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Neighborhood diversity and the appreciation of native- and immigrant-owned homes

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Neighborhood Diversity and the Appreciation of Native- and Immigrant-Owned Homes

Deborah A. Cobb-Clark
Mathias G. Sinning

September 2009

Forschungsinstitut
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of Labor

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Deborah A. Cobb-Clark
Australian National University
and IZA

Mathias G. Sinning
Australian National University,
RWI and IZA

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

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ABSTRACT

Neighborhood Diversity and the Appreciation of Native- and Immigrant-Owned Homes*

This paper examines the effect of neighborhood diversity on the nativity gap in home-value appreciation in Australia. Specifically, immigrant homeowners experienced a 41.7 percent increase in median home values between 2001 and 2006, while the median value of housing owned by the native-born increased by 59.4 percent over the same period. We use a semi-parametric decomposition approach to assess the relative importance of the various determinants of home values in producing this gap. We find that the differential returns to housing wealth are not related to changes in the nature of the houses or the neighborhoods in which immigrants and native-born homeowners live. Rather, the gap stems from the fact that over time there were differential changes across groups in the hedonic prices (i.e., returns) associated with the underlying determinants of home values.

JEL Classification: F22, D31

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Corresponding author:

Mathias Sinning
Social Policy Evaluation, Analysis and Research Centre (SPEAR)
Research School of Social Sciences
Australian National University
Fellows Road, Coombs Building (Building 9)
Canberra ACT 0200
Australia
E-mail: mathias.sinning@anu.edu.au

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1 Introduction

Immigrants' settlement patterns across metropolitan areas, communities, or neighborhoods affect not only their own integration, but also the outcomes of others around them. Immigrant enclaves, for example, reduce the costs of assimilation, primarily by making it less necessary to achieving economic success (Cutler et al., 2008a). Immigrants have been linked to increased rents and house prices in the metropolitan areas that receive them (Saiz, 2003, 2007; Ottaviano and Peri, 2007; Gonzalez and Ortega, 2009), though housing values may increase more slowly in immigrant neighborhoods within those metropolitan areas (Saiz and Wachter, 2006). This is perhaps not surprising given that immigrant enclaves are often located in older residential neighborhoods in central cities or inner-ring suburbs with relatively poor schools and high crime rates (Cutler et al., 2008a). Immigrants disproportionately rely on public transport (Cutler et al., 2008b; Heisz and Schellenberg, 2004), perhaps tying them to these inner-city neighborhoods. Finally, there is evidence that native-born residents often move out as immigrants move in (Filer, 1992; Saiz and Wachter, 2006). Taken together, these patterns suggest that – even within metropolitan areas – the neighborhoods in which immigrants and natives live are likely to be quite different. Unfortunately, we know very little about the ways in which the unique nature of many immigrant neighborhoods affects the social and economic integration of immigrant communities.

Our objective is to fill a void in the literature by examining the link between neighborhood characteristics and the disparity in home-value appreciation among immigrant and native-born homeowners. Building housing wealth is an important step in the integration process. We begin by using a hedonic-price model to link home and neighborhood characteristics to the median value of single-family homes in both 2001 and 2006. We then apply a semi-parametric, decomposition approach to assess the relative contribution of changes in housing attributes (including neighborhood characteristics) and changes in the market value of existing attributes in producing the large disparity in the median home-value appreciation realized by

immigrant and native-born homeowners. These decomposition results are then compared to parallel results at the bottom (25th percentile) and top (75th percentile) of the home-value distribution. We estimate our models using unique nationally-representative, household-level data from Australia on home values (and their characteristics) matched to data on various social problems (e.g. burglary and theft, vandalism, traffic noise, etc.), socioeconomic conditions, population demographics, and previous home sales within postcode areas. Australia is a particularly attractive country for studying the link between neighborhood characteristics and nativity differences in home-value appreciation because nearly one in four individuals in the Australian population is foreign-born (Australian Bureau of Statistics, 2007), home ownership rates are relatively high (69.8 percent) (Parliament of Australia, 2009) and do not differ much by nativity status (Bourassa, 1994) and, unlike the case in most countries, detailed information about home values and neighborhood characteristics for a large, nationally-representative sample of immigrant homeowners is available. Moreover, external data on neighborhood home sales allow us to validate the home values that homeowners are reporting. We are particularly interested in the following. How does the return to housing investments differ for foreign- and Australian-born families? Have immigrant households benefited from the recent boom in the housing market to the same extent as native-born households? How do the characteristics of the neighborhoods and houses in which immigrants live affect the appreciation in home values they experience?

Understanding the link between neighborhood characteristics and the return to housing for immigrant and native-born homeowners is important for a number of reasons. First, for most families, the appreciation of housing assets is central to building wealth and achieving economic security more generally (see Flippen, 2004; Flavin and Yamashita, 2002). Differential home-value appreciation potentially leads to a disparity in wealth accumulation across groups. Moreover, there is a differential propensity to consume out of non-financial (housing) and financial wealth (Tan and Voss, 2003; Bostic et al., 2005; Dvornak and Kohler, 2003) as well as an asymmetry in savings responses to total and unanticipated appreciation in home values

(Engelhardt, 1996). This implies that consumption expenditure may differ among groups with similar wealth levels but dissimilar portfolios. Finally, while providing direct services, housing – in particular its location – also links immigrant families to job opportunities, educational, health and transport services, churches, and social networks influencing their ability to successfully integrate into host-country society.

Against this backdrop, this paper makes an important contribution to the existing literature by studying immigrant integration and economic well-being through the lens of the housing market. It is clear that immigrants affect both rental and sales prices within metropolitan areas (Saiz, 2003, 2007; Saiz and Wachter, 2006; Ottaviano and Peri, 2007; Gonzalez and Ortega, 2009) and may pay more for housing themselves (Cutler et al., 2008b), however, it is less clear how immigrant families fare over the long term in host-country housing markets. Along with producing a nativity gap in wealth, disparity in property values also reflects a differential in the well-being derived from housing services (Collins and Margo, 2003). Others have studied racial disparities in the return to housing investments in the U.S. (Coate and Vanderhoff, 1993; Collins and Margo, 2003; Flippen, 2004), however, to our knowledge, we are the first to study this issue for immigrants. Moreover, we employ semi-parametric decomposition methods in order to quantify the relative importance of differences in house attributes and neighborhood characteristics in generating the disparity in home-value appreciation across groups. Decomposition methods have a long tradition in the study of labor markets, but are less frequently applied to housing markets.[1]

Our results indicate that immigrant homeowners experienced a 41.7 percent increase in median home values between 2001 and 2006, while the median value of housing owned by the native-born increased by 59.4 percent over the same period. These differential returns to housing wealth are not related to changes in the nature of the houses or the neighborhoods in which immigrants and native-born homeowners live. Rather, the nativity gap in home-value appreciation stems from the fact that over time there were differential changes across groups in the hedonic prices

[1]Collins and Margo (2003) is a recent exception.

(i.e., returns) associated with the underlying determinants of home values.

In Section 2, we begin by reviewing the evidence regarding the consequences of immigrants' residential decisions for their economic and social integration. We discuss the data in detail in Section 3 paying particular attention to benchmarking homeowner reports of home values against external market data from house sales. Section 4 discusses the hedonic price approach and presents the estimates of our empirical model. Finally, the decomposition analysis is presented in Section 5, while our conclusions and suggestions for future research are detailed in Section 6.

