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

Maggie HU
University of New South Wales
Adrian LEE
University of Technology Sydney

Sep 8th, 2015
UNSW Real Estate Symposium 2015

Research Question

Does cultural distance between a buyer's ethnicity and the neighbourhood affects a home's selling price.

+ve: Home buyers who are more culturally distant from the culture of a property's neighborhood are faced with higher search costs and greater information friction to access the local property market.

-ve: Home buyers prefer locations with greater cultural similarity, and are willing to pay more for homes in those locations (supported)

Main Finding

- Homebuyers are willingly to pay higher prices for homes in neighbourhoods which are closer to their culture of origin.

- If the cultural distance between a homebuyer and the suburb decreases by one point, housing price increases by 1.1% or AUD$7,509 (based on the sample mean sales price of AUD$682,650).

Motivation

1) To fill up a gap in literature

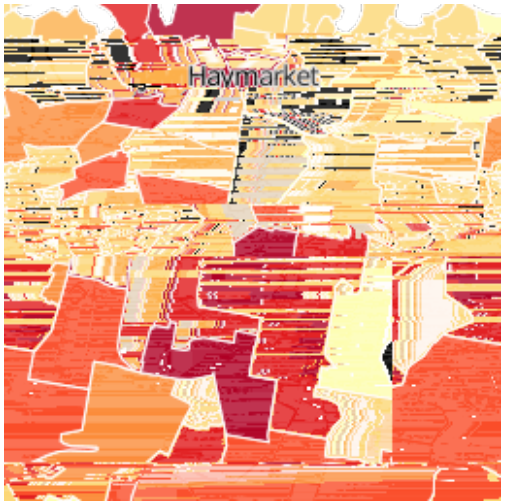
- Literature implies that culture is a **latent priced factor** in hedonic housing price models, although never directly tested empirically.

“As we have seen in the case of our hedonic housing price example ... . **Latent unobservable influences** related to **culture**, infrastructure, or recreaturuaTw 4.84 06uruaTeuaTeh

Motivation

2) My own observation: Sydney's Chinese population

- 52.5% of Hurstville's population reported their heritage as Chinese. Burwood (41%), Eastwood (36.5%), Haymarket (36%)
- Migrants of most nations congregate in cities as a way of finding support in a new land and as a means of preserving culture.
- Are home buyers willing to pay for cultural congregation?

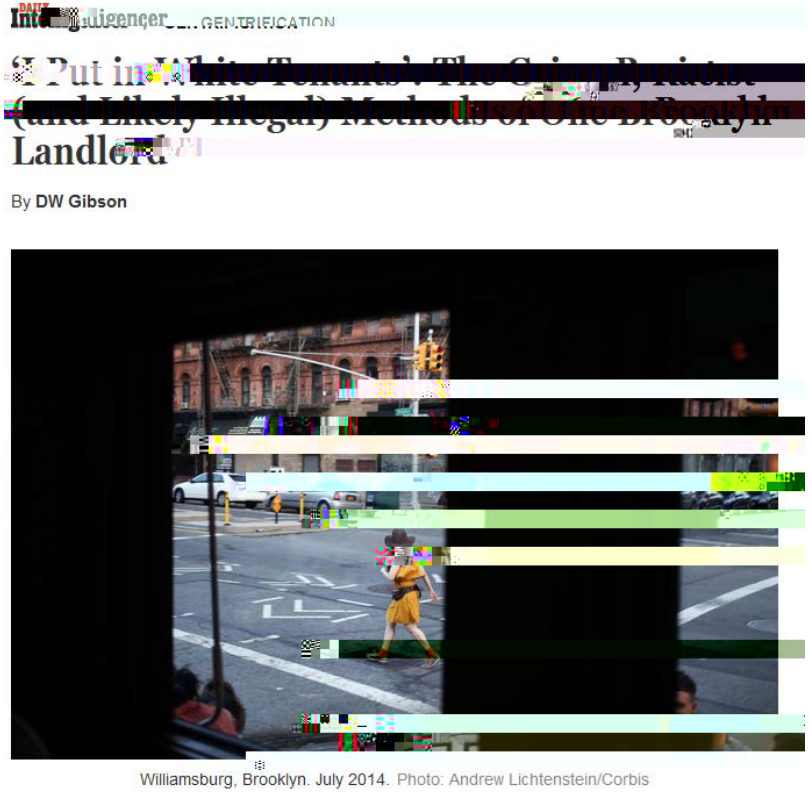


NYmag.com, May 12th, 2015

NYC Rental Market:

- One landlord in Brooklyn, NYC bribes the black tenants to move out, so that he can then rent to white people and double the rent.

