

Superstition and prices in residential real estate transactions

ABSTRACT

Superstition surrounding lucky numbers has been observed to affect behaviour in consumer goods and investment markets alike. Arguing superstition represents a cognitive bias, this paper examines the effect of the number 8 and the number 4 on residential real estate prices in Sydney, Australia. These numbers are considered exceptionally lucky and unlucky, respectively, in Chinese culture. The results presented here support previous evidence from Asian housing markets of a premium (discount) to properties with lucky (unlucky) addresses in areas of Sydney with high populations of Chinese immigrants. Interestingly, this result is stronger for houses than units. There is evidence that Western superstitions around the number 13 can also lead to lower property prices.

Keywords: Behavioural finance, superstition, residential real estate, hedonic regression

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Superstition surrounding lucky numbers has been observed to affect behaviour in consumer goods and investment markets alike. Arguing superstition represents a cognitive bias, this paper examines the effect of the number 8 and the number 4 on residential real estate prices in Sydney, Australia. These numbers are considered exceptionally lucky and unlucky, respectively, in Chinese culture. The results presented here support previous evidence from Asian housing markets of a premium (discount) to properties with lucky (unlucky) addresses in areas of Sydney with high populations of Chinese immigrants. Interestingly, this result is stronger for houses than units. There is evidence that Western superstitions around the number 13 can also lead to lower property prices.

1. Introduction

The Beijing Summer Olympics opened at 8:08:08pm on August 8th, 2008 – a day that also saw a record 9,000 marriages in the same city.¹ Much more than coincidence, this resulted from policy makers and happy couples alike hoping to benefit from the luck associated with the number 8 in Chinese culture. While there are many examples of the influence of cultural superstition on human decisions, where investments and large asset purchases are involved, the expectation of neoclassical economics is that individual rationality will supersede superstition and the search for ‘luck’. This paper examines the impact of Eastern and Western cultural superstitions on residential property prices.

Numerology, the symbolism of numbers, is a common cross-cultural pseudoscience though with differing interpretations across cultures. The most common superstition in Western culture is the perceived misfortune attached to the number 13. In Chinese culture, on the other hand, the number 8 is strongly linked to good fortune while the number 4 is considered unlucky. This is due to homophonic similarities in both Cantonese and Mandarin between the former to the word for prosperity (*‘ba’*) and the latter to the word for death (*‘si’*).

¹ China’s Xinhua News Agency reported that a further 300,000 weddings took place on that date across the entire country: http://www.chinadaily.com.cn/olympics/2008-08/09/content_6920782.htm

Two decades prior to the opening ceremony of the Beijing Olympics, on this same auspicious 8/08 date, the Bank of China opened its Hong Kong office on the 8th August, 1988 and now trades on the HKSE with the chosen listing symbol 3988. Ang (1997) reports that most companies locate their Treasury departments on the 8th or 18th level, while the Jin Mao Tower, China's tallest skyscraper, stands 88 floors high. Meanwhile, to avoid bad luck, many Asian hospitals, hotels and casinos do not label 4th floors (Woo et al, 2008). This is similar to the practice in many Western countries of avoiding the 13th floor.²

Behavioural finance is expanding the discipline by considering the explanations for and economic outcomes of breaches to the neoclassical viewpoint. Superstitions are a cognitive bias that can have a significant effect on decision-making. Research into the effect of superstition on decision-making, however, has not been extensively examined in investment markets. The present study extends the behavioural finance literature to the relatively unexplored question of the effect of culture and superstition with application to the economically significant decision of property investment. By examining prices of properties with auspicious addresses in the residential real estate market of Sydney, a city known for its high level of multiculturalism, this study is the first to compare the effect of different cultural superstitions on economically significant decisions within the same market.

Kim and Nofsinger (2008) summarise the cross-cultural behavioural finance research which suggests that individuals of Asian background are more likely to demonstrate behavioural biases than individuals from Western backgrounds (see also Chen et al, 2007). This finding is reinforced in a recent study of stock 'gambling' tendencies between different groups of investors by Lepone and Wright (2014).