2 Immigrant Segregation, Immigrant Assimilation, and the Housing Market

Residential segregation persists among immigrants to the U.S. even as racial segregation has declined (Cutler et al., 2008a) and remains a defining characteristic of immigrant communities in many countries despite policy initiatives to disperse new arrivals more broadly (see Edin et al., 2003; Chiswick et al., 2002; Hugo, 2004). Public officials are often concerned that highly-concentrated, mainly urban, immigrant populations lead to over-crowding and strain local jurisdictions' ability to provide necessary public services (Burnley et al., 1997).

Researchers across a range of social science disciplines are also interested in immigrants' settlement patterns because they see a direct link between location decisions and the ability to successfully integrate into the host country. Sociologists have long argued that residential integration is an important benchmark of assimilation (see Duncan and Lieberson, 1959; Massey, 1985; Massey and Denton, 1985). Geographers have expanded on these models of spatial assimilation (see Zelinsky and Lee, 1998; Ellis et al., 2006; Wright and Ellis, 2000), however, it remains the case that geographic location – in and of itself – is often used as a yardstick of the extent to which immigrant communities have entered mainstream, host-country society.[2]

[2]See Myles and Hou (2003) and Schaerer and Baranzini (2008) who analyze immigrants' residential segregation in Toronto and Geneva/Zurich respectively.

In general, economists have been more interested in understanding the ways in which immigrants' tendency to live together affects other measures of assimilation, in particular their wage assimilation, human capital investment, and labor market integration. Geographic concentration, for example, gives rise to ethnic markets, reducing the need for new arrivals to invest in host-country-specific human capital, in particular language skills or local networks, before entering the labor market (e.g. Chiswick et al., 2002; Edin et al., 2003). Not surprisingly then, earnings growth is often lower in enclaves (see Warman, 2007, for a review), though research which accounts for selectivity into enclaves seems to suggest the opposite (Edin et al., 2003; Cutler et al., 2008a). There is heterogeneity in the effects of immigrant enclaves with groups that have higher levels of human capital benefiting more from concentration (Cutler et al., 2008a). Moreover, the interactions between the immigrant community as a whole and the host-country society appear to have an independent effect over and above individual characteristics in explaining the assimilation patterns of different groups (Hatton and Leigh, in press).

Immigrant segregation is influenced not only by the location decisions of immigrants, but also those of natives as well. Natives may be prepared to pay to live in neighborhoods where there are fewer immigrants (Cutler et al., 2008b; Saiz and Wachter, 2006) or may move out as immigrants move in because of changing labor market opportunities (Filer, 1992). Both are expected to result in lower house prices in immigrant neighborhoods than in non-immigrant neighborhoods.[3] Along these lines, Gautier et al. (2009) demonstrate that an act of violence in Amsterdam, which altered views about Muslim minorities, subsequently lead to a significantly lower valuation of houses in predominantly Muslim neighborhoods.

Immigrant and native neighborhoods differ in more than their demographic composition, however, and hedonic price models have proven to be a useful way of valuing the vast array of amenities and disamenities that distinguish one neighborhood from another. House prices have been used to value access to good schools, racial and ethnic diversity, environmental quality, crime risk, urban form, and transportation

[3]See Cutler et al. (1999), Bostic and Martin (2003) and Card et al. (2008) who discuss this issue in the context of racial segregation in the United States.

links.[4]

A more limited literature explicitly considers the racial disparity in home-value appreciation. The overarching conclusion is that while the race of the individual homeowner is generally unimportant (e.g. Coate and Vanderhoff, 1993; MacPherson and Sirmans, 2001), increases in the relative size of the minority population are associated with lower appreciation (e.g. Archer et al., 1996; Flippen, 2004; MacPherson and Sirmans, 2001). This suggests that wealth accumulation will be slower in minority neighborhoods than in similar non-minority neighborhoods. Our objective is to extend this literature by investigating disparity in the returns to housing investments made by immigrant and native-born homeowners. Unlike Saiz and Wachter (2006) who also study immigrant neighborhoods, we are able to link individual homeowners to the neighborhoods in which they live, allowing us to assess the impact of neighborhood characteristics on the economic integration of immigrants.

3 Data and Descriptive Analysis

3.1 Data Sources

The data come from the Household Income and Labour Dynamics in Australia (HILDA) Survey which collects longitudinal information from a national representative sample of more than 7,600 Australian households encompassing almost 20,000 individuals aged 15 years and older (see Watson, 2009). The HILDA Survey is a broad survey which pays particular attention to income, household formation, economic and social well-being, living arrangements, and neighborhood characteristics.

Most importantly for our purposes, HILDA respondents who own or are purchasing their own homes are asked to provide information about the dollar value of their houses, units, or apartments. This variable will serve as a dependent variable in our

[4]This literature is too extensive to comprehensively review here. See, for example, Archer et al. (1996), Bayer et al. (2007), Collins and Margo (2003), Downes and Zabel (2002), Flippen (2004), Gibbons and Machin (2008), Kiel and Zabel (1996), Figlo and Lucas (2004), Linden and Rockoff (2006), MacPherson and Sirmans (2001), Myers (2004) and Song and Knaap (2003).

empirical analysis. Access to the in-confidence HILDA data allows us to identify the postcode area in which each home is located and to match census data on the demographic profiles of local areas to individual homeowners. In particular, information from the 2001 and 2006 Australian censuses on the proportion of the population in the postcode area that is foreign-born have been matched to the 2001 and 2006 HILDA data.[5] Moreover, each HILDA respondent (irrespective of homeowner status) is asked to indicate whether or not the following are a problem in his or her neighborhood: i) noise from airplanes, trains or industry; ii) burglary and theft; iii) people being hostile and aggressive; iv) homes and gardens being in bad condition; v) rubbish and litter laying around; vi) traffic noise; vii) teenagers hanging around on the streets; and viii) vandalism and deliberate damage to property. We aggregated these responses across the entire HILDA sample by postcode (dropping the individual homeowner's response in each case) to construct continuous measures (ranging from 0 to 1) that reflect the extent to which each specific issue is seen as a problem by the residents of that postcode. Finally, we also control for social and economic conditions in each postcode using Australian Bureau of Statistics's (ABS) socioeconomic indicators for areas from the 2001 census. This index takes into account factors such as the proportion of residents with a higher qualification or employed in a skilled occupation (Australian Bureau of Statistics, 2004).

Our empirical analysis is performed at the household level and we restrict our sample to households that are homeowners in either wave 1 (2001) or wave 6 (2006) of HILDA.[6] The definition of home ownership is very broad and includes households that own (or are purchasing) units, apartments, townhouses, etc. as well as separate houses.[7] Missing home values are imputed in approximately 10 percent of cases by the

[5]Postcode areas are the smallest geographic unit identified in the in-confidence HILDA data. On average, about 5,500 people live in each of the 2,500 postcode areas in Australia. Approximately 90 percent of postcode areas have less that 15,000 inhabitants and only 12 postcode areas have more than 40,000 inhabitants. Given this, it seems reasonable to think of postcode areas as representing neighborhoods.

[6]Before restricting the sample to homeowners, we estimated a binary Logit model of home ownership for the standard determinants of home ownership (i.e. income, family structure, location, and socioeconomic characteristics). Our estimates suggest that in 2001 native households are as likely to own a home as immigrant households, while in 2006 immigrants are approximately 3.5 percentage points more likely to be homeowners.

[7]Using this definition, approximately 69 percent of the Australian populations are home-

Melbourne Institute (see Watson, 2009). After excluding all observations with missing values on one of the other variables of interest, our sample includes 2,968 (3,029) native-born households and 1,460 (1,285) immigrant households in 2001 (2006).[8]

3.2 Do Homeowners Know the Value of their Homes?

We begin by considering whether or not there is evidence that homeowners are able to provide a sensible estimate of their homes' values. Previous research based on the American Housing Survey indicates that the average U.S. homeowner overvalues his or her property by 5.1 percent, however, the disparity between sales prices and house values is not related to the particular characteristics of the house, occupants, or neighborhood (Kiel and Zabel, 1996).[9] Thus, Kiel and Zabel (1996) conclude that homeowner valuations will provide reliable estimates of the prices of house and neighborhood characteristics. Similarly, Bucks and Pence (2006) compare the distribution of home values and mortgage terms in the 2001 Survey of Consumer Finances to data reported by lenders and find that most U.S. homeowners report their house values reasonably accurately.