- Many of his **white** tenants think paying high rent means they have a right to demand **housing segregation**.



Related Literature

Home culture preference in the finance literature

International syndicated bank loan terms: Giannetti and Yafeh (MS 2012), more culturally distant lead banks offer borrowers smaller loans at a higher interest rate and are more likely to require third-party guarantees.

Cross-border mergers: Ahern et al (JFE 2015), culture proximity affect cross-border merger volume and synergy gains.

Cross-listings: Dodd et al (EFM 2013), firms cross-list in markets that have greater cultural similarities.

Ethnicity preferences and house prices

Racial quotas: Wong (RES 2013), Wong (JPubE 2014), all 3 main ethnic groups in Singapore prefer to live with some own-ethnic-group neighbours but they also exhibit inverted U-shaped preferences

Ethnic diversity and house prices: Li (RUSE 2014), social interactions influence people's preference and behaviour for housing in Vancouver, Canada.

Data

- Australian Property Monitors home sales transaction data for the Sydney Metropolitan Area
  - 2006 to 2013, with 386,803 observations.
  - Include: home address, buyer surname, prior owner's name, price paid, housing characteristics (housing type, beds, baths, parking, additional features), etc.
- Suburb ethnicity data from Australian Bureau of Statistics Census 2006 and 2011.
  - Population, ethnic composition by birthplace or by ancestry for each suburb in Sydney, etc.
- Hofstede (2001): six cultural dimensions
- Final sample removing company owners, multiple ethnicity surnames and unclassified surnames:
  - 6-dimension Hofstede, 208,878

List of Housing Characteristics 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, house, semi, studio, townhouse, villa, etc.)
Has Air Conditioning	1 if home has air conditioning, 0 otherwise
Has Alarm	1 if home has alarm system, 0 otherwise
Has Balcony	1 if home has balcony, 0 otherwise
Has Barbeque	1 if home has barbeque, 0 othe.8(a)-wA448isysn.8(t,)4.8 ET EMC BT /P <</MCID 8( )C

Hofstede 6-Dimensions

1) **Power Distance**: the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally.
2) **Individualism**

Method: Ethnicity Classification

We infer owner's ethnicity from buyers' surname.

We build surnames/ethnicity database from various web sources (such as surnamedb.com, wikipedia).

British and Scottish surnames are assumed to be Australian.

Surnames with multiple ethnicities are removed:

- E.g. Lee is both Anglo-Saxon, Chinese and Korean

Mixed ethnicity multiple owners are removed.

Ethnicities refer to those used in the Hofstede dimensions

- Data availability for different culture dimension varies.
- Some ethnicities cannot be classified in all 6 culture dimension

Method: Hedonic Regression Model

Where:

- ( )

Summary Statistics: Cultural Distance for the Top 20 Buyer Ethnicity Groups

A Real Transaction Example:

Summary Statistics by Top 20 Ethnicities

Ethnicity	Price ($'000)	House dummy	House Size (1,000 sqf)	Bed	Bath	Parking	Auction	N
Australian	770.49	0.59	3.95	2.91	1.62	0.83	0.16	73,114
Chinese	674.48	0.47	3.2	2.89	1.7	0.89	0.15	39,223
Arabic	546.04	0.72	4.84	3.05	1.51	0.88	0.19	20,145
Indian	551.03	0.59	3.92	2.95	1.59	0.89	0.13	17,945
Irish	765.7	0.58	3.78	2.88	1.6	0.83	0.17	14,476
Italian	673.05	0.64	4.17	2.94	1.58	0.87	0.18	12,056
Vietna 0.18								

Baseline Result

Robustness Check
Concern 1: Selection Bias

We only observe completed transactions, i.e. when buyer's offer price is higher than the seller's reservation price.

Use instrumental variable approach to address this concern.

Run Heckman 2-step regression and instrument in 1st stage probit with dummy for prior year buying by ethnicity in suburb (*lagybuy*):

Intuition: buyers are influenced to buy in suburb from observing buying by their own peer group (i.e. ethnic group).