Previous work on culturally significant numbers in investment markets, such as Brown et al (2002), Brown and Mitchell (2008) and Na and Schneider (2010) find evidence of price clustering around culturally significant numbers on stock markets in Asia with large numbers of Chinese investors. By contrast there is no conclusive evidence of an unlucky '13' effect on Western stock markets.³

Though several prior studies have considered the significance of lucky numbers in residential real estate markets, this paper analyses a significantly larger and representative sample, overcomes a range of data limitations faced by previous studies, and is the first to consider competing superstitions in a hetero-culture setting.

Using a sample of sales for the Sydney residential real estate market from the period January 2000 to December 2013, this study uses hedonic regression analysis to estimate the price effect of lucky and unlucky numbers in street addresses. The initial results suggest that superstitious numbers in both Western (13) and Chinese culture (8 and 4) have little effect on house prices at the city-wide level. On further analysis, it is found that houses with an 8 in the street address in suburbs with high Chinese immigrant communities sell at a statistically significant average 1.4% premium to other houses. Bad luck also has an effect in these suburbs, with properties that have the unlucky 4 in their address selling on average 3.9% below other houses.

Several interesting results arise when unit transactions are considered. Firstly, supporting the expectation of Bourassa and Peng (1999), the results indicate that unit number, not street number,

² It is estimated that as many as 85% of skyscraper buildings in the U.S. do not have public floors designated 'level 13'.

³ While Kolb and Rodriguez (1987) find evidence of a negative Friday the 13th effect, subsequent studies have found no meaningful influence of the date on stock returns (see Dyl and Meberly, 1988; Agarwal and Tandon, 1994; and Coutts, 1999).

plays a significant role in the pricing of superstition. Lucky (unlucky) units are found to sell at a 1% premium (1.3% discount) relative to other properties. Superstition is also found to have an effect on price when units with the unlucky Western culture number 13 are considered, these properties trading at a 3% discount on average.

This paper overcomes the sample and data limitations of much of the previous research. It contributes to the small but growing behavioural finance literature that examines the role of culture in cognitive biases, extending the analysis to a market with heterogeneous cultures and number-related superstitions. It also extends the behavioural finance literature more generally to consider how these biases can affect decision in large asset markets, as the decision to purchase a house will be the largest investment decision made by most individuals.

There are real world implications from this research. At the extreme, policymakers in Richmond Hill, Canada, and Arcadia, Los Angeles, where Chinese immigrant populations are particularly concentrated, considered bans on the number 4 in new developments and exiting homeowners were given the option to change their street address. There are also significant implications for investment markets from the findings of behavioural finance in residential real estate. As made apparent through the Global Financial Crisis in 2007-09, real estate and international financial systems are complexly linked, and misvaluations can have serious consequences for the stability of all asset markets.

The remainder of the paper is presented as follows. Section 2 discusses the key literature that has studied the significance of certain numbers in Western and Chinese cultures and the influence of number symbolism on consumer and investment decisions from which several hypotheses are drawn. Section 3 describes the data that will be used in empirically testing the paper's hypotheses, its sources and presents summary statistics. Section 4 outlines the methodology, Section 5 presents the results and Section 6 concludes with a discussion of the implication of the paper's results and outlines several opportunities for future research.

2. Literature Review and Hypothesis Development

The examination of superstition on investment markets can be traced back to Kolb and Rodriguez's (1987) analysis of U.S. stock market returns on 'Fridays the Thirteenths', a date commonly related in Western culture to paranormal activity and heightened risk aversion. The authors document a persistent below-average return to stocks on this date over the period 1962 to 1985. Subsequent work, however, has found no evidence in support of a Friday-the-thirteenth effect, attributing the findings of Kolb and Rodriguez (1987) to other empirical anomalies such as the weekend effect (see Dyl and Maberly, 1988, among others).

With growing globalisation on business and financial markets, increasing interest in the effect of culture and number-related superstitions has occurred. The literature has largely developed through analysis of consumer decisions, with only recent extensions to financial markets and investment decisions.

In a widely-noted study, Woo et al (2008) estimate a series of hedonic regression equations for licence plate auctions in Hong Kong. After controlling for other factors, including seasonality and the plate style, the authors find highly statistically significant positive coefficient estimates on dummy variables

representing plates which contained the number 8.⁴ Significant negative coefficients, by contrast, were estimated for plates containing the number 4. Ng et al (2010) extend the licence plate study of Woo et al (2008), identifying an asymmetric relationship between macroeconomic environment and the value of lucky symbols. Specifically, a higher premium is paid for lucky symbols in bad times than the discount applied to unlucky numbers, with the authors concluding that “people tend to be more superstitious in bad times” (2010: 309).

