Which Neighborhood Attributes Matter?

The Influence of Ethnicity, School Quality and Property Crime

on Property Values in Pima County

by

Robert Miles Ebel

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This Thesis has been approved on the dates shown below

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Date

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Abstract

A negative price premium exists for neighborhoods with higher racial/ethnic minority representation in Pima County. Interesting questions arise as to the motivations for this price differential, with two major hypotheses being presented. The first is that *Racial/Ethnic Preferences* drive the negative premium. Alternatively, the *Racial Proxy Aversion* hypothesis posits that the strong negative correlation between economic achievement and racial/ethnic minorities leads to negative premiums. That is, race/ethnicity proxies for low economic status, and aversion to the characteristics embodied by poor neighborhoods drives the negative price premium. This study finds that after controlling for multiple non-racial indicators of neighborhood quality, racial/ethnic composition maintains a negative relationship with home sales prices. Additional interesting results are found regarding the neighborhood unit of analysis, role of school quality and role of crime in housing prices.

Chapter 1 - Introduction

Testing hypotheses on the causes and consequences of racial/ethnic segregation in the United States is an ongoing professional commitment of sociologists, economists, political scientists and philosophical theorists. To determine what can be done to alleviate segregation, research from the economic perspective has addressed the task of accurately detailing the nature and extent of current inter-racial/ethnic interaction. In the context of American housing markets, current empirical analysis consistently reveals a negative premium for minority neighborhoods. The question of what is driving this preference for segregation remains relevant, even in 2009.

Two potential explanations for the neighborhood price differential exist, and require an accurate model for definitive conclusions to be made. The first is that homebuyers may be considering race/ethnicity alone as a characteristic of significant importance in the purchasing decision, behavior classified as *Racial/Ethnic Preference*. Alternatively, consumer preference against minority neighborhoods may be strictly a function of the generally lower socioeconomic profiles of minority neighborhoods, a contention known as "Racial Proxy Aversion" (Harris 1999).

It is necessary to present *Racial Proxy Aversion* as an alternative hypothesis to *Racial/Ethnic Preference* in explaining price differentials because of the strong negative relationship observed between minority race/ethnicity and socioeconomic status (U.S. Census Summary Tape Files). Implied is a logical chain of events, namely, low education and income levels in segregated minority neighborhoods lead to poorly funded schools and higher crime rates which generally depress housing prices. Consequently minority-dominated neighborhoods tend to be characterized by traits which are identified, independently of race, as undesirable. Previous work on the role of neighborhood effects has identified school quality and incidence of

crime as strongly significant in the choice of homes (Black 1999, Clapp 2007, Gibbons 2008). Given these neighborhood preferences, the market will show a negative price premium for homes in neighborhoods with less desirable social and ecological characteristics.

Research can distinguish between the two effects if the explanatory models are properly specified and clearly allow for the independent movement of both potential explanations. In an innovative article, Myers (2004) developed a hedonic price model that includes the racial description of neighborhoods, while controlling for proxy characteristics (e.g. income and education). Myers provides a useful template for this research, specifically with respect to the representation of racial preferences as an econometric variable.

In this paper, a model is developed which broadens the range of home-specific and neighborhood characteristics. In addition to income, the hedonic equation controls for crime and school quality across neighborhoods within the study area of Pima County, Arizona. Utilizing 6 years of sales transactions (years 2002-2007), this study provides both a dynamic and contemporary view of the relationship between race/ethnicity and home value. Pima County represents an ideal study area, as there exists a sizable Hispanic population which is diverse in location and income level. This variation is necessary, as a study area without significant variation in race and income would negate the meaningful interpretation of results.

Regarding the ever present racial integration policy debate, the conclusions garnered from this work have the potential of affecting the objectives and methods of policy-makers. Specifically, a result of insignificant racial/ethnic preferences allows for a future steady-state of racial integration. Should minority achievement be brought to levels equivalent to whites, there will be lower levels of segregation and a drop in the differential in housing wealth between

whites and minorities over time. In contrast, significant racial/ethnic preference poses more serious questions about the reality of racial/ethnic integration in America.

Corroborating the findings of Myers (2004) and others, this model estimates a negative relationship between Hispanic proportion and sales prices. The following chapters will cover how this conclusion was formed, and what efforts have been made to control for distortions and biases in the data and estimation process.

The paper is organized as follows. The next section will briefly review the relevant literature, which spans over five decades. Subsequently, details on how this study improves upon previous work will be provided. The empirical results and conclusions drawn can be found in the final two sections.

Chapter 2 - Review of Relevant Literature

Formal analysis of the interaction between race and housing price was spurred by the observed segregation of (specifically) Black communities in many cities across the United States. While the segregation was known, the drivers of this phenomenon were unclear, including whether prices of equivalent housing differed by race. Some amount of theory helped focus the discussion, but the empirical work has remained more central, and constitutes the vast majority of literature. In this literature survey, the evolution of this controversial and dynamic subject is reviewed.

Becker (1957) made the critical observation that homebuyers may show "tastes" for the racial composition of a neighborhood, i.e. a preference for residential segregation or integration. Through the subsequent 25 years after Becker's work, a multitude of studies found mixed evidence of racial discrimination and prejudice. Recent work (last 20 years) has accelerated the research to a question of the drivers of price differentials, which can be addressed by econometric modeling.

After a hiatus of sorts in the price differentials literature, the topic of price differentials resurfaced in the 1990's. A useful synopsis is provided in Harris (1999), where the debate is focused not on the existence of price differentials between neighborhoods, but rather the motivation for such a differential. Two hypotheses are posited to explain the differentials: "Preference" and the "Racial Proxy Aversion" hypothesis.

Bobo & Zubrinsky (1996) present two hypotheses which concentrate on racial/ethnic decision-making: "in-group preference" or "ethnocentrism" and "Racial Prejudice" or "active out-group avoidance". Empirically this could be documented by a model, with proper controls, which finds minority racial/ethnic composition to be a negative neighborhood attribute in

determining housing values.[1] The *Racial Proxy Aversion* or "Perceived Social Class Difference" hypothesis, on the other hand, argues that neighborhood price differentials reflect variations in socioeconomic composition. That is, homebuyers are avoiding low-achievement neighbors, not necessarily minorities. This theory is important because of the continued high correlation between minority composition and low income/low education.[2]

2.1 - Second Generation of Empirical Literature

The empirical evidence has evolved quickly over the past 20 years as a result of vastly improved data. While early work relied on small sample sizes, and aggregated data, contemporary work utilizes large, comprehensive datasets. The integration of reliable socioeconomic data has helped as well.

Several authors have used fairly comprehensive data which includes housing characteristics, household race, neighborhood racial composition, and socioeconomic characteristics (Chambers 1992, Kiel & Zabel 1996, Harris 1999). Though these studies improve upon previous literature which failed to include some of these crucial variables, there are still weaknesses in the use of survey data, neighborhood size, and sufficient neighborhood quality controls.

Chambers (1992) recognized the bias in under-specified models. His study indicates that the omission of neighborhood characteristics which are correlated with race will unduly attribute lower values to racial preferences, rather than preferences for more highly performing economic neighbors. Using American Housing Survey (AHS) data from 1975 and 1979, Chambers

[1] Considering race as an amenity per Yinger's 1978 model, neighborhood racial composition enters the consumer's utility function as an attribute of the housing bundle, which can take a positive or negative coefficient. The hedonic function treats race as such.

[2] Race and socioeconomic achievement have an unfortunate relationship in American society. On average, racial minorities have significantly lower educational attainment and income levels. Hispanic per capita income in the United States is 51% of White income (for African-Americans the comparable ratio is 60%). In reference to education, only 10.4% of Hispanics (14.3% for African-Americans) hold a Bachelor's degree or higher, while 26.1% of whites have attained that level (2000 US Census).

estimates a negative relationship between non-white neighborhood composition and home values. Structural characteristics and a host of neighborhood quality indicators are used as controls to isolate the racial effect.[3] This result is assuredly an improvement over the early (1970's) estimates, though room for improvement exists.

Particularly of interest is the unit of analysis. Kiel and Zabel (1996) continue with use of the AHS dataset while shrinking the neighborhood unit from Chamber's "residence zone" to the Census Tract.[4] Kiel and Zabel (1996) utilize the more precise Census Tract demographic statistics to control for racial and socioeconomic differences between neighborhoods. Their findings indicate mixed racial preferences, dictated by location. Specifically they find increasing prejudice in Denver and Philadelphia, while Chicago exhibited decreasing prejudice. These researchers determined that the inclusion of details regarding the socioeconomic composition of the neighborhood significantly impacted the estimates of racial preferences. Additionally, Kiel and Zabel (1996) note that even at the Tract unit of analysis, neighborhood heterogeneity may be masked.

Heeding Kiel and Zabel's call for a more micro neighborhood unit, Myers (2004) uses a "cluster" available from the American Housing Survey. [5] In this study, Myers observes prejudicial behavior at a national level. Myers contributes on multiple counts, including specification of racial composition, neighborhood unit, and improved neighborhood quality indicators. The AHS provides resident responses on income, crime, and education levels.[6]

[3] Chambers uses owner descriptions of 9 conditions at the residence zone level, including income, education, and proportion of rental units.
[4] Residence zones are meant to capture "socioeconomically homogeneous areas" but contain approximately 100,000 residents. Census tracts are the U.S. Census Bureau' "neighborhood" unit, but can contain anywhere from 2,500 to 8,000 residents
[5]"Clusters" are defined as units of 11 contiguous neighbors. The AHS gathers data on each member of each cluster.
[6] Kiel and Zabel 1999 demonstrate that owner's estimates of housing value are generally 5% higher than true value. Additionally, the use of survey responses on neighborhood quality have self-evident comparability weaknesses as compared to objective statistics.

However, there are several weaknesses. Myers speculates that the cluster unit, using only the 10 nearest neighbors, may be too small for inferential purposes, and limits sample size. Additionally, the nation-wide dataset only controls for broad regional (North, South, East, West) submarkets, rather than city-specific housing market controls. Basically, this method considers each region as a housing market, which is clearly a substantial aggregation.

Multiple authors (Chamber 1992, Kiel and Zabel 1996, Myers 2004) use a helpful combination of continuous and dummy variable approaches to classifying neighborhood racial composition. This hybrid approach essentially creates racial submarkets, and allows for racial preferences to float within these submarkets. Threshold levels are defined to create a set of neighborhood types. For example, in Kiel and Zabel (1996), "Ghetto" neighborhoods are those with percentage Black greater then 60%, "Border" neighborhoods with between 10% and 60% Black, and "Other" as neighborhoods with less than 10% Black. In the regression estimations, interactions between the submarket variable and the continuous racial percentage variable attempt to capture the inherently complex nature of racial preferences.[7]

Most recently, Kiel and Zabel (2008) created a model to deal with the disconnect in unit of analysis. Their study utilizes both the cluster and tract units, to ideally capture street and town level preferences. Again, the study is conducted at a national level, with regional dummies in the same vein as Myers (2004). Given the broad spectrum of observations, mixed results are to be expected, and are confirmed. Prejudice is found in the Northeast and Midwest at the tract and cluster levels, but insignificant results are found in both the South and West, at tract and cluster levels, though prices are found to rise as Black composition increases within clusters in the West.

[7] The creation of racial submarkets, and interacting these with a continuous racial composition variable utilizes the work of two pioneers in this field. Bailey (1966) created a "Border" model which delineates racial zones, i.e. "Ghetto" and "White" zones. This model results in equilibrium only if very specific racial preference, ability to pay and initial segregation conditions are met. Yinger (1976) relaxes these assumptions by allowing for interaction terms, and thus, a gradient of racial preferences.

Similar to Myers (because these authors actually use the same dataset) several neighborhood quality controls are used, including income, education and measures of home tenancy. Kiel and Zabel (2008) conclude that additional analysis is needed at the metropolitan level.

There are several elements missing from this set of empirical studies. First, each is using a neighborhood unit which is considered either too small (and consequently limiting sample sizes and neglecting broader characteristics of an area) or too large (masking heterogeneity within neighborhoods). Second, each of the aforementioned studies utilizes survey data which allows for potential home value estimation errors on the part of owners (Kiel and Zabel 1999), as well as subjective responses regarding neighborhood quality. Third, the time frames analyzed in each of these studies is nearly 20 years old (at a minimum). Finally, there exists a parallel set of literature attesting to the strong role of other neighborhood characteristics in home valuation. Specifically, criminal activity (Freeman 1999, Gibbons 2008) and school performance (Black 1999, Clapp 2008) are cited as important in price determination, but also correlated with race. The omission of reliable variables which measure these characteristics may be biasing previous estimates on preferences for the racial/ethnic composition of neighborhoods. The following chapter will discuss how this dataset and model address each of these weaknesses.

Table 1: Relevant Literature

			Home/Neighborhood Data includes:								Method	Result
Authors	Year	Journal	Sales	Structural	% Black	% Hispanic	Neighborhood Income	School Quality	Crime	Neighborhood Size		
Chambers	1992	Journal of Urban Economics	N	Y	Y	N	Y	N	N	RESIDENCE ZONES[a]	OLS	Negative Sign for Racial Composition
Kiel & Zabel	1996	Journal of Housing Economics	N	Y	Y	Y	Y	N	N	TRACT	OLS	Negative Sign for Racial Composition
Harris	1999	American Sociological Review	N	Y	Y	N	Y	N	N	TRACT	OLS	Negative Sign for Racial Composition, but mixed significance
Myers	2004	Journal of Urban Economics	N	Y	Y	N	Y	N	Y	CLUSTER	F.E.[b]	Negative Sign for Racial Composition
Kiel & Zabel	2008	Journal of Housing Economics	N	Y	Y	Y	Y	N	N	CLUSTER/TRACT	OLS	Mixed, but generally negative sign for racial composition

Notes:
[a] - see footnote 4, [b] - F.E. = OLS w/ Fixed Effects

Chapter 3 - Data and Empirical Strategy

3.1 - Data Sources

To address the issues of neighborhood unit of analysis, omitted variable bias, and timeframe, this dataset uses a variety of sources. This study's primary unit of analysis is the universe of housing transactions within Pima County from the years 2002 through 2007.[8] These transactions are paired with the Pima County Assessor's structural characteristics and geo-coded parcel database.[9]

Each home is subsequently joined to a neighborhood defined by year 2000 US Census boundaries. Kiel and Zabel (2008) state "our recommendation is for more efforts aimed at collecting neighborhood measures at multiple levels of aggregation in order to obtain accurate inferences from house value hedonic regressions" (pp 188). Following Kiel and Zabel's recommendation, this study introduces a set of regressions which use the Census Block Group as the neighborhood unit. The Block Group is a smaller unit in comparison with the Tract, and captures more of the heterogeneity in socioeconomic and demographic traits previously masked by Census Tracts.

In Pima County, the average Block Group has a population of 1,400 and the County can be broken into 617 Block Groups. Each block group has associated demographic and economic data, i.e. racial/ethnic composition and income level (Summary Tape Files of the year 2000 Census). Home sales are also assigned to the traditional neighborhood unit, the Census Tract (198 Tracts in Pima County with average of 4,200 residents) for comparison of results.

[8] See Appendix A for detailed data cleaning process

[9] Home sales are merged with the Pima County parcel database using a parcel code (the primary key). The parcel database is geo-coded, which allows for the use of the ArcGIS Spatial Join operation to assign the parcel to its corresponding US Census area (Block Group and Tract). The Spatial Join is repeated for school districts. The result is that every home sold has a neighborhood, and every neighborhood has many sales within..

While imperfect, using correlation coefficients is nonetheless useful to show the differences in using Block Groups and Census Tracts. If the units were equivalent in describing the general makeup of a neighborhood, we would expect to see a very high correlation between, for example, % Hispanic at the Tract level vs. % Hispanic at the Block Group level.[10] This is true for % Hispanic in Pima County, where $\rho = 0.96$. The interpretation would be that a Block Group which is 30% Hispanic will most likely be in a Tract which is 30% Hispanic. However, the interesting result is regarding income correlation. Using the same technique, the calculated $\rho = 0.50$, indicating much greater heterogeneity in income within Tracts.

An additional measure of the heterogeneity is to simply consider the ranges of the Tract and Block Group units. For % Hispanic, Block Groups take values from [0.02,0.93] and Tracts [0.02,0.93], which corroborates the correlation analysis. For income, the Block Group range is [3.65,76.72] while Tracts have the range [6.57,49.81], indicating substantial differences. The conclusion is that using the Tract as a neighborhood unit does not cause much loss in information on racial composition, but does hide variation in income levels across neighborhoods.

A primary contribution to the literature is this study's incorporation of crime as an independent variable. Thanks to former University of Arizona Geography Ph.D student Megan Cahill (2004), Tucson and South Tucson have comprehensive crime statistics, initially recorded by the Tucson Police Department, aggregated to Census Block Group and Tract geographic areas.

