Cultural Distance and Housing Prices: Evidence from the Australian Housing Market*

with robust standard errors clustered at the suburb level. Furthermore the results are robust to endogeneity and selection bias.

Considering that different ethnicity groups may display varying degrees of home culture preference, we also explore the extent to which culture distance affects the housing prices for regions of the world. Some ethnicities may be more recent migrants into Australia, and have strong emotional and cultural bond with their home country, and therefore may display stronger home cultural preferences. We extend our baseline analysis by examining ethnicities by region. Our result

The paper is related to several strands of the literature. Culture plays an important role in shaping the behavior and decision making of individuals (e.g., Hermalin (2001)). The significance of cultural distance in investment decisions is highlighted in prior works. Specifically, studies have

Anglo-Saxons (mainly Irish and UK) experienced peak population in 1954. In the 1950's and 60's, the peak population occurs for Eastern and Western Europe namely the Dutch, Germans and Polish. From the 1970's, the Southern Europeans (Greeks, Italians and Maltese) had population peaks. In the 1980's Lebanese migration peaked and in the 1990's it peaked for Yugoslavia. For both the Lebanese and Yugoslavs the peaks follow the outbreak of civil war in their respective countries. In the 2010's Asian countries, China, India, Malaysia, Philippines and Vietnam experience their peak population as well as for neighboring Commonwealth countries New Zealanders and South Africans. Asian countries entered the top ten in the 1990's suggesting Asians are the most recent wave of new migrants. In summary, the most established ethnicity in Australia are the Anglo-Saxons, followed by Western Europeans, Southern Europeans, Middle East, Asia and New Zealand. The sequencing is important as cultural distance sensitivity may be weaker for more established ethnicities than recent migrants.

2.2 Culture and Investment Decision

There is a developing literature on the affect of culture on investment decisions. The papers find consistent that cultural differences along several dimensions between two countries negatively into our analysis. Second we look at cultural differences between buyer and the population-weighted ethnic mix in the neighborhood instead of country pairs. Such analysis differs to the usual cross-country pair analysis of the literature and represents a novel method to apply cultural distance. Third we investigate the relationship of cultural distance to housing prices at the individual housing transaction level whereas other studies focus on the country trade level (e.g.

size of 3900

algorithm is above 85 percent. We remove buyers with multiple owners of different ethnicities. We remove company owners which make up about 2.5% of the sample. Using these filters we are able difference between buyer *i*'s culture and the cultural mix of the suburb. For robustness, we also measure the suburb's ethnicity by birthplace instead of ancestry and use all six dimensions or just four dimensions excluding long-

¡Gis buyer

the individual. Consistent with this effect, Hvide and Östberg) find stock market decisions of individuals are positively correlated with those of co-workers and this positive correlation is not associated with positive future returns. As such we hypothesize that prior buying by the same ethnicity is a valid instrument as it increases the probability of buying by the ethnicity group however has no effect on the price paid.

Endogeneity is also present in our baseline specification as there may be an omitted variable bias where unobserved characteristics of the buyer, home or neighborhood may be correlated with both prices and cultural distance. To address endogeneity we identify cultural distance with genetic distance following Guiso *et al.* (2009) and Ahern *et al.* (2012). As Ahern *et al.* (2012) describes, genetic distance is 'a measure of the probability that two random alleles (DNA variations) from two populations will be different, based on the dominant population of a country'. Genetic distance is correlated to cultural distance as ethnicities that share common ancestors will tend to inherit both biological and cultural similarities (e.g. Spolaore and Wacziarg (2009)). However as genetic similarities take many generations to eventuate in ethnicity, it is unrelated to house prices. The first stage regression regresses the buyer's cultural distance on all control variables including genetic distance as such:

$$= \quad + \quad + \quad + \quad + G + \quad + W + \qquad (4)$$

where GD_{ist} is the genetic distance Í ìl VĐV0Ý% u# Ñ BÀQ^ BV! ì< 2 ,X1= 0P¾~bõâ 0b

The coefficient estimate across measures and methods ranges from -0.009 (Table 4 Panel B, ordinary least squares) to -0.032 (Table 4 Panel C, two stage least squares). This suggests that a one standard deviation increase in the cultural distance of a buyer with the suburb reduces the buyer's price by between 0.9% to 3.2%. For example for ordinary least squares in Table 4 Panel A, a one standard deviation move in cultural distance reduces housing prices by 1.1% or AUD$7,509 given the mean sales price of AUD$682,650

culture distance is economically meaningful, given the sample mean sales price of AUD$682,650. The results are robust to different cultural distance measures, endogeneity and selection bias.