There is no evidence that the numbers on a licence plate affect the safety or quality of life of the car owner. The papers by Woo et al (2008) and Ng et al (2010) show that despite this, individuals are prepared to pay a premium (require a discount) for plates with the number 8 (4). This evidence supports the hypothesis that numerology biases consumer decisions of individuals influenced by Chinese culture, a finding that has also been documented in marketing research. Ang (1997) examines the impact of numbers in brand names on Chinese consumer preferences, finding that 8 perceived as highly lucky and 4 perceived as significant unlucky, while Simmons and Schindler (2003) demonstrate that as much as 99-cent endings are a common pricing strategy in Western consumer markets, 88-cent price endings are commonly used in China.

More recently, research into the Chinese cultural influence of certain numbers has been extended to investment markets. Brown and Mitchell (2008) identify a strong systematic bias in the prices of A-shares traded on Shanghai and Shenzhen stock exchanges that matches the cultural luck heuristic. The authors find that prices are twice as likely to finish in the number of “8” than “4”. While this bias has weakened over the sample period, 1994-2008, it is shown to be much more significant in A-shares (typically held by mainland Chinese individuals and organisations) than foreign-held B-shares.

This developed the study by Brown et al (2002) into price clustering at culturally-significant numbers in six Asia-Pacific stock markets: Australia, Hong Kong, Indonesia, Philippines, Singapore and Taiwan. The results in this paper found that in all markets but Hong Kong, the Western tendency for prices to trade and close at values ending in 0 predominated (attributed to cognitive limitation and the relative ease of numbers divisible by 2, 5 and 10). This paper also documented a significant seasonal effect related to Lunar New Year in Hong Kong but not in other markets.

Na and Schnieder (2010) use a natural experiment to test for evidence of superstition and price-clustering in the pricing of Chinese A-share IPOs. Between July 2001 and December 2004, the China Securities Regulatory Commission (CSRC) controlled the IPO pricing process, largely removing issuer discretion from the price-setting. Before and after this period, IPO pricing was controlled by issuers and underwriters following a book building period. The authors find an increased tendency towards prices that end in 8 (20%) or 80 (26%), and that IPOs priced with this ending attract increased investor interest and optimism.

These results run contrary to the finding in most Western markets of price clustering around numbers ending in five and zero which has been attributed more to the effect of cognitive limitation than cultural bias (Harris, 1991; Bradley et al, 2004; Frino et al, 2014).

The effect of Chinese superstition on housing markets represents an interesting extension of this research. Ang (1997) argues that the significance of ‘luck’ is heightened in larger purchases for

⁴ Woo et al (2008) also find that certain sets of numbers that had positive numerological translations. These included: 128 (sure easy prosperity), 138 (lifelong prosperity), 168 (sure way to prosperity), 228 (double easy prosperity), 238 (easy longevity and prosperity), 268 (prosperity both ways), 328 (longevity and easy prosperity), 338 (double longevity and prosperity), 368 (longevity and prosperity always), 663 (longevity every way), 668 (prosperity every way) and 988 (long lasting prosperity).

durable assets such as property. Property also has a deep connection to Chinese culture and superstition through Feng Shui and design preferences, with Tam et al (1999) demonstrating a price premium for properties in a new Hong Kong development.

Mok et al (1995) develop a pricing model for Hong Kong properties which includes data for the floor level, though use this information is used only as a proxy to control for the quality of the apartment view (the higher the better). The authors make reference to Feng Shui in property attractiveness, but only insofar as to comment on the relative appeal of south-facing properties, not exploring the influence of the floor-number itself. A preference and price premium for Feng Shui in itself then is not necessarily a cognitive bias; it can be considered an attractive characteristic of a property in the same way many waterfront properties in a city such as Sydney attract a significant price premium. The price effect of numerology and superstition, however, are biases as this characteristic does not alter anything about the objective attractiveness of a property. That a number attached to a property alters how it is valued is exclusively a culturally-driven perception.

