Immigrants, Hispanics, and the Evolution of Housing Prices in the US

Albert Saiz

University of Pennsylvania

Abstract

How has immigration and the associated growth in the Hispanic population impacted the evolution of housing prices and rents in the United States? The answer to this question depends on the scale of the local housing demand shock associated with immigration and the growth in the Hispanic population in a city. This paper reviews the existing literature on the issue and introduces a number of new facts. Cities where immigrants moved to experienced faster housing price and rent appreciation during the last two decades of the 20th century. Hispanic-dense metropolitan areas have more expensive housing. Part of the price differential is due to the growth in the Hispanic population, and we derive a statistical causal link between Hispanic growth and average housing price growth. However, within metropolitan areas it is precisely those neighborhoods with increasing Hispanic share where relatively slower housing price and rent appreciation took place. The facts are consistent with immigrant and Hispanic population growth generally driving up the demand for living in a city, but with increasing ethnic segregation within the city.

1. Introduction.

What is the impact of the growth of the immigrant and Hispanic populations on the housing markets of the United States? The relationship between Hispanic and immigrant population growth and housing price movements is of vital importance in assessing the impact of immigration on an economy. The housing market itself is of interest because the evolution of housing prices and rents are key economic indicators of welfare. Natives and immigrants alike spend about one-third of their incomes on housing in the United States. Individuals in the lower quintile of the income distribution spend an even greater share. Similarly, housing wealth represents about 60% of total wealth for American homeowners (Tracy, Scheneider, and Chan, 1999).

Yet much of the previous research in the economic impact of immigration has focused on the labor markets. Wages, employment conditions, and unemployment rates are certainly important to understand the social and economic dynamics of the arrival of new immigrants. Labor market conditions are important to understand the interaction of natives and immigrants, and how perceptions among the each group about the other are formed. On reflection, however, there are many complementary ways by which the US economy imports foreign labor without immigration. International trade brings to American shores the product of foreign workers' efforts. American firms routinely produce offshore, or outsource parts of their supply chain to foreign producers, always entailing the participation of foreign labor in products that will eventually be purchased by American consumers. More recently, the internet and improvements in telecommunication technologies have made it possible to hire workers who will deliver their services in the US while working abroad. Customer service representatives, technical support

personnel, and salesmen, working from a remote office in Bangalore meet the needs of many American customers nowadays.

Immigration cannot solely be defined by the job market and the fact that immigrants work for the US economy. Therefore, the study of the impact of immigration on local economics cannot be limited to labor outcomes. Immigrants come also to dwell into their new destination countries. It is thus important to understand their economic impact on residential markets.

Housing markets are important per se given their weight in the expenditures and wealth of the native and the foreign-born in the US. However, there are at least two other reasons why housing markets should come to the forefront of the study of the economic impact of immigration.

Firstly, the evolution of housing prices and rents may help us understand the mobility decisions of natives (or non-Hispanics) in cities where immigration or the Hispanic population is growing rapidly. Previous research seems to imply that wages may not be strongly impacted by immigration in the short run. But very high housing prices in California, New York, Miami, or Chicago may account for internal migration of natives.

Secondly, housing prices at a more micro level may tell us about the existence of segregatory preferences. Cutler, Glaeser, and Vigdor (2005) have recently demonstrated that immigrant residential segregation has been on the rise for the last 20 years. Similarly, Hispanics are now more segregated than 30 years ago. We can use housing prices as a measure of the perceived valuation of Hispanic neighborhoods by the market. If neighborhoods that are becoming denser with immigrants or Hispanics experience relative housing price and rent depreciation, keeping physical structural quality constant, then this implies the existence of ethnic preferences by natives. Why? The easiest way to understand this is by a simple "financial

arbitrage" argument (for a more detailed exposition see Saiz and Wachter, 2006). If prices are lower in a neighborhood and the perceived quality is the same as in other native areas, then all natives would like to move to the cheaper neighborhood. Keeping other quality attributes constant (that is what the bulk of existing research tries to do empirically) prices should be equalized everywhere. If prices are not lower in Hispanic or immigrant neighborhoods relative to the rest of the city, assuming similar location and structural characteristics, this implies different valuations of the neighborhood that are contingent on its ethnic composition.

The research linking immigration to housing prices also informs the debate on the impact of immigration on local prices. Cortés (2006) shows that relative prices of services produced with abundant immigrant labor grew more slowly during the 1980s and 1990s. However, it is still possible that absolute prices are growing faster in metropolitan areas where immigrants concentrate. In fact, the cross-sectional correlation between local housing price levels and the American Chamber of Commerce Price Index is a very high 0.8. Clearly, the results on the evolution of rent and housing prices need to be an integral part of future investigations about the evolution of local prices in immigrant areas.

In this chapter, I examine this relationship and the consequences of the new immigrant and Hispanic population expansion for housing price growth in metropolitan areas of the United States. I first compare the evolution of prices and rents in cities that experienced substantial growth in the Hispanic population with cities in which Hispanic growth has been more muted. I then evaluate the association between "Hispanization" and local price growth within three metropolitan areas: Houston, Los Angeles, and Chicago. I consider the impact of the growth in the foreign-born population generally, as well as the growth of the Hispanic population. Sometimes I will focus on the Mexican and Central American communities. Of course, most

Hispanics in the United States are not immigrants, and one should not confuse the two groups. Peoples from Spain were the first European colonizers of North-America. About one-third of the territories in the United States belonged to Mexico prior to the Texas Independence and Mexican-American Wars. Hispanic presence in the United States has been always important and is indeed historic. However, the *growth* in the Hispanic population has been fueled by recent immigration since 1960. In this sense, I will try empirically to treat Hispanic growth as parallel to the process of international migration from Mexico, Central American, and other Latin American countries, and therefore exogenous to the initial conditions of the local economies (more on this below).