To investigate this issue in more depth for Australia, we benchmark HILDA respondents' home valuations against external sales price data (in the same postcode and month) as reported by the Australian Property Monitors (APM). While the APM data provide external market-based information for the subset of homes that have recently sold, the HILDA data provide estimated values for the total housing stock. A comparison of these data sources reveals that existing Australian homeowners also overvalue their properties relative to external sales data, however these

owners. It is well known that potential sample selection bias makes it difficult to generalize results based on a sub-sample of homeowners to all individuals. Fortunately, we do not face this problem because we are interested in the effect of neighborhood characteristics on home values and we observe the full distribution of housing units in our data.

[8]Mixed households in which one partner is Australian-born and the other is foreign-born are considered to be immigrant households in our empirical analysis. To investigate the sensitivity of our results to this definition, mixed households were treated as Australian-born households in an alternative analysis. The results derived from this alternative analysis do not differ qualitatively from the results presented in the paper and are available upon request.

[9]The exception is that owners with longer tenure overvalue their homes by less.

self-reported property valuations nonetheless trace market prices quite well over time (see Figure 1). In addition, self-reported home valuations mirror geographic variation in house price appreciation. Specifically, Figure 2 shows the change in home values reported by HILDA respondents (y-axis) against the corresponding change in APM sales prices between 2001 and 2006 (x-axis) across major capital cities. We find a nearly linear relationship (slope coefficient 0.86) between the two measures of house prices across cities. Taken together this evidence indicates that homeowner property valuations do provide consistent and reliable information about appreciation in housing values across time and space.

< Figures 1 and 2 about here >

Finally, we consider whether or not there is any evidence that native-born and immigrant homeowners differentially over-report the value of their homes. Table 1 presents a median regression of self-reported home valuations for 2001 and 2006 controlling for recent sales prices in the neighborhood, immigrant status and an interaction term. As expected, the results highlight the strong positive relationship between sales prices in the local area and self-reported housing valuations. At the same time, neither the immigrant dummy nor the interaction term are significant, indicating that there is no significant difference in the relationship between neighborhood sales and the way in which native-born and immigrant households report their homes' values.

< Table 1 about here >

3.3 Home Values for Native and Immigrant Homeowners

Immigrant homeowners report both higher mean and higher median home values than their native-born counterparts (see Table 2). Specifically, the average home value reported by immigrant homeowners was $282,364 in 2001, somewhat higher than the $260,045 average home value reported by native-born homeowners. Similarly, the median immigrant-owned home in 2001 was valued at $240,000 which was $40,000 more than the median value of homes owned by the Australia born.

< Table 2 about here >

That immigrant homeowners report their homes are worth more than Australian-born homeowners do is not particularly surprising. Immigrants to Australia – like their counterparts elsewhere – are much more likely to live in urban areas where house prices are higher. More than one in four immigrant families lives in Sydney, for example, in comparison to approximately 17 percent of native-born families (see Appendix Tables 1 and 2). The proportion of Australian-born households living outside of Australia's major capital cities (approximately 40 percent) is about twice as high as that of immigrant households. This disparity in the geographic distribution of immigrant and native-born households is important in light of the large variation in housing costs and house price appreciation across geographic regions. Specifically, house prices are much higher in urban areas – in particular Sydney – than in the rest of Australia and there is variation in the extent (and timing) of the housing boom across cities. Price increases have been especially rapid in Perth, for example, as a result of the rapid expansion of the mining industry (see Table A1 in the appendix).

On balance, immigrant homeowners saw a 41.7 percent increase in median home values between 2001 and 2006, while the median value of housing owned by the native-born increased by 59.4 percent (see Table 2). This disparity in home-value appreciation for immigrant homeowners in Australia is consistent with racial disparities in the return to housing investments in the United States (Coate and Vanderhoff, 1993; Collins and Margo, 2003; Flippen, 2004).

Does this differential in the appreciation of housing wealth stem from relative changes in the characteristics of the neighborhoods in which immigrant and native-born families live? To what extent do differences in residential patterns across Australian cities contribute to this disparity in home value appreciation? We begin to investigate these issues by analyzing the trends in home attributes, neighborhood characteristics, and neighborhood home sales for native-born and immigrant homeowners. Specifically, Table 3 presents information about the level (and direction) of change as well as the results (p-values) of t-tests for significant differences in 2006 versus 2001 characteristics. The results indicate that Australian homes became

somewhat larger over the period with both immigrant and native-born homeowners reporting an increase of just under 2.5 percent in the average number of bedrooms. Neighborhoods also appear to have become less prone to crime with large falls in the extent to which neighborhood residents characterized their neighborhoods as having problems with burglary, theft, vandalism, and deliberate damage to property. There were also key changes in the demographic composition of neighborhoods. In particular, a higher proportion of residents in both immigrant and native-born neighborhoods in 2006 were Asian immigrants, while new arrivals from the Middle East appear to have disproportionately located in immigrant neighborhoods. Finally, housing became more expensive between 2001 and 2006 with neighborhood sales prices increasing approximately 40 percent on average.

< Table 3 about here >

These patterns are consistent with aggregate trends in the Australian property market more generally and with the large numbers of immigrants from non-English-speaking backgrounds who enter Australia each year. It is striking, however, that housing market trends seem to have been much the same in immigrant and native-born neighborhoods. This suggests that the disparity in housing wealth appreciation among immigrant and native-born homeowners (see Table 2) stems from differential changes in market returns. In Section 4, we investigate this further by estimating a hedonic model of house prices for both 2001 and 2006.

4 The Determinants of Home Value

4.1 The Conceptual Framework and Estimation Equation

Economic theory suggests that the prices from market transactions represent the outer-envelope of individual offer functions because each commodity is purchased by the consumer with the highest offer price (see DiPasquale and Wheaton, 1996). In the case of housing, consumers are assumed to value individual home attributes when developing their offer prices, making it reasonable to assume that market house

prices will have the same functional relationship with housing attributes that individual offer price functions do. Given this, a hedonic price equation is often used to relate specific structural, neighborhood, and locational home attributes to house prices (e.g. Coate and Vanderhoff, 1993; Flippen, 2004). In particular, a multiplicative relationship between the current value of the home y and its various structural, neighborhood, and locational attributes Z_j $(j = 1, ..., J)$ is typically assumed. Specifically,

$$y = Z_1^{\theta_1} Z_2^{\theta_2} \dots Z_J^{\theta_J} e^{\lambda_1 D_1 + \lambda_2 D_2 + \ldots + \lambda_K D_K} \tag{1}$$

where $D_1, ..., D_K$ are indicator (0/1) variables which shift baseline prices and $\theta_1, ..., \theta_J$ and $\lambda_1, ..., \lambda_K$ are the model parameters to be estimated. These estimated parameters represent the implicit prices of home attributes. Taking the natural logarithm of equation (1) results in a linear estimation equation of the following form:

$$\begin{aligned} Y &= \ln y = \theta_1 \ln Z_1 + \theta_2 \ln Z_2 + \ldots + \theta_J \ln Z_J + \lambda_1 D_1 + \lambda_2 D_2 + \ldots + \lambda_K D_K + \varepsilon \\ &= (\ln Z)'\theta + D'\lambda + \varepsilon \qquad (2) \\ &= X'\beta + \varepsilon. \end{aligned}$$