The earliest published study to explicitly consider the influence of Chinese superstition on property values was conducted by Bourassa and Peng (1999). The authors empirically analyse prices for a small sample of properties sales for the period 1989 to 1996 from a neighbourhood in Auckland, New Zealand, with a relatively high Chinese immigrant population. The results from a hedonic model indicate that houses ending with a lucky number (defined as 3, 6, 8 and 9) attract a 2.5% price premium on average. This “luck premium” result is supported in subsequent studies in Hong Kong, China, Singapore and Canada.

Bourassa and Peng (1999) also consider the effect of unlucky numbers on prices in their study of a single Auckland neighbourhood. Interestingly, no negative price effect is identified for unlucky street numbers (ending in 4) attributed to the buying power of non-Chinese homebuyers. The existence of an “unlucky discount” is less certain, the literature split as to whether the number ‘4’ has any impact on price.

Chau et al (2001) examine the lucky apartment trend in Hong Kong apartment market. Relating floor number to sales price the authors find that, on average, homebuyers in Hong Kong pay a 2.8% premium for lucky apartments (defined as apartments located in the 8th floor). The authors make the distinction between the premium that would be paid for a lucky apartment during market booms and slumps, arguing that the premium will be exacerbated during booms due to increased buying pressure and ability for the seller to extract value from the buyer – floor number and pricing in small sample of apartment sales in HK. When the data is split into sub-periods representing different levels of aggregate price growth, the lucky unit premium during the boom increases to 5%, but disappears in the slump.

Choy et al (2007) develop a hedonic price model for the Hong Kong residential real estate market. In their model, they include separate dummy variables for properties on a lucky number floor and properties on an unlucky number floor. Using a sample of 749 sales for the 12 months July 1999-June 2000, the authors find a significant negative coefficient to unlucky numbers, though interestingly find no evidence of a premium being paid for lucky numbers.

Shum et al (2014) take a similar approach to Choy et al (2007) to analyse transaction level data from Chengdu, China. The study finds evidence that properties on floors ending in 8 achieve a high size-adjusted price in a lower marketing time. This paper argues that the observed bias is linked to the

homebuyers' superstitions as there is a significant correlation between digits in the purchaser's phone numbers and the apartment floor.

Evidence of a price premium for lucky apartments in markets outside of China with large Chinese populations is found by Agarwal et al (2014) in Singapore and Fortin et al (2014). Agarwal et al (2014) estimate a price premium of 0.9% for units which end in the number 8 and price discount of 1.1% for properties which end in the number 4.

Fortin et al (2014) extend this area of research to a market in North America, finding a price premium of 2.5% to houses with street addresses ending in "8" while houses ending in "4" sell at a 2.2% discount in areas with relatively high Chinese immigrant populations. The authors estimate a hedonic pricing model using a larger sample of housing sales than previous studies of this type (almost 117,000 records) from the Greater Vancouver area for the period 2000-2005, interacting dummy variables for addresses ending in 4 and 8 with neighbourhoods identified from Census data as having high Chinese immigrant populations. Across the whole market, the authors find a weaker, yet still positive and significant premium attached to properties ending in 8. However, the discount to properties ending in 4 disappears, supporting the finding by Bourassa and Peng (1999) that the unlucky discount does not hold in a heteroculture market.

Other recent work documents a shift away from the luck-premium in Hong Kong. Li et al (2014) restudy the lucky and unlucky floor number effect for apartments in Hong Kong, finding no significant relationship between floor number and price. The authors attribute this finding to a demographic shift in the importance of superstition in the younger buyers in the specific housing market studied.

The present study will test whether the lucky Chinese number 8 has an effect on prices in the Sydney residential real estate market. It is hypothesised that 'lucky' properties sell at a premium and that this premium is higher in areas with larger Chinese communities. This study will also examine whether properties with unlucky numbers trade at a discount. It is hypothesised that the number 4, considered unlucky in Chinese culture, will cause a price discount to properties in areas of high Chinese concentration with no effect in other areas. A discount attached to the unlucky Western number 13 will also be examined. The Sydney housing market is extremely well developed and Western superstition has been shown to have little or no effect in other investment markets. However, there is no research to date that has considered whether Western number superstition affects residential real estate prices.