Combining the results in this chapter with previous research on the impact of immigration on housing prices and rents yields a number of novel and sometimes unexpected results. Firstly, cities where Hispanics tended to dwell in the 1980s and 1990s were singularly expensive, in terms of both housing rents and prices. Secondly, part of the fact that prices are higher in Hispanic areas is due to the demographic pressure exercised by Hispanic growth. In areas where immigrants concentrated in the 1980s and 1990s housing prices and rents experienced faster inflation. Since the *growth* of the Hispanic population in the United States is directly linked to recent migratory patterns, it follows that Hispanic population growth has been associated with dearer housing, on average, in the metropolitan areas where Hispanics clustered. Thirdly, the positive impact on prices was uneven. Within metropolitan areas, neighborhoods with growing Hispanic settlement experienced relatively slower appreciation. The results are consistent with Hispanic growth pushing up demand for a city, but also with increased segregation within the city. Non-Hispanics have been paying price premiums in order to avoid areas of growing Hispanic concentration.

2. Immigrants and Housing Rents and Prices

In this section I follow closely the methodology exposited in Saiz (2002 and 2007). That paper finds that immigration pushes housing prices in destination metropolitan areas. The author uses yearly admissions data (from the former Immigration and Naturalization Service) and yearly rent data from HUD on rents at the median and 45th percentile of each metropolitan statistical area (MSA). That research also examines the evolution of housing prices by MSA using Freddie Mac's repeat sales index. The Fredddie Mac index is constructed using repeated observations of separate sales of the same underlying properties, and is relatively robust to structural changes in the composition of the housing stock. Therefore Saiz (2007) focuses on relative high-frequency changes in rents and housing prices in response to recorded migratory fluxes. Here I will consider lower frequencies, extending the previous results to long differences: 1984-1998. This implies, non-technically, that I will correlate the change in housing prices and rents between the two years (1998 and 1984) to total accumulated immigration inflows during that period. The regressions are, therefore, using a cross section of city[1] changes between two points in time.

There are several advantages derived from using longer data frequencies. More saliently it avoids problems related to short term fluctuations in the changes in the variables, which may obscure long term relationships. Moreover, it reduces issues with measurement error of the variables, which is exacerbated by taking differences of the data at lower frequencies (i.e. annual data).

Table 1 shows the results of the exercise. In fact, the results using the change of the log of rents or housing prices on the left-hand side are very similar to those obtained by Saiz (2007).

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[1] I will use the term city and MSA indistinctly throughout the paper.

TABLE 1
Impact of New Immigrant Residents on Rents and Prices

	Change in log rents 84-98 (FMR)		Change in log prices 84-98 (Freddie Mac)	
	(1)	**(2)**	**(3)**	**(4)**
Immigrant Admissions (83-97) per 1983 population	**0.654**	**0.641**	**1.755**	**1.796**
	(0.212)***	(0.228)***	(0.325)***	(0.341)***
Change in log incomes 83-97	0.418	0.417	0.956	0.960
	(0.091)***	(0.091)***	(0.151)***	(0.151)***
Unemployment rate (1983)	-0.420	-0.416	3.199	3.191
	(0.266)	(0.267)	(0.510)***	(0.511)***
Murders per 100 inhabitants (1983)	0.883	0.903	-14.577	-14.679
	(1.485)	(1.490)	(2.400)***	(2.413)***
Log central city area	-0.017	-0.017	-0.005	-0.004
	(0.008)**	(0.008)**	(0.014)	(0.014)
Log January Average Temperature (Average 1941-1970)	0.007	0.007	-0.049	-0.050
	(0.019)	(0.019)	(0.037)	(0.037)
Log July Mean Relative Humidity (Average 1941-1970)	-0.007	-0.007	0.049	0.049
	(0.023)	(0.023)	(0.031)	(0.031)
Percentage with Bachelor's Degree 1980	0.004	0.004	0.003	0.003
	(0.002)**	(0.002)**	-0.003	-0.003
Constant	0.209	0.208	-0.301	-0.300
	(0.144)	(0.144)	(0.266)	(0.266)
Observations (MSA)	300	300	155	155
R-squared	0.220	0.220	0.540	0.540

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

The main explanatory variable of interest is the total number of new permanent immigrant admissions in a metro area (a proxy for recent permanent immigration inflows in a city) between the years 1983 and 1997, divided by the initial level of population in the MSA.[2] The ordinary least squares (OLS) regressions in columns 1 and 3 imply that a "shock" to the immigrant

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[2] The measure does not take into account illegal immigration and its growth but focuses on measured permanent inflows. For a discussion of the quantitative interpretation of the coefficients in the presence of omitted illegal inflows see Saiz (2007).