[10] Census Tracts are comprised of Block Groups, e.g. Census Tract 1 has 3 corresponding Block Groups (1,2,3). Using this fact, a correlation coefficient is calculated by using the Block Group data for income (and race) and matching it with a vector where Tract data is repeated, depending on the number of Block Groups within each Tract. In this way, 198 Tracts becomes 617 observations, to correspond with 617 Block Groups.

Finally, transacted homes are assigned to their corresponding school districts, again using geographic location.[11] The Arizona Department of Education AZLearns program provides the measure of school quality.

3.2 – Variables

The dependent variable used in each regression is the sale price of individual homes as recorded by the Pima County Assessor. Two transformations were performed on the sale price. First, prices were inflated to 2007 dollars, using the Consumer Price Index Inflation Adjustment Factors for Phoenix (the nearest approximation for Pima County). Next, according to the literature the natural log of sales price is taken. The log of sales price is used frequently in the hedonic literature because it allows for interpretation of the coefficient estimate to be in percent terms, rather than absolute terms.

Included in all regressions is a set of house-specific structural characteristics. The specific set used here was chosen as a result of their reliability (limited mistakes, transparency in definition, and sufficient variability). Each of these control variables is defined in Table 2.

[11] In Pima County, intra-district school of choice is allowed, subject to capacity constraints. Additionally, within Tucson Unified School District, up until 2008, a Federal desegregation order was in place, limiting the selection of schools, subject to proportional representation. The relevant idea is that measuring school quality at a district level, rather than individual school level, helps mitigate the problems incurred by the lack of a one-house, one-school direct correspondence policy. Additionally, individual school attendance boundaries were not available in GIS format from the Pima County database.

Table 2: Variable Descriptions

Variable Name	Variable Description
BATHROOMS	Measured as the number of bathroom fixtures
SQ. FT.	Internal square footage of home (Divided by 1000)
PROPERTY SIZE	Size of property in acres
PATIO	Dummy for presence of patio
GARAGE	Dummy for presence of garage
POOL	Dummy for presence of pool
AGE	Age of structure in years
% HISPANIC	% of Census Block Group/Tract which identifies as Hispanic
% BLACK	% of Census Block Group/Tract which identifies as Black
White Neighborhood	Neighborhood with less than 15% Hispanic residents
Integrated Neighborhood	Neighborhood with between 15% and 30% Hispanic residents
Hispanic Neighborhood	Neighborhood with greater than 30% Hispanic residents
INCOME	Per capita income of Census Block Group/Tract (Divided by 1000)
HIGH SCHOOL	Rating of Schools, Index score based on meeting AIMS test score standards, attendance rates, graduation rates, dropout rates; 1=Underperforming, 2=Performing (and Performing Plus for 2005,2006,2007), 3=Highly Performing, 4=Excelling
PROPERTY CRIME	Average (of years 1998-2002) frequency of property crimes committed in Census Block Group/Tract (Burglary, Larceny, Motor Vehicle Theft) divided by census block group/Tract population

* Observations used are the set of housing transactions from 2002 - 2007 as recorded by Pima County Assessor's Office. Only single-family, townhome, and condominiums are used. See appendix A for full data cleaning process.

At a neighborhood level, the focus of this study is racial/ethnic composition. In Pima County, the dominant ethnic minority are people of Hispanic origin.[12] As a share of the total population, Hispanics represent 28%. Previous studies have concentrated on different geographic regions of the country, hence, the focus has been on Black proportions. It would be unwise to neglect completely the relationship between Black proportions and prices, but all results presented here are based on a limited population of ~1.5%.

The complexity of preferences for the racial/ethnic composition of neighborhoods is inherent in this topic. Consequently, multiple methods for introducing race/ethnicity in the model are used. This study follows the specification of Myers (2004), which uses a combination of

[12] Hispanic population is determined in the Census questionnaire. Respondents choose to self-identify as Hispanic (though they can be of multiple nationalities or racial categories within Hispanic). This disallows coupling Hispanic with Black and/or Native American to create a "Minority" variable.

continuous and dummy variables to capture the effect of race. Initially, three neighborhood types are defined, based on threshold levels of Hispanic proportion. Myers delineates "Black", "Integrated" and "White" neighborhoods, and this model uses the same three threshold levels, substituting Hispanic for Black. In this model "Hispanic" neighborhoods are those with greater than 30% Hispanic representation. "Integrated" are those with between 15% and 30% Hispanic, and "White" neighborhoods contain less than 15% Hispanic residents.

These three neighborhoods are then interacted with a continuous [0,1] variable of Hispanic proportion. The coefficient estimate is interpreted as the effect of increasing Hispanic proportions within distinct neighborhood types, rather than a single effect across all neighborhoods. Therefore, the interaction variable is a more accurate approach because of the intuitive interpretation that potential residents do not observe single percent changes in racial/ethnic composition, but can observe more general designations such as "Hispanic", "Integrated" and "White". The literature refers to these as racial submarkets.

Choosing threshold values of 15 and 30 is consistent with Myers, but also has a direct application to Pima County. The national Hispanic share of population (as of the 2000 Census) is 12.5%, and the Pima share is 29%. Thus, given that the majority of Pima homebuyers are transplants to the area, a definition of "Integrated" neighborhoods as between 15% and 30% has intuitive value. That is, an average homebuyer would be viewing integration from a national perspective where neighborhoods exceeding the national Hispanic representation are integrated. Additionally, neighborhoods which exceed even the Pima County Hispanic share of population are deemed "Hispanic" neighborhoods.

To control for the significant correlation between economic and racial variables, the dataset and model must include a variety of economic indicators. Previous literature widely

accepts the use of income level as a general proxy for economic achievement. This study specifically uses the per capita income of a neighborhood (at Census Tract and Block Group levels). Income variation not only controls for ability to pay, but is also crucial in distinguishing between preferences for neighbors of differing economic achievement.

Accounting for criminal activity is accomplished through a continuous variable in this set of regressions. Cahill (2004) uses a frequency count of burglary, larceny and motor vehicle theft from 1998, 2000 and 2002 in Tucson and South Tucson. These numbers are summed for each year, then averaged over the 3 years to give a single comprehensive "Property Crime" measure for each Census Tract and Block Group. This study uses Cahill's average frequency, adjusted for population, resulting in a continuous [0,1] per capita property crime rate. It is important to note that these crime statistics are official Police Department data, as opposed to previous literature which utilizes resident's subjective responses on prevalence or presence of crime.

Anecdotal evidence has pointed to the next variable as significant, and recent empirical work corroborates this supposition, that school quality matters to homebuyers (Black 1999, Clapp 2008). Arguably the most innovative explanatory variable used here is this study's measure of school quality. In 2002 the Arizona Department of Education began publishing individual school's achievement profiles. This comprehensive index, the AZLearns Achievement Profile, is comprised of several indicators of school quality. The most recognizable component in the profile is "AIMS" (Arizona's Instrument to Measure Standards) which is a standardized test covering mathematics, reading and writing, and is administered each school year. Schools are given an index score based not only on their pass rates but also their improvement over the previous year's scores. The overall achievement profile also includes graduation rates, dropout rates, and English proficiency test performance. When the final index (achievement profile) is

calculated, the school is given a rating of Underperforming, Performing, Highly Performing, or Excelling. In this analysis, these four achievement profile levels have been coded as an ordinal [1,4] variable. Each school district receives a score for each year from 2002 to 2007, and this score is assigned to all homes within that district, corresponding to the year of the home sale.

3.3 – Discussion of Descriptive Statistics

Tables 2a-8b present the descriptive statistics of this unique Pima County study area. This housing market includes a large number of transactions in each year, ranging from 15,174 to 24,944 (total of 116,632 when pooled). Additionally the consistency from year to year in average size and structure of homes sold allows for valid comparison between years.

Table 3a
2002

Full Dataset

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	15174	174741	123259	10000	2900000
BATHROOMS	15174	6.98	2.36	3.00	26.00
SQ. FT.	15174	1.76	0.65	0.40	7.98
PROPERTY SIZE	15174	0.33	0.57	0.00	15.50
PATIO	15174	0.85	0.36	0.00	1.00
GARAGE	15174	0.92	0.28	0.00	1.00
POOL	15174	0.17	0.37	0.00	1.00
AGE	15174	16.95	18.93	0.00	105.00
Block Group Stats					
% BLACK	15174	0.03	0.03	0.00	0.29
% HISPANIC	15174	0.24	0.21	0.03	0.94
White Neighborhood	6360				
Integrated Neighborhood	5258				
Hispanic Neighborhood	3556				
INCOME	15174	23.14	9.72	5.52	76.72
Tract Stats					
% BLACK	15174	0.03	0.02	0.00	0.12
% HISPANIC	15174	0.24	0.20	0.02	0.93
White Neighborhood	6174				
Integrated Neighborhood	5338				
Hispanic Neighborhood	3662				
INCOME	15174	24.37	9.79	6.57	49.81
HIGH SCHOOL	15174	2.40	0.50	1.00	3.00

Table 3b
2002

Subset with Crime Variable

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	8105	147020	96425	10257	2900000
BATHROOMS	8105	6.22	2.18	3.00	24.00
SQ. FT.	8105	1.59	0.55	0.40	6.15
PROPERTY SIZE	8105	0.26	0.41	0.00	8.40
PATIO	8105	0.81	0.40	0.00	1.00
GARAGE	8105	0.87	0.33	0.00	1.00
POOL	8105	0.14	0.35	0.00	1.00
AGE	8105	23.50	21.38	0.00	105.00
Block Group Stats					
% BLACK	8105	0.04	0.03	0.00	0.29
% HISPANIC	8105	0.29	0.23	0.05	0.94
White Neighborhood	2758				
Integrated Neighborhood	3068				
Hispanic Neighborhood	2279				
INCOME	8105	20.27	8.30	5.61	61.72
PROPERTY CRIME	8105	0.07	0.08	0.00	0.86
Tract Stats					
% BLACK	8105	0.04	0.02	0.00	0.12
% HISPANIC	8105	0.30	0.22	0.07	0.93
White Neighborhood	2566				
Integrated Neighborhood	2819				
Hispanic Neighborhood	2720				
INCOME	8105	22.63	9.61	8.69	46.26
PROPERTY CRIME	8105	0.07	0.05	0.00	0.68
HIGH SCHOOL	8105	2.06	0.24	2.00	3.00

* N = # of home sales

Table 4a
2003

Full Dataset

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	16952	184803	234911	10000	4525000
BATHROOMS	16952	6.81	2.26	3.00	25.00
SQ. FT.	16952	1.67	0.63	0.40	21.45
PROPERTY SIZE	16952	0.25	0.40	0.00	8.60
PATIO	16952	0.83	0.37	0.00	1.00
GARAGE	16952	0.88	0.32	0.00	1.00
POOL	16952	0.15	0.35	0.00	1.00
AGE	16952	18.54	18.00	0.00	100.00
Block Group Stats					
% BLACK	16952	0.02	0.02	0.00	0.29
% HISPANIC	16952	0.23	0.20	0.02	0.94
White Neighborhood	7441				
Integrated Neighborhood	5670				
Hispanic Neighborhood	3841				
INCOME	16952	23.74	10.30	5.52	76.72
Tract Stats					
% BLACK	16952	0.03	0.02	0.00	0.12
% HISPANIC	16952	0.23	0.19	0.02	0.93
White Neighborhood	7029				
Integrated Neighborhood	6295				
Hispanic Neighborhood	3628				
INCOME	16952	25.32	10.35	6.57	49.81
HIGH SCHOOL	16952	2.45	0.61	2.00	4.00

Table 4b
2003

Subset with Crime Variable

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	8995	144025	88755	10000	2995000
BATHROOMS	8995	5.99	2.03	3.00	22.00
SQ. FT.	8995	1.49	0.55	0.40	21.45
PROPERTY SIZE	8995	0.20	0.28	0.00	5.80
PATIO	8995	0.78	0.41	0.00	1.00
GARAGE	8995	0.83	0.38	0.00	1.00
POOL	8995	0.12	0.32	0.00	1.00
AGE	8995	25.39	19.70	0.00	100.00
Block Group Stats					
% BLACK	8995	0.03	0.03	0.00	0.29
% HISPANIC	8995	0.29	0.22	0.05	0.94
White Neighborhood	3065				
Integrated Neighborhood	3308				
Hispanic Neighborhood	2622				
INCOME	8995	20.14	8.09	5.61	61.72
PROPERTY CRIME	8995	0.07	0.07	0.00	0.86
Tract Stats					
% BLACK	8995	0.04	0.02	0.00	0.12
% HISPANIC	8995	0.29	0.22	0.02	0.93
White Neighborhood	2654				
Integrated Neighborhood	3493				
Hispanic Neighborhood	2848				
INCOME	8995	23.49	10.12	8.69	46.26
PROPERTY CRIME	8995	0.07	0.05	0.00	0.68
HIGH SCHOOL	8995	2.09	0.29	2.00	4.00

Table 5a
2004

Full Dataset

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	22451	199335	134886	10800	2700000
BATHROOMS	22451	6.95	2.33	3.00	30.00
SQ. FT.	22451	1.72	0.65	0.41	7.85
PROPERTY SIZE	22451	0.30	0.62	0.00	38.30
PATIO	22451	0.83	0.37	0.00	1.00
GARAGE	22451	0.88	0.32	0.00	1.00
POOL	22451	0.15	0.36	0.00	1.00
AGE	22451	17.85	18.30	0.00	113.00
Block Group Stats					
% BLACK	22451	0.02	0.02	0.00	0.29
% HISPANIC	22451	0.24	0.20	0.02	0.94
White Neighborhood	9428				
Integrated Neighborhood	7878				
Hispanic Neighborhood	5145				
INCOME	22451	23.34	10.05	3.65	76.72
Tract Stats					
% BLACK	22451	0.03	0.02	0.00	0.12
% HISPANIC	22451	0.23	0.20	0.02	0.93
White Neighborhood	9296				
Integrated Neighborhood	8374				
Hispanic Neighborhood	4781				
INCOME	22451	24.35	10.34	6.57	49.81
HIGH SCHOOL	22451	2.40	0.58	2.00	4.00

Table 6a
2005

Full Dataset

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	24944	244973	166784	12000	3650000
BATHROOMS	24944	6.86	2.34	3.00	27.00
SQ. FT.	24944	1.71	0.65	0.40	9.68
PROPERTY SIZE	24944	0.29	0.69	0.00	50.10
PATIO	24944	0.81	0.39	0.00	1.00
GARAGE	24944	0.86	0.35	0.00	1.00
POOL	24944	0.14	0.34	0.00	1.00
AGE	24944	18.28	18.65	0.00	107.00
Block Group Stats					
% BLACK	24944	0.03	0.03	0.00	0.29
% HISPANIC	24944	0.26	0.21	0.02	0.94
White Neighborhood	9831				
Integrated Neighborhood	8460				
Hispanic Neighborhood	6653				
INCOME	24944	22.37	9.75	5.52	76.72
Tract Stats					
% BLACK	24944	0.03	0.02	0.00	0.12
% HISPANIC	24944	0.25	0.20	0.02	0.93
White Neighborhood	9676				
Integrated Neighborhood	8799				
Hispanic Neighborhood	6469				
INCOME	24944	24.22	10.25	6.57	49.81
HIGH SCHOOL	24944	2.92	0.44	2.00	4.00

Table 5b
2004

Subset with Crime Variable

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	12219	167913	96769	11500	2200000
BATHROOMS	12219	6.26	2.15	3.00	21.00
SQ. FT.	12219	1.56	0.56	0.41	6.30
PROPERTY SIZE	12219	0.24	0.55	0.00	38.30
PATIO	12219	0.79	0.41	0.00	1.00
GARAGE	12219	0.83	0.37	0.00	1.00
POOL	12219	0.13	0.33	0.00	1.00
AGE	12219	23.75	20.37	0.00	113.00
Block Group Stats					
% BLACK	12219	0.03	0.03	0.00	0.29
% HISPANIC	12219	0.29	0.22	0.03	0.94
White Neighborhood	4200				
Integrated Neighborhood	4669				
Hispanic Neighborhood	3350				
INCOME	12219	20.30	8.27	3.65	61.72
PROPERTY CRIME	12219	0.06	0.08	0.00	0.86
Tract Stats					
% BLACK	12219	0.04	0.02	0.00	0.12
% HISPANIC	12219	0.28	0.22	0.05	0.93
White Neighborhood	4041				
Integrated Neighborhood	4505				
Hispanic Neighborhood	3673				
INCOME	12219	22.29	9.90	8.69	46.26
PROPERTY CRIME	12219	0.07	0.05	0.00	0.68
HIGH SCHOOL	12219	2.08	0.28	2.00	4.00