Given this general framework, we are able to estimate the determinants of median house prices using a quantile regression model to analyze the determinants of the logarithm of the current home value at the median of the distribution. Specifically, we estimate the following cross-sectional quantile regression model at the median for native and immigrant households $(h = 1, ..., H)$,

$$Y_h = \beta_0^{0.5} + \beta_1^{0.5} I_h + \beta_2^{0.5} \mathbf{H}_h + \beta_3^{0.5} \mathbf{S}_h + \beta_4^{0.5} \mathbf{N}_h + \varepsilon_h^{0.5}, \tag{3}$$

where I_h is an indicator variable for immigrant households, H_h contains measures of housing structure, S_h controls for neighborhood sales prices, N_h includes measures of neighborhood characteristics, ε_h is an error term and $\beta^{0.5}$ is a vector of model parameters to be estimated. More specifically, the indicator variable for immigrant households allows us to compare home values for immigrant households to otherwise similar homes owned by native-born households. Our vector of structural

attributes includes the logarithm of the number of bedrooms and an indicator variable identifying stand-alone (separate) housing units. Moreover, the inclusion of average, postcode-specific sales prices accounts for the effects of aggregate demand and supply effects on homeowners' valuations of their properties. Finally, the vector of neighborhood characteristics can be divided into three different sets of variables: (i) neighborhood disamenities (i.e., noise from airplanes, etc.), (ii) socioeconomic status of residents (i.e., indicator variables for quantiles of an index of education and occupation) and (iii) demographic composition (i.e, the share of the postcode area population that is foreign-born by region of origin enumerated in the Australian census).

4.2 Hedonic Price Results

Equation (3) is estimated separately for 2001 and 2006 and the results (coefficients and t-statistics) at the median are reported in Table 4. We find that once we account for the structural and neighborhood characteristics of Australian homes there is no significant gap in the value of homes owned by immigrant and native-born households. This is true in both 2001 and 2006, indicating that the unconditional housing wealth advantage enjoyed by immigrants (see Table 2) stems from characteristics of the homes and neighborhoods in which they live.[10]

< Table 4 about here >

Not surprisingly, homeowners report that their homes are worth more the more bedrooms they have and there is a premium for separate, stand-alone houses relative to other types of housing units. Between 2001 and 2006, the return to home size (as measured by the number of bedrooms) grew somewhat, while the premium associated with owning a detached house fell (see Table 4).

[10]In related research Bauer et al. (in press) find that relative to Germany and the United States there is a relatively small wealth gap between Australian-born and immigrant households. This small nativity gap in overall wealth, however, becomes larger once the differentials in household characteristics are taken into account.

Median home vales are also closely related to recent neighborhood sales prices. Unlike the case in the United States and other countries, much of Australia's housing stock is bought and sold at onsite auctions – often with the neighbors in attendance. This institutional feature of the Australian property market makes it relatively easy for homeowners to observe the final (rather than simply advertised) prices their neighbors are receiving for their homes and to gauge local market trends. Even after accounting for neighborhood property sales prices, however, we find that home values also depend on economic and social conditions in the neighborhoods in which they are located. Reported home values in 2006, for example, are significantly lower in neighborhoods in which people being aggressive and hostile is seen as a problem than in similarly priced neighborhoods without this problem. Similarly, home values in 2001 were significantly lower – everything else equal – in those neighborhoods in which people reported noise problems from airplanes, trains or industry, but surprisingly were higher in neighborhoods in which rubbish and litter were problems.

There is also a strong positive relationship between the socioeconomic status of residents and home values in a neighborhood. Specifically, homeowners in neighborhoods with a higher proportion of high-income, highly-skilled, tertiary-educated residents report higher home values. Thus, consistent with U.S. evidence (Harris, 1999; Bayer et al., 2007), there appear to be positive externalities – for which Australian home buyers may be prepared to pay – associated with having neighbors with high socioeconomic status. Affluent families may find it easier to afford to maintain their properties for example, providing an incentive for their neighbors to do the same. Alternatively, parents may prefer to have their children educated in local schools with other children from advantaged backgrounds. The premium attached to having neighbors with high socioeconomic status was somewhat smaller in 2006 than in 2001 however.

Finally, home values can also be linked to the ethnic composition of the neighborhood. Saiz and Wachter (2006) argue that a priori the relationship between immigrant concentration and housing prices is unclear. While immigrant inflows can be expected to put upward pressure on housing prices this effect is weakened to the

extent that the native born move out in response (Card et al., 2008). Our results indicate that, everything else constant, Australian home values are higher the greater is the share of the neighborhood population that has immigrated from the Middle East. Higher proportions of Asian immigrants, however, are associated with lower home values, while the proportion of residents from English-speaking countries (i.e. U.S., Canada, New Zealand, and South Africa) and Europe has no significant effect on home values.[11]

5 Appreciation in Home Values

5.1 Decomposition Methodology

To understand how variation in the level of – and returns to – housing attributes and neighborhood characteristics affects relative housing wealth, we require an estimation strategy that allows us to quantify those factors underlying the disparity in home-value appreciation for immigrant and native-born households. One obvious strategy would be the method proposed by Blinder (1973) and Oaxaca (1973) which is often used to decompose the disparity in the mean outcomes of two groups (or at two time periods) into its underlying components. This approach is less than ideal for our purposes, however, because the skewness of home values leads us to be more interested in outcomes at the bottom, median, and top of the distribution than at the mean. Moreover, the Blinder-Oaxaca method requires that we specify a parametric relationship between home values and their determinants. Instead, we investigate the source of the nativity gap in home-value appreciation by building upon the semi-parametric decomposition method originally proposed by DiNardo et al. (1996). In particular, we adapt their methodology to account for changes across time in the

[11]The fact that immigrants are choosing neighborhoods in part on the basis of house prices makes it difficult to isolate the effect of population demographics on median home values. Saiz and Wachter (2006) deal with this problem by using lagged values of immigrant proportions. This option is not available to us because the 1996 Australian Census does not provide information about the demographic composition of postcode areas. Fortunately, however, we are able to control directly for local market prices eliminating this potential source of omitted variable bias.

outcomes of two groups. Thus, we are able to assess the relative impact of various explanatory factors on the appreciation in home values experienced by immigrant and native-born homeowners at several points of the distribution without making strong parametric assumptions.

To illustrate our approach, we begin by focusing on four determinants of home values: (i) home attributes (i.e. number of bedrooms; indicator of free standing home) (h), (ii) neighborhood sales prices (s), (iii) neighborhood (dis)amenities (i.e. the presence of noise, crime, litter, hostile or aggressive residents and the socioeconomic status of residents) (n), and (iv) population demographics (i.e. the share of immigrants in the population) (p). Given this partitioning, each observation in our data is then drawn from some joint density function, f, over (y, h, s, n, p, I, T), where y is the home value and I and T are our indicators of immigrant status and time period, respectively. We can then write the marginal home-value distribution of group I in period T as follows:

$$\begin{aligned} f_t^j(y) &\equiv f(y|I=j, T=t) \qquad (4) \\ &= \int_h \int_s \int_n \int_p f(y|h,s,n,p,I=j,T=t) f_{h|s,n,p}(h|s,n,p,I=j,T=t) \\ &\times f_{s|n,p}(s|n,p,I=j,T=t) f_{n|p}(n|p,I=j,T=t) f_p(p|I=j,T=t) \delta p \delta n \delta s \delta h, \end{aligned}$$

where $j = (0, 1)$ and $t = (2001, 2006)$. Equation (4) consists of five conditional probability densities. The first (f) is the distribution of home values given all determinants, immigrant status and time period. The second ($f_{h|s,n,p}$) is the conditional density of home attributes given neighborhood sales prices, neighborhood (dis)amenities, population demographics, immigrant status and time period. Similarly, $f_{s|n,p}$ and $f_{n|p}$ are the conditional densities of neighborhood sales prices, and neighborhood (dis)amenities, respectively. Finally, f_p is the density of population demographics conditional on immigrant status and time period.[12]