Examining these questions in the Sydney residential real estate market enable concurrent analysis of these questions due to its large Chinese community. Where previous studies, particularly Bourassa and Peng (1999) and Chau et al (2001) use very restricted samples from single neighbourhoods or housing estates, this research examines superstition across a large residential real estate market which has well developed selling, financing and regulatory frameworks. The next section outlines the dataset and the methodology that will be used to test these hypotheses.

3. Data and Methodology

Sydney is Australia's largest city, housing approximately one-fifth of Australia's population. It is also Australia's most ethnically diverse city, with almost 40% of the city's residents born in a foreign country. This value has been steadily increasing over the past 30 years according to Census data, and

as has the mix of immigrants, as shown in Figure 1. In 1991, 33% of Sydney's population were born overseas, and only 1.19% Chinese-born. As at the 2011 Census, the largest source of Australia's foreign-born residents is the United Kingdom (4.5%), while China (3.5%) accounts for the second-largest source of Sydney's residents. This is not evenly spread across the city though, with significant concentrations of Chinese immigrants in suburbs such as Hurstville (34.2%), Burwood (26.5%), Rhodes (25.4%), Allawah (22.5%) and Campsie (21.8%). Figure 2 shows the largest immigrant communities in each suburb in Sydney, with red representing Chinese.

For this study, suburbs are defined as more likely to experience superstitious behaviour related to Chinese culture as those with a high proportion of Chinese immigrants. Specifically, suburbs where the Chinese immigrant population is greater than or equal to 10%. Suburbs with high concentrations of population that would be influenced by Chinese cultural superstitions are identified using 2011 Census data, accessed from the Australian Bureau of Statistics (ABS).⁵

Property sales and attribute data is supplied by Securities Industry Research Centre of Asia-Pacific (SIRCA) on behalf of RP Data. The sales data is constrained to sales of existing residential houses and units in the Sydney metropolitan area as defined by the Australian Standard Geographical Classification (ASGC) statistical division for the period 1 January 2000 to 31 December 2013. Several filters are applied to the data to remove erroneous entries,⁶ remove data with incomplete hedonic information, and prices are windsorised to remove the upper and lower 5% of observations.

There are 774,423 sales observations in the final data set. Table 1 presents the summary statistics for the final sample. Of the total sample, it is approximately a 60-40 split between houses (456,636 sales) and units (317,787). This in part is due to the higher turnover of units and better hedonic attribute capture.

The hypotheses of this paper are tested using hedonic regression analysis. It involves developing a model that relates price to a series of property attributes that are expected to predict the value of the house. Notwithstanding the issues in data availability and comparability across different samples, hedonic regression is widely accepted as the benchmark modelling process for transaction level property data. The comprehensiveness of the dataset available to this study means that the substantial empirical problems associated with many previous studies, including omitted variable bias and truncated sampling, are largely overcome. The core hedonic model estimated by OLS is given by Equation 1:

$$\ln P_{i,t} = \alpha + \sum_{k=1}^K \beta_k X_{k,i,t} + \delta_1 D13 + \delta_2 D4 + \delta_3 D8 + \gamma_1 D4DChinese + \gamma_2 D8DChinese$$

In this model, $X_{i,t}$ is a matrix of hedonic attributes for the i^{th} property sold in time period t , including landsize (for houses), the number of bedrooms, bathrooms and carspaces, as well as dummy variables for pool and waterfrontage. Fixed effects are included for the year of sale to capture the market-wide

⁵ While the actual number and proportion of immigrants in a community has changed over time (increasing in most instances), the suburbs with the highest Chinese populations have remained reasonably constant over time.

⁶ For example negative bedroom counts or bedroom counts in excess of 10 are removed. Less than 2% of records from the original data set are affected by this filter.

price trend and the local government area (LGA) of the property to control for factors related to location.⁷

Dummy variables *D13*, *D4*, and *D8* are included in the model equal to 1 where the street number contains the number 13, 4 or 8 respectively.⁸ For units, equivalent dummy variables are created to capture the unit number effect. Interaction terms, *D4DChinese* and *D8DChinese*, are created to capture the effect of properties located in suburbs determined to have a large Chinese immigrant population and with 4 and 8 in the address respectively.

The semi-log modelling of property prices in the hedonic regression is commonly used to manage the large positive skew in the price distribution. It has the added advantage that the coefficient estimates from this model can be interpreted as the average percentage marginal effect of each variable to property price after controlling for other factors.