Table 6b
2005

Subset with Crime Variable

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	13712	209574	129502	20000	3600000
BATHROOMS	13712	6.22	2.18	3.00	19.00
SQ. FT.	13712	1.55	0.56	0.40	5.77
PROPERTY SIZE	13712	0.24	0.57	0.00	46.10
PATIO	13712	0.77	0.42	0.00	1.00
GARAGE	13712	0.82	0.39	0.00	1.00
POOL	13712	0.12	0.32	0.00	1.00
AGE	13712	24.13	20.76	0.00	107.00
Block Group Stats					
% BLACK	13712	0.03	0.03	0.00	0.29
% HISPANIC	13712	0.29	0.22	0.03	0.94
White Neighborhood	4419				
Integrated Neighborhood	5447				
Hispanic Neighborhood	3846				
INCOME	13712	19.74	7.59	5.61	61.72
PROPERTY CRIME	13712	0.06	0.08	0.00	0.86
Tract Stats					
% BLACK	13712	0.04	0.02	0.00	0.12
% HISPANIC	13712	0.29	0.21	0.02	0.93
White Neighborhood	4222				
Integrated Neighborhood	5215				
Hispanic Neighborhood	4275				
INCOME	13712	21.85	9.78	8.69	46.26
PROPERTY CRIME	13712	0.07	0.05	0.00	0.68
HIGH SCHOOL	13712	2.77	0.43	2.00	4.00

* N = # of home sales

Table 7a
2006

Full Dataset

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	20746	267332	179379	10000	4200000
BATHROOMS	20746	6.86	2.37	3.00	27.00
SQ. FT.	20746	1.70	0.66	0.40	7.87
PROPERTY SIZE	20746	0.28	0.60	0.00	37.70
PATIO	20746	0.82	0.38	0.00	1.00
GARAGE	20746	0.86	0.34	0.00	1.00
POOL	20746	0.13	0.34	0.00	1.00
AGE	20746	17.68	19.16	0.00	106.00
Block Group Stats					
% BLACK	20746	0.03	0.03	0.00	0.29
% HISPANIC	20746	0.28	0.22	0.02	0.94
White Neighborhood	7099				
Integrated Neighborhood	7568				
Hispanic Neighborhood	6079				
INCOME	20746	21.55	9.74	5.52	76.72
Tract Stats					
% BLACK	20746	0.03	0.02	0.00	0.12
% HISPANIC	20746	0.27	0.21	0.02	0.93
White Neighborhood	6996				
Integrated Neighborhood	7397				
Hispanic Neighborhood	6353				
INCOME	20746	23.15	10.33	6.57	49.81
HIGH SCHOOL	20746	2.92	0.44	2.00	4.00

Table 7b
2006

Subset with Crime Variable

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	11688	225352	124175	14653	2059171
BATHROOMS	11688	6.20	2.20	3.00	20.00
SQ. FT.	11688	1.52	0.55	0.42	5.57
PROPERTY SIZE	11688	0.22	0.53	0.00	37.70
PATIO	11688	0.77	0.42	0.00	1.00
GARAGE	11688	0.81	0.39	0.00	1.00
POOL	11688	0.11	0.32	0.00	1.00
AGE	11688	23.32	21.25	0.00	106.00
Block Group Stats					
% BLACK	11688	0.04	0.03	0.00	0.29
% HISPANIC	11688	0.32	0.23	0.03	0.94
White Neighborhood	3151				
Integrated Neighborhood	4808				
Hispanic Neighborhood	3729				
INCOME	11688	18.79	7.68	5.61	61.72
PROPERTY CRIME	11688	0.06	0.07	0.00	0.86
Tract Stats					
% BLACK	11688	0.04	0.02	0.00	0.12
% HISPANIC	11688	0.32	0.23	0.07	0.93
White Neighborhood	2980				
Integrated Neighborhood	4065				
Hispanic Neighborhood	4643				
INCOME	11688	20.90	10.04	8.69	46.26
PROPERTY CRIME	11688	0.07	0.05	0.00	0.68
HIGH SCHOOL	11688	2.86	0.36	2.00	4.00

* N = # of home sales

Table 8a
2007

Full Dataset

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	16059	281189	322812	10000	7000000
BATHROOMS	16059	7.01	2.51	3.00	30.00
SQ. FT.	16059	1.74	0.70	0.41	8.92
PROPERTY SIZE	16059	0.29	0.78	0.00	42.40
PATIO	16059	0.84	0.37	0.00	1.00
GARAGE	16059	0.86	0.35	0.00	1.00
POOL	16059	0.14	0.35	0.00	1.00
AGE	16059	18.22	19.32	0.00	130.00
Block Group Stats					
% BLACK	16059	0.02	0.02	0.00	0.29
% HISPANIC	16059	0.25	0.20	0.02	0.94
White Neighborhood	6302				
Integrated Neighborhood	5957				
Hispanic Neighborhood	3800				
INCOME	16059	22.43	10.30	3.65	76.72
Tract Stats					
% BLACK	16059	0.03	0.02	0.00	0.12
% HISPANIC	16059	0.25	0.19	0.02	0.93
White Neighborhood	6206				
Integrated Neighborhood	5668				
Hispanic Neighborhood	4185				
INCOME	16059	23.48	10.49	6.57	49.81
HIGH SCHOOL	16059	3.10	0.49	2.00	4.00

Table 8b
2007

Subset with Crime Variable

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	9130	246998	360641	10750	5650000
BATHROOMS	9130	6.33	2.26	3.00	21.00
SQ. FT.	9130	1.56	0.60	0.41	7.73
PROPERTY SIZE	9130	0.23	0.85	0.00	42.40
PATIO	9130	0.78	0.41	0.00	1.00
GARAGE	9130	0.81	0.40	0.00	1.00
POOL	9130	0.10	0.30	0.00	1.00
AGE	9130	23.41	21.48	0.00	130.00
Block Group Stats					
% BLACK	9130	0.03	0.03	0.00	0.29
% HISPANIC	9130	0.29	0.22	0.03	0.94
White Neighborhood	2859				
Integrated Neighborhood	4035				
Hispanic Neighborhood	2236				
INCOME	9130	19.43	7.69	3.65	61.72
PROPERTY CRIME	9130	0.06	0.07	0.00	0.83
Tract Stats					
% BLACK	9130	0.03	0.02	0.00	0.12
% HISPANIC	9130	0.29	0.21	0.06	0.93
White Neighborhood	2734				
Integrated Neighborhood	3219				
Hispanic Neighborhood	3177				
INCOME	9130	21.04	9.97	8.69	46.26
PROPERTY CRIME	9130	0.07	0.05	0.00	0.68
HIGH SCHOOL	9130	3.06	0.55	2.00	4.00

Table 9a
Pooled (2002-2007)

Full Dataset

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	116326	227222	202857	10000	7000000
BATHROOMS	116326	6.91	2.36	3.00	30.00
SQ. FT.	116326	1.71	0.66	0.40	21.45
PROPERTY SIZE	116326	0.29	0.63	0.00	50.10
PATIO	116326	0.83	0.38	0.00	1.00
GARAGE	116326	0.87	0.33	0.00	1.00
POOL	116326	0.15	0.35	0.00	1.00
AGE	116326	17.95	18.72	0.00	130.00
Block Group Stats					
% BLACK	116326	0.02	0.03	0.00	0.29
% HISPANIC	116326	0.25	0.21	0.02	0.94
White Neighborhood	46461				
Integrated Neighborhood	40791				
Hispanic Neighborhood	29074				
INCOME	116326	22.72	9.99	3.65	76.72
Tract Stats					
% BLACK	116326	0.03	0.02	0.00	0.12
% HISPANIC	116326	0.25	0.20	0.02	0.93
White Neighborhood	45377				
Integrated Neighborhood	41871				
Hispanic Neighborhood	29078				
INCOME	116326	24.13	10.29	6.57	49.81
HIGH SCHOOL	116326	2.71	0.58	1.00	4.00

Table 9b
Pooled (2002-2007)

Subset with Crime Variable

Variable	N	Mean	Std Dev	Minimum	Maximum
Individual Home Stats					
Sales Price	63849	192666	174631	10000	5650000
BATHROOMS	63849	6.21	2.17	3.00	24.00
SQ. FT.	63849	1.54	0.56	0.40	21.45
PROPERTY SIZE	63849	0.23	0.56	0.00	46.10
PATIO	63849	0.78	0.41	0.00	1.00
GARAGE	63849	0.83	0.38	0.00	1.00
POOL	63849	0.12	0.32	0.00	1.00
AGE	63849	23.90	20.83	0.00	130.00
Block Group Stats					
% BLACK	63849	0.03	0.03	0.00	0.29
% HISPANIC	63849	0.29	0.22	0.03	0.94
White Neighborhood	20452				
Integrated Neighborhood	25335				
Hispanic Neighborhood	18062				
INCOME	63849	19.75	7.94	3.65	61.72
PROPERTY CRIME	63849	0.07	0.07	0.00	0.86
Tract Stats					
% BLACK	63849	0.04	0.02	0.00	0.12
% HISPANIC	63849	0.29	0.22	0.02	0.93
White Neighborhood	19197				
Integrated Neighborhood	23316				
Hispanic Neighborhood	21336				
INCOME	63849	21.98	9.94	8.69	46.26
PROPERTY CRIME	63849	0.07	0.05	0.00	0.68
HIGH SCHOOL	63849	2.51	0.55	2.00	4.00

* N = # of home sales

The diversity in income and ethnicity in Pima County is especially attractive from an analysis perspective. Figure 1 is a visual representation of the Pima County (specifically Tucson) breakdown into ethnic submarkets (at the Block Group level). The segregated nature of the Hispanic neighborhoods is immediately evident, and is important for the choice of econometric models. Figure 2 shows the income variation across the Tucson area (Block Group level). The diversity of income levels is interesting to contrast with the ethnic submarkets map, exemplifying the unique advantages of Pima County as a study area. That is, there is observable diversity in incomes within both the Hispanic and White regions, which is advantageous for econometric modeling. For additional comparison, see the Tract level submarkets and income maps, Figures 3 and 4.

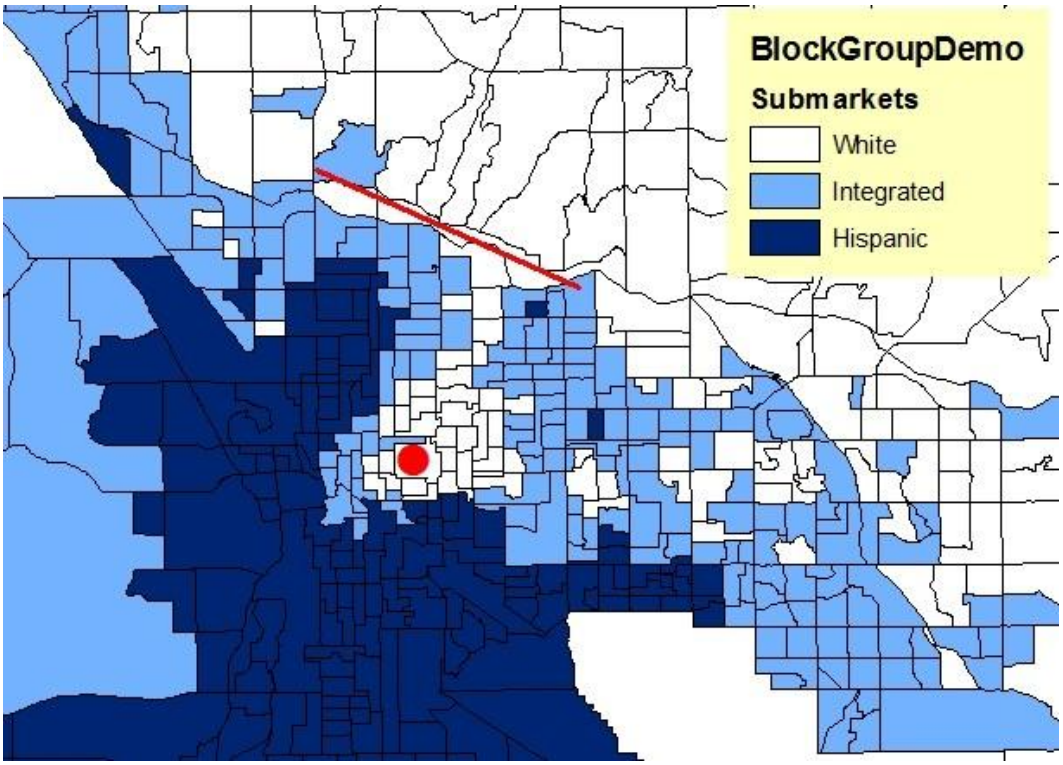

Figure 1 – Block Group Ethnic Submarkets Map *University of Arizona = red dot, Rillito River = red line

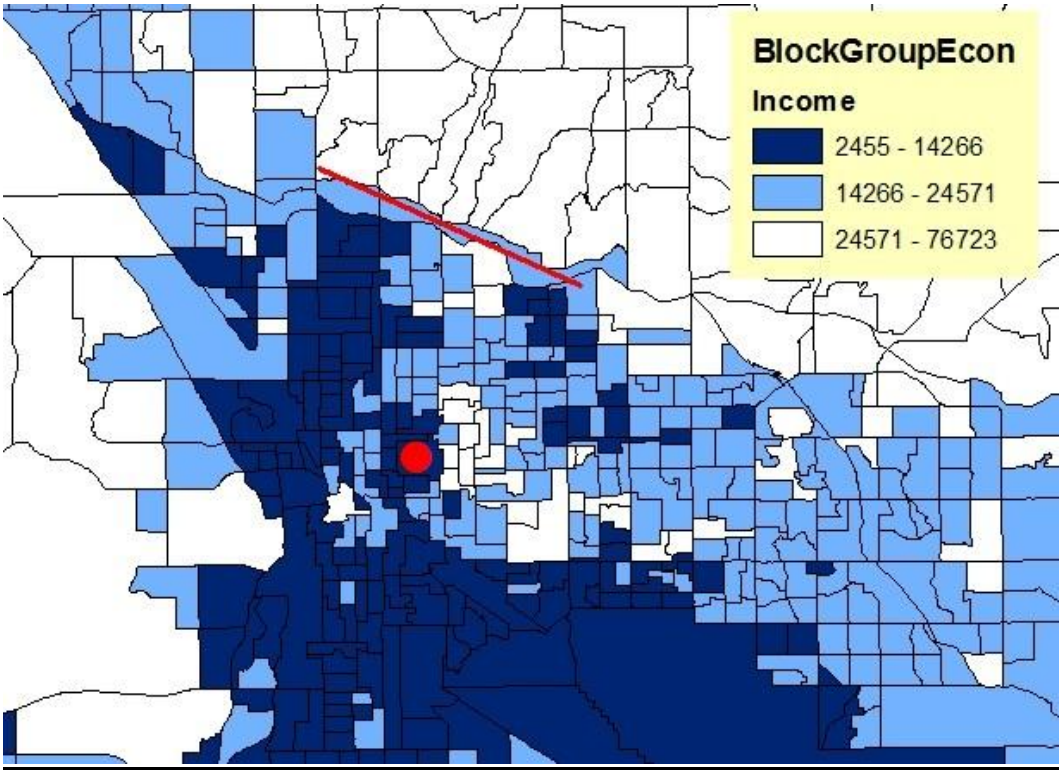

Figure 2 – Block Group Income Map *University of Arizona = red dot, Rillito River = red line.

