LTVs).

During the sample period 70 percent of Australian owned a property, and over half of them were still paying a mortgage.[11] Banks held on average 79 percent of all monthly housing finance commitmments in Australia (and 81 percent of the monthly value of all housing finance commitments).[12] The Australian mortgage market exhibits concentration around a few major domestic banks, and our data is sourced from one of this major banks.

Table 1 present summary statistics for residential real estate investors financing their investment with a mortgage, discerning those buying a residential dwelling locally and those purchasing non-locally, using the definition presented in Section 3. Residential real estate investors investing in a different SLA to the one they reside in represent almost a third of the sample. Figure 1(b) shows how preference for non-local properties has trended higher over the sample. Though most properties are purchased in the home market, the non-local proportion has increased from below 30 percent early in the sample, to around 34 percent at the end of the sample period.

Table 1 shows that those investors investing non-locally are slightly younger than those investors investing locally. There are lower proportions of married investors and investors applying for credit with a coborrower when buying non-locally than locally. Non-local residential investors also tend to have less dependants. There is a larger proportion of female investors buying non-locally than locally. Residential investors buying non-locally tend to have spent less time on average on their current address and their current employment.

[11] See ABS, Housing Occupancy and Costs, Australia, 4130. `http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4130.02015-16?OpenDocument`.

[12] See ABS, Housing Finance, Australia, 5609, Table 3. `http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5609.0July%202018?OpenDocument`.

By construct in our definition of a local purchase, local investors purchase property in the same state where they reside, and all non-local investors purchase a property in a different postcode to the one they reside in at the time of accessing housing finance. Interestingly, local investors take slightly larger housing loans than non-local investors, suggesting that those residential investors that invest further away follow similar house prices. This is also observed for property valuation, as those properties in further SLAs have lower value than the ones on the same SLA of residence. Although average monthly repayments don't differ much between investors, investors purchasing non-locally have higher average total loan payments and higher average monthly expenses. However, non-local investors have higher average income, larger asset value and net wealth position, consistent with our expected results under H2.

Table 1: Descriptive statistics for mortgage borrowers

	$RIPL$	
	$Local$	$Non-local$
Total obs.	160,306	75,972
Proportions	67.8%	32.2%
Borrower characteristics		
Age	43.6yrs.	42.4yrs.
Females	26.4%	27.6%
Married	74.3%	66.9%
Co-borrower	65.5%	54.4%
Number of dependents	0.7	0.6
Years at current address	7.6yrs.	6.7yrs.
Years at current employment	8.4yrs.	7.5yrs.
Sophistication		

Table 10 in Appendix B provides the definition for all variables used.

Table 1 – continued from previous page

	$RIPL$	
	$Locals$	$Non-locals$
Professionals	18.4%	23.6%
Management	17%	20.1%
Rent income	1.5%	1.9%
Hold shares	6.1%	5.9%
Property location		
Interstate	0%	31.9%
Inter-postcode	24.2%	100%
Financial characteristics		
Monthly net income	$9,301	$10,059
Total net wealth	$1,006,079	$1,083,109

Table 10 in Appendix B provides the definition for all variables used.

To measure price performance of different localities, we use monthly aggregated index data supplied by CoreLogic accessed through Sirca.

5 Results

5.1 H1: Familiarity bias

Some real estate investors may choose to invest in residential real estate geographically close to their place of residence as they may be more familiar with the area and the neighbourhood. They have more knowledge on the developments of the region and the local trends. They may find lower administration and maintenance cost associated with owning an investment property close to their home. But this famil-

iarity may obstruct these investors from learning about other real estate markets, and exploring beneficial diversification. It is, after all, quite unlikely that the 'home' market always outperforms other markets (nationwide). We proxy familiarity with the time spent at current address and current employment and test H1.

Table 2 presents the results of estimating eq(1) to test H1. The table shows the explanatory variables on the first column, and four models that specify the probability of investing in a residential property non-locally (at a different SLA to the purchaser's SLA of residence) with a mortgage following eq(1). Model (1) focuses on W control variables, model (2) adds X and Z control variables, while models (3) and (4) add to model (1) State or SLA and year dummies.

The main variables of interest to test H1 included in W are the residential investor's time spent at the current address and current employment, measured in years. The coefficients for these proxies for mobility are always negative and statistical significant, showing that residential investors financing their investment with a mortgage are 1-2 percent less likely to purchase a property located in a different SLA to the SLA where they reside if they have spent longer time residing at their current address and working at their current employment. This result strongly supports our first hypothesis H1, and suggests that the more familiar investors are with their local market, the more likely they are to invest locally.

Results in Table 2 also show that residential property investors with a higher number of dependants and applying with a co-borrower – suggesting more 'settled' households – are less likely to purchase non-locally. Supporting our last familiarity and mobility result.

Mortgage borrowers with higher net income are more than 10 percent likely to purchase non-locally, while those with higher net wealth are less likely to purchase

non-locally. Females, who represent 26.8 percent of all residential real estate investors mortgage borrowers, are not statistically different from male residential real estate investors.

Market variables are not statistically significant in most cases, and they don't have a strong economic significance either; this may be due to the fact that they are all relevant at a national level, but not so much at the SLA level. Model (4) controls for differences between SLAs incorporating SLA dummies.