4. Results

Table 2 presents the results of alternative specifications of the hedonic model specified in Equation 1 as applied to houses. Model 1 contains a standard hedonic specification, with significant coefficients of expected magnitude on each of the property attribute explanatory variables. Model 2 includes dummy variables for inauspicious numbers in the address. There is little evidence of a significant price effect across the city to the street number (while the coefficient on *D4* is statistically significant, the magnitude of the effect, roughly 0.3%, is not economically significant). When the numbers 4 and 8 are considered in Chinese-dominant communities, however, there is a significant result that we can relate to superstition.

Specifically, model 3 shows that houses with an address that contains the number 4 in Chinese communities trade on average at a discount of 3.9%, while houses in those same neighbourhoods that have the number 8 in their street address trade at a statistically significant average price premium of 1.4%, *ceteris paribus*.

Houses and units are modelled separately in this study for several reasons. Firstly, there are certain characteristics which explicitly differ between the different types of property (for example, landsize is not an attribute available for units or expected to have an effect on price). Stratifying the modelling by the property type also allows for the common attributes to vary in their significance and contribution to price.

In regards to the research question of this paper, there are further reasons to expect that houses and units may yield differing results. As identified in Section 3, there is a much higher proportion of units in suburbs that have a high Chinese immigrant population, and a relatively low proportion of the city's houses. Apartment complexes are also relatively more homogenous in their development, meaning that the possibility of any omitted variables etc on the analysis should be less evident – that is, the results relating to lucky and unlucky numbers should be more robust. Finally, apartments have

⁷ Local government areas are defined under the Australian Standard Geographical Classification Standards. The analysis presented in this paper is robust to the use of alternative location definitions in the fixed effects, including statistical subdivision and postcode.

⁸ The analysis was repeated using the stricter definition of property addresses that ended in these numbers only, with qualitatively similar results.

two sets of numbers in their address: the unit and the street number. The separate testing here enables more extensive analysis of the proposition by Bourassa and Peng (1999) that, “in the case of attached units, the number of the unit is more meaningful to Chinese than the address of the building” (1999: 86).

Table 3 presents the empirical results of alternative specifications of the hedonic model specified in Equation 1 when estimated using data for unit transactions. Several interesting results arise from analysing this sample separately from houses. Once again, the hedonic attributes are statistically significant and have the expected sign and relative magnitude. In Model 2, dummy variables are included for both street number and unit numbers that include 4, 8, and 13. It is found that none of these numbers in the property’s street number has a significant effect on price. At a city-wide level, there is weak evidence of a price effect attributable to units which contain the number 4 or 8. The most surprising result is that D13 has a highly significant negative coefficient. That is, Unit 13 in an apartment block in Sydney is expected to trade at a 3.2% discount relative to comparable properties.

This indicates that in the unit market in Sydney, the negative Western superstition attached to the ‘13’ has an impact on price. This result holds in Model 3 which considers also whether unit numbers 4 and 8 play a role in sales prices of units in suburbs with high Chinese populations. In line with expectations, units with the number 4 trade on average at a statistically significant 1.3% discount while units with a number 8 attract a 1.0% price premium on average.

5. Conclusion

This study analyses the effect of superstition, a culturally-induced behavioural bias, on prices in the Sydney residential real estate market. The results presented in this study has implications for future research in both behavioural finance and housing markets, as well as for policy and lending practice.

The results find that for both houses and units there is a significant price effect related to the numbers in the property’s address. In suburbs with substantial populations of Chinese immigrants, properties with the number 4 in the address sell on average at a discount, while properties with a number 8 in the address sell at a premium. The result is economically more significant for houses than units. This indicates that the Chinese population of Sydney does incorporate superstition in their investment decisions, extending the prior literature that has primarily focused on Chinese superstitions and investments in Asian markets.

Interestingly, in the subsample of apartment sales analysed the most dominant superstitious price effect is related to the number 13. Across all regions, the number 13 attracts a negative price premium. This is, to the author’s knowledge, the first study to consider the superstitions of alternative cultures and is made possible by analysis of a highly heteroculture city such as Sydney.