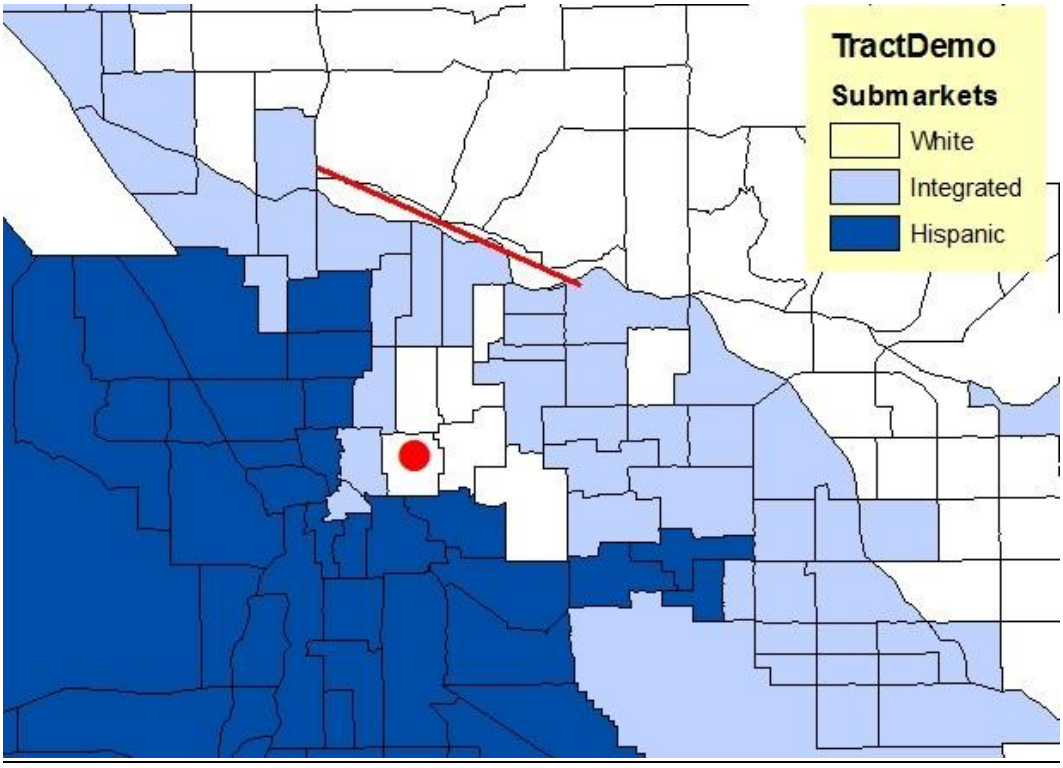

Figure 3 – Tract Ethnic Submarkets Map *University of Arizona = red dot, Rillito River = red line.

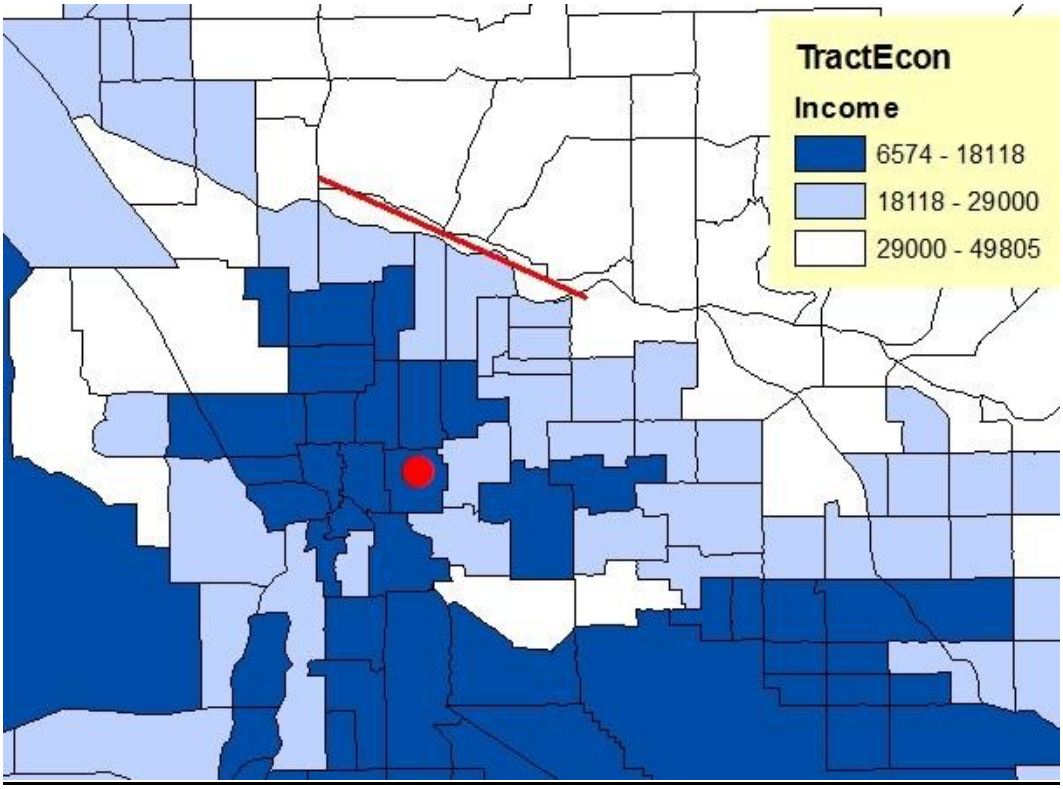

Figure 4 – Tract Income Map *University of Arizona = red dot, Rillito River = red line.

Two unique neighborhood descriptors, the crime and school quality variables, also show significant variation. Measured at the Block Group level, property crime ranges from 0 to 86 incidences per 100 residents, with a mean of 7 per 100 residents. See Figures 5 and 6 for a visual representation of property crime rates. A comparison with the income map is an empirical example of the relationship which Freeman (1999) describes as the targeting of relatively higher income neighborhoods by criminals. That is, the lowest income neighborhoods are not necessarily the neighborhoods with the highest property crime rates; it is the bordering higher income neighborhoods which experience higher crime rates.

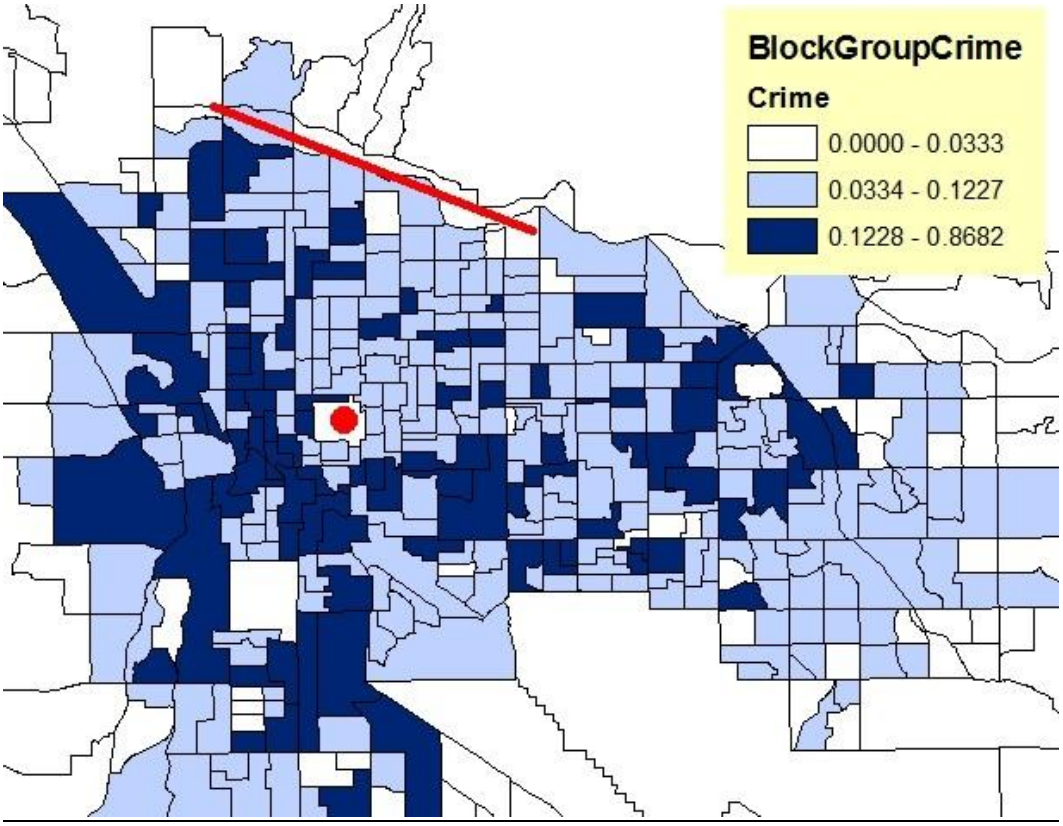

Figure 5 – Property Crime Map *University of Arizona = red dot, Rillito River = red line.

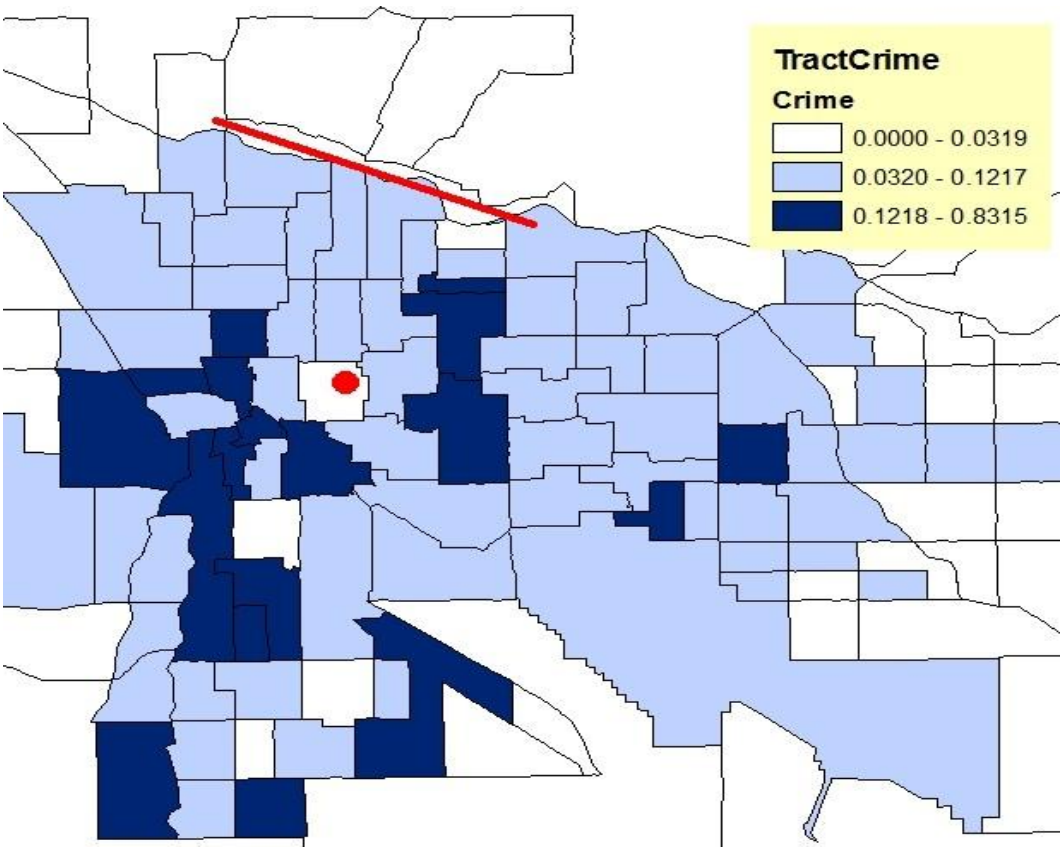

Figure 6 – Tract Property Crime Map_*University of Arizona = red dot, Rillito River = red line.

School quality takes all four potential values from Underperforming (1) to Excelling (4), with a mean of 2.71 over the six years combined, across all 10 districts. Figures 7 to 12 highlight the variation in school quality across districts in Pima County.

