Joint Center for Housing Studies
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The Impact of Demographic, Socioeconomic and Locational Characteristics on Immigrant Remodeling Activity

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Abstract

Immigrants have become a growing force in the housing and home improvement markets in recent years. This research explores how key demographic, socioeconomic and locational characteristics impact the remodeling spending and project choice of foreign-born homeowners using data from the 2001-2007 American Housing Surveys. A major finding of this research is that immigrant homeowners spend about the same as native-born homeowners on average for home improvements and on a similar mix of jobs, despite the fact that immigrant homeowners have demographic, socioeconomic and locational profiles that would imply higher average spending. While the specific characteristics of foreign-born owners suggest they should be more active remodelers than native owners, once all of the major differences between immigrant and native homeowners are controlled for, it is apparent that average immigrant remodeling spending is estimated to be significantly less than spending of comparably situated native-born homeowners. This finding implies that immigrant remodeling spending is on par with that of native owners only because of the skew in the composition along demographic, economic and geographic dimensions that matter to how much owners spend on remodeling. Moving forward, immigrant homeowners are expected to provide a strong and growing source of demand for the remodeling industry as they increase in number and spend longer in the country despite their propensity to spend less per homeowner, all else equal.

I. Introduction

Over the past four decades, the foreign-born population in the United States grew considerably from just under 10 million in 1970 to over 38 million in 2007. During this time period the immigrant share of total U.S. population also increased significantly from about one in twenty people to one in every eight, the highest level in 80 years. And in more recent years, immigration has become a particularly strong driver of growth in both new household formation as well as the number of homeowners in the U.S. By 2007, the foreign-born made up over ten percent of all homeowners, and that year immigrant owners spent almost $30 billion on home improvements and repairs. With immigrants becoming an ever-growing force in the housing and home improvement markets, recent trends in immigrant remodeling behavior are expected to shape the future of the home improvement industry.

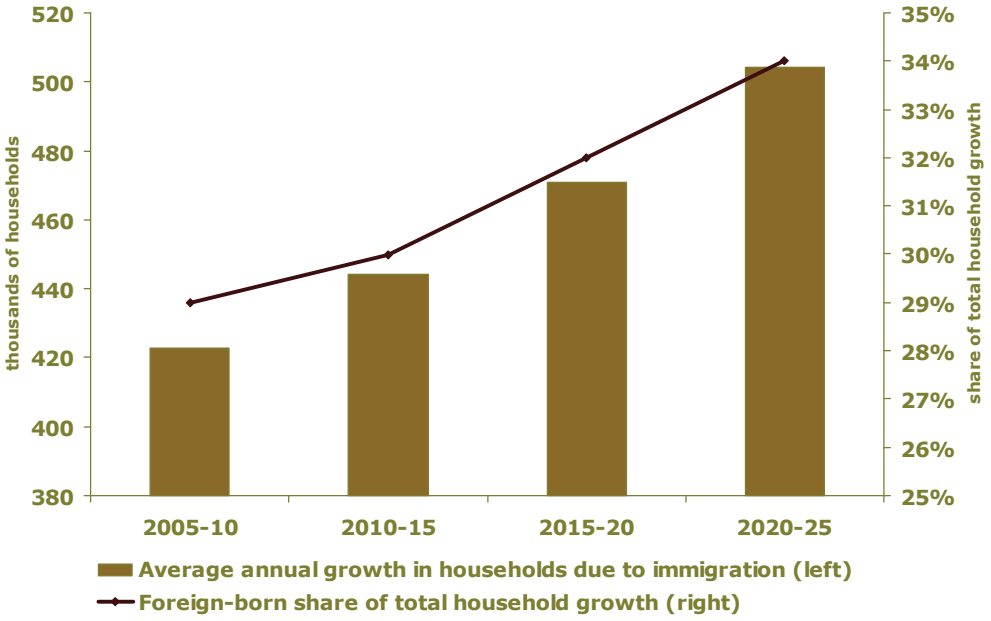
This research addresses how key demographic, socioeconomic and locational differences between native and foreign-born homeowners impact remodeling spending and project choice. Section II describes how immigrants have become increasingly active participants in the housing and home improvement markets, including how the remodeling spending of a typical immigrant homeowner compares to that of the average native homeowner. Section III uses an econometric model to better understand how improvement spending would compare between native- and foreign-born homeowners when simultaneously controlling for any differences in major demographic, socioeconomic and locational characteristics that are commonly thought to influence improvement spending. Section IV fully explores these important differences in the profiles of immigrant and native homeowners, as well as which characteristics seem to have the most impact on immigrant remodeling spending levels and patterns. Finally, not only are there important differences between immigrant and native homeowners, but Section V outlines the many differences among immigrants by region of origin, years in the U.S. and citizenship status.