A series of interesting counterfactual distributions may be derived from equation (4). For example, we can consider the distribution of home values (f_{2006}^A) that native-born homeowners would have faced in 2006 if the conditional distribution of

[12]When the conditional expectation is linear in its relevant arguments, these conditional densities are closely related to regression functions (Butcher and DiNardo, 2002, see).

their home attributes (i.e, number of bedrooms and type of structure), $f_{h|s,n,p}$, had remained the same as in 2001. Specifically,

$$\begin{aligned} f^A_{2006}(y) \equiv & \int_h \int_s \int_n \int_p f(y|h,s,n,p,I=0,T=2006) \\ & \times f_{h|s,n,p}(h|s,n,p,I=0,T=2001) f_{s|n,p}(s|n,p,I=0,T=2006) \\ & \times f_{n|p}(n|p,I=0,T=2006) f_p(p|I=0,T=2006) \delta p \delta n \delta s \delta h. \end{aligned}$$

This counterfactual distribution is useful in isolating the effect of changes in the housing stock itself on appreciation between 2001 and 2006 in the value of homes owned by the native-born. In effect, it provides an answer to the following question: What would 2006 home values for native-born homeowners have been had the structural characteristics of their homes remained as they were in 2001? We can also consider the counterfactual distribution of home values (f^B_{2006}) that would have resulted if, in addition, the values of homes in the neighborhood (s) were held constant at their 2001 levels:

$$\begin{aligned} f^B_{2006}(y) \equiv & \int_h \int_s \int_n \int_p f(y|h,s,n,p,I=0,T=2006) \\ & \times f_{h|s,n,p}(h|s,n,p,I=0,T=2001) f_{s|n,p}(s|n,p,I=0,T=2001) \\ & \times f_{n|p}(n|p,I=0,T=2006) f_p(p|I=0,T=2006) \delta p \delta n \delta s \delta h. \end{aligned}$$

Similarly, f^C_{2006} and f^D_{2006} are the counterfactual home value distributions that result when, in addition, neighborhood (dis)amenities and population demographics had remained the same as in 2001, respectively. Together, these counterfactual distributions allow us to decompose the appreciation in home values for native-born homeowners at any quantile $q(\cdot)$ in the following way:

$$\begin{aligned} q(f^0_{2006}(y)) - q(f^0_{2001}(y)) = & \left[q(f^0_{2006}(y)) - q(f^A_{2006}(y))\right] + \left[q(f^A_{2006}(y)) - q(f^B_{2006}(y))\right] \\ + & \left[q(f^B_{2006}(y)) - q(f^C_{2006}(y))\right] + \left[q(f^C_{2006}(y)) - q(f^D_{2006}(y))\right] \\ + & \left[q(f^D_{2006}(y)) - q(f^0_{2001}(y))\right]. \end{aligned} \quad (5)$$

The first right-hand-side term of equation (5) captures the part of changes in home values at quantile $q(\cdot)$ attributable to changes in home attributes, while the second term reflects the effect of changes in neighborhood sales prices. The third and fourth

terms capture the components of appreciation that are attributable to changes in neighborhood (dis)amenities and population demographics, respectively. The final term arises from changes between 2006 and 2001 in the conditional (on h, s, n, p) home-value distribution of native-born homeowners. We will refer to this as the effect of changing hedonic prices.[13] Repeating the exercise for immigrants provides a corresponding decomposition of the appreciation in the value of homes owned by immigrants.

In a seminal paper, DiNardo et al. (1996) develop a semi-parametric estimation strategy which allows the required counterfactual home-value distributions f^A_{2006}, f^B_{2006}, f^C_{2006} and f^D_{2006} to be estimated by "reweighting" the value distribution observed in one period or the other. Using Bayes theorem, DiNardo et al. (1996) demonstrate that the reweighting factors required to compute the necessary counterfactual distributions involve only the probability of (in our case) a home value being observed in 2006 vs. 2001 conditional on various sets of home-value determinants. These probabilities are easily estimated using simple Logit models. One advantage of the DiNardo et al. (1996) approach is that by estimating the entire counterfactual home-value distribution it is possible to decompose any summary statistic of the value distribution. Unlike alternative methodologies, this allows us to easily decompose the unconditional home-value distribution at any point of the distribution including the median as well as the 25th and 75th percentiles.

In what follows we use the above procedure to decompose the appreciation in home values between 2001 and 2006 for native-born and foreign-born households.Our results are obtained by calculating each of the relevant counterfactuals and then taking the simple average of these statistics over all of the possible decomposition sequences.[14] Bootstrapping methods using a normal approximation with 1,000 repli-

[13]This decomposition effectively weights changes in the hedonic prices for all factors (h, s, n and p) by 2001 values. Thus, the last term in the above decomposition provides a measure of the appreciation in home values that would have occurred between 2001 and 2006 if all the determinants of home values had remained at their 2001 levels.

[14]The proportion of the gap attributable to each of the explanatory factors will depend on the sequence (or order) in which we consider them (DiNardo et al., 1996). As we have no particular preference for one sequence over another, we will calculate each in turn and present results based on the simple average across all possible sequences.

cations are used to calculate standard errors.

5.2 Decomposition Results

The results of our decomposition analysis are presented in Table 5. In each case, the first row (A) presents the decomposition of home-value appreciation between 2001 and 2006 for Australian-born homeowners, while the second row (B) focuses on appreciation in home values for immigrant households over the same period. Finally, the third row shows the source of the disparity in home-value appreciation experienced by native-born and immigrant homeowners.[15]

Between 2001 and 2006, native-born homeowners experienced appreciation in their homes' values of 0.467 log points, while immigrants' homes appreciated by 0.349 log points – a disparity of 0.118 log points.[16] It is this disparity that we are seeking to understand. At the 25th percentile of the value distribution, appreciation was both higher (0.531 log points) and identical across groups. In contrast, appreciation at the 75th percentile was smaller and the nativity gap in appreciation (0.079 log points) while positive was not quite significant at conventional levels.

We find that changes in the conditional distribution of home attributes between 2001 and 2006 resulted in a fall in median home values for native-born homeowners of 4.9 percent (0.048 log points), while median home values for immigrant homeowners fell approximately 1.1 percent (0.011 log points). It is important to place this result in context. While overall homes were bigger and more likely to be free-standing in 2006 than in 2001 (see Table 3), conditional on the other determinants of home values, i.e., neighborhood sales prices, neighborhood characteristics, and population composition this is not the case. In other words, if we compare equally-priced neighborhoods (with the same amenities and population composition) in both

[15]Since we have two independent sets of observations, the variance of the difference presented in the third row is given by the sum of the two independent variances of rows (A) and (B) (see, e.g. Greene, 2003).

[16]The percent increase associated with a log point change equal to x can be calculated as: $(\exp(x) - 1) \times 100$. Consequently, an increase of 0.467 log points corresponds to a 59.5 percent increase in the median home value for native-born homeowners, while an increase of 0.349 corresponds to an increase in median home value of 41.8 percent for immigrant homeowners.