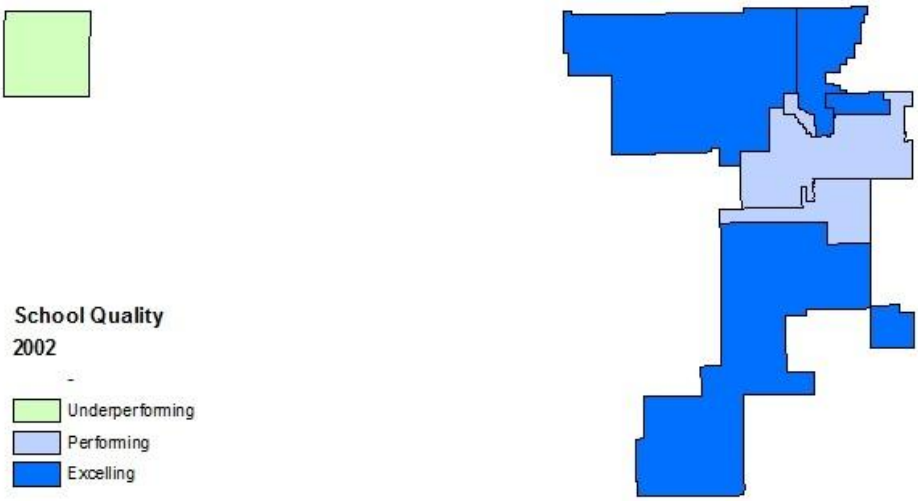

Figure 7 - 2002 School Quality Map

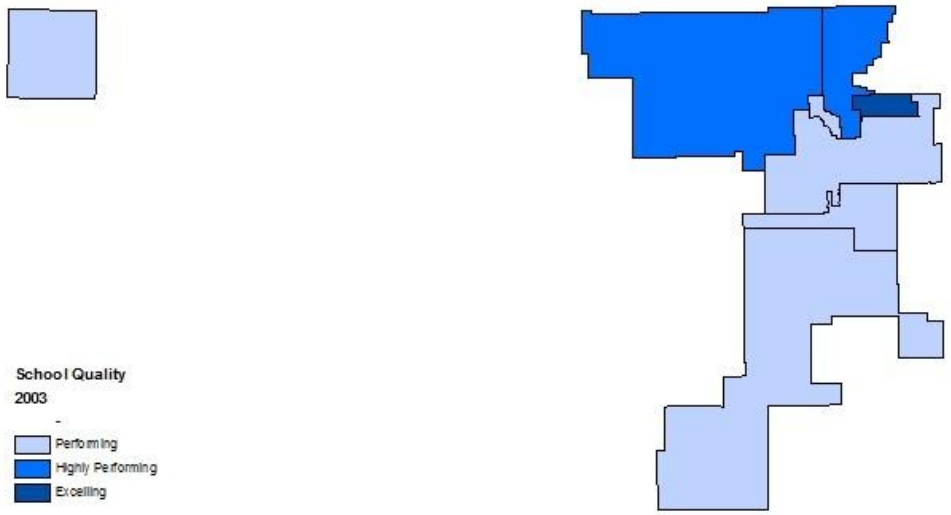

Figure 8 - 2003 School Quality Map

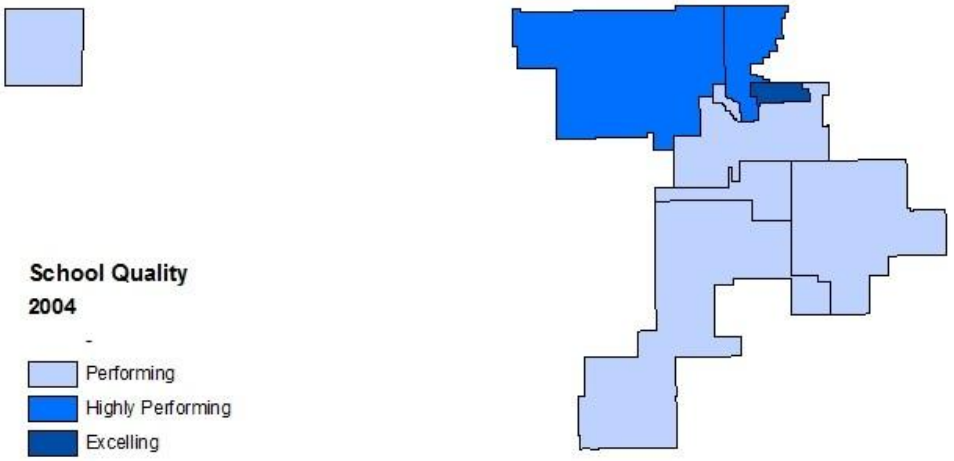

Figure 9 - 2004 School Quality Map

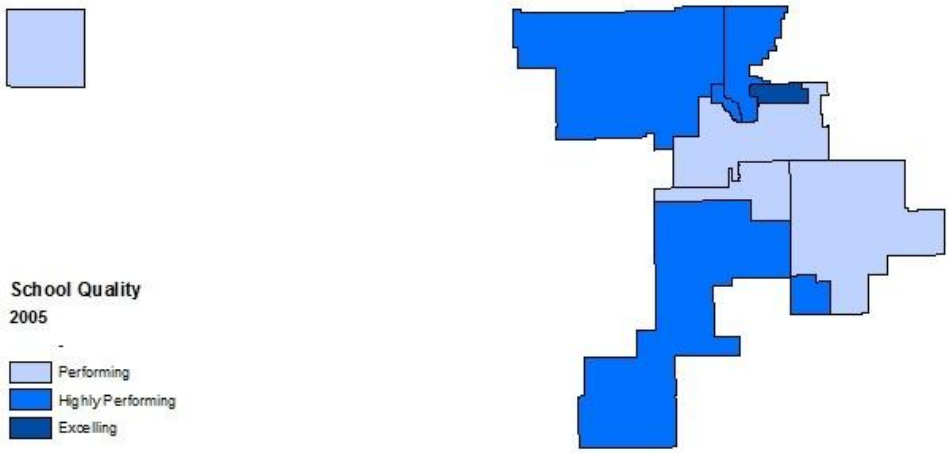

Figure 10 - 2005 School Quality Map

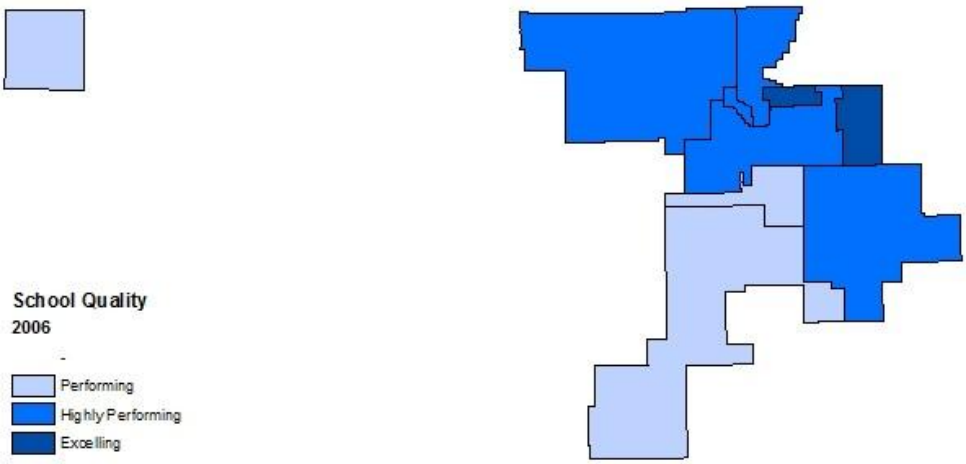

Figure 11 - 2006 School Quality Map

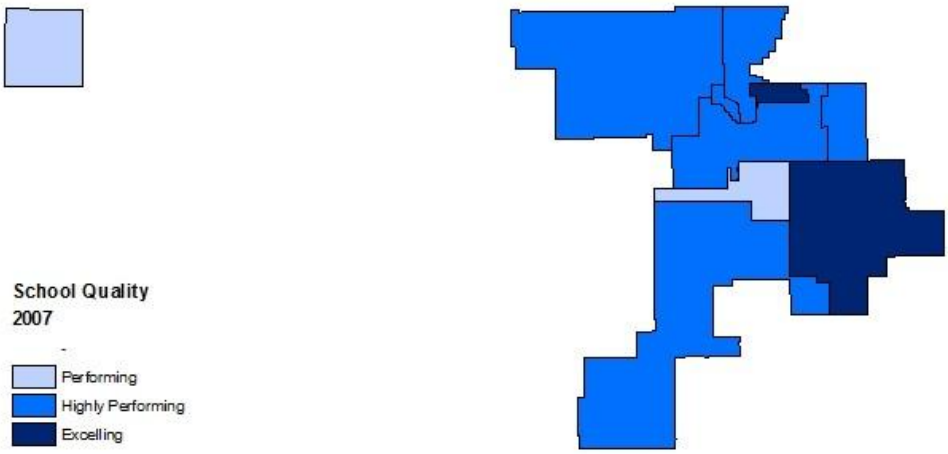

Figure 12 - 2007 School Quality Map

The present study contributes to the debate on neighborhood preferences by addressing three concerns. Specifically, previous literature is limited in use of current decade data (2000's), notable neighborhood quality indicators crime and school quality have been omitted previously and choice of neighborhood unit of analysis remains questionable. These considerations have the potential to bias previous results, and these study attempts to minimize these sources of bias with an improved dataset.

3.4 - Empirical Strategy

Keeping in tradition with the hedonic price analysis technique, this study has developed a model to measure market preferences for the ethnic composition of neighborhoods. Theoretically grounded in Rosen's (1974) work, hedonic price analysis draws out implicit prices of the various characteristics which describe a house and the neighborhood it lies in.[13] By estimating this (inverse) demand function, one can arrive at parameter estimates which provide evidence of the role neighborhood racial/ethnic composition plays in housing prices. The simplified functional forms are as follows:

(1) $\ln P_{ij} = \beta_0 + \beta_i Structural + \beta_j RacialComposition + \varepsilon_{ijkt}$

(2) $\ln P_{ij} = \beta_0 + \beta_i Structural + \beta_j RacialComposition + \beta_j Income + \varepsilon_{ijkt}$

(3) $\ln P_{ijkt} = \beta_0 + \beta_i Structural + \beta_j RacialComposition + \beta_j Income + \beta_{kt} SchoolQuality + \varepsilon_{ijkt}$

(4) $\ln P_{ijkt} = \beta_0 + \beta_i Structural + \beta_j RacialComposition + \beta_j Income + \beta_{kt} SchoolQuality + \beta_j Crime + \varepsilon_{ijkt}$

where subscript *i* refers to the individual home sold, *j* refers to the neighborhood (tract/block group), *k* refers to the school district and *t* refers to the year the home sold (year only for use with school quality which is measured annually).

The progression from the foundational specification (1) to the comprehensive specification (4) follows the evolution of the econometric literature on neighborhood preferences. That is, the story of what defines neighborhood quality is detailed using progressively more comprehensive neighborhood quality indicators. Each specification is estimated using both the Tract and Block Group neighborhood designations, for each individual year 2002-2007 (cross-sections), as well as a pooled (cross-sectional) dataset. The Ordinary Least Squares estimations of these specifications (1) – (4) are presented in Tables 2-8.

[13] See Appendix B for more detailed explanation of Rosen's Hedonic model.

One technique which tries to capture the unique geographic differences in Pima County, and inherent spatial properties of housing, is to use fixed effects. In Tables 9-16 neighborhoods are only described by a set of characteristics, and fail to account for unique location within Pima County. In utilizing a set of geographic fixed effects, an independent intercept is created for regions, at a scale larger than the block group neighborhood (in this case the unit is Census Tract). By allowing for location to float, as well as inclusion of continuous neighborhood descriptors (demographic composition, economic traits), these estimations tell a more complete story than any previous models. Table 17 displays the results of these comprehensive regressions, which use the same specifications (1) – (4) with geographic fixed effects in addition.

Results can be interpreted in a straightforward fashion. Because this is a logged dependent variable (semi-log) model, all coefficients represent percent changes for a given unit change in the independent variable. For the structural variables, the expectation is positive signs on all, except the age variable, which should exhibit a negative sign for the linear term, and a positive sign for the squared term. In reference to the neighborhood quality proxies, positive coefficients demonstrate that the variable has a "good" relationship with sales price, i.e. these are considered to be amenities. Negative estimates would imply homebuyers consider the particular neighborhood descriptor to be a disamenity. The variable of primary interest, Hispanic composition, has the potential to follow one of two explanations. When the model controls for multiple neighborhood quality proxies, i.e. specifications (2)-(4), a negative coefficient would imply *Racial/Ethnic Preferences*, while a positive or insignificant coefficient would suggest the *Proxy Aversion* hypothesis.

Chapter 4 - Results

This study's stated objective was to examine the relationship between neighborhood demographic composition and housing prices. In this section the results are detailed and compared across increasingly comprehensive specifications.

4.1 – Structural Characteristics

Control variables for structural characteristics are all significant at a 99% confidence level throughout nearly all specifications (1)-(4), individual years (Tables 10-15) and the pooled cross sections (Tables 16, 17). One indicative variable is the square footage measure, where 38% price increase is observed for an additional 1,000 square feet of home. Also of interest are the age terms, where a linear and squared term are used to capture the potential increase in price as a home reaches some threshold age and gains historical or other significance. In these estimations, a turning point occurs when a home is between ~30 and ~ 40 years old, when the sum of the coefficients becomes positive, for a net positive relationship between age and sales price. This could be capturing some degree of historical significance, but may also be capturing, for example, the maturity of landscaping or proximity to the University or downtown. Overall, the robustness of this set of control variables is encouraging, and allows the focus to turn to neighborhood preferences.

4.2 – Neighborhood Preferences (Tract)

It is helpful to begin the discussion of neighborhood preferences by demonstrating the price relationship when racial/ethnic composition is the only descriptive factor of a neighborhood. Using the Census tract as an approximation for neighborhood, the results when regressing sales price on structural and neighborhood characteristics are reported in Tables 10 to 16. This study documents a negative and significant relationship between Hispanic neighborhood

representation and home sales prices, which is comparable to Myers (2004), Kiel & Zabel (1996) and others. Specification (1)-T (T=Tract, BG=Block Group) shows the estimated coefficients for this narrow, yet foundational view of a neighborhood. The first noticeable aspect of this result is the robustness. Each model for the individual year regressions (Tables 10-15) and the pooled regression (Table 16) show negative coefficients on all racial/ethnic variables. Additionally, coefficient magnitudes decrease as a neighborhood moves from White to Hispanic. That is, the relationship between increasing Hispanic percentage and sale price is contingent upon the racial/ethnic submarket designation. Intuition and previous empirical results indicate this result. The price gradient graph (Figure 13) is a visual representation of this relationship. Each segment represents percent deviation from zero as % Hispanic increases.

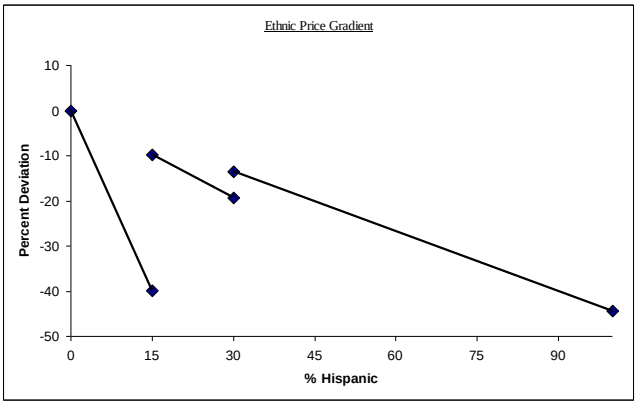

Figure 13 – Estimated Ethnic Price Gradient[14]

4.2.1 – Response to Omitted Variables

Clearly, the above specifications are a partial explanation of housing price differentials. For example, race and economic achievement have a strong correlation, and a model describing neighborhoods only by their racial/ethnic composition is most likely reflecting the lower

[14] As a result of the semi-log specification, coefficient estimates represent the percent change in price in comparison to a neighborhood with zero Hispanic representation. Recall that there are dummy variables for Hispanic and Integrated neighborhoods, and interaction terms between % Hispanic and each of the three neighborhood designations. For example, to define the price gradient from 30% to 100% Hispanic, calculate the end points as: *Hispanic dummy + %Hispanic_Interaction_Term*30 and Hispanic dummy + %Hispanic_Interaction_Term*100*

purchasing power of Hispanics and/or the perception by affluent buyers of poor neighbors as a disamenity in their housing utility function. The original research question, R*acial/Ethnic Preference* or *Proxy Aversion* is not addressed by that specification. A more accurate story can be told by including more neighborhood factors which influence the desirability of an area and economic position of its residents.

Estimation results are largely invariant with respect to the inclusion of per capita income, shown in Specification (2)-T in Tables 10-16. While there is fluctuation in magnitudes, the general conclusion remains that there exists a premium for neighborhoods with lower Hispanic concentration, despite controlling for differences in income levels across neighborhoods.

Across all permutations of the hedonic equation, per capita income proved the most consistent neighborhood variable. As expected (theoretically and empirically) income has a significant positive relationship with home prices. This result affirms the value of including such a uniform measure of a neighborhood's economic well-being.

Continuing with the inclusion of additional neighborhood descriptors, the result of market R*acial/Ethnic Preference* is robust to differences in school quality, see specifications (3)-T and (4)-T in Tables 10 to 16. That is, differences in school quality from district to district do not explain the price differential between neighborhoods with low and high Hispanic proportions.

In reference to the school quality variable itself, expectations are again met, in that better school quality consistently relates positively with home prices. This study observes a wide range of magnitudes from year to year, but the pooled regression (Table 16) (which should provide the best estimates) finds an 18% increase in sale price for a single unit jump (e.g. from "Performing" to "Highly Performing" on the AZLearns scale). Although this result is not directly comparable

to previous work, due to the unique measure of school quality, these positive estimates do compare well in significance and sign.

The most inclusive, in terms of descriptive variables, specification of a neighborhood which this study attempts is (4)-T, shown in Tables 10-16. These regressions account for differences in property crime between neighborhoods, in addition to racial/ethnic composition, income, and school quality. Generally this study observes results similar to those above, with some slight variation. Negative parameter estimates, and significance hold for Hispanic and White neighborhoods, but for several (Tables 11, 12, 14, 15) the previous significance in Integrated neighborhoods vanishes. These estimations suggest that the relationship between ethnic composition and home prices within Integrated neighborhoods (recall that these neighborhoods form a border of sorts between the wealthy north and poor south of Tucson) may be negligible when the model accounts for differences in property crime rates.

Intuition and empirical results have a complex relationship concerning crime and home prices. The expectation is that homebuyers view crime as a disamenity, and thus are willing to pay less for higher crime rates. However, as Freeman (1999) notes, property crime may also increase with expected payoffs, so neighborhoods with higher income and home values can also experience higher rates of property crime. Specification (4)-T in Tables 10-16, exhibit this result, with positive estimates on the property crime variable throughout. This counterintuitive result may be attributable to defining neighborhood as a Census tract, a designation which may be too large to capture the localized impacts of crime on housing prices, and may actually capture a regional effect of higher expected value of property crime. Several authors (Lynch and Rasmussen, Gibbons 2004) observe similar initial positive relationships, before considering different estimation techniques.

In synopsis, this set of estimations (where neighborhood is defined by Census tract) provide some evidence in favor of the *Racial/Ethnic Preference* hypothesis. To what degree this may change due to level of aggregation is addressed in the following section.

4.3 – Neighborhood Preferences (Block Group)

Myers (2004) and Kiel & Zabel (2008) clarify the importance and relevance of neighborhood unit, in that the definition, and associated amount of information loss, has the potential to affect results. The specific question posed here is whether there is significant change in the results by moving from Tract to Block Group as the neighborhood unit? The estimations (1)-BG to (4)-BG in Tables 10-16 show minimal difference; save some fluctuation in magnitude (even shifts in magnitude are not uniformly one direction). These results continue to demonstrate a negative relationship between sales prices and Hispanic population, despite adjustment for economic differences.

Given what the correlation analysis demonstrated, it should be expected for some changes to occur in the income variable coefficient estimates, seen in specifications (2)-BG to (4)-BG, in Tables 10-16. In fact, an increase in magnitude is observed, with the same positive sign and strong significance as estimated when Tracts are used as the unit of analysis. Generally it would be unwise to give much import to changes in coefficient magnitude, but the across-the-board (re: robust) increase $\beta_{\text{BlockGroup}} \cong 4 * \beta_{\text{Tract}}$ is compelling. This is an indication that income is a more influential indicator of housing prices at the more local Block Group scale. In conjunction with the lack of coefficient change in the racial variables, and the weak correlation between Tract and Block Group income levels, it is prudent to investigate whether large scale racial segregation (despite economic diversity) plays a role in prices which may be difficult to capture without more sophisticated estimations, such as use of geographic fixed effects.

Little change is observed for the school quality variable in specifications (3)-BG and (4)-BG in Tables 10-16, which should be anticipated because it is measured at an independent scale from Block Group and Tract. To reiterate, while not unexpected, the positive estimate indicates a positive relationship between home prices and school performance. The robustness of the school quality variable is encouraging, though there is potential that the broad geographic regions encompassed by school districts may be contributing to the magnitude of this coefficient estimate.

The more localized scale of Block Group appears to have a measurable effect upon the property crime variable. This change $\beta_{\text{BlockGroup}} \cong 0.5 * \beta_{\text{Tract}}$ provides evidence that criminal activity measured at the larger Tract scale may be capturing regional differences, rather than strictly the effect of crime. That is, property crime levels overall may be higher in one region of the city compared to another (because of higher payoffs), so if crime is considered at a more local level, the estimates of crime's effect may be moving closer to the intuitive, negative relationship.

4.3.1 – Response to Tract Fixed Effects

To address the potential complications of omitting any measure of geographic location, this section details the results when regressions include geographic fixed effects. Considering Specifications (1) – (3) in Table 17, aside from small deviations in magnitude, minimal change is demonstrated for the set of racial variables, as compared to estimates without geographic fixed effects. Coefficient estimates still demonstrate that increasing Hispanic composition leads to different price effects depending on the ethnic submarket. An interesting result, which occurs only with the inclusion of geographic fixed effects, is the substantially decreased magnitude and significance of the Hispanic and Integrated dummy variables. One potential explanation is that

the fixed effect dummies are subtracting magnitude which had previously been attributed to the ethnic submarket dummies. This is a result of the highly regional (re: segregated) Hispanic concentrations in Pima County.