Table 2: Logit Marginal Effects

	$P(non-locals)=1$			
	(1)	(2)	(3)	(4)
Years at current	-0.003***	-0.002***	-0.002***	-0.002***
address	[0.000]	[0.000]	[0.000]	[0.000]
Years at current	-0.002***	-0.001***	-0.002***	-0.001***
employment	[0.000]	[0.000]	[0.000]	[0.000]
Monthly net	0.113***	0.106***	0.111***	0.101***
income (logarithm)	[0.002]	[0.002]	[0.002]	[0.002]
Net wealth	-0.023***	-0.018***	-0.023***	-0.022***
(logarithm)	[0.001]	[0.001]	[0.001]	[0.001]
Age $<$ 30 years	0.052***	0.054***	0.054***	0.056***
	[0.004]	[0.004]	[0.004]	[0.004]
$30 \leq$ Age $<$ 40 years	0.030***	0.029***	0.033***	0.030***
	[0.003]	[0.003]	[0.002]	[0.002]
$50 \leq$ Age $<$ 60 years	0.014***	0.011***	0.011***	0.011***
	[0.003]	[0.003]	[0.003]	[0.003]
Age $\geq$ 60 years	0.049***	0.041***	0.043***	0.037***
	[0.004]	[0.004]	[0.004]	[0.004]
Female	0.001	0.003	0.003	-0.001

[Standard errors]. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Table 10 in Appendix B provides the definition for all variables used. All monetary variables are in logarithms and deflated by CPI of the corresponding SLA state capital city for Q1-2006.

Table 2 – continued from previous page

	$P(non-locals)=1$			
	(1)	(2)	(3)	(4)
	[0.002]	[0.002]	[0.002]	[0.002]
Co-borrower	-0.112***	-0.110***	-0.111***	-0.102***
	[0.002]	[0.002]	[0.002]	[0.002]
Number of	-0.023***	-0.021***	-0.023***	-0.018***
dependants	[0.001]	[0.001]	[0.001]	[0.001]
Interbank		-0.003*		
rate		[0.002]		
Unemployment		0.000		
rate		[0.001]		
%ΔDwelling		-0.000		
index		[0.000]		
State dummies	NO	NO	YES	NO
SLA dummies	NO	NO	NO	YES
Year dummies	NO	NO	YES	YES
Adj. R^2	0.0251	0.0224	0.0303	0.0559
N	232,145	212,352	232,145	232,145

[Standard errors]. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Table 10 in Appendix B provides the definition for all variables used. All monetary variables are in logarithms and deflated by CPI of the corresponding SLA state capital city for Q1-2006.

5.2 H2 Sophisticated investors

H2 hypothesis posits that sophisticated investors will want to access diversification gains, and then be less affected by home bias. In addition, obtaining information

from non-local markets may be less costly for sophisticated investors, and they may hold a stronger bargaining power due to their financial experience.

Table 3 shows the results that test H2, following the methodology explained in Section 3. The first column in the table shows the control variables added in each model. The models in the rest of the columns replicate the estimations in model (3) of Table 2, and adds new exogenous variables to control for investor sophistication.[13] Model (A) adds some control variables that may proxy for sophistication, such as: whether the residential property investor held a prior mortgage, holds shares, and already receives rent/board income. If a residential property investor held a prior mortgage and/or already receives rent/board income it suggests she/he has previous financial experience with mortgage and real estate markets, and presumably is more savvy in terms of considering mortgage costs, property and capital gain taxes, and rent, sell, and maintenance costs. Similarly, holding shares suggests property investors are more financially diversified and sophisticated.

Model (B) considers investor's selected occupations that may be related to financial knowledge and experience such as: professionals, management positions, small business proprietors, and self-employed. We have included some occupations where we expect lower financial sophistication, such as professional skilled trades and unskilled trades. Although not a perfect proxy, we expect property investors with higher education – reflected in whether they are professionals or not – and those with management experience, whether employed by other businesses or managing their own businesses, to have higher financial sophistication. We acknowledge that many professionals, managers and business owners may not have financial education

[13] As presented in Table 2, W includes the years at current address and employment, monthly net income and net wealth (in logarithmic form), age brackets, female dummy, co-borrower dummy and number of dependants.

or experience, which means that we would be underestimating the effect of financial education and sophistication using these proxies.

Finally, in model (C) we add a control variable that identifies whether the purchase price of the investment residential property financed with a mortgage was above the median SLA house price. This last exogenous variable controls for those residential investors that can afford to purchase expensive properties in any market, and are not investing in non-local markets due to affordability constraints.

Table 3: Logit Marginal Effects

	$P(non-locals)=1$		
	(A)	(B)	(C)
Held a prior	-0.029***	-0.031***	-0.032***
mortgage	[0.004]	[0.004]	[0.004]
Hold shares	0.024***	0.018***	0.018***
	[0.005]	[0.005]	[0.005]
Receive rent	0.042***	0.052***	0.050***
income	[0.007]	[0.007]	[0.007]
Professionals		0.027***	0.027***
		[0.003]	[0.003]
Management		0.016***	0.016***
positions		[0.003]	[0.003]
Skilled trade		-0.058***	-0.057***
		[0.004]	[0.004]
Unskilled		-0.074***	-0.073***
trade		[0.005]	[0.005]
Small business		-0.010**	-0.010**
proprietors		[0.004]	[0.003]
Self-employed		-0.044***	-0.044***

[Standard errors]. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Table 10 in Appendix B provides the definition for all variables used.