It could be due to the relative affordability of units relative to houses that the unlucky-13 superstition is only apparent in this subsample. This would mean it is more likely to see entry-level, and so, less ‘sophisticated’ buyers. It could otherwise be explained by the common ‘investment property’ nature of many apartments in Sydney, which means luck is considered more desirable than an owner-occupier purchase. Future research can explore this question more thoroughly.

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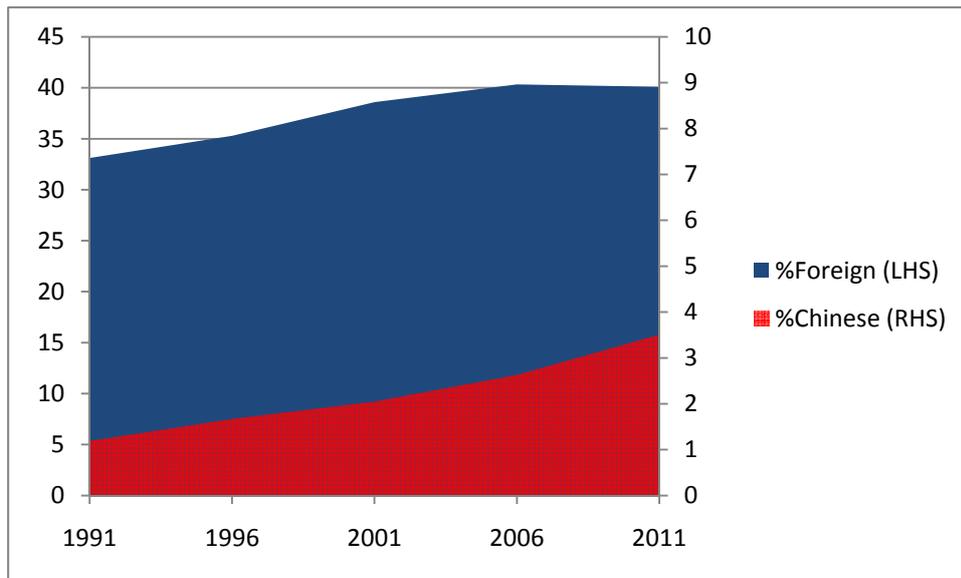
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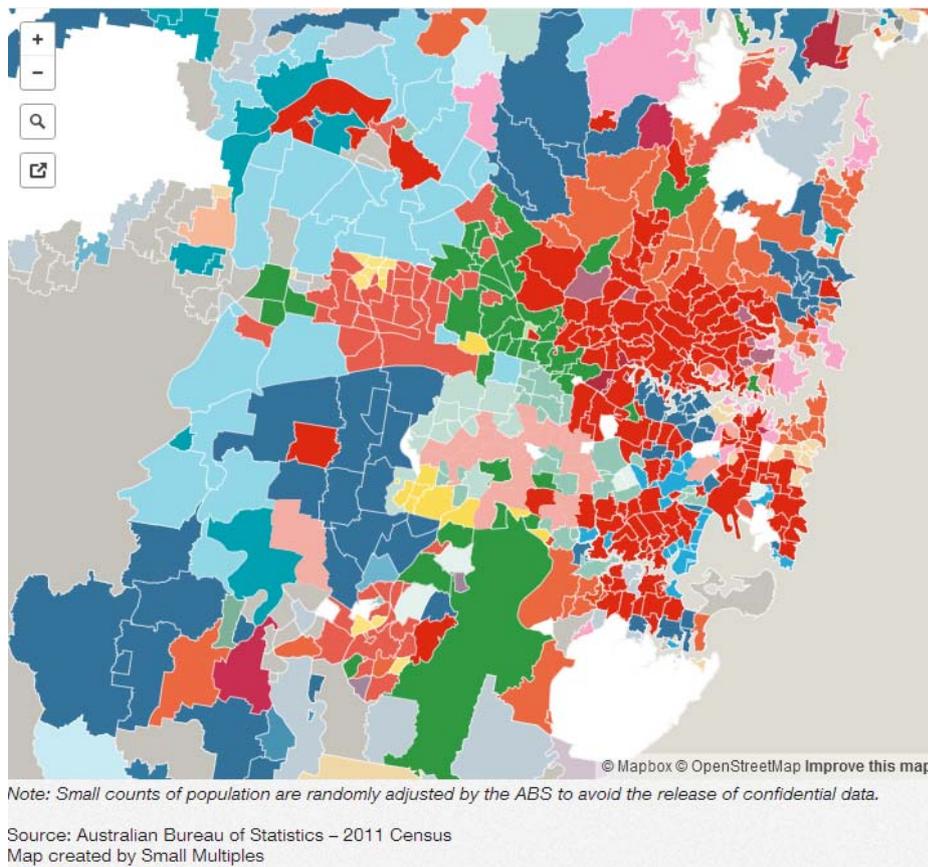
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Figure 1: Sydney's immigrant mix, 1991 – 2011