permanent resident population that amounted to 1% of the initial population of an MSA was associated with robust housing inflation: 0.65% for rents and 1.7% for housing prices. Factually, immigrant cities are becoming more expensive cities. All regressions in Table 1 control for the change in the log of income between 1983 and 1997. This variable captures the evolution of the local economy during that period, a confounding factor for the evolution of housing prices and rents; previous research has shown that housing prices and rents tend to follow the evolution of local income, other variables constant (Malpezzi, 1999). Moreover, a major concern of past studies on the impact of immigration on wages is that immigration could be endogenously capturing the impact of income shocks that attracted immigrants into an area. However, part of the growth in incomes in absolute terms in an area can be attributable to immigration itself. If this is the case, the coefficients in Table 1 reflect the impact of immigration that goes above and beyond its impact as mediated by changes in income. In fact, controlling for income does not change the relevant coefficients much. The regressions additionally include other variables that are commonly associated with rent growth in the United States during the relevant period (Glaeser, Kolko, Saiz, 2002).

Columns 2 and 4 in Table 4 perform a similar exercise, this time using an instrumental variables (IV) approach. Immigration flows may be endogenous to the growth in housing prices for two reasons. The first is reverse causality: immigrants may be attracted to areas that are experiencing slower price appreciation. In this case, the association between immigration and prices shown in columns 1 and 2 would represent a lower bound of the actual causal impact of immigration. The second reason for endogeneity is omitted variables: the characteristics of a city that attracted immigrants may also be the features that caused price/rent growth, independent of immigration, per se. In this case, the sign of the bias in previous estimates is unknown.

To deal with endogeneity issues a possible approach is to use exogenous sources of variation. Optimally, one would like to have an exogenous immigration shock into a group of metropolitan areas and compare their subsequent price/rent evolution. IV techniques try to emulate that ideal experiment. In this case, the approach used in Saiz (2007) is implemented. Immigration inflows by year and origin nationality are predicted first using a simple random effects model that fits the US experience with data on immigration by country and other characteristics of the sending country. For instance, immigrant outflows into the US are predicted to decrease in countries with increasing GDP and to increase in countries with increasing population. Once I obtain the predictions by country and year, I use the share of immigrants moving to each MSA by nationality in 1983 and subsequent immigrant inflows. For instance, if Mexicans tended to move to Los angles in 1983 and I predict a substantial inflow of Mexicans into the United States in 1996, we would expect a substantial number of new immigrants in Los Angeles in that year. Using the predictions as instruments for the actual inflows (details can be found in Saiz 2007) yield results that are extremely close to the OLS estimates. In fact, just by knowing where immigrants went in 1983 and estimating the size of subsequent inflows by country, one can explain a good deal of the variance of legal immigrant inflows in the period that we study. Therefore, subsequent fluctuations in the economic and social conditions of these cities cannot account for the association between price growth and immigrant intake. The results are clearly consistent with a causal interpretation going from increased housing demand due to immigration to subsequent housing price growth.

The results confirm the previous literature that establishes a link between immigration and housing inflation. First, Gonzalez (1998) found a positive association between immigration and housing price levels in California and Texas, which he attributes to a compensating differential

in terms of a higher willingness-to-pay of Mexicans and Mexican-Americans for cities with specific amenities that cater to that community. Saiz (2003) used the Mariel boatlift in Miami as a natural experiment to show that rents in Miami grew 7 to 11 percent faster in Miami subsequent to the massive arrival of Cuban immigrants in 1980. Saiz (2007) also used all immigrants in the 1970, 1980, 1990, and 2000 censuses and find similar results.

Saiz (2002,2003, 2007), Quigley and Raphael (2004), Ottaviano and Peri (2006), and this chapter confirm this link between immigration and price growth at the metropolitan area level using alternative data sources, time periods, geographic coverage, and statistical techniques.

3. Hispanic Growth and Housing Rents and Prices

Moving beyond immigration is the question of the growth in the Hispanic population in the US and its impact on US housing markets. As discussed earlier the phenomenon is linked with the growth in the immigrant Latino population since the late 1960s. However, considerable growth in the native-born Hispanic population has also occurred. What is the impact of overall Hispanic growth in those cities where this phenomenon has been more quantitatively important?

First, however, it is necessary to distinguish Hispanic growth from other components of population growth to show that this question is worth asking. Assessing the impact of Hispanic population growth makes sense if one compares the current scenario to a counterfactual world where the growth of Hispanic population was nonexistent or minuscule. Conventional spatial equilibrium models in economics and geography imply that, in countries with reduced barriers to inter-urban mobility, such as the United States, population flows will equilibrate quality of life across locations. Wages and rents and housing prices tend to adjust until everyone (or at least those individuals who are initially willing to move for realistic changes in local economic and

environmental circumstances) is indifferent between locations For instance, if local productivity increases in a city, with consequently higher wages, then a number of individuals will move to that city, which has become now relatively more attractive. Increased labor supply and higher demand for housing will then tend to depress the initial wage boost and put pressure on housing prices until the new economic conditions cease to make the city more attractive than others. It is in a context of a hypothetical counterfactual initial spatial equilibrium across locales without Hispanic growth where it makes sense to ask what the impact of this phenomenon was. Clearly, Hispanic growth was disproportionally concentrated in a number of metropolitan areas for reasons other than wages, prices, and other economic factors. New Hispanic immigrants located in areas that corresponded to previous Hispanic population centers, and natural population growth of the Hispanic population has disproportionally concentrated in these areas. Of course, many Hispanic individuals have relocated to other cities searching for higher wages, amenities, and low housing costs.