Table 3 – continued from previous page

	$P(non-locals)=1$		
	(A)	(B)	(C)
		[0.003]	[0.003]
Purchased above			0.023***
the median house price			[0.002]
W_i controls	YES	YES	YES
State dummies	YES	YES	YES
Year dummies	YES	YES	YES
Adj. R^2	0.0308	0.0353	0.0357
N	231,774	231,774	231,774

[Standard errors]. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Table 10 in Appendix B provides the definition for all variables used.

As evidenced in Table 3, most proxies used for residential property investor sophistication increase the likelihood of investing non-locally. These results support the conjecture that more sophisticated investors are more likely to invest non-locally than less sophisticated investors.

Investors who hold shares are 1.8 percent more likely to purchase a residential investment property non-locally relative to the average residential property investor. Investors who already receive rent/board income, and presumably have other real estate investment, are 5 percent more likely to invest in real estate at a different SLA to their current residence SLA. We find however that investors who already held a prior mortgage, and have experience in the mortgage market, are less likely to invest non-locally.

Residential property investors who are professionals or hold management posi-

tions are more likely to invest non-locally, while residential property investors who work in the skilled or unskilled trade industry, or who are self-employed or a small business proprietor are more likely to invest locally. Moreover, investors who pay above the median house price for the investment property they are purchasing, and therefore can afford the top market, are 2.3 percent more likely to invest non-locally.

These findings relating to investor sophistication proxies are consistent with Campbell (2006), who comments that investment mistakes are more commonly made by less wealthy and less well educated individuals. He argues that as a result, less sophisticated investors come to know their limits and avoid more complex or sophisticated investment situations. Graham et al. (2009) apply this argument to the home bias in equity market investing, finding that investor's own perception of competence limits their likelihood to invest non-locally. Our results provide further evidence to support this argument.

5.3 H3 out-performing markets

Lastly, H3 posits that residential property investors are less likely to purchase non-locally when their home market has outperformed other markets.

Table 4 tests H3 by considering the market performance of the investors' current SLA of residence, i.e. their home market. For consistency with our definition of local and non-local purchases, we use CoreLogic price index data aggregated to the SLA level in this analysis.[14] The estimation uses the same control variables as in model (B) of Table 3,[15] however we add a new exogenous dummy variable that

[14]Consistent results are observed using other geographical definitions such as postcode.

[15]That is, estimation results not reported in Table 4 include W variables– the years at current address and current employment, monthly net income and net wealth (in logarithmic form), age brackets, female dummy, co-borrower dummy and number of dependents – and Z variables – whether investors held a prior mortgage, hold shares, receive rent income, professionals, manage-

identifies outperforming markets. The new variable in X in eq(1) is now included and reported in the estimation results presented in Table 4. *Above median growth* is a dummy that takes the value of one if the house price growth (measured as change in all-property median index price) in the SLA where the investor resides – their home market – over the prior k ($k = 3, 6, 12, 24, 36$) months is above the state-wide all-property median SLA house price growth – that is, the price growth in the home market is in the top half of all state's SLAs.

Table 4: Logit Marginal Effects

	$P(non-locals)=1$				
	(1)	(2)	(3)	(4)	(5)
Above median growth	-0.005*				
(3 months, home market)	[0.002]				
Above median growth		-0.013***			
(6 months, home market)		[0.002]			
Above median growth			-0.020***		
(12 months, home market)			[0.002]		
Above median growth				-0.030***	
(24 months, home market)				[0.002]	
Above median growth					-0.039***
(36 months, home market)					[0.002]
Z_i controls	YES	YES	YES	YES	YES
W_i controls	YES	YES	YES	YES	YES
State dummies	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES
$AdjR^2$	0.0344	0.0345	0.0348	0.0352	0.0358

[Standard errors]. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Table 10 in Appendix B provides the definition for all variables used.

ment positions, small business proprietor, self-employed, professional skilled trade, and unskilled trade.

Table 4 – continued from previous page

	$P(non-locals)=1$				
	(1)	(2)	(3)	(4)	(5)
N	206,821	206,821	206,821	206,821	206,821

[Standard errors]. * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Table 10 in Appendix B provides the definition for all variables used.

Table 4 shows that investors whose home market (current SLA market of residence) outperforms half the state market are more likely to invest locally. For example, in an environment where the home market house prices has had relatively strong price growth over the preceding 12 months, investors are 2 percent less likely to invest non-locally, and therefore more likely to invest in the same area as their current residence.

This finding runs contrary to our expectation in H3. Rather than using their relatively strong purchasing power to invest non-locally following strong property prices in their home areas, investors follow their home market's trend. This result may be indicative of momentum chasing. If investors want to chase a rising market, they would have more familiarity of strong price appreciation in their home market, supporting local preference.

Interestingly, this effect is stronger when performance is measured at longer time intervals. The marginal effects considering prior 24 months price appreciation in home market indicates a near-doubling of the likelihood that investors will choose the home market following home market outperformance.

As a further robustness test of the relative purchasing power hypothesis, we consider the price performance of the non-local market (that is, the market into

which the investors buy). To do this we add an analogous *Above median growth* dummy variable for the "buy" market. The results from this analysis provide further support for a momentum-chasing effect. The home market coefficient estimate remains negative and statistically significant, while the buy market coefficient estimate is positive and, at performance measurement periods greater than or equal to 12 months, statistically significant. For brevity the full results are presented in Table 9 in Appendix A.