A key source of data on national homeowner remodeling spending, project type and installation method is the biennial American Housing Survey (AHS) from the U.S. Department of Housing and Urban Development. Since 2001, the AHS has provided data on nativity and other key immigration variables, such as country of origin, age at arrival, number of years in the U.S. and citizenship status. Accordingly, this research on immigrant remodeling trends makes use of data from the four most recent surveys from 2001 through 2007.

II. Importance of Immigration for the Housing and Home Improvement Markets

During the 1980s, the immigrant share of total household growth was 16 percent, but this share nearly doubled to 30 percent in the 1990s. Indeed, immigration is expected to continue to be a major driver of household growth in the U.S. over the coming decades. According to the latest household projections produced by the Joint Center for Housing Studies, the foreign-born share of total household growth is expected to grow steadily between 2005 and 2025, reaching 34 percent of total household growth between 2020 and 2025 (Figure 1).

Figure 1: Immigration is Expected to Become an Increasingly Important Driver of Household Growth



Note: Joint Center household projections based on the 2008 Census Bureau population projections.
Source: "Household Projections in Retrospect and Prospect: Lessons Learned and Applied to New 2005-2025 Projections" by George S. Masnick and Eric S. Belsky, Joint Center for Housing Studies, July 2009, Working Paper W09-5.

Just as immigrants have been a major driver of new household formations in the U.S., the foreign-born have also contributed significantly to growth in the number of homeowners in recent years. Between 2001 and 2007 the number of homeowners in the U.S. grew from just under 70 million to 75.5 million, and the immigrant share of this growth was nearly a third. Over the past decade as the number of foreign-born homeowners increased substantially, immigrants also made up an increasing share of the total number of homeowners, up from 8.4

percent in 2001 to 10.1 percent in 2007 (Figure 2). Between 2001 and 2007 the homeownership rate of immigrants also grew steadily, and at a much faster rate than the growth in the native homeownership rate. Where the homeownership rate of natives only increased by 1.4 percentage points from 2001 to 2007, the foreign-born homeownership rate grew by over four percentage points from 49.3 percent to 53.4 percent. Still, the much lower homeownership rate of immigrants compared to natives suggests there is a great deal of potential for immigrants to expand their participation in the housing and home improvement markets moving forward.

Figure 2: Immigrants Make Up a Growing Share of Owners; See Strong Growth in Homeownership

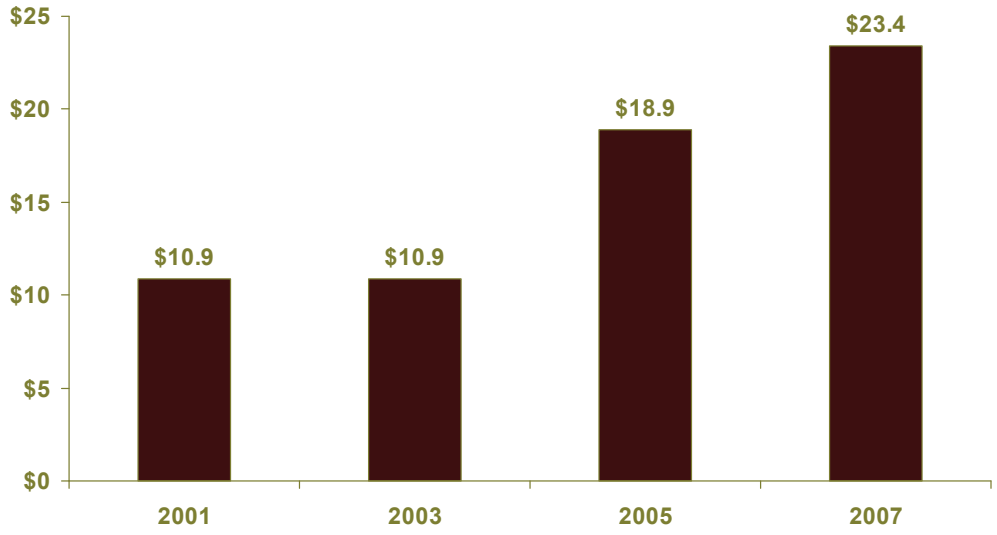
	2001	2003	2005	2007
Share of Homeowners (percent)				
Native	91.6	91.5	90.7	89.9
Immigrant	8.4	8.5	9.3	10.1
Homeownership Rate (percent)				
Native	67.8	68.6	68.8	69.2
Immigrant	49.3	51.9	52.9	53.4