2001 and 2006, we find that homes in those neighborhoods were both smaller and less likely to be free-standing in 2006 than in otherwise identical neighborhoods in 2001. Thus, holding neighborhoods constant, changes in home attributes over time lead to a decrease in home values. Interestingly, the effect of the changing conditional distribution of home attributes favors – rather than disadvantages – immigrant homeowners at the bottom and the median of the distribution, but disadvantages immigrant homeowners at the top of the distribution. Given the precision of our estimates, however, none of these effects are statistically significant.

< Table 5 about here >

Not surprisingly, appreciation in home values is more closely linked to changes in neighborhood sales prices themselves. These sales prices are conditional on neighborhood characteristics as well as population composition and reflect changes in the demand for and supply of housing at the neighborhood level. In all cases, increasing neighborhood prices resulted in substantial appreciation in reported home values.[17] The disparity in the effect of price changes in immigrant and native-born neighborhoods is striking. Specifically, changes over time in neighborhood sales prices resulted in nearly identical appreciation rates in median home values across groups. Native-born homes increased by 0.152 log points, while homes owned by immigrants increased by 0.166 log points at the median. Similarly, at the 25th percentile increasing neighborhood prices resulted in appreciation rates that were nearly identical across groups. In contrast, immigrants at the 75th percentile of the home-value distribution saw their home appreciate 19.8 percent over the period as the result of changing neighborhood prices, while homes owned by native-born families only increased by 6.5 percent. Thus, the nativity gap in the appreciation of home values cannot be explained by differential changes in the value of neighborhoods as reflected in sales prices. Increasing neighborhood sales prices resulted in very similar rates of appreciation among homes at the bottom and median of the distribution, while

[17]These components are all statistically significant with the exception of that for native-born homeowners at the top of the distribution.

at the top of the distribution changing neighborhood prices favored – rather than disadvantaged – immigrant homeowners.

To what extent then, do changes in the economic and social context of particular neighborhoods have an independent effect (net of neighborhood price levels) on the appreciation in the value of residents' homes? Can differential changes in crime levels or the socioeconomic status of neighborhood residents help us to understand the nativity gap in the appreciation of housing wealth? Our decomposition results indicate that – conditional on the demographic composition of neighborhoods – changes in neighborhood (dis)amenities and the socioeconomic status of residents lead to a slight fall in home values between 2001 and 2006. In other words, neighborhoods in 2006 were more likely to face social problems (e.g., crime, traffic noise, etc.) and to have less economically and socially advantaged residents than similar neighborhoods with exactly the same population composition in 2001. As home values are typically lower in these neighborhoods (see Table 4), this change between 2001 and 2006 in the conditional distribution of neighborhood characteristics, everything else equal, results in a fall in home values. Native-born homeowners, for example, experienced significant depreciation of 5.0 percent (0.049 log points) in median home values as a result of changes in conditional neighborhood characteristics. The median value of homes owned by immigrant families, on the other hand, did not fall significantly as a result of changes in neighborhood characteristics. Only at the top of the value distribution do relative changes in the conditional distribution of neighborhood characteristics provide some explanation for the overall nativity gap in the appreciation of home values. This effect, however, is very small in magnitude (accounting for only 3.3 percent of the nativity gap) and is not statistically significant.

Finally, the changing ethnic composition of neighborhood populations between 2001 and 2006 had a positive effect on the appreciation in home values. These effects, however, are economically small, statistically insignificant, and fairly constant across groups as well as across the distribution. Thus, we find no evidence that the nativity gap in the appreciation of housing wealth can be explained by compositional changes in the ethnic mix of predominately immigrant as opposed to predominately native-

born neighborhoods.

Taken together, these results demonstrate that the nativity gap in the appreciation of housing wealth is not related to differential changes in the nature of the houses or the neighborhoods in which immigrants and native-born homeowners live. Rather, the gap stems from the fact that over time there were differential changes across groups in the hedonic prices (i.e., returns) associated with the underlying determinants of home values. Specifically, changes between 2001 and 2006 in hedonic prices resulted in median home values appreciating by 0.398 log points (48.9 percent) for native-born homeowners and only 0.186 log points (20.4 percent) for immigrant homeowners. Thus, price changes for 2001 median home attributes and neighborhood characteristics were substantially higher for native-born homeowners. A similar nativity gap occurred at the 75th percentile of the distribution, while the effect of changes in hedonic prices were very similar among native-born and immigrant homeowners at the bottom of the distribution. Thus, immigrants have not benefited to the same extent as the native born from the housing boom.

6 Conclusions

Building housing wealth is an important mechanism through which new arrivals can achieve both social and economic integration. Consequently, it is important to understand the way that residential segregation, and ensuing neighborhood diversity, affect the relative return to housing wealth across groups. This paper has analyzed this issue by examining the link between home attributes and neighborhood characteristics in generating a nativity gap in home-value appreciation. In particular, between 2001 and 2006 immigrant homeowners in Australia saw their homes appreciate 41.7 percent at the median, while the median value of homes owned by the native born increased by 59.4 percent. This nativity gap in appreciation stems not from differential changes in the nature of the houses or neighborhoods in which immigrants and the native born live. Rather, the gap results from the differential changes across groups in the hedonic prices (i.e., returns) associated with the under-

lying determinants of home value. Thus, it seems clear that immigrants to Australia have not benefited from the recent boom in the Australian housing market to the same extent as Australian-born homeowners.

While our decomposition approach has been very powerful in allowing us to draw distinctions between conditional and unconditional appreciation in home values, we are nonetheless left with a number of important questions. Most importantly, why did changes in the hedonic prices of home attributes favor native-born over immigrant homeowners? Why was the return on the 2001 immigrant-owned housing stock so much smaller than that associated with the 2001 stock of housing owned by the native-born? One possibility is that there were changes over this period in the way in which immigrants report their home values. They may have been become increasingly pessimistic, for example, about the nature of the housing boom – and its implications for the value of their homes – in ways that native-born homeowners did not. While we cannot rule out the possibility that this type of differential time-varying reporting affects our results, this does not seem to us to be a likely explanation for the patterns we are observing. In particular, the results presented in Section 3 do not point to differences in the way that immigrant and native-born families report home values across periods. Moreover, the institutional features of the Australian property market, i.e., that large fraction of homes sold at public auction, ensure that it is relatively easy for homeowners – both native- and foreign-born – to follow market trends.

Alternatively, it is possible that, despite our vast range of controls, we have nevertheless omitted an important determinant of home values from our model. To the extent that this omitted factor is related to nativity status, this might result in the appreciation for one group being over- or under-stated relative to the other group. At the same time, we have no *a priori* reason to believe that this is the case given the large number of detailed housing attributes included in the analysis. Moreover, while this type of omitted variable bias might produce a nativity gap in home values, it seems unlikely that it would produce a nativity gap in the *appreciation* of home values.

It seems more likely that the differential in the appreciation of housing wealth stems from disparity in housing attributes within – rather than across – neighborhoods. Although our postcode areas are small, the homes and local areas within them may nonetheless be quite heterogenous. In this case, the effects of immigrant segregation on housing markets could be quite localized, affecting only a few blocks or a handful of streets. Future research which assesses the housing choices of new arrivals within neighborhoods would be particularly useful in shedding additional light on the way in which housing markets affect the social and economic integration of immigrant families.