6 Additional Analysis

6.1 Price deviations

To further explore residential real estate investments locally and non-locally, we calculate the relative deviation between the real estate investment purchase price and the median house sale price in the SLA where that property is located.[16] Table 5 shows the all-Australian average relative price deviation between each individual property price and the SLA median purchase price for non-local and local investors. Non-local investors tend to pay on average 8.9 percent above the median SLA purchase price, while local investors pay on average 18.7 percent above median prices. This difference may be due to quality factors in the properties purchased but most likely also reflect that local investors tend to purchase properties in the top-end of the price distribution; consistent with results obtained in Section 5.3. Figure 2 shows the Australian average price deviation between local and non-local investors

[16]The dataset contains informations on the sale price of the property purchased with the mortgage contracted as well as a valuation of the property secured with the mortgage. The sale price variable is an incomplete variable though, so when sale price is not available we used the valuation of the property.

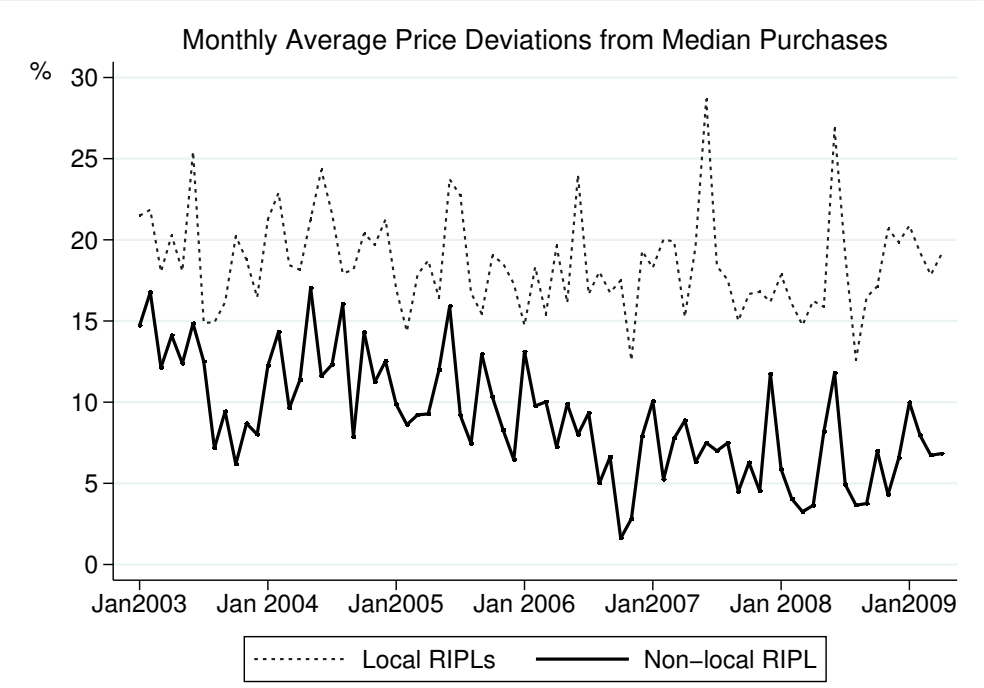
over time.

Table 5: Average monthly median price deviations.

Non Locals	**Locals**	**difference**	**S.E.**	**t-test**
8.89%	18.72%	9.83%	0.33%	29.57

.

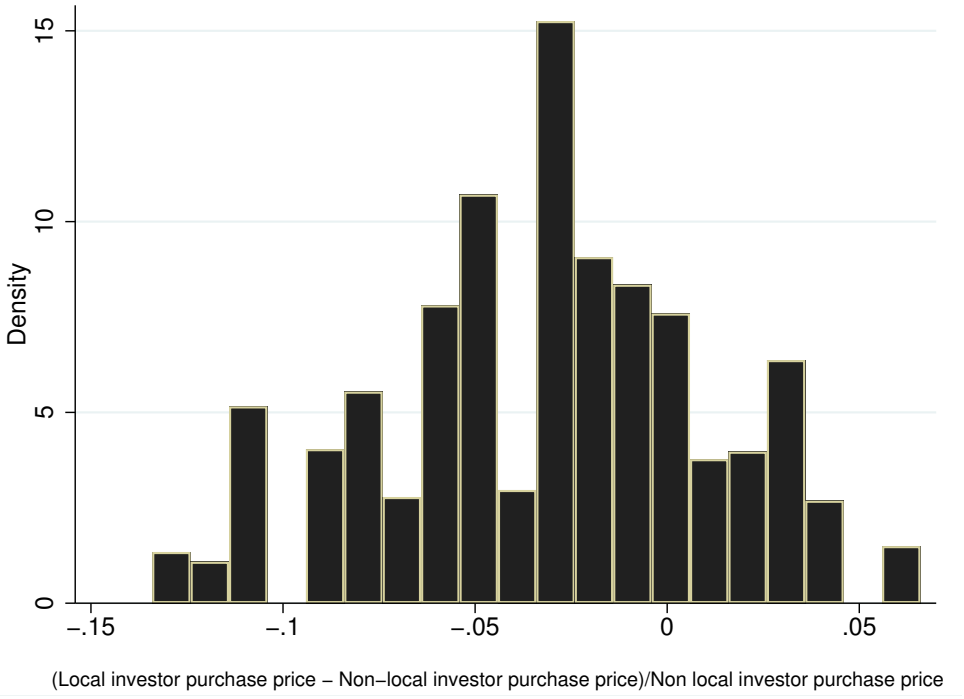
Figure 2: .