To show that different ethnicity groups display varying degree of home, we perform a battery of subsample analysis for the top ten ethnicity group in our sample. Our findings demonstrate that immigrants particularly from Asia display a greater degree of home culture preference, whereas we find no or weak statistical significance for buyers from Australia or Europe.

Taken together, our paper provides important insights in the area of culture, foreign immigrant homebuyers, and housing price. It contributes to thet Io0.5(f)55( )]05(c)0

References

Appendix 1
Top Ten Overseas Country of Birth in Australia from 1954 to 2011

We collect top ten overseas country of birth by percentage of the Australian population from the Australian Census from 1954 (just prior to the relaxation of the White Australia policy in 1958) to 2011. The table reports for each top ten birthplace, the census year entry into the top ten and the census year and figure of when the birthplace was at the peak of the total percentage of the Australian population. The census year entry and peak provides a guide of the most recent immigration way from the birthplace country.

Census Year	Year of Entry	Birthplace	% of Total Population
1954	1954	r1.5(n)0.5(f)N9.(e)21.5l	

Appendix 3
List of Housing Characteristic Variables

Variable	Description
Beds	Number of beds
Baths	Number of bathrooms
Multiple Parking	1 if home has two or more parking spots, 0 otherwise
Street type dummies	1 if a certain street type (e.g. avenue, highway, lane, street, road, etc.), 0 otherwise
Housing type dummies	1 if a certain housing type (e.g. apartment (condominium), house, semi, studio, townhouse, villa, etc.), 0 otherwise
Housing type dummy* Area size	Housing type dummy interacted with land area size of home (square metres).
HasAirConditioning	1 if home has air conditioning, 0 otherwise
HasAlarm	1 if home has alarm system, 0 otherwise
HasBalcony	1 if home has balcony, 0 otherwise
HasBarbeque	1 if home has barbeque, 0 otherwise
HasBeenRenovated	1 if home has been renovated, 0 otherwise
HasBilliardRoom	1 if home has billiard room, 0 otherwise
HasCourtyard	1 if home has courtyard, 0 otherwise
HasEnsuite	1 if home has ensuite, 0 otherwise
HasFamilyRoom	1 if home has family room, 0 otherwise
HasFireplace	1 if home has fire place, 0 otherwise
HasGarage	1 if home has garage, 0 otherwise
HasHeating	1 if home has heating, 0 otherwise
HasInternalLaundry	1 if home has internal laundry, 0 otherwise
HasLockUpGarage	1 if home has lock up garage, 0 otherwise
HasPolishedTimberFloor	1 if home has polished timber floors, 0 otherwise
HasPool	1 if home has swimming pool, 0 otherwise
HasRumpusRoom	1 if home has rumpus room, 0 otherwise
HasSauna	1 if home has sauna, 0 otherwise
HasSeparateDining	1 if home has separate dining room, 0 otherwise
HasSpa	1 if home has spa, 0 otherwise
HasStudy	1 if home has study room, 0 otherwise
HasSunroom	1 if home has sunroom, 0 otherwise
HasTennisCourt	1 if home has tennis court, 0 otherwise
HasWalkInWardrobe	1 if home has walk in wardrobe, 0 otherwise
View dummies	1 if home has a certain view (e.g. bush, city, district, harbour, ocean, park, river, etc.), 0 otherwise

Table 2
Summary Statistics of Cultural Distance between Buyer and Home's Suburb

The table reports summary statistics for the cultural distance of the buyer to the home's suburb across sales in the

Table 3
First Stage Probit Regression

The table reports coefficient estimates of the probit model in equation 3. The data is home sales from 2006 to 2013 for the Sydney metropolitan area from 2006 to 2013. Buyer ethnicity is classified by surname of the buyer. Cultural dfcienmatanic(o)-20.2(e .2(m)104[(R)-28(e)-56(.0162ID 2 >>BDC (m)104[(R24a)21.5(.3( )]TJ 0.0tR24a)21.5(.3(1.231 TD)i31 T

Table 4
Baseline Regressions

The table reports coefficient estimates regressing log sales price on the cultural distance of buyer to a suburb with control variables. The data is home sales from 2006 to 2013 for the Sydney metropolitan area from 2006 to 2013.