It therefore makes sense to try to emulate the ideal experiment (comparing a world with exogenous Hispanic growth to a counterfactual without it) by using instrumental variables techniques. In that sense, immigration and the subsequent growth of the Hispanic population in immigrant cities can be consider, conceptually, a "helicopter drop" of people.

Table 2 starts by documenting a new stylized fact: Hispanics live in expensive areas. The table consists of an OLS regression where the log of median housing rents (columns 1, and 2) and values (columns 3 and 4) in the 1980, 1990, 2000 Census by metropolitan area appear on the left-hand-side. We include time fixed effects to capture the evolution of inflation in the US and cluster standard errors at the MSA level. On the right hand side, the main explanatory variable is

the Hispanic share (exclusively in columns 1 and 3), and other metropolitan area characteristics,

most importantly income.

TABLE 2
Hispanics Live in Expensive Metro Areas

	Log median rent		Log median house value	
	(1)	**(2)**	**(3)**	**(4)**
Hispanic Population/Population	**0.187**	**0.285**	**0.339**	**0.482**
	(0.127)	(0.048)***	(0.250)	(0.121)***
Log Income		0.725		1.281
		(0.037)***		(0.085)***
Unemployment rate		0.575		1.942
		(0.235)**		(0.588)***
Log January Average Temperature (Average 1941-1970)		0.104		0.137
		(0.016)***		(0.032)***
Log July Mean Relative Humidity (Average 1941-1970)		0.013		-0.031
		(0.019)		(0.047)
Log Area		0.006		0.012
		(0.008)		(0.017)
Murders per 100 inhabitants		-4.396		-9.469
		(1.047)***		(2.455)***
Percentage with Bachelor's Degree		0.007		0.016
		(0.001)***		(0.002)***
YEAR FIXED EFFECTS	yes	Yes	yes	Yes
Observations (MSA*time)	954	948	954	948
R-squared	0.79	0.94	0.51	0.82

Clustered standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

One can interpret the coefficients as giving us a sense of the strength of the correlation

between housing rents and prices and the Hispanic share across cities. Controlling for a number

of important variables, from Table 2 one can expect cities where the Hispanic share is one

percentage point higher to have rents and prices that are from about 0.3 to 0.5 percent higher. In

fact, most of the variation in rents and prices across cities can be explained by a single variable:

income. And yet, considering two metropolitan areas with the same income, it is a stylized fact that the one with higher proportion of Hispanics is likely to have higher prices.

The regressions in Table 2 do not tell us much about the impact of immigration on rents and housing prices. Attributes that made a city more attractive to Hispanics could have also been associated with higher prices. In order to know more about this we consider a statistical model that links changes in the number of Hispanic shares to changes in housing prices/rents. Of course, changes in the Hispanic share, per se, should not be associated with increasing prices if Hispanic growth is not associated with growth in the demand for a city. Therefore, the total number of Hispanic population growth in a MSA divided by its initial population level will be considered as a measure of housing demand "shock." For instance, if a city with 1 million inhabitants in 1990, 200,000 of which were Hispanic, went to 300,000 Hispanics this measure would imply a demand "shock" of (100,000/1,000,000)=0.1, or 10% of the initial population.

Following Saiz (2007), the relationship between decadal changes in median housing prices and rents from the census and the measure of Hispanic population shocks in each of the decades under consideration (1980-1990 and 1990-2000) is given in Table 3. The regressions are similar to those in Table 1 but now the Hispanic share, rent, and price measures from the census is used together with the Freddie Mac price index. There are also several time observations for each MSA included, allowing for the variation within cities. The main controls are the change in per capita income in each decade and decade fixed effects, which control for the general evolution of the housing markets in the nation as a whole. As in other specifications, several characteristics of the metropolitan area as measured in the initial year of the decade are also controlled for. Standard errors are clustered at the MSA level.

TABLE 3

OLS: Hispanic Population "Shock" and Housing Rents/Prices

	ΔLog Rent	ΔLog Median Price	ΔLog Price Index
	(1)	**(2)**	**(3)**
ΔHispanic Population/(Population at T-10)	**0.406**	**0.554**	**0.686**
	(0.098)***	(0.158)***	(0.239)***
ΔLog Income	0.889	1.743	1.672
	(0.068)***	(0.146)***	(0.168)***
Unemployment rate at T-10	0.036	-0.627	0.792
	(0.195)	(0.342)*	(0.500)
Log January Average Temperature (Average 1941-1970)	0.027	-0.002	-0.042
	(0.007)***	-0.015	(0.020)**
Log July Mean Relative Humidity (Average 1941-1970)	-0.028	-0.053	-0.002
	(0.012)**	(0.019)***	-0.026
Log Area	-0.006	-0.02	-0.011
	(0.004)	(0.006)***	(0.009)
Murders per 100 inhabitants	0.708	1.701	-2.611
	(0.790)	(1.718)	(2.440)
Percentage with Bachelor's Degree at T-10	0	-0.005	-0.001
	(0.001)	(0.001)***	(0.001)
YEAR FIXED EFECTS	*yes*	*yes*	*yes*
Observations	632	632	442
R-squared	0.74	0.31	0.33

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

The results in Table 3 suggest very strong associations between Hispanic "demand shocks" and the growth of housing prices and rents. Column 1 suggests that a Hispanic "demand shock" that amounts to 1% of the initial population is associated, other things equal, with a 0.4% rental price inflation. Columns 2 and 3 suggest that the impact on housing prices is slightly higher, 0.5-0.7%, albeit the magnitudes of the price and rent results are not statistically different. It is not only that Hispanics tend to live in expensive areas: areas with greater Hispanic population shares also happened to experience rapid housing appreciation.