E.g. in car purchases (Grinblatt, Keloharju and Ikäheimo (2008) , employment outcomes (Bayer, Ross and Topa (2008), Patacchini and Zenou (2012)), welfare participation (Bertrand, Luttmer and Mullainathan (2000), Betrand, Luttmer and Mullainathan (2000)) and worker productivity (Mas and Moretti (2009)).

Robustness Check
Concern 1: Selection Bias

Probit at the suburb/ethnicity/quarter level.

$Lagybuy_{jst}$ is a dummy of 1 if there is any sale by the buyer's ethnicity in the prior twelve months in suburb *s* and 0 otherwise.

Obtain the inverse mills ratio from the Probit estimate and use it as an additional independent variable in main regression.

Robustness Check
Concern 2: Omitted Variable Bias

CD may be correlated to an omitted variable in our hedonic regression.

Could be an omitted housing characteristics (e.g. build quality) or an omitted buyer characteristic (e.g. income).

Use 2-stage least squares with genetic distance (GD) of buyer to suburb as instrument.

Also used by Guiso, Sapienza and Zingales (2009) and Ahern et al. (2012) as an instrument for CD.

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'.

GD obtained from Spolaore and Wacziarg (2009) and Spolaore's website.

Robustness Check
Address Concern 1 and 2 Together

Follow Wooldridge (2010) section 19.6.2.

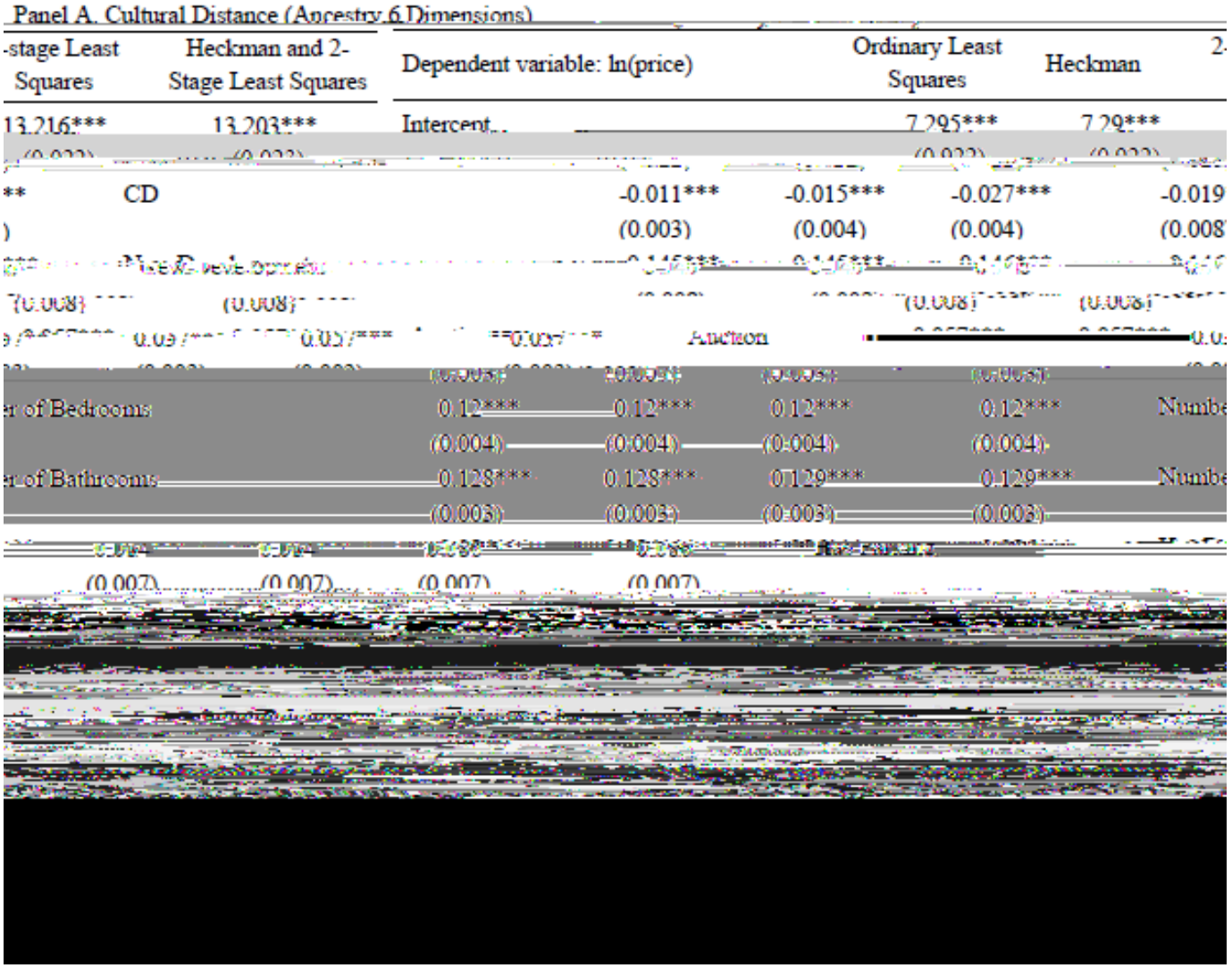
First stage Probit uses GD instead of CD.