Both income and school quality retain their positive and significant coefficient estimates, referring to specifications (2)–(4) in Table 17. At a minimum these estimates are further confirmation of the robustness of this model. Expectations are met in nearly all specifications, and estimates of school quality and income are invariant to the inclusion of geographic fixed effects. The evidence remains strong that neighborhood services such as school quality have a strong relationship with prices.

Crime, on the other hand, takes a dramatic shift from positive with large magnitudes in the Tract models, to negative and significant in the Block Group with Tract Fixed Effects models, specification (4) in Table 17. This result lends credence to suspicions that the crime variable estimates (without geographic fixed effects) were capturing multiple effects, both a pure crime effect, and an 'expected payoff' region effect. Consequently, when the model distinguishes between regions, the crime variable no longer captures two effects, but solely the expected negative effect.

Table 10: OLS Estimates (2002)

	Tract				Block Group			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Intercept	11.4974 ***	11.3481 ***	11.3303 ***	11.5269 ***	11.5232 ***	11.1468 ***	11.1184 ***	11.2762 ***
	(0.0226)	(0.0246)	(0.0330)	(0.0479)	(0.0223)	(0.0242)	(0.0295)	(0.0471)
Baths	0.0101 ***	0.0096 ***	0.0095 ***	0.0143 ***	0.0091 ***	0.0059 ***	0.0056 ***	0.0107 ***
	(0.0020)	(0.0019)	(0.0020)	(0.0020)	(0.0019)	(0.0018)	(0.0019)	(0.0020)
Sq. Ft.	0.4221 ***	0.4174 ***	0.4177 ***	0.3962 ***	0.4193 ***	0.3892 ***	0.3900 ***	0.3794 ***
	(0.0087)	(0.0086)	(0.0086)	(0.0092)	(0.0086)	(0.0083)	(0.0083)	(0.0085)
Acres	0.1007 ***	0.1007 ***	0.1004 ***	0.1400 ***	0.1000 ***	0.0924 ***	0.0920 ***	0.1154 ***
	(0.0095)	(0.0093)	(0.0093)	(0.0105)	(0.0092)	(0.0080)	(0.0080)	(0.0110)
Patio	0.0581 ***	0.0572 ***	0.0571 ***	0.0432 ***	0.0556 ***	0.0513 ***	0.0512 ***	0.0314 ***
	(0.0059)	(0.0059)	(0.0059)	(0.0070)	(0.0058)	(0.0057)	(0.0057)	(0.0067)
Garage	0.1095 ***	0.1065 ***	0.1068 ***	0.0804 ***	0.1051 ***	0.0934 ***	0.0939 ***	0.0642 ***
	(0.0108)	(0.0108)	(0.0109)	(0.0114)	(0.0107)	(0.0106)	(0.0106)	(0.0108)
Pool	0.0946 ***	0.0912 ***	0.0913 ***	0.0856 ***	0.0943 ***	0.0876 ***	0.0878 ***	0.0814 ***
	(0.0062)	(0.0061)	(0.0061)	(0.0079)	(0.0062)	(0.0058)	(0.0058)	(0.0074)
Age	-0.0109 ***	-0.0117 ***	-0.0117 ***	-0.0121 ***	-0.0112 ***	-0.0116 ***	-0.0115 ***	-0.0122 ***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Age Sq.	0.0001 ***	0.0002 ***	0.0002 ***	0.0001 ***	0.0001 ***	0.0002 ***	0.0002 ***	0.0002 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
%Black	-0.3634 ***	-0.3079 ***	-0.2625 *	-1.4989 ***	-0.3872 ***	0.1363	0.1783 *	-0.3405 ***
	(0.1171)	(0.1162)	(0.1388)	(0.1518)	(0.0906)	(0.0895)	(0.0979)	(0.1059)
Hispanic Neighborhood	-0.2622 ***	-0.2199 ***	-0.2154 ***	-0.2718 ***	-0.3481 ***	-0.1489 ***	-0.1467 ***	-0.1836 ***
	(0.0198)	(0.0195)	(0.0192)	(0.0323)	(0.0192)	(0.0193)	(0.0191)	(0.0312)
Integrated Neighborhood	-0.2116 ***	-0.2120 ***	-0.2114 ***	-0.3621 ***	-0.3385 ***	-0.0794 ***	-0.0862 ***	-0.1443 ***
	(0.0193)	(0.0192)	(0.0191)	(0.0383)	(0.0174)	(0.0183)	(0.0188)	(0.0346)
% Hispanic*Hispanic Neighborhood	-0.4892 ***	-0.3994 ***	-0.4002 ***	-0.6361 ***	-0.3698 ***	-0.2282 ***	-0.2222 ***	-0.3526 ***
	(0.0283)	(0.0291)	(0.0289)	(0.0305)	(0.0282)	(0.0283)	(0.0292)	(0.0327)
% Hispanic*Integrated Neighborhood	-0.8867 ***	-0.4719 ***	-0.4666 ***	-0.5685 ***	-0.2158 ***	-0.4285 ***	-0.3784 ***	-0.5521 ***
	(0.0819)	(0.0869)	(0.0881)	(0.1372)	(0.0695)	(0.0668)	(0.0730)	(0.0867)
% Hispanic*White Neighborhood	-2.1773 ***	-1.7200 ***	-1.6997 ***	-3.2006 ***	-2.1895 ***	-0.7124 ***	-0.6790 ***	-1.6146 ***
	(0.1098)	(0.1123)	(0.1152)	(0.2561)	(0.1066)	(0.1095)	(0.1115)	(0.2238)
Income		0.0042 ***	0.0042 ***	0.0022 ***		0.0111 ***	0.0111 ***	0.0097 ***
		(0.0003)	(0.0003)	(0.0003)		(0.0004)	(0.0004)	(0.0005)
High School Performance			0.0055	0.0444 ***			0.0097 *	0.0162
			(0.0058)	(0.0127)			(0.0053)	(0.0122)
Property Crime				0.8719 ***				0.3985 ***
				(0.0870)				(0.0462)
# of Observations	15174	15174	15174	8105	15174	15174	15174	8105
R- Sq.	0.7981	0.8015	0.8015	0.7796	0.8027	0.8177	0.8178	0.7781
Adj. R- Sq.	0.7979	0.8013	0.8013	0.7791	0.8025	0.8175	0.8176	0.7777

Notes:
***= significant at .01, ** = significant at .05, *= signficant at .10, Heteroskedasticity-consistent standard errors in ( )

Table 11: OLS Estimates (2003)

	Tract				Block Group			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Intercept	11.6931 ***	11.5802 ***	11.3149 ***	11.5091 ***	11.6889 ***	11.1288 ***	11.0345 ***	11.2741 ***
	(0.0460)	(0.0507)	(0.0426)	(0.0731)	(0.0444)	(0.0288)	(0.0288)	(0.0700)
Baths	0.0256 **	0.0253 **	0.0239 **	0.0358 ***	0.0247 **	0.0187 **	0.0183 *	0.0302 **
	(0.0102)	(0.0102)	(0.0102)	(0.0133)	(0.0102)	(0.0094)	(0.0094)	(0.0126)
Sq. Ft.	0.3402 ***	0.3404 ***	0.3414 ***	0.3064 ***	0.3379 ***	0.3132 ***	0.3148 ***	0.2937 ***
	(0.0563)	(0.0563)	(0.0563)	(0.0899)	(0.0562)	(0.0531)	(0.0533)	(0.0883)
Acres	0.1599 ***	0.1593 ***	0.1543 ***	0.2238 ***	0.1588 ***	0.1455 ***	0.1444 ***	0.2211 ***
	(0.0194)	(0.0193)	(0.0191)	(0.0350)	(0.0195)	(0.0176)	(0.0176)	(0.0403)
Patio	0.0788 ***	0.0795 ***	0.0801 ***	0.0656 ***	0.0754 ***	0.0735 ***	0.0751 ***	0.0577 ***
	(0.0069)	(0.0069)	(0.0069)	(0.0080)	(0.0067)	(0.0065)	(0.0065)	(0.0077)
Garage	0.1060 ***	0.1074 ***	0.1146 ***	0.1737 ***	0.0974 ***	0.1090 ***	0.1122 ***	0.1711 ***
	(0.0149)	(0.0150)	(0.0145)	(0.0106)	(0.0149)	(0.0141)	(0.0138)	(0.0102)
Pool	0.1000 ***	0.1006 ***	0.1039 ***	0.1203 ***	0.1039 ***	0.1083 ***	0.1096 ***	0.1187 ***
	(0.0146)	(0.0146)	(0.0146)	(0.0225)	(0.0146)	(0.0137)	(0.0137)	(0.0221)
Age	-0.0119 ***	-0.0127 ***	-0.0126 ***	-0.0159 ***	-0.0128 ***	-0.0139 ***	-0.0138 ***	-0.0170 ***
	(0.0006)	(0.0006)	(0.0006)	(0.0008)	(0.0006)	(0.0006)	(0.0006)	(0.0008)
Age Sq.	0.0002 ***	0.0002 ***	0.0002 ***	0.0002 ***	0.0002 ***	0.0002 ***	0.0002 ***	0.0003 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
%Black	-0.5683 ***	-0.5402 ***	-0.0980	-1.2147 ***	-1.0182 ***	-0.2616 **	-0.1665	-0.9385 ***
	(0.1482)	(0.1482)	(0.1504)	(0.1924)	(0.1255)	(0.1060)	(0.1088)	(0.1511)
Hispanic Neighborhood	-0.3840 ***	-0.3462 ***	-0.2505 ***	-0.2959 ***	-0.4029 ***	-0.1131 ***	-0.0857 ***	-0.0547 *
	(0.0271)	(0.0282)	(0.0252)	(0.0351)	(0.0247)	(0.0200)	(0.0198)	(0.0320)
Integrated Neighborhood	-0.4567 ***	-0.4733 ***	-0.4764 ***	-0.5752 ***	-0.4425 ***	-0.1300 ***	-0.1483 ***	-0.0993 **
	(0.0286)	(0.0281)	(0.0278)	(0.0399)	(0.0284)	(0.0219)	(0.0223)	(0.0397)
% Hispanic*Hispanic Neighborhood	-0.5292 ***	-0.4736 ***	-0.4863 ***	-0.6330 ***	-0.4276 ***	-0.2325 ***	-0.2385 ***	-0.4173 ***
	(0.0300)	(0.0308)	(0.0311)	(0.0347)	(0.0298)	(0.0304)	(0.0304)	(0.0356)
% Hispanic*Integrated Neighborhood	-0.4199 ***	-0.0437	0.3023 ***	0.2983 **	-0.2272 **	-0.1568 *	0.0085	-0.3767 ***
	(0.0800)	(0.0862)	(0.0896)	(0.1287)	(0.0953)	(0.0913)	(0.0935)	(0.1116)
% Hispanic*White Neighborhood	-3.3708 ***	-3.0475 ***	-2.5364 ***	-3.3568 ***	-2.9732 ***	-0.7813 ***	-0.6436 ***	-0.9469 ***
	(0.2012)	(0.2138)	(0.1903)	(0.2936)	(0.1774)	(0.1195)	(0.1153)	(0.2303)
Income		0.0028 ***	0.0026 ***	0.0006 *		0.0141 ***	0.0134 ***	0.0080 ***
		(0.0003)	(0.0003)	(0.0003)		(0.0007)	(0.0007)	(0.0008)
High School Performance			0.0789 ***	0.0602 ***			0.0347 ***	-0.0174 *
			(0.0062)	(0.0080)			(0.0052)	(0.0089)
Property Crime				0.3693 ***				-0.0266
				(0.0990)				(0.0524)
# of Observations	16952	16952	16952	8995	16952	16952	16952	8995
R- Sq.	0.6997	0.7012	0.7063	0.7349	0.7026	0.7293	0.7302	0.7219
Adj. R- Sq.	0.6995	0.7009	0.7061	0.7343	0.7024	0.729	0.73	0.7214

Notes:
***= significant at .01, ** = significant at .05, *= signficant at .10, Heteroskedasticity-consistent standard errors in ( )

Table 12: OLS Estimates (2004)

	Tract				Block Group			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Intercept	11.5624 ***	11.4441 ***	11.2833 ***	11.5171 ***	11.5721 ***	11.1801 ***	11.1073 ***	11.2945 ***
	(0.0187)	(0.0205)	(0.0251)	(0.0382)	(0.0177)	(0.0206)	(0.0227)	(0.0407)
Baths	0.0179 ***	0.0177 ***	0.0167 ***	0.0191 ***	0.0169 ***	0.0135 ***	0.0131 ***	0.0137 ***
	(0.0014)	(0.0014)	(0.0014)	(0.0019)	(0.0014)	(0.0013)	(0.0013)	(0.0018)
Sq. Ft.	0.4094 ***	0.4084 ***	0.4101 ***	0.4239 ***	0.4086 ***	0.3872 ***	0.3888 ***	0.4197 ***
	(0.0068)	(0.0068)	(0.0067)	(0.0079)	(0.0067)	(0.0065)	(0.0065)	(0.0089)
Acres	0.0903 ***	0.0892 ***	0.0883 ***	0.1250 ***	0.0869 ***	0.0852 ***	0.0849 ***	0.0690 ***
	(0.0132)	(0.0132)	(0.0129)	(0.0119)	(0.0126)	(0.0121)	(0.0120)	(0.0194)
Patio	0.0602 ***	0.0604 ***	0.0616 ***	0.0696 ***	0.0566 ***	0.0550 ***	0.0561 ***	0.0543 ***
	(0.0050)	(0.0050)	(0.0050)	(0.0061)	(0.0050)	(0.0049)	(0.0049)	(0.0058)
Garage	0.1715 ***	0.1733 ***	0.1759 ***	0.1672 ***	0.1653 ***	0.1672 ***	0.1688 ***	0.1615 ***
	(0.0074)	(0.0075)	(0.0075)	(0.0086)	(0.0073)	(0.0074)	(0.0074)	(0.0082)
Pool	0.0921 ***	0.0936 ***	0.0946 ***	0.0787 ***	0.0926 ***	0.0923 ***	0.0929 ***	0.0804 ***
	(0.0055)	(0.0055)	(0.0054)	(0.0080)	(0.0054)	(0.0051)	(0.0051)	(0.0073)
Age	-0.0098 ***	-0.0107 ***	-0.0108 ***	-0.0133 ***	-0.0102 ***	-0.0110 ***	-0.0111 ***	-0.0133 ***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0003)	(0.0003)	(0.0003)	(0.0004)
Age Sq.	0.0002 ***	0.0002 ***	0.0002 ***	0.0002 ***	0.0002 ***	0.0002 ***	0.0002 ***	0.0002 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
%Black	-0.1808 *	-0.0147	0.2058 *	-0.9058 ***	-0.6963 ***	-0.2124 ***	-0.1553 *	-0.8366 ***
	(0.1016)	(0.1034)	(0.1054)	(0.1291)	(0.0807)	(0.0803)	(0.0810)	(0.0974)
Hispanic Neighborhood	-0.3422 ***	-0.3039 ***	-0.2426 ***	-0.3480 ***	-0.3516 ***	-0.1434 ***	-0.1205 ***	-0.1393 ***
	(0.0179)	(0.0176)	(0.0185)	(0.0279)	(0.0162)	(0.0164)	(0.0167)	(0.0259)
Integrated Neighborhood	-0.3660 ***	-0.3633 ***	-0.3470 ***	-0.5576 ***	-0.3333 ***	-0.1265 ***	-0.1267 ***	-0.1897 ***
	(0.0172)	(0.0172)	(0.0168)	(0.0343)	(0.0168)	(0.0171)	(0.0171)	(0.0280)
% Hispanic*Hispanic Neighborhood	-0.4546 ***	-0.3988 ***	-0.4027 ***	-0.5811 ***	-0.3980 ***	-0.2548 ***	-0.2543 ***	-0.3951 ***
	(0.0242)	(0.0248)	(0.0248)	(0.0259)	(0.0235)	(0.0241)	(0.0241)	(0.0295)
% Hispanic*Integrated Neighborhood	-0.4405 ***	-0.1443 *	0.0152	0.1319	-0.4171 ***	-0.2923 ***	-0.1983 ***	-0.2612 ***
	(0.0717)	(0.0737)	(0.0773)	(0.1342)	(0.0758)	(0.0733)	(0.0754)	(0.0862)
% Hispanic*White Neighborhood	-2.6470 ***	-2.2955 ***	-1.9078 ***	-3.5570 ***	-2.4795 ***	-0.9520 ***	-0.7981 ***	-1.6032 ***
	(0.0886)	(0.0920)	(0.0968)	(0.1923)	(0.0799)	(0.0847)	(0.0859)	(0.1649)
Income		0.0029 ***	0.0026 ***	0.0004		0.0101 ***	0.0098 ***	0.0066 ***
		(0.0002)	(0.0002)	(0.0003)		(0.0003)	(0.0003)	(0.0006)
High School Performance			0.0489 ***	0.0596 ***			0.0246 ***	0.0133
			(0.0037)	(0.0070)			(0.0035)	(0.0083)
Property Crime				0.5757 ***				0.0691 *
				(0.0803)				(0.0379)
# of Observations	22451	22451	22451	12219	22451	22451	22451	12219
R- Sq.	0.78	0.7818	0.7838	0.7627	0.7837	0.7974	0.7979	0.7541
Adj. R- Sq.	0.7799	0.7817	0.7836	0.7623	0.7835	0.7972	0.7977	0.7537