There is an important shortcoming, however, in the results in the previous Table. As we say in table 2, Hispanics tended to live in relatively more expensive areas. This was true in 1980 and all subsequent initial years of the previous estimates (1980 and 1990). Previous literature on the evolution of housing prices and rents has conclusively establishes mean-reversion as an established empirical fact (Case and Shiller, 1990, Meese and Wallace, 2003, Glaeser and Gyourko, 2006).

Prices in expensive areas tend to grow at a slower rate than prices in cheaper areas. The explanations to this fact are many: from data measurement error or the existence of important temporary components in the data generation process, to convergence in productivity and amenities across locales. For instance, areas in the South have become more integrated with the national economy and generally have been catching up in most measures of economic and social development. The process of economic convergence within countries (as documented by Barro and Sala-i-Martin, 1992 and Sala-i-Martin, 1996) implies mean reversion in the distribution of housing prices and rents in a country.

Previous literature on the relationship between demographics and the evolution of housing prices has, to date, tended to ignore this fact. This may generate omitted variable bias insofar demographic factors are associated with initial housing prices, as is the case in this study. Table 4 takes care of the problem by including the log of initial housing rents and prices as explanatory variables.

TABLE 4

OLS (MR): Hispanic Population "Shock" and Housing Rents/Prices

	ΔLog Rent	ΔLog Median Price	ΔLog Price Index
	(1)	(2)	(3)
ΔHispanic Population/(Population at T-10)	**0.458**	**0.732**	**0.781**
	(0.130)***	(0.241)***	(0.296)***
Log Rents/Prices at T-10	-0.079	-0.151	-0.052
	(0.026)***	(0.023)***	(0.028)*
ΔLog Income	0.859	1.663	1.631
	(0.064)***	(0.134)***	(0.162)***
Unemployment rate at T-10	-0.017	-0.614	0.754
	(0.194)	(0.359)*	(0.518)
Log January Average Temperature (Average 1941-1970)	0.03	0.006	-0.037
	(0.008)***	(0.017)	(0.021)*
Log July Mean Relative Humidity (Average 1941-1970)	-0.02	-0.034	0.005
	(0.014)	(0.025)	(0.030)
Log Area	-0.004	-0.014	-0.011
	(0.004)	(0.008)*	(0.010)
Murders per 100 inhabitants	0.518	0.783	-3.041
	(0.827)	(2.001)	(2.624)
Percentage with Bachelor's Degree at T-10	0.001	0	0.001
	(0.001)	(0.001)	(0.001)
YEAR FIXED EFECTS	*yes*	*yes*	*yes*
Observations	632	632	442
R-squared	0.74	0.35	0.33

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

The results in Table 4 point to an even stronger relationship between Hispanic population growth and price and rent appreciation in the housing sector. This makes sense in the presence of mean reversion. Hispanics moved to cities that were initially quite expensive, in relative terms: New York, Chicago, Los Angeles, San Diego, and other large metropolitan areas in California and other parts of the country. These are precisely the areas in which, other things constant, one would have expected housing price growth to be relatively slower, due to the fact that other areas

have been catching up. Therefore, Hispanic growth in many of these high-rent areas was a factor slowing convergence of rents and housing prices in the United States.

The previous results can be understood as descriptive statistics. It seems an uncontestable fact that in MSAs with strong Hispanic "demand shocks" (Hispanic growth as a percentage of initial population levels), housing prices and rental contracts experienced faster appreciation. But two conceptual issues of interpretation remain.

The first conceptual issue pertains to causality. Are the previous estimates the result of Hispanic growth or do they just reflect the fact that Hispanics moved to more expensive areas? Alternatively, initial attributes that attracted Hispanics may have also been associated with economic growth or improving local amenities. In order to make a causal interpretation, an instrumental variable technique is again required. As in the preferred theoretical interpretation for explaining the focus on Hispanic growth (the existence of a hypothetical counterfactual where Hispanic growth would not have happened), the following analysis will try to exploit exogenous shocks to the local populations of cities where an initial market equilibrium was disrupted due to the cities' *disproportional* attractiveness to Hispanics for reasons other than housing prices. As in most of the literature focusing on the economic impact of immigration I use a "shift-share" of national Hispanic growth as an instrument.

As it is well-known from very early literature the growth of immigrant groups in a city follows a snow-ball process, where early settlers establish a bridge-head for later comers. The establishment of local ethnic networks is therefore very important to explain subsequent growth of ethnic minorities, like Hispanics, which tend to cluster in areas where family, friends, and other co-ethnics settled earlier.

This section makes use of ethnic clustering as an exogenous shock to a population, not related to other factors that generally made the city more attractive to everyone in the country. Consider thus the total growth of the Hispanic population in the United States in a given decade (say 1990 to 2000). An instrument for Hispanic growth that assigns those flows proportionally according to the initial Hispanic share as a proportion of the Hispanic population in the US in 1980. The expected Hispanic inflow in a city will simply be the city's initial "market share" in 1980 (number of Hispanics in the city divided by the total number of Hispanics in the US) times the total Hispanic growth in the US. The instrument thus produced should be exogenous to the subsequent fortunes of a city after 1980. The instrumental variable technique therefore uses the variation in the data that is related to initial ethnic settlement patterns, as opposed to changes in Hispanic growth after 1980.