We are interested in observing whether non-local investors tend to pay a premium on the properties they purchase relative to local investors. We calculate the difference between the average purchase price local investors pay and the average purchase price non-local investors pay per SLA per month. We observe that non-local investors tend to pay $12,564 less than local investors on average for a particular SLA on the same month (with a median price difference of $10,193). More

generally, on average local investors seem to be paying a 3.1 percent premium over non-local investors; the histogram is presented in Figure 3. As suggested above it could be the case that local and non-local investors target different qualities in their investments, and that can account for the price differential. Although we can't control for quality differences in properties, we believe much of this differential is due to non-local investors being more sophisticated and experienced. These results support the results found in Section 5, and suggest that local investors exhibit momentum chasing, and home bias due to familiarity and lack of sophistication.

Figure 3: Histogram of purchase price premium between local and non-local investors.



6.2 Owner-occupiers vs. Investors

As we showed in Section 5, familiarity bias, lack of sophistication – including information asymmetry and bargaining power – and momentum chasing can explain the preference for residential real estate investment in the local area of residence. We now explore these conclusions for the whole sample of residential real estate purchasers, not only investors. We expect to find similar and even stronger results for residential real estate purchasers, particularly owner-occupiers. That is, we expect to find that buyers of residential property are more likely to purchase properties that are geographically close over properties that are geographically distant. We specifically test whether owner-occupiers demonstrate a stronger home bias than property investors.

To explore this new conjecture, we follow eq(1), for the whole sample of property purchasers with a mortgage. The variable of interest included in W is whether the mortgage applicant is a residential property investor (RIPL) or not, where $RIPL = 1$ if the mortgage applicant takes a residential property investment loan, and $RIPL = 0$ otherwise. We expect a statistically significant positive sign for the coefficient of $RIPL$, as the probability of investing non-locally should be greater for residential investors, relative to owner-occupiers. Results are presented in Table 6, while summary statistics for all the sample are presented in the Appendix in Table 2(b).

Table 6: Logit Marginal Effects

	$P(non-locals)=1$			
	(1)	(2)	(3)	(4)
Residential investment	0.136***	0.135***	0.133***	0.133***

[Standard errors]. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Table 10 in Appendix B provides the definition for all variables used. All monetary variables are in logarithms and deflated by CPI of the corresponding SLA state capital city for Q1-2006.

Table 6 – continued from previous page

	$P(non-locals)=1$			
	(1)	(2)	(3)	(4)
property loans (RIPL)	[0.001]	[0.001]	[0.001]	[0.001]
First-time	0.100***	0.100***	0.096***	0.096***
home buyer	[0.001]	[0.001]	[0.001]	[0.001]
Years at current	-0.002***	-0.002***	-0.002***	-0.002***
address	[0.000]	[0.000]	[0.000]	[0.000]
Years at current	-0.001***	-0.001***	-0.001***	-0.001***
employment	[0.000]	[0.000]	[0.000]	[0.000]
Monthly net	0.105***	0.105***	0.099***	0.095***
income (logarithm)	[0.001]	[0.001]	[0.001]	[0.001]
Net wealth	-0.016***	-0.016***	-0.017***	-0.016***
(logarithm)	[0.000]	[0.000]	[0.000]	[0.000]
Age $<$ 30 years	0.022***	0.023***	0.025***	0.024***
	[0.001]	[0.001]	[0.001]	[0.001]
$30 \leq$ Age $<$ 40 years	0.019***	0.019***	0.017***	0.018***
	[0.001]	[0.001]	[0.001]	[0.001]
$50 \leq$ Age $<$ 60 years	0.012***	0.011***	0.011***	0.010***
	[0.001]	[0.001]	[0.001]	[0.001]
Age $\geq$ 60 years	0.036***	0.035***	0.033***	0.030***
	[0.002]	[0.002]	[0.002]	[0.002]
Female	-0.004***	-0.004***	-0.006***	-0.014***
	[0.001]	[0.001]	[0.001]	[0.001]
Co-borrower	-0.070***	-0.070***	-0.066***	-0.065***
	[0.001]	[0.001]	[0.001]	[0.001]
Number of	-0.023***	-0.023***	-0.021***	-0.023***
dependants	[0.000]	[0.000]	[0.000]	[0.000]
Held a previous				-0.028***

[Standard errors]. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Table 10 in Appendix B provides the definition for all variables used. All monetary variables are in logarithms and deflated by CPI of the corresponding SLA state capital city for Q1-2006.