Notes:
***= significant at .01, ** = significant at .05, *= signficant at .10, Heteroskedasticity-consistent standard errors in ( )

Table 13: OLS Estimates (2005)

	Tract				Block Group			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Intercept	12.0124 ***	11.8644 ***	11.5183 ***	11.7849 ***	11.9901 ***	11.5898 ***	11.2964 ***	11.5137 ***
	(0.0189)	(0.0206)	(0.0256)	(0.0468)	(0.0169)	(0.0210)	(0.0257)	(0.0406)
Baths	0.0204 ***	0.0202 ***	0.0188 ***	0.0155 ***	0.0199 ***	0.0167 ***	0.0158 ***	0.0106 ***
	(0.0014)	(0.0014)	(0.0014)	(0.0020)	(0.0014)	(0.0014)	(0.0014)	(0.0017)
Sq. Ft.	0.3723 ***	0.3699 ***	0.3727 ***	0.3798 ***	0.3722 ***	0.3554 ***	0.3594 ***	0.3890 ***
	(0.0072)	(0.0072)	(0.0073)	(0.0100)	(0.0071)	(0.0070)	(0.0071)	(0.0092)
Acres	0.0620 ***	0.0611 ***	0.0635 ***	0.1458 ***	0.0601 ***	0.0586 ***	0.0610 ***	0.0715 ***
	(0.0195)	(0.0193)	(0.0201)	(0.0078)	(0.0186)	(0.0183)	(0.0191)	(0.0264)
Patio	0.0373 ***	0.0365 ***	0.0393 ***	0.0432 ***	0.0386 ***	0.0355 ***	0.0379 ***	0.0410 ***
	(0.0052)	(0.0052)	(0.0051)	(0.0068)	(0.0052)	(0.0051)	(0.0051)	(0.0064)
Garage	0.1099 ***	0.1141 ***	0.1257 ***	0.0961 ***	0.1080 ***	0.1105 ***	0.1216 ***	0.0909 ***
	(0.0075)	(0.0074)	(0.0075)	(0.0093)	(0.0074)	(0.0074)	(0.0074)	(0.0089)
Pool	0.0989 ***	0.1011 ***	0.1015 ***	0.0844 ***	0.1004 ***	0.0966 ***	0.0975 ***	0.0851 ***
	(0.0060)	(0.0060)	(0.0060)	(0.0077)	(0.0059)	(0.0057)	(0.0057)	(0.0071)
Age	-0.0098 ***	-0.0106 ***	-0.0114 ***	-0.0146 ***	-0.0102 ***	-0.0111 ***	-0.0121 ***	-0.0137 ***
	(0.0004)	(0.0004)	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0004)	(0.0005)
Age Sq.	0.0001 ***	0.0002 ***	0.0002 ***	0.0002 ***	0.0001 ***	0.0002 ***	0.0002 ***	0.0002 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
%Black	-0.1726	0.0156	-0.1801	-1.3001 ***	-0.1954 *	0.2400 **	0.1294	-0.3173 ***
	(0.1146)	(0.1140)	(0.1108)	(0.1311)	(0.1049)	(0.1040)	(0.1020)	(0.1211)
Hispanic Neighborhood	-0.4845 ***	-0.4299 ***	-0.3571 ***	-0.4345 ***	-0.4751 ***	-0.2540 ***	-0.2331 ***	-0.2507 ***
	(0.0189)	(0.0192)	(0.0181)	(0.0304)	(0.0167)	(0.0176)	(0.0171)	(0.0274)
Integrated Neighborhood	-0.3185 ***	-0.3186 ***	-0.1747 ***	-0.4463 ***	-0.4566 ***	-0.2399 ***	-0.1755 ***	-0.2829 ***
	(0.0209)	(0.0207)	(0.0205)	(0.0383)	(0.0191)	(0.0194)	(0.0191)	(0.0306)
% Hispanic*Hispanic Neighborhood	-0.4241 ***	-0.3741 ***	-0.3401 ***	-0.4685 ***	-0.3795 ***	-0.2453 ***	-0.1878 ***	-0.3259 ***
	(0.0225)	(0.0223)	(0.0226)	(0.0255)	(0.0224)	(0.0229)	(0.0235)	(0.0288)
% Hispanic*Integrated Neighborhood	-1.2202 ***	-0.8365 ***	-1.1353 ***	-0.4538 ***	-0.3302 ***	-0.2193 **	-0.2276 ***	-0.0772
	(0.0865)	(0.0817)	(0.0828)	(0.1400)	(0.0896)	(0.0877)	(0.0866)	(0.0963)
% Hispanic*White Neighborhood	-3.6041 ***	-3.1520 ***	-2.4005 ***	-3.7732 ***	-3.3167 ***	-1.7686 ***	-1.2486 ***	-2.0653 ***
	(0.0986)	(0.1058)	(0.1027)	(0.2174)	(0.0843)	(0.0929)	(0.0921)	(0.1733)
Income		0.0036 ***	0.0022 ***	0.0031 ***		0.0101 ***	0.0088 ***	0.0084 ***
		(0.0003)	(0.0003)	(0.0004)		(0.0003)	(0.0003)	(0.0006)
High School Performance			0.1032 ***	0.0790 ***			0.0912 ***	0.0578 ***
			(0.0052)	(0.0087)			(0.0051)	(0.0065)
Property Crime				0.7619 ***				0.4096 ***
				(0.0696)				(0.0490)
# of Observations	24944	24944	24944	13712	24944	24944	24944	13712
R- Sq.	0.7122	0.7151	0.7202	0.6678	0.7136	0.7254	0.7296	0.6545
Adj. R- Sq.	0.712	0.7149	0.72	0.6673	0.7134	0.7253	0.7294	0.6541

Notes:
***= significant at .01, ** = significant at .05, *= signficant at .10, Heteroskedasticity-consistent standard errors in ( )

Table 14: OLS Estimates (2006)

	Tract				Block Group			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Intercept	11.9810 ***	11.8469 ***	11.6200 ***	11.9403 ***	11.9854 ***	11.5644 ***	11.4171 ***	11.7338 ***
	(0.0190)	(0.0202)	(0.0293)	(0.0403)	(0.0177)	(0.0223)	(0.0286)	(0.0407)
Baths	0.0194 ***	0.0192 ***	0.0181 ***	0.0138 ***	0.0184 ***	0.0164 ***	0.0159 ***	0.0093 ***
	(0.0014)	(0.0014)	(0.0014)	(0.0020)	(0.0014)	(0.0013)	(0.0013)	(0.0017)
Sq. Ft.	0.3769 ***	0.3728 ***	0.3759 ***	0.3824 ***	0.3747 ***	0.3638 ***	0.3662 ***	0.3881 ***
	(0.0072)	(0.0072)	(0.0071)	(0.0094)	(0.0071)	(0.0068)	(0.0068)	(0.0098)
Acres	0.0915 ***	0.0904 ***	0.0875 ***	0.1443 ***	0.0880 ***	0.0869 ***	0.0852 ***	0.0747 **
	(0.0176)	(0.0176)	(0.0170)	(0.0094)	(0.0166)	(0.0161)	(0.0158)	(0.0298)
Patio	0.0488 ***	0.0487 ***	0.0492 ***	0.0479 ***	0.0461 ***	0.0403 ***	0.0412 ***	0.0374 ***
	(0.0054)	(0.0054)	(0.0053)	(0.0063)	(0.0053)	(0.0053)	(0.0053)	(0.0061)
Garage	0.1132 ***	0.1153 ***	0.1209 ***	0.1014 ***	0.1092 ***	0.1142 ***	0.1181 ***	0.0955 ***
	(0.0072)	(0.0072)	(0.0072)	(0.0083)	(0.0072)	(0.0071)	(0.0071)	(0.0078)
Pool	0.1083 ***	0.1102 ***	0.1098 ***	0.0984 ***	0.1097 ***	0.1040 ***	0.1042 ***	0.0921 ***
	(0.0056)	(0.0056)	(0.0055)	(0.0080)	(0.0055)	(0.0053)	(0.0052)	(0.0072)
Age	-0.0085 ***	-0.0094 ***	-0.0097 ***	-0.0124 ***	-0.0088 ***	-0.0100 ***	-0.0103 ***	-0.0123 ***
	(0.0004)	(0.0005)	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0004)	(0.0005)
Age Sq.	0.0001 ***	0.0001 ***	0.0001 ***	0.0002 ***	0.0001 ***	0.0001 ***	0.0001 ***	0.0002 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
%Black	0.0835	0.2351 **	-0.0680	-0.9577 ***	-0.1259 *	0.3077 ***	0.1543 **	-0.2437 ***
	(0.1020)	(0.1028)	(0.1019)	(0.1195)	(0.0718)	(0.0731)	(0.0727)	(0.0862)
Hispanic Neighborhood	-0.4487 ***	-0.3813 ***	-0.3524 ***	-0.4977 ***	-0.4492 ***	-0.2244 ***	-0.2022 ***	-0.2748 ***
	(0.0162)	(0.0165)	(0.0162)	(0.0309)	(0.0163)	(0.0171)	(0.0167)	(0.0297)
Integrated Neighborhood	-0.2750 ***	-0.2831 ***	-0.2734 ***	-0.6052 ***	-0.3135 ***	-0.0883 ***	-0.0837 ***	-0.2016 ***
	(0.0192)	(0.0190)	(0.0187)	(0.0378)	(0.0158)	(0.0164)	(0.0163)	(0.0291)
% Hispanic*Hispanic Neighborhood	-0.3270 ***	-0.3020 ***	-0.2661 ***	-0.3658 ***	-0.2864 ***	-0.1449 ***	-0.1357 ***	-0.2521 ***
	(0.0194)	(0.0193)	(0.0200)	(0.0220)	(0.0213)	(0.0217)	(0.0220)	(0.0270)
% Hispanic*Integrated Neighborhood	-1.0751 ***	-0.6858 ***	-0.5333 ***	0.0933	-0.7358 ***	-0.6373 ***	-0.5725 ***	-0.6431 ***
	(0.0782)	(0.0780)	(0.0809)	(0.1394)	(0.0611)	(0.0584)	(0.0586)	(0.0709)
% Hispanic*White Neighborhood	-2.8830 ***	-2.4707 ***	-2.2386 ***	-3.9899 ***	-2.6966 ***	-1.0992 ***	-0.9863 ***	-2.2567 ***
	(0.0978)	(0.0997)	(0.1008)	(0.2196)	(0.0905)	(0.0988)	(0.0990)	(0.1985)
Income		0.0035 ***	0.0023 ***	0.0031 ***		0.0101 ***	0.0093 ***	0.0094 ***
		(0.0002)	(0.0003)	(0.0004)		(0.0003)	(0.0003)	(0.0006)
High School Performance			0.0772 ***	0.0522 ***			0.0508 ***	0.0098
			(0.0060)	(0.0077)			(0.0053)	(0.0089)
Property Crime				0.5633 ***				0.1710 ***
				(0.0810)				(0.0504)
# of Observations	20746	20746	20746	11688	20746	20746	20746	11688
R- Sq.	0.7581	0.7609	0.7635	0.7172	0.7611	0.7728	0.774	0.7166
Adj. R- Sq.	0.7579	0.7607	0.7633	0.7168	0.7609	0.7726	0.7738	0.7162

Notes:
***= significant at .01, ** = significant at .05, *= signficant at .10, Heteroskedasticity-consistent standard errors in ( )

Table 15: OLS Estimates (2007)

	Tract				Block Group			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Intercept	12.0516 ***	11.9131 ***	11.8319 ***	12.2237 ***	12.0481 ***	11.6717 ***	11.6896 ***	11.9274 ***
	(0.0204)	(0.0244)	(0.0299)	(0.0483)	(0.0201)	(0.0251)	(0.0280)	(0.0426)
Baths	0.0230 ***	0.0232 ***	0.0228 ***	0.0282 ***	0.0222 ***	0.0219 ***	0.0220 ***	0.0214 ***
	(0.0020)	(0.0020)	(0.0020)	(0.0032)	(0.0020)	(0.0020)	(0.0020)	(0.0027)
Sq. Ft.	0.3586 ***	0.3558 ***	0.3552 ***	0.3117 ***	0.3574 ***	0.3420 ***	0.3420 ***	0.3227 ***
	(0.0094)	(0.0093)	(0.0093)	(0.0152)	(0.0093)	(0.0091)	(0.0091)	(0.0122)
Acres	0.0624 ***	0.0611 ***	0.0609 ***	0.1249 ***	0.0612 ***	0.0607 ***	0.0607 ***	0.0410 ***
	(0.0171)	(0.0170)	(0.0171)	(0.0283)	(0.0166)	(0.0161)	(0.0160)	(0.0138)
Patio	-0.0029	-0.0028	-0.0029	-0.0124	-0.0056	0.0024	0.0025	-0.0131
	(0.0095)	(0.0095)	(0.0095)	(0.0126)	(0.0094)	(0.0094)	(0.0094)	(0.0115)
Garage	0.0271 **	0.0283 **	0.0296 **	0.0057	0.0245 *	0.0296 **	0.0292 **	-0.0081
	(0.0124)	(0.0125)	(0.0126)	(0.0158)	(0.0125)	(0.0125)	(0.0126)	(0.0150)
Pool	0.1168 ***	0.1184 ***	0.1189 ***	0.1022 ***	0.1189 ***	0.1142 ***	0.1139 ***	0.0975 ***
	(0.0074)	(0.0073)	(0.0073)	(0.0107)	(0.0073)	(0.0070)	(0.0070)	(0.0096)
Age	-0.0059 ***	-0.0067 ***	-0.0066 ***	-0.0082 ***	-0.0061 ***	-0.0070 ***	-0.0071 ***	-0.0094 ***
	(0.0006)	(0.0006)	(0.0006)	(0.0008)	(0.0005)	(0.0005)	(0.0005)	(0.0007)
Age Sq.	0.0001 ***	0.0001 ***	0.0001 ***	0.0001 ***	0.0001 ***	0.0001 ***	0.0001 ***	0.0001 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
%Black	0.3437 **	0.5193 ***	0.5034 ***	-0.4695 ***	0.0772	0.4831 ***	0.4889 ***	-0.0521
	(0.1374)	(0.1391)	(0.1382)	(0.1644)	(0.0981)	(0.0998)	(0.0995)	(0.1127)
Hispanic Neighborhood	-0.5308 ***	-0.4559 ***	-0.4612 ***	-0.5857 ***	-0.5349 ***	-0.3381 ***	-0.3340 ***	-0.2378 ***
	(0.0211)	(0.0206)	(0.0208)	(0.0452)	(0.0217)	(0.0226)	(0.0235)	(0.0432)
Integrated Neighborhood	-0.3003 ***	-0.3048 ***	-0.3062 ***	-0.6642 ***	-0.3176 ***	-0.1169 ***	-0.1122 ***	-0.0942 **
	(0.0232)	(0.0230)	(0.0230)	(0.0485)	(0.0183)	(0.0192)	(0.0196)	(0.0419)
% Hispanic * Hispanic Neighborhood	-0.2871 ***	-0.2671 ***	-0.2482 ***	-0.4304 ***	-0.2358 ***	-0.1101 ***	-0.1134 ***	-0.3085 ***
	(0.0248)	(0.0247)	(0.0258)	(0.0340)	(0.0290)	(0.0294)	(0.0300)	(0.0346)
% Hispanic * Integrated Neighborhood	-1.2298 ***	-0.8463 ***	-0.8616 ***	-0.1701	-0.9539 ***	-0.8565 ***	-0.8582 ***	-1.0458 ***
	(0.0968)	(0.0991)	(0.0990)	(0.1875)	(0.0705)	(0.0678)	(0.0678)	(0.0865)
% Hispanic * White Neighborhood	-2.9191 ***	-2.4835 ***	-2.5441 ***	-3.8642 ***	-2.7231 ***	-1.2845 ***	-1.2499 ***	-1.4281 ***
	(0.1443)	(0.1368)	(0.1395)	(0.3310)	(0.1375)	(0.1477)	(0.1543)	(0.3348)
Income		0.0034 ***	0.0033 ***	0.0028 ***		0.0084 ***	0.0085 ***	0.0103 ***
		(0.0003)	(0.0003)	(0.0004)		(0.0004)	(0.0004)	(0.0008)
High School Performance			0.0282 ***	-0.0117 *			-0.0080	-0.0506 ***
			(0.0045)	(0.0065)			(0.0049)	(0.0063)
Property Crime				0.9962 ***				0.2570 ***
				(0.0925)				(0.0477)
# of Observations	16059	16059	16059	9130	16059	16059	16059	9130
R- Sq.	0.6571	0.6594	0.66	0.5256	0.6607	0.6607	0.6607	0.6607
Adj. R- Sq.	0.6568	0.6591	0.6596	0.5246	0.6604	0.6604	0.6604	0.6604