The results of the IV estimation are presented in Table 5. Yet again, the coefficients of the "Hispanic population shock" on rental and price growth in residential real estate markets show increases in housing prices. The coefficients suggest an impact close to unity. The results do not yield a statistical rejection of the hypothesis that a Hispanic shock that amounted to 1 percent of the initial population in the 80s and 90s caused a 1% increase in housing prices and rents, as benchmarked against a counterfactual without growth in the Hispanic population. This suggests that endogeneity bias may have been biasing the OLS coefficients downward. This makes sense, because one could have expected new Hispanic move-ins to avoid metropolitan areas that were becoming inordinately expensive, forcing somewhat of a negative correlation between Hispanic growth and price inflation.

TABLE 5
OLS (IV): Hispanic Population "Shock" and Housing Rents/Prices

	ΔLog Rent	ΔLog Median Price	ΔLog Price Index
	(1)	(2)	(3)
ΔHispanic Population/(Population at T-10)	**0.746**	**1.255**	**1.217**
	(0.198)***	(0.365)***	(0.404)***
Log Rents/Prices at T-10	-0.1	-0.168	-0.069
	(0.033)***	(0.029)***	(0.033)**
ΔLog Income	0.869	1.687	1.662
	(0.065)***	(0.137)***	(0.163)***
Unemployment rate at T-10	-0.128	-0.791	0.589
	(0.213)	(0.399)**	(0.607)
Log January Average Temperature (Average 1941-1970)	0.015	-0.022	-0.061
	(0.009)*	(0.021)	(0.024)**
Log July Mean Relative Humidity (Average 1941-1970)	-0.003	-0.006	0.026
	(0.018)	(0.031)	(0.033)
Log Area	-0.007	-0.019	-0.015
	(0.004)	(0.008)**	(0.010)
Murders per 100 inhabitants	0.588	0.899	-2.899
	(0.839)	(1.978)	(2.640)
Percentage with Bachelor's Degree at T-10	0.001	0	0.001
	(0.001)	(0.001)	(0.002)
YEAR FIXED EFECTS	*yes*	*yes*	*yes*
Observations	632	632	442
R-squared			

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

The second conceptual issue that it is worthwhile to discuss has to do with the interpretation of the coefficients. IV techniques can help with causal claims, but the impact of immigration and Hispanic population growth on average residential real estate inflation can go through a number of mechanisms. In many senses, the impact being estimated is an amalgamation of different channels. When exogenous population growth shocks happen there are three responses in the housing market that merit attention (see Saiz, 2002, 2003 and 2007 for more extensive

discussions). Initially most of the impact of an unexpected housing demand shock will be translated in higher rents (the first response). If the surge in demand is expected to persist then housing prices will rise through conventional asset pricing mechanisms. The rise in housing rents, however, will in the long run motivate a surge in construction (the second market response). Depending on the elasticity of housing supply in a metropolitan area, increased supply will mute somewhat the initial impact on rents. In areas with quite inelastic housing supply (this is, in areas where it is rather difficult to build or where the marginal land has many undesirable features) new construction won't detract much to the initial housing price surge. Finally, the third response to higher housing rents, and possibly slightly more competitive labor market conditions, may imply the reduced growth in the native population (or reduced internal migration to the city). Since counterfactual native growth may have been higher in the absence of immigration, the final impact on housing prices and rents is also muted. The results should therefore be interpreted in the light of this discussion. The parameters on the impact of housing demand shocks (what the IV estimates try to get to) correspond to the final impact as mediated by housing supply and the response of native populations. In this context, they might very well have been zero or very small. However, they are not, and this supports the validity of measuring the Hispanic population impact as separate from studying population growth as a whole.

Yet, one statistical concern remains. The instruments may not be exogenous to the evolution of housing prices. This could happen if, for some reason, Hispanics had chosen locations with attributes that happened to predict housing price or rent growth, even in 1980. A way to tackle this issue is to use the other source of variation in the Hispanic growth data: changes in the level of Hispanic growth within a city. This is explored in Table 6. The table displays a model similar to that in Table 4, but now includes MSA fixed effects. Recall that the data contain 2 decades

(80s and 90s) and the model's main variables of interest are the change in the log of rents and prices (left-hand side) and the Hispanic demand shock (right-hand side). Including fixed effects, since there are two observations by MSA, is equivalent to taking first-differences of the variables. This associates the acceleration of Hispanic growth to accelerations or decelerations in housing inflation. From another perspective, the fixed effects model implies looking at deviations from the previous decade, controlling for a general trend of city growth during both decades. City-specific omitted variables that were generally associated with growth will be controlled for.