Source: JCHS tabulations of the 2001-2007 AHS.

At $23.4 billion in 2007, total home improvement spending by immigrants grew considerably since 2001, more than doubling in nominal terms (Figure 3). Immigrant homeowners' share of total home improvement spending also increased from about 8.5 percent in 2001 to more than 10 percent in 2007. Also, immigrant remodeling spending grew at a significantly faster rate than native-born spending over this time period, with an average annual growth of 13.6 percent compared to less than ten percent for native-born owners.

Figure 3: Improvement Spending By Immigrant Homeowners Grew Substantially in Recent Years

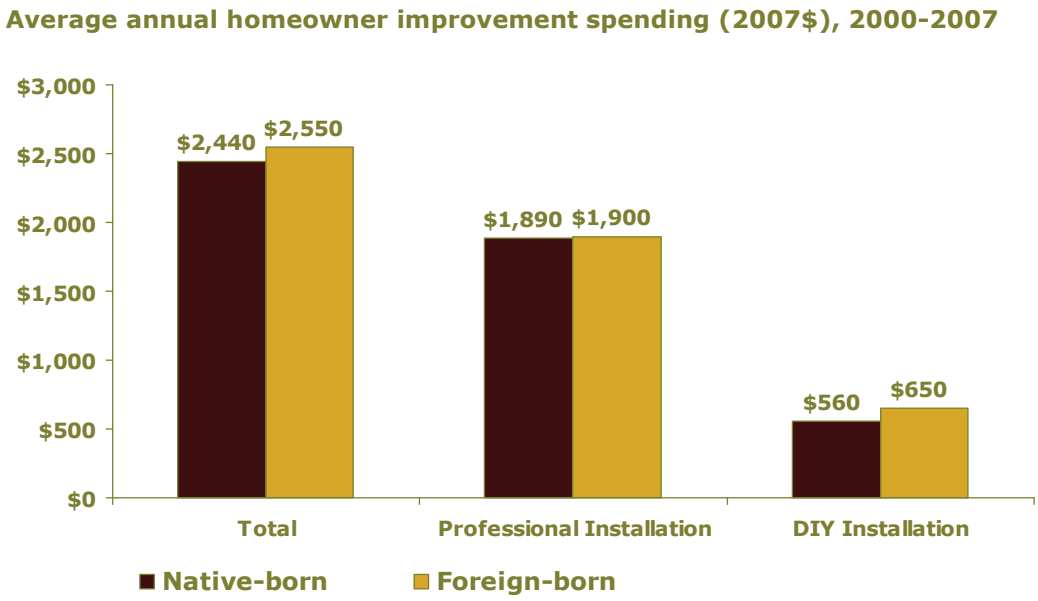
Total improvement spending by foreign-born homeowners (billions)



Source: JCHS tabulations of the 2001-2007 AHS.

Surprisingly, immigrant homeowners tend to behave very similarly to native-born homeowners when it comes to remodeling. Immigrant owners spend about the same amount on average for home improvements and undertake the same types of improvements. On average, immigrant homeowners spend the same amount on remodeling as native owners, even though immigrants and natives differ by key demographic and economic characteristics (Figure 4). Foreign-born homeowners tend to spend more on do-it-yourself (DIY) projects, but spending for professionally installed projects is essentially the same as native owners. And while immigrants are still a relatively small segment of the remodeling market, their share of the market has been growing and the fact that their average spending levels equal natives' bodes well for future prospects.