Put the inverse mills function from the GD Probit estimates in the second stage regression of 2-stage least squares.

We present 4 versions of result in the tables:

1) ordinary least squares
2) Heckman selection
3) 2-stage least squares
4) Heckman plus 2-stage least squares

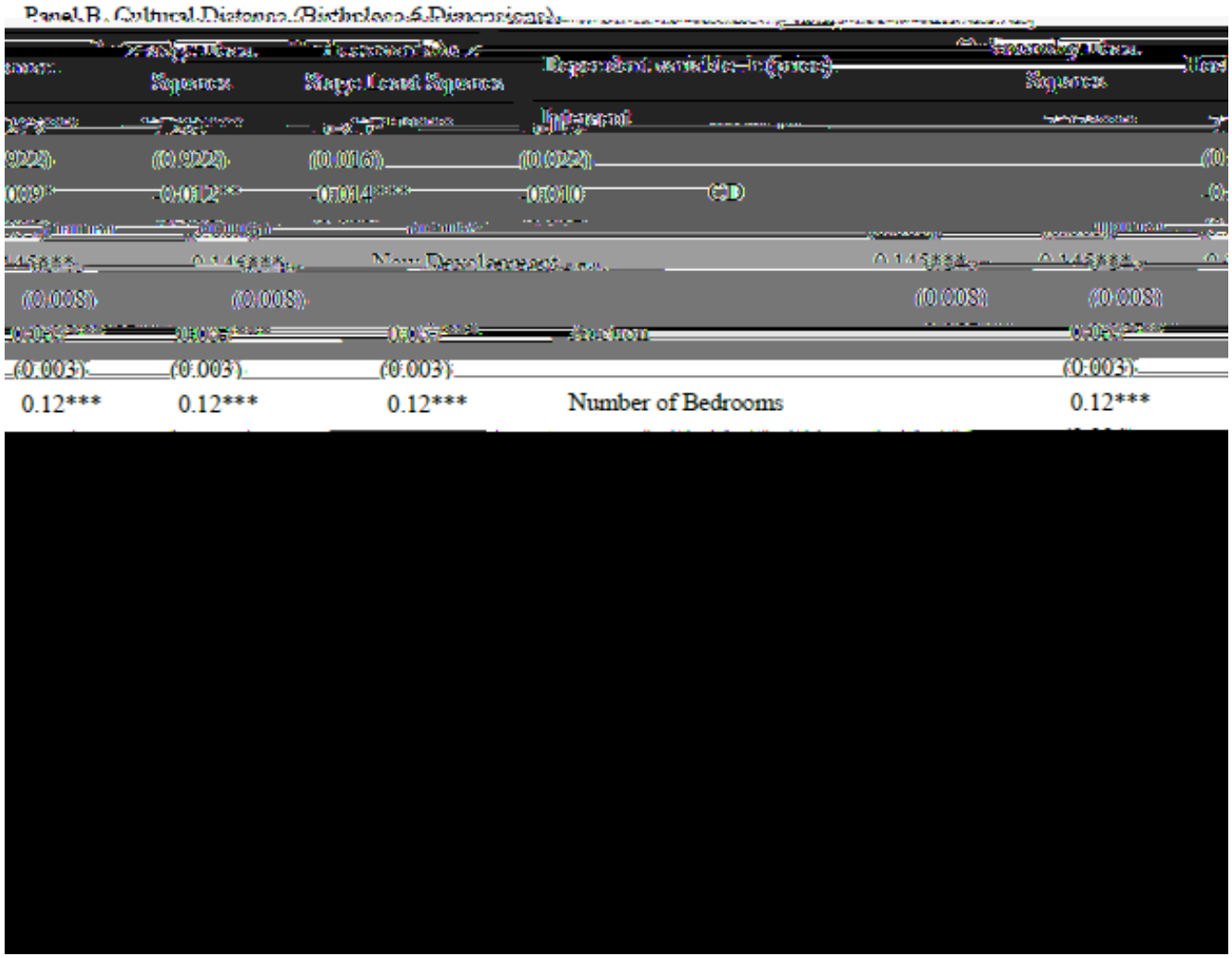
Result Using Suburb Ethnicity based on Ancestry and Hofstede 6 Dimensions