Table 6 – continued from previous page

	$P(non-locals)=1$			
	(1)	(2)	(3)	(4)
mortgage				[0.000]
Hold shares				0.016***
				[0.002]
Receive rent				0.043***
income				[0.002]
Professionals				0.019***
				[0.001]
Management				0.012***
positions				[0.001]
Skilled Trade				-0.034***
				[0.001]
Unskilled Trade				-0.054***
				[0.001]
Small business				0.002
Proprietors				[0.001]
Self-employed				-0.012***
				[0.001]
State dummies	NO	YES	NO	YES
SLA dummies	NO	NO	YES	NO
Year dummies	NO	YES	YES	YES
Adj. R^2	0.0972	0.0996	0.1140	0.1041
N	1,130,263	1,130,263	1,130,263	1,129,019

[Standard errors]. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Table 10 in Appendix B provides the definition for all variables used. All monetary variables are in logarithms and deflated by CPI of the corresponding SLA state capital city for Q1-2006.

By analysing all property purchases financed with a mortgage, including owner-occupiers and investors, we acknowledge the possible effect of confounding factors in the owner-occupiers property purchase decision on our analysis. That is, owner-occupiers are more likely than property investors to buy and reside in a similar location to existing property due to lifestyle preferences – such as schools, work, family and social connections, and also because that is the area in which they have been hedged to price returns (assuming current property price change has a closer relationship to price changes of properties in similar locations compared to properties further away).

We are aware that our empirical exercise may suffer from selection bias, and possibly endogeneity. As our sample includes only all individuals who have successfully applied for a mortgage to purchase a residential property with one of the major Australian banks, we can't account for those individuals purchasing property non-locally financed with a mortgage from different financial institutions or by any other mean. Nor can we include other non-local investors who have chosen not to invest in residential real estate but other type of assets. More importantly, non-RIPL may choose to purchase property locally or not based on non-capital gain considerations, such as choosing a neighbourhood based on labour market, educational supply, and other social and community considerations. Moreover, there may exist some common factors (omitted variables) that determine both whether an individual becomes a residential property investor and whether real estate purchasers buy non-locally, however these are not so evident to us. For the reasons described above we check our results applying propensity score matching (PSM).

The basic idea behind PSM[17] is to define a group of non-RIPL who are similar to RIPL in all relevant characteristics X, W, and Z, and calculate their probability of purchasing residential property non-locally. In this way, differences in whether they purchase locally or non-locally between the selected control and treatment groups can be attributed to choosing a residential property investment loan. Specifically, The PSM estimator for the average treatment effect (ATT) is written generally as:

$$\tau_{ATT}^{PSM} = E_{P(X)\|D=1}\{E[Y(1)\|D=1, P(X)] - E[Y(0)\|D=0, P(X)]\}$$

where $Y(D)$ are the potential outcomes – in our case purchasing residential property non-locally y_i, with a treatment indicator variable D that equals 1 (in our case $RIPL = 1$) if the mortgage applicant is an investor in residential real estate, and equals 0 otherwise. And P(X) is the propensity score based on the probability for an individual to be a residential property investor given the observed covariates X (in our case X, W, and Z in eq(1)). The control group in our case are all non-RIPL mortgage borrowers.[18] All variables included in the PSM analysis are measured before contracting a mortgage loan to purchase the property, and therefore are expected not to be affected by whether borrowers are residential real estate investors or not and whether they are purchasing locally or non-locally. We use a logit model to estimate the propensity scores then used in the matching approach.

Table 7 shows the average treatment effect for the treated (ATT) when comparing the treated (RIPL) and control (non-RIPL) groups considering non-local residential property investment with a mortgage as the outcome. We have tested PSM using

[17]See Caliendo and Kopeinig (2008) for a clear explanation of the implementation of PSM.

[18]We could expand our robustness experiment to include a broader control group by finding common covariates in a national survey such as the Household, Income and Labour Dynamics in Australia (HILDA) survey; `https://melbourneinstitute.unimelb.edu.au/hilda`.

Table 7: Individual characteristics, by mortgage type.

PSM method	**ATT**	**S.E.**	**t-test**
Nearest Neighbour (without replacement)	0.165	0.001	118.5
Nearest Neighbour (with replacement)	0.168	0.001	137.3
Nearest Neighbour caliper (5, 10, 100, 1000)	0.165	0.001	118.5

ATT refers to 'average treatment effect of the treated'.

the nearest-neighbour approach with and without replacement, and caliper matching with replacement – with distance set at 5, 10, 100 and 1000 and always obtaining the same result. As pointed out in Smith and Todd (2001), all PSM estimators yield very similar results asymptotically; with the large sample size they all become closer to comparing only exact matches.

The robustness exercise confirms that RIPLs are 16 percent more likely to purchase residential property non-locally than non RIPLs.

7 Conclusion and Future Research Directions

In this paper we analyse the preference for local investment in a limitedly explored setting: residential real estate. This setting provides unique insights, given the breadth of access across demographic groups and other known inefficiencies. It also warrants exploration in the context of investment concentration, where regulators have commented on the increase in systemic financial risks potentially created by undiversified property investments.

We document a large home bias across property investors. Using a large and detailed mortgage-application level database, we find that non-local property purchases account for 15.8 percent of all purchases in the sample. After controlling for a range of buyer characteristics and market and economic factors, we show that

owner-occupiers are more disposed to home bias than investors. Investors are around 13 percent more likely to buy property in a different area to their current address. The home bias among investors is partially mitigated through the investor's level of sophistication. Proxies for investor sophistication, such as prior investment knowledge, wealth, and education, increase the likelihood that the investor will purchase in a non-local market. Finally, we consider whether the relative price performance of home and non-local markets influences the home bias. We argue that if an investor's home market has outperformed, then they have higher purchasing power in non-local markets. However, if their home market has underperformed, a rational explanation for the home bias might be observed. Our results suggest the opposite. Strong local price performance increases the home bias. Investors are observed to prefer their home market when it has outperformed, and will prefer non-local markets when their home market underperforms.