TABLE 6
OLS (FE): Hispanic Population "Shock" and Housing Rents/Prices

	ΔLog Rent	ΔLog Median Price	ΔLog Price Index
	(1)	(2)	(3)
ΔHispanic Population/(Population at T-10)	1.019	1.146	0.586
	(0.315)***	(0.383)***	(0.899)
Log Rents/Prices at T-10	-1.201	-1.52	-1.263
	(0.055)***	(0.047)***	(0.080)***
ΔLog Income	0.23	0.263	0.502
	(0.064)***	(0.112)**	(0.189)***
Unemployment rate at T-10	-0.563	-2.656	0.635
	(0.277)**	(0.465)***	(1.382)
Murders per 100 inhabitants	-0.313	2.262	-1.541
	(1.465)	(2.454)	(5.614)
Percentage with Bachelor's Degree at T-10	0.008	0.017	0.036
	(0.004)**	(0.007)**	(0.015)**
YEAR FIXED EFECTS	*yes*	*yes*	*yes*
MSA FIXED EFFECTS	*yes*	*yes*	*yes*
Observations	632	632	442
R-squared	0.97	0.95	0.92

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

The results in Table 6 are, surprisingly, very consistent with the previous ones. The hypothesis that a Hispanic demand shock that amounts to 1% of the initial population in a metropolitan area is associated with 1% growth in housing prices and rents cannot be statistically rejected. The results are surprising because the model now uses the absolute opposite source of variation that the IV technique used. In the IV specification the variance was mostly cross-sectional: variation between MSAs in initial Hispanic populations. Now, this specification solely uses longitudinal variation within MSAs to obtain consistent parameters. In all and however one wants to read the evidence, the facts are very clear: the metropolitan areas that experienced fast Hispanic growth also experienced marked appreciation of residential real estate rents and values during the last two decades, on average.

3. Hispanic Density and Housing Prices: a Neighborhood Analysis within Cities

While average housing prices and rents are growing faster in metropolitan areas that are becoming more Hispanic, it is not clear a priori whether, within a metropolitan area, prices in the neighborhoods where Hispanics settle should grow at a relatively faster rate.

Previous research has documented increasing segregation for Hispanics. Conventional racial segregation models (Bailey, 1959; Schelling, 1971; Yinger, 1974; Courant and Yinger, 1975; Kanemoto, 1980) yield a few unambiguous predictions as to the impact of individuals belonging to a minority group moving into a neighborhood. Most models consider three types of neighborhoods: a "white" (non-Hispanic) set of neighborhoods, an entirely "minority" group of neighborhoods, and a number of "mixed" areas (the literature focuses on African-Americans as the relevant minority group, although the focus here will be on Hispanic neighborhoods). "Mixed" neighborhoods are either in long-run equilibrium or on their way to becoming one of

the other two types of neighborhoods. If the members of the "white" group have negative tastes for living with members of the "minority" group, prices in the "mixed" neighborhoods must be lower than in the "white" neighborhoods: this reflects a compensating differential necessary for "whites" to live in the ethnically mixed place. Similarly, if "minority" individuals prefer to live with their co-ethnics there will be a housing premium in "minority" neighborhoods vis-à-vis the mixed areas. The magnitude of the "white" versus "mixed" price differential (or, similarly, the *changes* in prices in "white" neighborhoods as minorities move in) can be thought of as a lower bound for the negative amenity as perceived by "whites:" the marginal "white" living in "mixed" neighborhoods is likely to exhibit less of a preference for ethnic segregation.

If a "mixed" equilibrium is not possible, then the "mixed" neighborhoods "tip" toward total segregation (as in Schelling, 1971). In that case, the difference between prices in the "white" and "minority" neighborhoods need not reflect the tastes of the marginal white mover. "Minority" individuals may actually be willing to pay a higher price than "whites" to live in a "minority" neighborhood (theoretically, even a premium over the "white" neighborhood price is possible). However, if prices go down during the transition, then that is a sufficient condition for the existence of racially-based preferences: if "whites" were indifferent to ethnic composition and prices were going down, that would create an arbitrage opportunity for prospective white movers.

In sum, if prices increase during the transition toward a more minority-dense neighborhood, that does not necessarily say anything about ethnic tastes among non-minorities. However, if prices in a neighborhood where minorities are moving decline, that is certainly a signal of racial preferences by "whites," and the magnitude of the price decline is a *lower* bound for the actual valuation of the perceived "negative amenity" to non-minorities.

Saiz and Watcher (2007) find that, controlling for the evolution of prices at the metropolitan area level, increases in the share of immigrant population in a neighborhood are associated with lower housing price appreciation. This empirical fact is, indeed, consistent with the idea that natives are on average willing to pay a premium for living in predominantly native areas. We focus here on three MSAs from the Saiz and Wachter (2007). We start by reproducing their results for these 3 areas: Chicago, Los Angeles, and Houston. The three cities have been an important magnet for Latino immigrants, and their Hispanic populations have grown substantially over the last decades. But they are also quite different in terms of geography, land zoning and transportation policies, productive structure, governmental dynamics, and so on. Finding common patterns in such three different cities may point out to quite strong and resilient social dynamics.

Table 7 focuses on changes in housing prices within each of these metropolitan areas. The basic unit of observation is the census tract. A census tract is a relatively homogenous collection of city blocks that encompasses about a 4,000 population in the 2,000 Census. We use the census-defined geography as a proxy for a neighborhood (as has been done in previous literature – for instance, see Card, Mas, and Rothstein, *forthcoming*). We use a version of the census data compiled by Geolytics ™ that keeps the definition of a neighborhood constant in its 2,000 boundaries. We focus on the changes in the log average housing values by neighborhood between 1990 and 2000 as the main dependent variable. The main explanatory variable in column 1 is the change in the share of population that is foreign-born between the years 1990 and 2000.