Notes:
***= significant at .01, ** = significant at .05, *= signficant at .10, Heteroskedasticity-consistent standard errors in ( )

Table 16: OLS Estimates (Pooled 2002-2007)

	Tract				Block Group			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Intercept	11.7870 ***	11.6594 ***	11.0820 ***	11.2518 ***	11.7942 ***	11.3872 ***	10.8879 ***	11.0305 ***
	(0.0108)	(0.0117)	(0.0119)	(0.0197)	(0.0103)	(0.0107)	(0.0111)	(0.0184)
Baths	0.0223 ***	0.0221 ***	0.0177 ***	0.0198 ***	0.0213 ***	0.0187 ***	0.0150 ***	0.0159 ***
	(0.0020)	(0.0020)	(0.0020)	(0.0033)	(0.0020)	(0.0019)	(0.0019)	(0.0032)
Sq. Ft.	0.3807 ***	0.3786 ***	0.3839 ***	0.3613 ***	0.3805 ***	0.3627 ***	0.3703 ***	0.3746 ***
	(0.0102)	(0.0102)	(0.0102)	(0.0202)	(0.0102)	(0.0099)	(0.0100)	(0.0199)
Acres	0.0803 ***	0.0794 ***	0.0781 ***	0.1347 ***	0.0795 ***	0.0774 ***	0.0771 ***	0.0647 ***
	(0.0089)	(0.0088)	(0.0088)	(0.0079)	(0.0087)	(0.0083)	(0.0085)	(0.0116)
Patio	0.0414 ***	0.0414 ***	0.0463 ***	0.0430 ***	0.0408 ***	0.0396 ***	0.0451 ***	0.0355 ***
	(0.0029)	(0.0029)	(0.0028)	(0.0036)	(0.0029)	(0.0029)	(0.0027)	(0.0034)
Garage	0.0814 ***	0.0833 ***	0.1062 ***	0.1003 ***	0.0778 ***	0.0816 ***	0.1042 ***	0.0939 ***
	(0.0044)	(0.0044)	(0.0042)	(0.0047)	(0.0044)	(0.0043)	(0.0041)	(0.0046)
Pool	0.0961 ***	0.0970 ***	0.1025 ***	0.0987 ***	0.0974 ***	0.0943 ***	0.1004 ***	0.0980 ***
	(0.0039)	(0.0039)	(0.0038)	(0.0061)	(0.0039)	(0.0037)	(0.0036)	(0.0060)
Age	-0.0092 ***	-0.0100 ***	-0.0102 ***	-0.0127 ***	-0.0098 ***	-0.0107 ***	-0.0109 ***	-0.0137 ***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Age Sq.	0.0001 ***	0.0001 ***	0.0002 ***	0.0002 ***	0.0001 ***	0.0002 ***	0.0002 ***	0.0002 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
%Black	-0.3468 ***	-0.2173 ***	0.0867	-1.1383 ***	-0.4114 ***	0.0522	0.1400 ***	-0.4989 ***
	(0.0591)	(0.0589)	(0.0555)	(0.0649)	(0.0464)	(0.0451)	(0.0420)	(0.0484)
Hispanic Neighborhood	-0.3428 ***	-0.2903 ***	-0.1870 ***	-0.2755 ***	-0.4017 ***	-0.1851 ***	-0.1178 ***	-0.2233 ***
	(0.0089)	(0.0091)	(0.0085)	(0.0131)	(0.0086)	(0.0088)	(0.0083)	(0.0131)
Integrated Neighborhood	-0.3355 ***	-0.3392 ***	-0.2647 ***	-0.3420 ***	-0.3902 ***	-0.1673 ***	-0.1476 ***	-0.1652 ***
	(0.0103)	(0.0102)	(0.0098)	(0.0170)	(0.0090)	(0.0089)	(0.0086)	(0.0138)
% Hispanic*Hispanic Neighborhood	-0.4408 ***	-0.3985 ***	-0.3369 ***	-0.4562 ***	-0.3274 ***	-0.1865 ***	-0.1419 ***	-0.2134 ***
	(0.0111)	(0.0111)	(0.0107)	(0.0120)	(0.0117)	(0.0120)	(0.0115)	(0.0138)
% Hispanic*Integrated Neighborhood	-0.6310 ***	-0.2791 ***	-0.1295 ***	-0.3866 ***	-0.2415 ***	-0.1624 ***	0.0700 **	-0.4486 ***
	(0.0402)	(0.0410)	(0.0398)	(0.0636)	(0.0348)	(0.0343)	(0.0330)	(0.0377)
% Hispanic*White Neighborhood	-2.6643 ***	-2.2786 ***	-1.4468 ***	-2.5095 ***	-2.5894 ***	-1.0150 ***	-0.4431 ***	-1.5703 ***
	(0.0542)	(0.0558)	(0.0530)	(0.0983)	(0.0500)	(0.0504)	(0.0489)	(0.0904)
Income		0.0032 ***	0.0020 ***	0.0004 **		0.0101 ***	0.0080 ***	0.0071 ***
		(0.0001)	(0.0001)	(0.0002)		(0.0002)	(0.0002)	(0.0003)
High School Performance			0.1807 ***	0.2136 ***			0.1706 ***	0.2053 ***
			(0.0016)	(0.0022)			(0.0015)	(0.0021)
Property Crime				0.6718 ***				0.1573 ***
				(0.0351)				(0.0205)
# of Observations	116326	116326	116326	63849	116326	116326	116326	63849
R- Sq.	0.6661	0.6682	0.7009	0.6714	0.6686	0.6807	0.7097	0.6580
Adj. R- Sq.	0.6661	0.6681	0.7009	0.6713	0.6686	0.6807	0.7096	0.6579

Notes:
***= significant at .01, ** = significant at .05, *= signficant at .10, Heteroskedasticity-consistent standard errors in ( )

Table 17: Tract Fixed Effects Estimates (Pooled 2002-2007)

	(1)	(2)	(3)	(4)
Intercept				
Baths	0.0206 ***	0.0201 ***	0.0171 ***	0.0158 ***
	(0.0006)	(0.0006)	(0.0006)	(0.0008)
Sq. Ft.	0.3575 ***	0.3541 ***	0.3608 ***	0.3697 ***
	(0.0023)	(0.0023)	(0.0021)	(0.0031)
Acres	0.0755 ***	0.0748 ***	0.0774 ***	0.0648 ***
	(0.0015)	(0.0015)	(0.0015)	(0.0021)
Patio	0.0351 ***	0.0363 ***	0.0408 ***	0.0365 ***
	(0.0024)	(0.0024)	(0.0023)	(0.0028)
Garage	0.0989 ***	0.0996 ***	0.1115 ***	0.1101 ***
	(0.0029)	(0.0029)	(0.0028)	(0.0032)
Pool	0.0987 ***	0.0978 ***	0.1023 ***	0.1078 ***
	(0.0027)	(0.0027)	(0.0025)	(0.0036)
Age	-0.0083 ***	-0.0083 ***	-0.0091 ***	-0.0112 ***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Age Sq.	0.0001 ***	0.0001 ***	0.0001 ***	0.0001 ***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
%Black	-0.3537 ***	-0.1324 **	-0.2452 ***	-0.2738 ***
	(0.0648)	(0.0653)	(0.0619)	(0.0646)
Hispanic Neighborhood	-0.2261 ***	-0.1153 ***	-0.0476 ***	0.0236
	(0.0187)	(0.0192)	(0.0182)	(0.0239)
Integrated Neighborhood	-0.1955 ***	-0.0915 ***	-0.0117	0.0967 ***
	(0.0176)	(0.0181)	(0.0171)	(0.0226)
% Hispanic * Hispanic Neighborhood	-0.3397 ***	-0.2487 ***	-0.2572 ***	-0.3482 ***
	(0.0269)	(0.0271)	(0.0256)	(0.0289)
% Hispanic * Integrated Neighborhood	-0.2867 ***	-0.2214 ***	-0.3976 ***	-0.6552 ***
	(0.0608)	(0.0607)	(0.0575)	(0.0702)
% Hispanic * White Neighborhood	-1.6715 ***	-0.8803 ***	-0.4807 ***	0.1189
	(0.1051)	(0.1098)	(0.1041)	(0.1484)
Income		0.0057 ***	0.0053 ***	0.0035 ***
		(0.0002)	(0.0002)	(0.0003)
High School Performance			0.2012 ***	0.2270 ***
			(0.0018)	(0.0021)
Property Crime				-0.1015 ***
				(0.0213)
Tract Fixed Effects	Yes	Yes	Yes	Yes
# of Observations	116326	116326	116326	63849
R- Sq.	0.7174	0.7188	0.7474	0.7018
Adj. R- Sq.				

Notes:
*****= significant at .01, ** = significant at .05, *= signficant at .10, Heteroskedasticity-consistent stand**

Chapter 5 – Conclusions and Implications

Pima County, Arizona represents a unique area for the study of housing prices and the role of neighborhood attributes. There exists ample diversity in Pima both within and across neighborhoods, regarding ethnic and economic composition. From an econometric perspective, this significant variation allows for strong conclusions to be made about the neighborhood preferences which consumers exhibit in their housing choices. In order to examine these preferences *ceteris parabis*, data is compiled from a variety of sources. Specifically, objective U.S. Census Bureau, Arizona Department of Education and Tucson Police Department figures serve as descriptive variables in this hedonic price model. Isolated estimates of each neighborhood variable's contribution to price were presented, while also satisfying the original research question of *Racial/Ethnic Preference* or *Racial Proxy Aversion*.

Comprehensive estimations resulted in this study's support of the hypothesis that *Racial/Ethnic Preference* is playing a significant role in the negative premiums observed for Hispanic neighborhoods in Pima County. This result corroborates the findings of the two most recent benchmarks (Myers 2004, Kiel & Zabel 2008) while contributing to the literature with tests of response to omitted variables, neighborhood definition, and contemporary multi-year observations. In opposition to the *Racial Proxy Aversion* hypothesis, the policy implications of *Racial/Ethnic Preference* are complex, and well beyond the scope of this empirical study. However, the associated costs of preferences for segregation are known, and this study presents a relevant piece of evidence for consideration in addressing segregation (Cutler & Glaeser 1997). While the demonstrated result of *Racial/Ethnic Preference* may not lend itself well to direct economic or social policy decision-making, there are several important contributions this study brings to bear.

A major contribution is the inclusion of improved neighborhood quality indicators. Specifically the school quality variable is unique in its comprehensiveness. In comparison with studies such as Clapp (2008) and Black (1999), which also observe positive estimates for school quality, this study includes a more comprehensive index (comprised of both absolute and relative proficiency exam scores, attendance rates, graduation rates, and dropout rates). Utilizing multiple indicators of school quality reflects the decision-making process of a concerned parent more accurately than a single standardized test score. Further, the positive, significant coefficients (across years and specifications) are indicative of the intuitive positive relationship between school quality and home prices. Providing statistical proof of a strong relationship between housing value and school performance is relevant for school boards, state and municipal policy makers as they consider the returns to investment in education.

Property crime as a neighborhood quality variable exemplifies the complexity of housing market studies. The evolution of this variable through multiple specifications follows an interesting path. When crime is considered at a large scale (Tract) the coefficient is likely capturing the economic differences between regions within the city. That is, crime and prices have a positive relationship, which has been documented in previous studies (Gibbons 2004). However, as crime is measured at a smaller, more local scale (Block Group) the coefficient magnitude drops substantially. Finally, when crime is measured at the Block Group scale, and geographic fixed effects are utilized, the estimate becomes negative, as intuition would suggest, higher crime is associated with lower prices. This result not only demonstrates the complex relationship between housing values and property crime, but also demonstrates the necessity of using a smaller scale of neighborhood unit.

Both Myers (2004) and Kiel & Zabel (2008) highlight the need for analysis at new levels of aggregation, due to the complex nature of neighborhood definition. Use of the Census Block Group unit enables this analysis to capture more of the heterogeneity in neighborhoods than Census Tracts (the common unit) could capture. Econometrically, disaggregation had a clear effect upon the income measure, and this is directly due to the increased variation measured by the Block Group. Little effect was observed for the set of racial/ethnic variables, though this is most likely due to the segregated nature of the Hispanic-dominant neighborhoods. In other study areas the smaller Block Group unit could affect the conclusions drawn regarding racial/ethnic preferences. In consideration of the property crime variable, it is clear from these estimations that the definition of neighborhood scale has a measurable impact, and may in fact lead to differing conclusions about the interaction between property crime and housing prices. Additionally, the Block Group estimations had higher R-squared values throughout the various specifications and cross sections, indicating the robustness of the use of Block Groups as a neighborhood unit. The correct analytical definition of neighborhood is a worthwhile question for additional research, and certain measures such as the CART algorithm (Clapp & Wang 2005) may make Census measures obsolete. For now, it seems the Block Group provides an econometric advantage as well as more intuitive value than the Tract.

Appendix A

2002		
Single Family, Townhome, Condos	17472	
Less Price < $10,000, BathFixtures<3, SQ. FT. < 400, Missing Structural Characteristics		77
Less No School District		2221
Total Observations	15174	
Less No Crime data for neighborhood		7069
Total Crime Subset	8105	

2003		
Single Family, Townhome, Condos	20280	
Less Price < $10,000, BathFixtures<3, SQ. FT. < 400, Missing Structural Characteristics		34
Less No School District		3294
Total Observations	16952	
Less No Crime data for neighborhood		7957
Total Crime Subset	8995	

2004		
Single Family, Townhome, Condos	24990	
Less Price < $10,000, BathFixtures<3, SQ. FT. < 400, Missing Structural Characteristics		42
Less No School District		2497
Total Observations	22451	
Less No Crime data for neighborhood		10232
Total Crime Subset	12219	

2005		
Single Family, Townhome, Condos	27247	
Less Price < $10,000, BathFixtures<3, SQ. FT. < 400, Missing Structural Characteristics		56
Less No School District		2247
Total Observations	24944	
Less No Crime data for neighborhood		11232
Total Crime Subset	13712	

2006		
Single Family, Townhome, Condos	22122	
Less Price < $10,000, BathFixtures<3, SQ. FT. < 400, Missing Structural Characteristics		72
Less No School District		1304
Total Observations	20746	
Less No Crime data for neighborhood		9058
Total Crime Subset	11688	

2007		
Single Family, Townhome, Condos	17339	
Less Price < $10,000, BathFixtures<3, SQ. FT. < 400, Missing Structural Characteristics		73
Less No School District		1207
Total Observations	16059	
Less No Crime data for neighborhood		6929
Total Crime Subset	9130	

Appendix B

Rosen's Hedonic Method; and the Tiebout Hypothesis:

Rosen (1974) formalized the theory on hedonic price analysis by utilizing basic economic optimization principles. In order to use Rosen's conclusions, it is necessary to clarify how these conclusions were formed. We begin with a composite good 'Z', which is composed of 'n' attributes:

$$Z = (z_i \ldots z_n)$$

It is necessary to say that the market (in which Z is transacted) is at equilibrium:

$$Q^d_z = Q^s_z$$

In describing market equilibrium, the conclusion is that buyers are maximizing utility according to their preferences and income, sellers are maximizing profit according to their costs and there is large, diverse selection of the good. With equilibrium assumed, it is possible to derive an inverse demand function, or implicit price function:

$$P(Z) = f(z_i \ldots z_n)$$

Consequently, the marginal values (parameters) of each attribute can be found through partial derivation of the implicit price function:

$$dP/dz_i = P_i$$

In summary of Rosen, the observed price of a composite good envelopes the (implicit) prices of the good's attributes. Determining these implicit prices allows a researcher to give relative weights and directions to individual attributes.

With Rosen's work as a theoretical base for the use of implicit prices, it is now possible to consider how different attributes of housing demand affect price. The key concept in Tiebout's (1956) work is capitalization of neighborhood attributes. This principle of capitalization

establishes that consumers are placing a value, in the form of a home price premium (positive or negative), on the quality of their surroundings. Tiebout posited that home buyers have preferences for the bundle of public goods provided by a neighborhood. These preferences are weighed against the tax rates required to finance the provision of public goods. Given enough choice of neighborhoods, consumers will bid for the neighborhood which best suits their preferences.

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