Figures and Tables

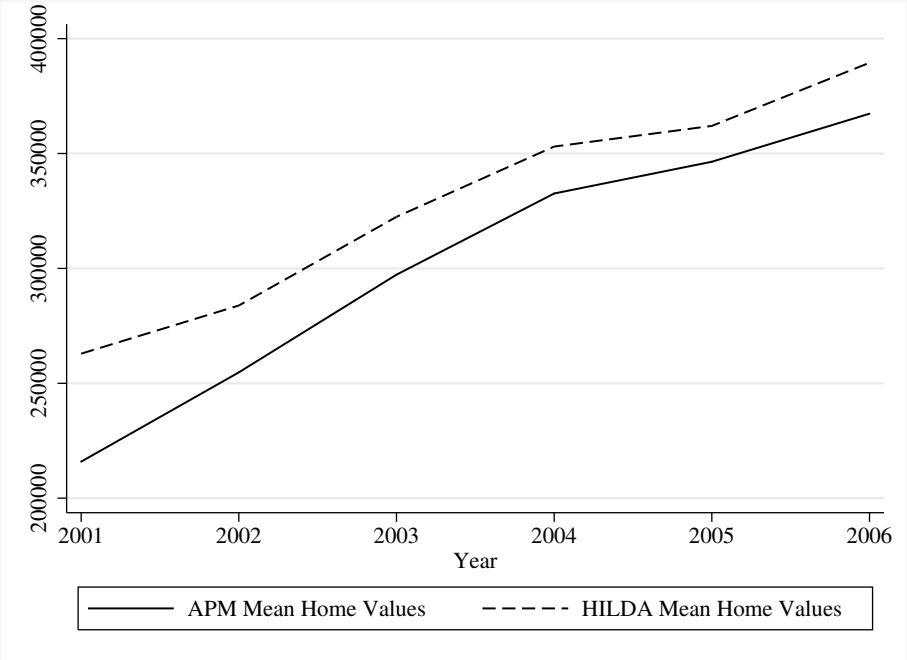

FIGURE 1: **Comparison of Mean Home Values Measured in APM and HILDA Data – 2001-2006.**

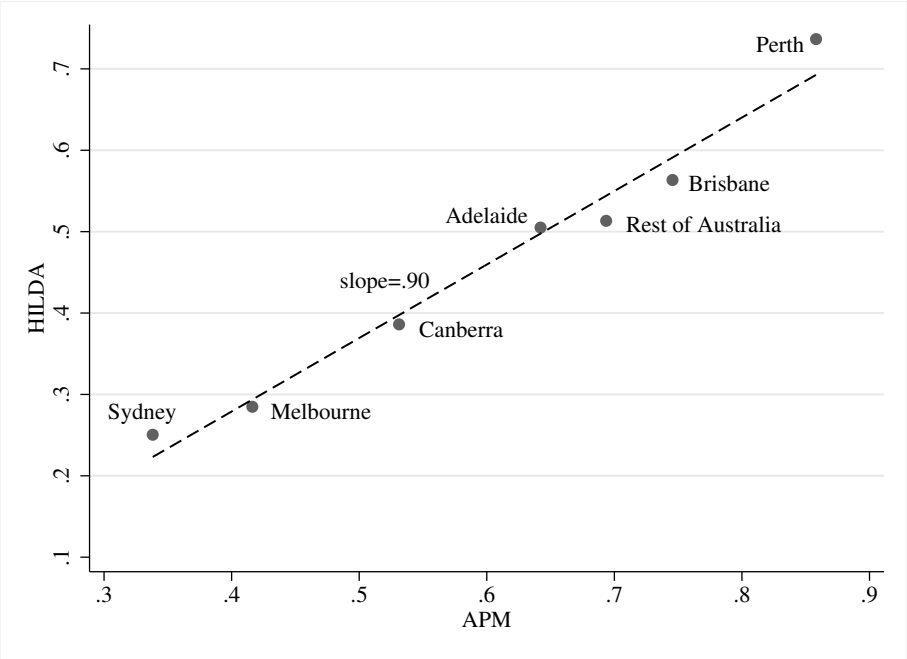

FIGURE 2: **Comparison of Home Value Appreciation Measured in APM and HILDA Data by Major Capital City – 2001-2006.**

TABLE 1: The Relationship between Immigrant Status, Neighborhood Home Sales and Self-reported Home Valuations (Median Regression)

	Coefficient	t-value	Coefficient	t-value
	2001		**2006**	
Immigrant household	-0.367	-0.99	-0.155	-0.30
Neighborhood home sales	0.920	53.67	0.849	40.49
Immigrant household × neighborhood home sales	0.030	1.01	0.013	0.33
Constant	1.010	4.84	1.837	6.89
Pseudo-R^2	0.369		0.285	
N	4,428		4,313	

TABLE 2: Descriptive Statistics: Mean and Median of Reported Value of Home

	2001	**2006**	**Appreciation**
Native			
Mean	260,045	387,545	49.0%
Standard deviation	232,627	316,602	
Median	200,000	318,901	59.4%
Median absolute deviation	80,000	99,073	
N	2,968	3,028	
Migrant			
Mean	282,634	403,942	42.9%
Standard deviation	209,447	274,453	
Median	240,000	340,161	41.7%
Median absolute deviation	90,000	93,545	
N	1,460	1,285	

TABLE 3: Changes in Home Attributes and Neighborhood Characteristics between 2001 and 2006

	Natives		**Migrants**	
	Change	p-value	Change	p-value
Home Attributes:				
Number of bedrooms	2.4%	0.001	2.3%	0.041
Separate house	1.7%	0.093	0.6%	0.748
Neighborhood Characteristics:				
NEIGHBORHOOD (DIS)AMENITIES:				
Noise from airplanes, trains or industry	-2.5%	0.808	-10.9%	0.530
Burglary and theft	-109.6%	0.000	-100.7%	0.000
People being hostile and aggressive	-11.2%	0.606	-22.2%	0.535
Homes and gardens in bad condition	-10.6%	0.479	-51.0%	0.034
Rubbish and litter lying around	-1.1%	0.947	-64.1%	0.038
Traffic noise	-0.7%	0.957	-28.8%	0.108
Teenagers hanging around on the streets	-17.6%	0.193	-26.0%	0.261
Vandalism and deliberate damage to property	-55.7%	0.001	-47.9%	0.056
INDEX OF EDUCATION AND OCCUPATION:				
Lowest quintile	3.2%	0.589	-4.3%	0.654
2nd quintile	8.8%	0.115	0.4%	0.970
3rd quintile	2.0%	0.713	18.8%	0.025
4th quintile	0.4%	0.944	-5.6%	0.501
Highest quintile	-12.8%	0.021	-8.4%	0.270
POPULATION DEMOGRAPHICS:				
Share of Asian migrants	22.0%	0.000	22.7%	0.000
Share of migrants from Europe, North-America, New Zealand and South Africa	-4.0%	0.001	-5.4%	0.001
Share of migrants from the Middle East	5.5%	0.396	25.8%	0.004
Neighborhood Home Sales	40.0%	0.000	38.0%	0.000

NOTE.–Weighted numbers based on weights provided by HILDA.