TABLE 7

	Intercensal Change in Log Value (Census Tract)			
	(1)	(2)	(3)	(4)
CHICAGO				
ΔForeign Population/Population	-0.003 (0.043)	0.339 (0.145)**		
ΔForeign Population/Population × Share NH White at T-10		-0.482 (0.207)**		
ΔForeign Population/Population × House Value Quartile at T-10		-0.029 (0.048)		
ΔShare Hispanic			-0.137 (0.031)***	
ΔShare Mexico				-0.28 (0.065)***
ΔShare Central America				-1.109 (0.387)***
HOUSTON				
ΔForeign Population/Population	-0.315 (0.090)***	-0.192 (0.230)		
ΔForeign Population/Population × Share NH White at T-10		-0.075 (0.380)		
ΔForeign Population/Population × House Value Quartile at T-10		-0.031 (0.078)		
ΔShare Hispanic			-0.356 (0.066)***	
ΔShare Mexico				-0.489 (0.173)***
ΔShare Central America				-0.199 (0.345)
LOS ANGELES				
ΔForeign Population/Population	-0.294 (0.040)***	-0.567 (0.090)***		
ΔForeign Population/Population × Share NH White at T-10		-2.105 (0.231)***		
ΔForeign Population/Population × House Value Quartile at T-10		0.86 (0.060)***		
ΔShare Hispanic			-0.318 (0.030)***	
ΔShare Mexico				-0.132 (0.086)
ΔShare Central America				-0.763 (0.161)***

The regressions include a host of neighborhood characteristics that are omitted in Table 7 for ease of exposition. The interested reader should consult the full specifications in Saiz and Wachter (2007). As in that paper, we find now that in all cities, increases in the share of population that is foreign-born in the cities are associated with relative declines in housing prices. The declines are relative, remember, because the general price level in the city is growing everywhere, simply more slowly in areas that are becoming immigrant-dense (as opposed to declining in absolute terms).

For instance, in a Houston neighborhood that goes from a 0 percent immigrant share to a 50% one can be expect housing values to be 15 percent lower than they would have been otherwise. Note that the effect that Saiz and Wachter (2007) find as an average for the US is much muted, statistically indifferent from zero, in Chicago. The answer to why is given in column 2 where we interact the change in the immigrant share by neighborhood by its initial non-Hispanic (NH) white share, and by a variable containing the neighborhood's quartile in the MSA price distribution (the first quartile –lowest housing values- is normalized to a value of zero; the other quartiles take value 1, 2, and 3).

Saiz and Wachter (2007) also found that the negative association between increases in the immigrant share and price appreciation was much stronger in neighborhoods that used to be more expensive and less dense with minorities initially. In minority neighborhoods with low socioeconomic status (SES as captured by the initial price levels) immigration had a null or even positive impact on prices. We repeat the exercise in Saiz and Wachter (2007) here for our three reference cities. While the results on initial housing values are less clear (in these cities housing values and the share of minorities are extremely related to start with) the results are remarkably consistent for the interaction with the variable capturing minority density. The negative

association between increasing immigrant density and lower price appreciation is stronger in neighborhoods that used to be majoritarily non-Hispanic white. This is consistent with a "white-flight" story within these metropolitan areas. In Chicago we also find a negative relative impact of immigration on price growth on white neighborhoods.

In column 3 we go further and repeat a similar exercise, this time with the share of Hispanics as the main explanatory variable. Now all coefficients are clearly negative in the three cities. Whatever the explanation, it is an uncontestable fact that relative prices (within a city) are growing less fast precisely in the areas that are becoming denser with Hispanics in Chicago, Houston, and LA. Again, since changes in structural housing quality do not seem to be at play (Saiz and Wachter, 2007) this points to social dynamics related to ethnic segregation.

In column 4 we focus on the share of individual in a neighborhood that was born in Mexico, and Central America. Mexico and the Central American countries are the source of origin of a majority of immigrants in the United States. The social dynamics of neighborhoods in which these groups settle deserve special attention.

As in the previous regressions, we find that neighborhoods in which the concentrations of Mexicans and Central Americans increased saw relative slower growth in housing price and rents in the three cities. Unfortunately, this seems to point out to the fact that these new immigrant enclaves are perceived as relatively less desirable places to live by many other residents in these cities.

4. Concluding Remarks

How has immigration and the associated growth in the Hispanic population impacted the evolution of housing prices and rents in the United States? The answer to these questions

depends on the scale of the local housing demand shock associated with immigration and the growth in the Hispanic population in a city. This chapter reviews the existing literature on the issue and introduces a number of new facts. Cities where immigrants moved to experienced faster housing price and rent appreciation during the two last decades of the 20th century. Hispanic metropolitan areas have more expensive housing. Moreover, part of the price differential is due to the growth in the Hispanic population. In the chapter we derive a statistical causal link from Hispanic population growth to rising average housing prices at the metropolitan area level. However, within metropolitan areas it is precisely the neighborhoods with increasing Hispanic share the ones experiencing relatively slower housing price and rent appreciation. The facts are consistent with immigrant and Hispanic population growth generally driving up the demand for living in a city, but with increasing ethnic segregation within the city and a perception by many of the new Hispanic enclaves as relatively less attractive places to live.

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