Figure 4: On Average, Immigrant Remodeling Spending Matches Native-born Levels

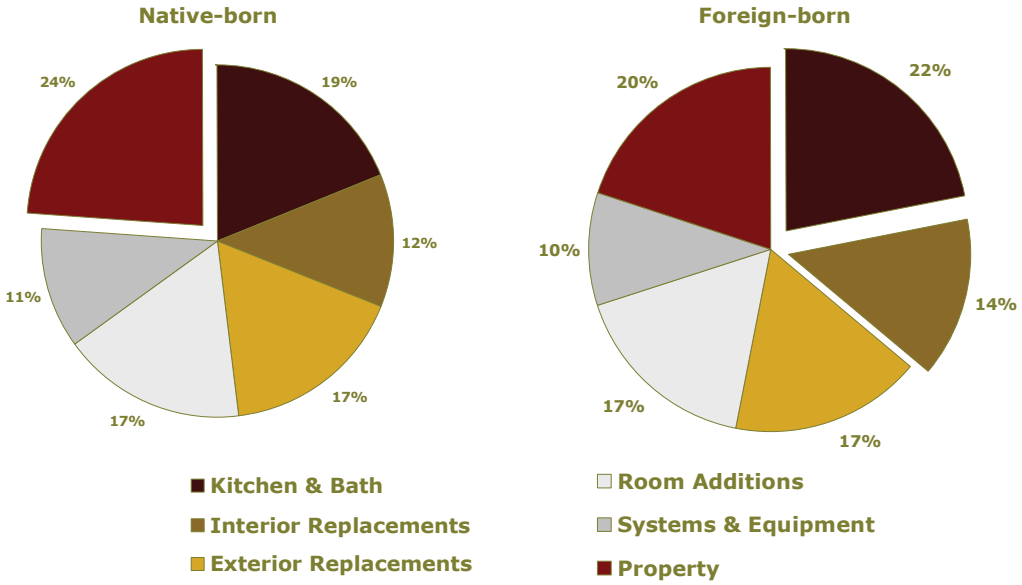


Source: JCHS tabulations of the pooled 2001-2007 AHS.

In addition to average spending levels, nationally the composition of immigrant remodeling spending is fairly comparable to the project mix of native homeowners. Foreign-born owners tend to spend a slightly greater share on kitchen and bath remodels and interior replacements, while a greater share of spending by native-born homeowners goes toward other property improvements (Figure 5). This difference in other property improvements may be explained by locational differences between immigrants and natives. With a greater share of native-born owners located in rural or less densely populated suburban areas, such as newer suburbs or exurbs, native owners would likely have more space available for property improvements.

Figure 5: Immigrant Spending Focuses More on Kitchen & Bath and Interior Replacements; Less on Property Improvements

Share of total homeowner improvement spending, 2000-2007



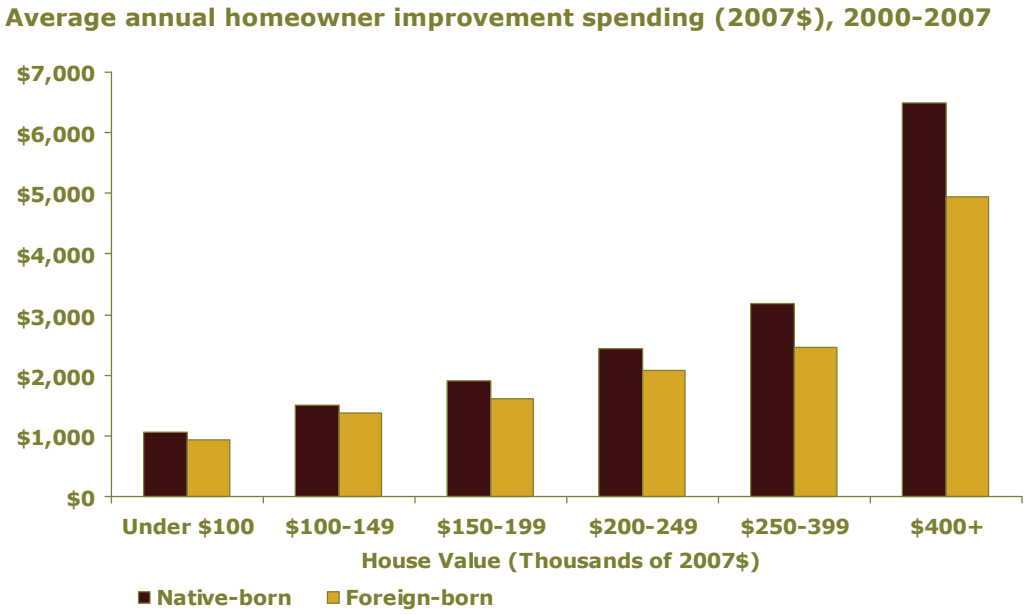
Note: Other improvements include outside attachments, disaster repairs and other property improvements.
Source: JCHS tabulations of the 2001-2007 AHS.