Table 4: The Determinants of Home Values (Median Regression)

	2001		**2006**	
	Coefficient	t-value	Coefficient	t-value
Intercept	2.186	11.26	3.279	14.78
Immigrant Status:				
Immigrant household	0.006	0.51	-0.002	-0.21
Home Attributes:				
Logarithm of number of bedrooms	0.479	22.12	0.514	25.34
Separate house	0.063	3.23	0.015	0.83
Neighborhood Characteristics:				
Neighborhood (dis)amenities:				
Noise from airplanes, trains or industry	-0.051	-2.25	-0.030	-1.40
Burglary and theft	-0.035	-1.38	0.012	0.39
People being hostile and aggressive	-0.079	-1.72	-0.106	-2.33
Homes and gardens in bad condition	-0.004	-0.12	-0.040	-1.27
Rubbish and litter lying around	0.105	2.90	0.043	1.12
Traffic noise	-0.012	-0.47	0.006	0.26
Teenagers hanging around on the streets	-0.027	-0.91	0.014	0.47
Vandalism and deliberate damage to property	0.003	0.10	-0.008	-0.25
Index of education and occupation:				
2nd quintile	0.084	4.33	0.066	3.73
3rd quintile	0.122	6.26	0.117	6.52
4th quintile	0.236	11.45	0.175	9.18
Highest quintile	0.320	13.20	0.310	13.94
Population demographics:				
Share of Asian migrants	-0.263	-2.23	-0.273	-3.09
Share of migrants from Europe, North-America, New Zealand and South Africa	-0.107	-1.09	0.101	1.05
Share of migrants from the Middle East	1.928	5.19	1.536	5.06
Neighborhood Home Sales	0.763	45.15	0.677	36.71
Pseudo-R^2	0.437		0.374	
N	4,428		4,313	

TABLE 5: DFL Decomposition: 2006-2001

	Raw Gap	Home Attributes	Neighborhood Home Sales	Neighborhood Characteristics	Population Demographics	Unexplained
				25^{th} percentile		
(A) Natives, 2006−2001	0.531	-0.004	0.193	-0.011	0.020	0.334
	[0.018]	[0.011]	[0.050]	[0.015]	[0.017]	[0.061]
		(-0.8)	(36.2)	(-2.1)	(3.7)	(63.0)
(B) Migrants, 2006−2001	0.531	-0.002	0.184	-0.002	0.002	0.349
	[0.028]	[0.016]	[0.068]	[0.019]	[0.021]	[0.083]
		(-0.3)	(34.6)	(-0.3)	(0.3)	(65.7)
(A) − (B)	0.000	-0.002	0.009	-0.010	0.018	-0.014
	[0.033]	[0.019]	[0.084]	[0.024]	[0.028]	[0.103]
		(.)	(.)	(.)	(.)	(.)
				50^{th} percentile		
(A) Natives, 2006−2001	0.467	-0.048	0.152	-0.049	0.014	0.398
	[0.021]	[0.015]	[0.061]	[0.019]	[0.024]	[0.058]
		(-10.2)	(32.5)	(-10.6)	(3.1)	(85.2)
(B) Migrants, 2006−2001	0.349	-0.011	0.166	-0.006	0.014	0.186
	[0.027]	[0.016]	[0.057]	[0.019]	[0.014]	[0.070]
		(-3.2)	(47.7)	(-1.8)	(3.9)	(53.4)
(A) − (B)	0.118	-0.036	-0.015	-0.043	0.001	0.211
	[0.035]	[0.022]	[0.084]	[0.027]	[0.028]	[0.091]
		(-30.9)	(-12.4)	(-36.7)	(0.7)	(179.4)
				75^{th} percentile		
(A) Natives, 2006−2001	0.369	-0.018	0.063	-0.032	0.007	0.349
	[0.033]	[0.013]	[0.064]	[0.019]	[0.034]	[0.035]
		(-5.0)	(17.1)	(-8.7)	(2.0)	(94.6)
(B) Migrants, 2006−2001	0.290	-0.034	0.181	-0.035	0.003	0.174
	[0.039]	[0.017]	[0.048]	[0.022]	[0.014]	[0.054]
		(-11.6)	(62.3)	(-12.0)	(1.2)	(60.2)
(A) − (B)	0.079	0.015	-0.117	0.003	0.004	0.174
	[0.051]	[0.021]	[0.079]	[0.029]	[0.037]	[0.065]
		(19.5)	(-149.4)	(3.3)	(4.9)	(221.7)

NOTE.–Percentage of total variation explained in parentheses. Bootstrapped standard errors (1,000 replications) of explained variation are reported in brackets. Number of observations: 2001: 2,968 native and 1,460 migrant households; 2006: 3,028 native and 1,285 migrant households.

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Appendix

TABLE A1: Descriptive Statistics: Native Households

	2001		2006	
	Mean	Std.Dev.	Mean	Std.Dev.
Housing Attributes:				
Number of bedrooms	3.247	0.867	3.326	0.901
Separate house	0.873	0.333	0.888	0.315
Neighborhood Characteristics:				
Noise from airplanes, trains or industry	0.071	0.256	0.069	0.253
Burglary and theft	0.076	0.265	0.036	0.187
People being hostile and aggressive	0.021	0.144	0.019	0.137
Homes and gardens in bad condition	0.039	0.194	0.035	0.185
Rubbish and litter lying around	0.029	0.167	0.028	0.166
Traffic noise	0.055	0.228	0.054	0.227
Teenagers hanging around on the streets	0.053	0.224	0.045	0.207
Vandalism and deliberate damage to property	0.054	0.227	0.035	0.184
REGION:				
Sydney	0.178	0.382	0.167	0.373
Melbourne	0.196	0.397	0.181	0.385
Brisbane	0.090	0.286	0.096	0.295
Adelaide	0.064	0.245	0.061	0.239
Perth	0.063	0.243	0.068	0.251
Canberra	0.012	0.108	0.011	0.106
Rest of Australia	0.398	0.490	0.416	0.493
INDEX OF EDUCATION AND OCCUPATION:				
Lowest quintile	0.162	0.368	0.167	0.373
2nd quintile	0.173	0.379	0.190	0.392
3rd quintile	0.199	0.399	0.203	0.402
4th quintile	0.227	0.419	0.228	0.420
Highest quintile	0.239	0.426	0.212	0.408
SHARE OF MIGRANTS:				
Share of Asian migrants	0.043	0.052	0.056	0.066
Share of migrants from Europe, North-America, New Zealand and South Africa	0.149	0.063	0.143	0.062
Share of migrants from the Middle East	0.007	0.015	0.007	0.016
Neighborhood Home Sales	223,405	137,060	372,225	181,651
N	2,968		3,028	

NOTE.–Weighted numbers based on weights provided by HILDA.

TABLE A2: Descriptive Statistics: Migrant Households

	2001		2006	
	Mean	Std.Dev.	Mean	Std.Dev.
Housing Attributes:				
Number of bedrooms	3.322	0.895	3.401	0.875
Separate house	0.865	0.342	0.870	0.337
Neighborhood Characteristics:				
Noise from airplanes, trains or industry	0.061	0.239	0.055	0.228
Burglary and theft	0.078	0.269	0.039	0.194
People being hostile and aggressive	0.018	0.131	0.014	0.119
Homes and gardens in bad condition	0.045	0.208	0.030	0.171
Rubbish and litter lying around	0.038	0.190	0.023	0.150
Traffic noise	0.069	0.253	0.053	0.225
Teenagers hanging around on the streets	0.042	0.201	0.033	0.180
Vandalism and deliberate damage to property	0.046	0.209	0.031	0.173
REGION:				
Sydney	0.270	0.444	0.266	0.442
Melbourne	0.247	0.432	0.244	0.430
Brisbane	0.067	0.249	0.068	0.252
Adelaide	0.087	0.282	0.067	0.250
Perth	0.107	0.309	0.109	0.312
Canberra	0.019	0.137	0.016	0.125
Rest of Australia	0.203	0.402	0.229	0.421
INDEX OF EDUCATION AND OCCUPATION:				
Lowest quintile	0.177	0.382	0.170	0.375
2nd quintile	0.153	0.360	0.154	0.361
3rd quintile	0.171	0.377	0.210	0.408
4th quintile	0.241	0.428	0.228	0.420
Highest quintile	0.258	0.438	0.238	0.426
SHARE OF MIGRANTS:				
Share of Asian migrants	0.074	0.078	0.096	0.094
Share of migrants from Europe, North-America, New Zealand and South Africa	0.177	0.062	0.168	0.063
Share of migrants from the Middle East	0.012	0.024	0.016	0.031
Neighborhood Home Sales	250,819	149,091	404,756	176,478
N	1,460		1,285	

NOTE.–See Note to Table A1.