There are several areas of this study that we have yet to explore. An interesting question that our findings raise is, does the home bias have a negative impact on investors' performance? If this phenomenon is driven by behavioural biases we would expect underperformance. We may also consider the risks of home bias and investor concentration, given the practical implications of this aspect of our research. Due to current data limitations, we have not considered at the property purchase level whether non-local buyers overpay (as in Clauretie and Thistle (2007)). We also do not include property market forecasts that may drive demand, such as market expectations for rental yield and housing approvals. These data are observed ex-post, and ex-ante forecasts are unavailable for our sample period at the SLA level. Importantly, this study does not consider tax effects. Though important in property investment decisions, we do not expect that it would influence our work, as the

largest tax considerations for investment property in Australia are set nationally, not at different jurisdictional levels. However, this is a further area for future work into the drivers of residential real estate investment.

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A Figures and Tables

Table 8: Descriptive statistics for mortgage borrowers

	All		*RIPL*	
	Local	$Non-local$	*Locals*	$Non-locals$
Borrower characteristics				
Age	42.1yrs.	41yrs.	43.6yrs.	42.4yrs.
Under 30 yrs.	12%	16%	8.9%	12.1%
Between 30-39 yrs.	32%	33.9%	28.3%	31.5%
Between 40-49 yrs.	31%	26%	32.8%	28.6%
Between 50-59 yrs.	19%	18%	23.4%	21.3%
60 yrs. and over	6%	6%	6.6%	6.5%
Females	30%	28.9%	26.4%	27.6%
Married	72%	63.1%	74.3%	66.9%
Co-borrower	70.%	58.7%	65.5%	54.4%
Number of dependents	0.8	0.5	0.7	0.6
First-time buyers	4%	8.6%		
RIPL	16.6%	41.9%		
Years at current address	7yrs.	6yrs.	7.6yrs.	6.7yrs.
Years at current employment	7.2yrs.	6.6yrs.	8.4yrs.	7.5yrs.
Employment characteristics				
Professionals	14.8%	22.6%	18.4%	23.6%
Management	14.8%	19.1%	17%	20.1%
Skilled trade	13.5%	9.7%	11.7%	8.7%
Unskilled trade	8.4%	4.6%	5.5%	3.8%
Small business proprietor	9.9%	9.3%	14.3%	11%
Other occupation	38.6%	34.6%	33%	32.7%
Self-employed	20.6%	19.4%	29.1%	22.7%
Property characteristics				

Table 10 in Appendix B provides the definition for all variables used.

Table 8 – continued from previous page

	All		*RIPL*	
	$Locals$	$Non-locals$	$Locals$	$Non-locals$
Interstate	0%	26.5%	0%	31.9%
Inter-postcode	14.3%	100%	24.2%	100%
Financial characteristics				
Rent income	0.5%	1.1%	1.5%	1.9%
Rent/board monthly income	$407	$1,061	$1,302	$1,681
Monthly net income	$7,040	$8,738	$9,301	$10,059
Total assets	$879,313	$1,174,646	$1,398,317	$1,545,456
Property Value	$698,383	$1,049,003	$1,097,235	$1,287,177
Hold shares	4.4%	5.2%	6.1%	5.9%
Value of total shares	$2,627	$4,213	$5,012	$5,734
Total net wealth	$634,720	$840,323	$1,006,079	$1,083,109
Loan Size	$206,467	$272,896	$303,253	$300,966
LTV	60%	66.2%	62.7%	66.8%
Total obs.	968,114	181,370	160,306	75,972
Proportions	84.2%	15.8%	67.8%	32.2%

Table 10 in Appendix B provides the definition for all variables used.

Table 8 present summary statistics for mortgage applicants discerning those buying a residential dwelling locally and those purchasing non-locally, using the definition presented in Section 3.

Table 8 shows that in the cross-section non-local buyers are more likely to be male, single, younger, apply as a single applicant, and have fewer dependants than those buying locally. There are proportionally more first-time home buyers purchasing non-locally than buying locally (which may be driven by affordability con-

straints). Moreover, there are proportionally more borrowers applying for a residential investment property loan who buy non-locally than those residential investors buying locally. In particular, of those who buy a residential dwelling in a different SLA to their current neighbourhood 42 percent are residential investors – see Figure **??**(a), while of those who purchase a property in the same SLA where they reside only 17 percent are residential investors.

Additionally, those buying locally have spent, on average, longer time at their current address and at their current employment than those buying non-locally, suggesting lower mobility and indicative of home bias due to familiarity, as conjectured in hypothesis H2. Interestingly, there is a larger proportion of professionals and management workers that purchase non-locally relative to those purchasing dwellings locally; the opposite is true for skilled trade and unskilled trade occupations and self-employed mortgage applicants.[19] Moreover, 26.5 percent of those buying non-locally are purchasing property in a different state.