Panel B. Cultural Distance (Birthplace 6 Dimensions)

Dependent variable: ln(price)	Ordinary Least Squares	Heckman	2-stage Least Squares	Heckman and 2-Stage Least Squares
Intercept	7.273***	7.265***	13.315***	13.179***

Panel C. Cultural Distance (Ancestry 4 Dimensions)

Dependent variable: ln(price)	Ordinary Least Squares	Heckman	2-stage Least Squares	Heckman and 2-Stage Least Squares
Intercept	7.29***	7.286***	13.213***	13.2***
	(0.924)	(0.924)	(0.022)	(0.022)

Panel D. Cultural Distance (Birthplace 4 Dimensions)

Dependent variable: ln(price)	Ordinary Least Squares	Heckman	2-stage Least Squares	Heckman and 2-Stage Least Squares
Intercept	7.274***	7.27***	13.319***	13.183***
	(0.925)	(0.925)	(0.016)	(0.022)
CD	-0.013**	-0.015**	-0.02***	-0.013
	(0.006)	(0.007)	(0.003)	(0.008)
New Development	0.145***	0.145***	0.145***	0.145***
	(0.008)	(0.008)	(0.008)	(0.008)
Auction	0.057***	0.057***	0.057***	0.057***
	(0.003)	(0.003)	(0.003)	(0.003)
Number of Bedrooms	0.12***	0.12***	0.12***	0.12***
	(0.004)	(0.004)	(0.004)	(0.004)
Number of Bathrooms	0.129***	0.129***	0.129***	0.129***
	(0.003)	(0.003)	(0.003)	(0.003)
Has Parking	0.084***	0.084***	0.086***	0.086***
	(0.007)	(0.007)	(0.007)	(0.007)
Inverse Mills Ratio		0.005		-0.011
		(0.006)		(0.013)
Housing Characteristics	Yes	Yes	Yes	Yes
Suburb Fixed Effects	Yes	Yes	Yes	Yes
Buyer Ethnicity Fixed Effects	Yes	Yes	Yes	Yes
Year/Quarter Fixed Effects	Yes	Yes	Yes	Yes
Monthly Time Trend	Yes	Yes	Yes	Yes
Clustered Standard Errors By ...	Suburb	Suburb	Suburb	Suburb
Adjusted R-square	0.8598	0.8598	0.8584	0.8588
Number of Observations	210,269	210,269	210,269	210,269

Table 5
Cultural Distance and Ethnicity Region Interaction

The table reports coefficient estimates regression log sales price with cultural distance interacted with buyer's ethnicity region to suburb with control variables. The data is home sales from 2006 to 2013 for the Sydney metropolitan area from 2006 to 2013. Buyer ethnicity is classified by surname of the buyer. Cultural distance is measured as the euclidean distance between the Hofstede cultural dimensions of the buyer's ethnicity to the population weighted ethnicity cultural dimensions in the home's suburb. The cultural dimensions are power distance, uncertainty avoidance, individualism versus collectivism, masculinity versus femininity, long-term orientation and indulgence versus restraint. Standard errors are in parenthesis. ***, **, * signifies statistical significance at the 1, 5 and 10 percent level.

Panel A. Cultural Distance (Ancestry 6 Dimensions)

Dependent variable: ln(price)

Panel B. Cultural Distance (Birthplace 6 Dimensions)

Panel D. Cultural Distance (Birthplace 4 Dimensions)

Dependent variable: ln(price)	Ordinary Least Squares	Heckman	2-stage Least Squares	Heckman and 2-Stage Least Squares
Intercept	7.263***	7.257***	13.297***	13.16***
	(0.926)	(0.925)	(0.018)	(0.023)
CD*Africa	0.077	0.070	-0.203***	-0.196***
	(0.157)	(0.158)	(0.056)	(0.053)
CD*Australia	0.014	0.012	-0.010	-0.006
	(0.009)	(0.010)	(0.012)	(0.016)
CD*East Asia	-0.048***	-0.050***	-0.020***	-0.019**
	(0.008)	(0.009)	(0.007)	(0.009)
CD*South Asia	-0.052***	-0.055***	-0.012	-0.010
	(0.011)	(0.012)	(0.011)	(0.011)
CD*South East Asia	-0.043***	-0.046***	-0.013***	-0.010
	(0.007)	(0.008)	(0.004)	(0.009)
CD*Middle East	-0.048***	-0.05***	-0.008	-0.006
	(0.014)	(0.014)	(0.007)	(0.012)
CD*Eastern Europe	-0.001	-0.002	-0.003	-0.001
	(0.025)	(0.025)	(0.010)	(0.012)