Source: Author's calculations; Australian Census data, 1991, 1996, 2001, 2006, 2011 (ABS)

Figure 2: The primary birthplace of immigrants in each of Sydney's suburbs.



Source SBS: <http://www.sbs.com.au/news/map/where-australias-immigrants-were-born-sydney>

Table 1: Descriptive statistics

	Houses		Units	
Observations	456,636		317787	
	Non-Chinese	Chinese	Non-Chinese	Chinese
Average Price	475,077	587,008	396,223	370,769
Street address 8	480,644	575,619	405,825	364,731
Unit address 8			378,851	377,5820
Street address 4	478,177	580,645	389,320	346,341
Unit address 4			395,687	386,872

Table 2: Regression Results – Houses

	Model 1		Model 2		Model 3	
	Coefficient Estimate	<i>t</i> -Statistic	Coefficient Estimate	<i>t</i> -Statistic	Coefficient Estimate	<i>t</i> -Statistic
Intercept	13.946 ***	2224.44	13.947 ***	2221.44	13.949 ***	2225.28
Ln(landsize)	0.153 ***	209.52	0.153 ***	209.55	0.154 ***	210.20
Bedrooms	0.083 ***	164.88	0.083 ***	164.79	0.082 ***	164.26
Bathrooms	0.043 ***	78.16	0.043 ***	78.15	0.043 ***	76.88
Carspaces	0.023 ***	40.10	0.023 ***	40.10	0.022 ***	39.28
View	0.060 ***	33.50	0.060 ***	33.50	0.058 ***	32.09
Pool	0.093 ***	64.38	0.093 ***	64.36	0.090 ***	61.84
Waterfront	0.364 ***	81.31	0.364 ***	81.33	0.364 ***	81.40
House13			0.005	1.53	0.005 *	1.75
House4			-0.003 ***	-2.89		
House8			-0.001	-1.17		
House4*Chinese					-0.039 **	-2.34
House8*Chinese					0.014 **	0.85
Time FE	Yes		Yes		Yes	
Location FE	Yes		Yes		Yes	
Adjusted R2	0.7653		0.7653		0.7655	
Observations	456,636		456,636		456,636	

Table 3: Regression Results – Units

	Model 1		Model 2		Model 3	
	Coefficient Estimate	<i>t</i> -Statistic	Coefficient Estimate	<i>t</i> -Statistic	Coefficient Estimate	<i>t</i> -Statistic
Intercept	12.508 ***	2324.84	12.513 ***	2313.22	12.513 ***	2330.73
Bedrooms	0.229 ***	267.28	0.228 ***	266.50	0.227 ***	265.80
Bathrooms	0.047 ***	52.96	0.047 ***	52.88	0.045 ***	50.41
Carspaces	0.068 ***	65.83	0.069 ***	65.99	0.067 ***	64.25
View	0.062 ***	29.55	0.063 ***	29.69	0.056 ***	26.36
Pool	0.026 ***	10.87	0.026 ***	10.93	0.016 ***	6.77
Waterfront	0.427 ***	93.50	0.427 ***	93.51	0.428 ***	93.95
House13			0.004	0.85	0.006	1.16
House4			-0.014	-1.29		
House8			-0.016	-1.29		
Unit13			-0.032 ***	-8.00	-0.030 ***	-7.46
Unit4			-0.006 ***	-3.85		
Unit8			-0.004 ***	-7.02		
Unit4*Chinese					-0.013 ***	-8.99
Unit8*Chinese					0.010 ***	6.18
Time FE	Yes		Yes		Yes	
Location FE	Yes		Yes		Yes	
Adjusted R2	0.5913		0.5916		0.5935	
Observations	317,787		317,787		317,787	