Table 9: Logit Marginal Effects

	$P(non-locals)=1$				
	(1)	(2)	(3)	(4)	(5)
Above median growth	-0.013				
(3 months, buy market)	[0.013]				
Above median growth	-0.013				
(3 months, home market)	[0.013]				
Above median growth		0.006			
(6 months, buy market)		[0.013]			
Above median growth		-0.066***			

[Standard errors]. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Table 10 in Appendix B provides the definition for all variables used.

[19] Self-employed category is a distinct category from the occupation categories and can overlap with some of them.

Table 9 – continued from previous page

	$P(non-locals)=1$				
	(1)	(2)	(3)	(4)	(5)
(6 months, home market)		[0.013]			
Above median growth			0.105***		
(12 months, buy market)			[0.013]		
Above median growth			-0.169***		
(12 months, home market)			[0.013]		
Above median growth				0.163***	
(24 months, buy market)				[0.013]	
Above median growth				-0.257***	
(24 months, home market)				[0.013]	
Above median growth					0.268***
(36 months, buy market)					[0.014]
Above median growth					-0.377***
(36 months, home market)					[0.014]
_cons	-3.469***	-3.438***	-3.442***	-3.412***	-3.401***
	[0.093]	[0.093]	[0.093]	[0.093]	[0.093]
Financ. Sophist.	YES	YES	YES	YES	YES
W_i controls	YES	YES	YES	YES	YES
State dummies	YES	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES	YES
$AdjR^2$	0.0344	0.0345	0.0350	0.0358	0.0374
N	206,821	206,821	206,821	206,821	206,821

[Standard errors]. * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Table 10 in Appendix B provides the definition for all variables used.

B Variables

Table 10: Definitions for Variables

Variable	Description
Non-locals	Dummy for applicant's residence (SLA4) different to property's location (SLA4).
RIPL	Residential Investment Property Loan. The base are all other loans (mainly owner occupiers).
FHB	Dummy for first-time home buyer main borrower. The base is a repeat-buyer.
Time at current address	Time spent in years at the current residential address as reported by the main borrower at application time.
Time at current employment	Time spent in years at the current employment as reported by the main borrower at application time.
log(Net wealth)	Logarithm of real surplus/net wealth at application, deflated by corresponding capital city CPI 2006 Q1. Difference between real total assets and real total liabilities.
log(Net monthly income)	Logarithm of net monthly income for main applicant, deflated by corresponding capital city CPI 2006 Q1. Income from part-time and overtime work and commission, interest/dividends, rent received, government benefits or pensions, and other monthly income.
log(Total value of shares)	Stock of real value of shares at application, deflated by corresponding capital city CPI 2006 Q1. Zeros for no owned shares.
Shares	Dummy for borrowers who hold shares in their asset portfolios.
Rent income	Dummy for borrowers who receive rent income as part of their income.
Government benefits income	Dummy for borrowers who receive government benefits income as part of their income.

Note. Observations falling into a particular quarter are matched to the relevant quarterly data. All monetary values are expressed in 2006Q1 AUD $.

Table 10 – continued from previous page

Variable	Description
Prior Mortgage	Dummy for the presence of a prior mortgage. Base is no prior mortgage.
log(Total value of properties)	Logarithm of real value of properties in portfolio at application, deflated by corresponding capital city CPI 2006 Q1. Zeros for no owned shares.
LTV	Loan-to-value ratio (%).
Age $<$ 30 yrs., Age 30-39 yrs., Age 50-59 yrs., Age $\geq$ 60 yrs.	Dummies for borrower age group. The base is a borrower between 40-49 years old.
Female	Dummy for female main borrower. The base is a male borrower.
Co-borrower	Dummy for applications with joint borrowers.
Number of dependents	Number of dependents as reported by main borrower. Dependent may be children or older adults.
Occupation dummies	Dummies indicating occupation categories as follows: Professional, Management, Service, Office, Skilled Trade, Unskilled trade, Agriculture, Retired, Unemployed and Small business proprietor.
Self-employed	Dummy for self-employed main borrower. The base is an employee borrower.
Married	Dummy for married, or under de-facto relationship, main borrower. The base is a single borrower.
Interbank rate (RBA)	Monthly interbank rate reported by the RBA, F1 Interest Rates and Yields - Money Market.
Unemployment rate	Monthly unemployment rate by corresponding capital city reported by the ABS, Cat. No.6202.0 G7 Labour Force, unemployed persons as a percentage of labour force.

Note. Observations falling into a particular quarter are matched to the relevant quarterly data. All monetary values are expressed in 2006Q1 AUD $.

Table 10 – continued from previous page

Variable	Description
%Δ Dwelling Index	Percentage change in the dwelling index reported by the Westpac-Melbourne Institute Survey on Consumer Sentiment. This index tracks responses on 'whether now is a good time to buy a dwelling'.
Interstate	Dummy for borrower's whose current residential state is different to the state where the property under the mortgage contract is located.
Inter-postcode	Dummy for borrower's whose current address postcode is different to the postcode of the property under the mortgage contract.
Property Status	Dummy variables for existing house, to-be-built house, new house, or vacant land.
State dummies	Regional dummies for Australian States and Territories: ACT, NSW, QLD, SA, TAS, VIC, WA.
SLA dummies	Dummies for the SLAs of the property under the mortgage contract.

Note. Observations falling into a particular quarter are matched to the relevant quarterly data. All monetary values are expressed in 2006Q1 AUD $.