Interestingly, immigrant remodeling spending matches native spending along some key demographic, socioeconomic and locational measures, but not others. For example, the average annual spending levels of immigrant and native homeowners are nearly identical by age of the homeowner, income, and metro status (i.e. urban, suburban, or rural). On the other hand, foreign-born homeowners do seem to exhibit different home improvement spending patterns from native owners across other important dimensions, such as house values, region and mover status.

While average improvement spending rises in step with increasing house values for both immigrant and native homeowners, native owners consistently spend more than their immigrant counterparts in similarly valued housing, and this gap in spending grows larger with increasing house values (Figure 6). This same pattern also holds for varying degrees of appreciation in house prices between 2001 and 2007, as native homeowners in the top third of appreciation levels spent fully 20 percent more in 2007 than foreign-born owners who experienced similar levels of appreciation during this time. These findings that foreign-born homeowners

consistently spend less on remodeling than the native-born across home values and levels of house price appreciation, yet still have higher average spending overall may be explained by the fact that foreign-born homeowners are much more geographically concentrated in gateway cities along the coasts, which are areas of the country with higher housing costs overall and therefore correspondingly higher remodeling spending.

Figure 6: Foreign-born Spend Less on Improvements at All Levels of House Value



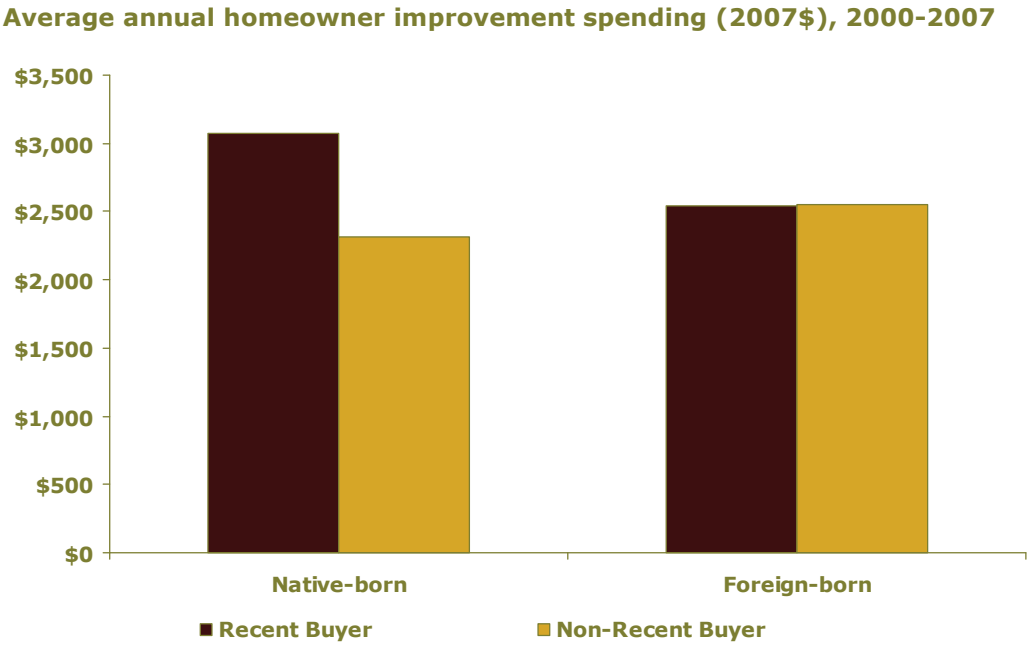
Source: JCHS tabulations of the pooled 2001-2007 AHS.