Panel A. Cultural Distance (Ancestry 6 Dimensions)

-stage Least Squares	Heckman and 2-Stage Least Squares	Dependent variable: ln(price)	Ordinary Least Squares		Heckman	2-
13.216***	13.203***	Intercept	7.295***		7.29***	
**	CD		-0.011***	-0.015***	-0.027***	-0.019
)			(0.003)	(0.004)	(0.004)	(0.008
		Auction				
r of Bedrooms			0.12***	0.12***	0.12***	0.12*** Numbe
			(0.004)	(0.004)	(0.004)	(0.004)
r of Bathrooms			0.128***	0.128***	0.129***	0.129*** Numbe
			(0.003)	(0.003)	(0.003)	(0.003)
(0.007)	(0.007)		(0.007)	(0.007)		

Result Using Suburb Ethnicity based on Birthplace and Hofstede 6 Dimensions



ResultUultuburb E(t)75oif 0.6(hni(t)7coci(t)7coif 0.6(yf 005

Result Using Suburb Ethnicity based on Birthplace and Hofstede 4 Dimensions

Regional Ethnicity CD:
Does CD affect ethnicities differently?

- Estimate the following hedonic model:

$$\ln(\quad) = \quad + \quad \text{Region} \quad + \quad + \quad + G +$$

Where $Region_{iu}$ is a dummy of 1 if buyer's ethnicity belongs to Region u (e.g. Australia, East Asia, Western Europe etc.) .

Note: main effect CD_{ist} is not included in regression so we have Region specific .

Regional Results Using Suburb Ethnicity based on Ancestry and Hofstede 6 Dimensions

Panel A. Cultural Distance (Ancestry 6 Dimensions)

Dependent variable: ln(price)	Ordinary Least Squares	Heckman	2-stage Least Squares	Heckman 2 Stage Least Squares
Intercept	7.26***	7.246***	13.165***	13.162***
	(0.923)	(0.923)	(0.031)	(0.031)
CD*Africa	0.062	0.037	0.001	0.004

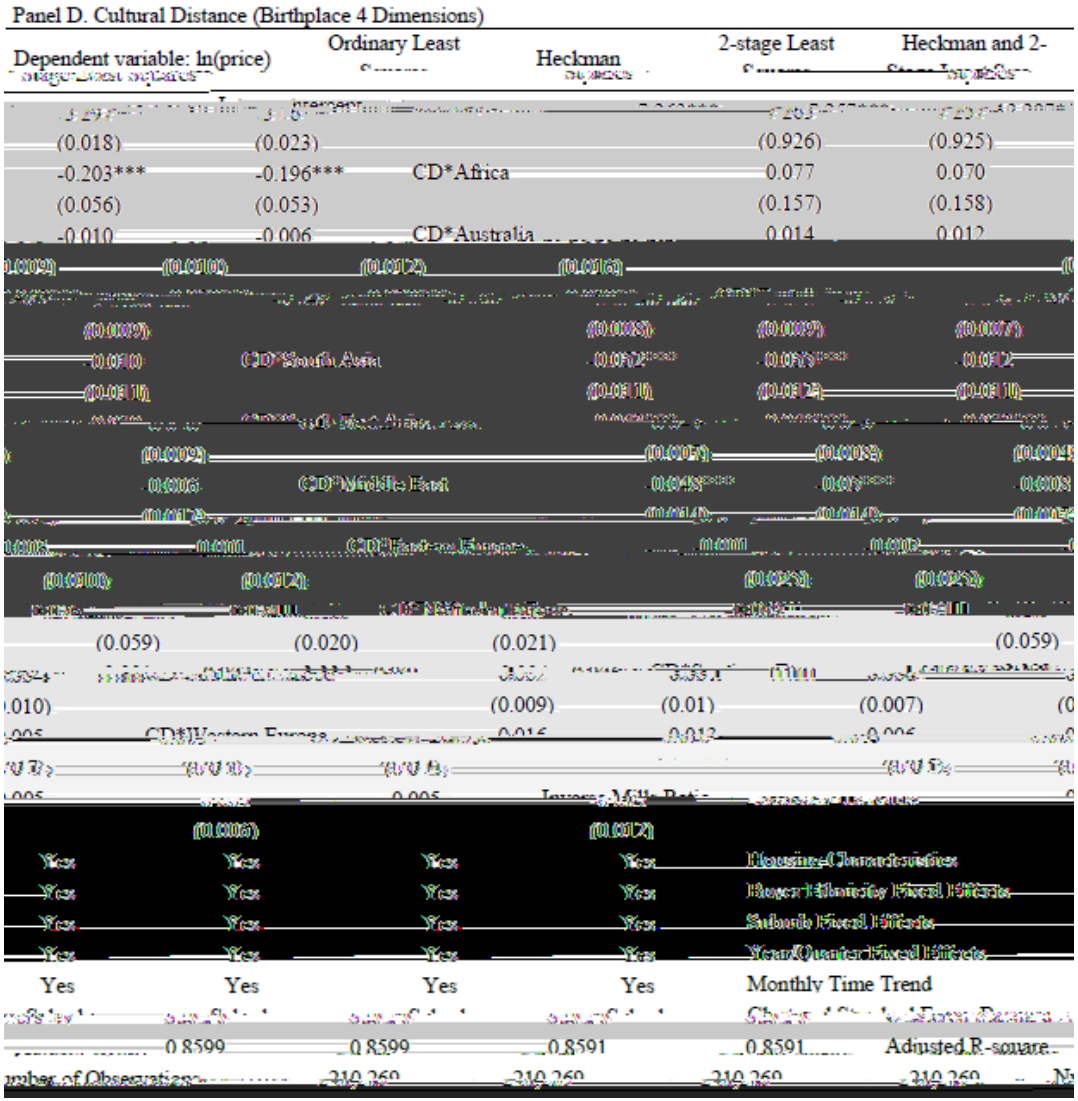
Regional Results Using Suburb Ethnicity based on Birthplace and Hofstede 6 Dimensions

Panel B. Cultural Distance (Birthplace 6 Dimensions)

ires	Dependent variable: Interest	Ordinary Least Squares		2 stage Least Squares	Heckman and 2 Stage Least Squ
	Intercept	7.259***	7.245***	13.296***	13.158***
		(0.923)	(0.922)	(0.018)	(0.023)
	CD*Africa	0.690	0.685	0.002	0.004

[redacted]

Regional Results Using Suburb Ethnicity based on Birthplace and Hofstede 4 Dimensions



Panel D. Cultural Distance (Birthplace 4 Dimensions)

Dependent variable: ln(price)	Ordinary Least	Heckman	2-stage Least	Heckman and 2-
			(0.018)	(0.023)
			-0.203***	-0.196***
		CD*Africa	(0.056)	(0.053)
			-0.010	-0.006
		CD*Australia		
		CD*South Asia		
		CD*Middle East		
			(0.059)	(0.020)
		CD*Western Europe		
		Inverse Mills Ratio		
Yes	Yes	Yes	Yes	Housing Characteristics
Yes	Yes	Yes	Yes	Buyer Ethnicity Fixed Effects
Yes	Yes	Yes	Yes	Suburb Fixed Effects
Yes	Yes	Yes	Yes	Year/Quarter Fixed Effects
Yes	Yes	Yes	Yes	Monthly Time Trend
0.8599	0.8599	0.8591	0.8591	Adjusted R-square
210,269	210,269	210,269	210,269	Number of Observations

Conclusion