While foreign-born homeowners spend more on average overall, this national pattern does not apply to all regions. Differences in average annual improvement spending at the regional level are also likely due to the concentration of immigrants in high housing cost areas. Foreign-born owners spend slightly more, on average, than the native-born in the Midwest and South, but slightly less in the northeastern and western regions of the country where the cost of living, including housing, tends to be higher.

Another significant difference in immigrant and native remodeling spending emerges when looking at recent buyers who moved into their current home within the past two years. Typically, a greater amount of remodeling activity occurs in the first couple years after purchasing a home, as new owners make changes to suit their tastes and needs. Yet,

surprisingly, foreign-born recent homebuyers do not spend any more, on average, than immigrant owners who have been living in their home for more than two years. This significant difference in spending patterns between native- and foreign-born recent homebuyers is, again, likely a factor of the concentration of immigrant households in metropolitan areas with high-cost housing. Foreign-born recent homebuyers are taking on heavier cost burdens than comparable native-born homebuyers in order to purchase their home, leaving fewer funds available for home improvements soon after purchase (Drew 2002). Since only a slightly higher share of immigrant homeowners live in newer homes compared to natives, it does not appear that immigrants are stretching to buy better quality homes and therefore have less need to remodel.

Figure 7: Recent Immigrant Buyers Are Not More Active Remodelers



Source: JCHS tabulations of the pooled 2001-2007 AHS.

Certainly it seems that major differences in demographic, socioeconomic and locational characteristics of immigrant and native homeowners may help explain why immigrant and native remodeling spending patterns are so similar overall. An econometric model of improvement spending can help determine how foreign-born spending would compare to that of native-born owners if all these important differences were controlled for simultaneously.

III. An Econometric Model and Estimation Method of Improvement Spending

As seen in the previous section, foreign-born homeowners spend the same amount on average for home improvements as native-born owners, yet this finding does not control for any differences in key demographic, socioeconomic and locational characteristics between immigrant and native homeowners that are likely to influence remodeling spending. An ordinary least squares (OLS) regression of main variables thought to impact remodeling spending, such as immigrant status, income, house value, age, race, location, etc. can provide an estimate of how immigrant improvement spending differs from native spending when all of these factors are controlled for, or held constant. The dataset used in this regression is a pooled cross-section of four consecutive American Housing Surveys from 2001-2007, where each homeowner household from each survey is treated as an individual observation independent of a specific time period.[1]

OLS Model of Home Improvement Spending

The following equation describes a multiple linear regression model of homeowner improvement spending, which highlights immigrant status as the main explanatory variable of interest:[2]

$$\log(spending) = \beta_0 + \beta_1 immigrant + \boldsymbol{\beta}\mathbf{x} + u,$$

where log(*spending*) is the natural log of average annual homeowner improvement expenditures (inflated to 2007 dollars), *immigrant* is a dummy variable equal to 1 if the homeowner is an immigrant and 0 otherwise, $\mathbf{x}$ denotes a set of other independent variables that are thought to explain or predict remodeling spending levels, and u is an error term that represents all factors other than $\mathbf{x}$ that affect spending but cannot be explicitly accounted for in the model.[3]

Spending, income, house value, number of years in the home and number of persons living in the home are all continuous variables, and the following homeowner and housing unit

[1] See Appendix A1 for a more detailed discussion of the dataset and research methodology.
[2] See Appendix A2 for a discussion of an alternate econometric model, the Tobit model, which was also considered for this analysis due to the irregular distribution of remodeling spending across homeowners. After careful comparisons of the two models, it was determined that while the Tobit model may fit the data appropriately, the coefficient signs, t-statistics and p-values for both models were nearly identical so the ease of interpretation of the OLS model was preferred.
[3] The dependent variable, *spending*, was transformed to the logarithmic functional form, or natural log, of average annual remodeling spending, in order to achieve normality by mitigating skewed conditional distributions and because the log form allows for a non-linear relationship between the explained and explanatory variables, as well as narrows the range of the variable and makes estimates less sensitive to outlying observations. Since the natural log of zero is undefined, it was necessary to first add $1 to the *spending* variable before taking the natural log. The natural log form of income and house value is used for the same reasons as with the dependent variable.

characteristics are included in the model as binary (i.e. dummy) variables: age, race, region, metro status, recent mover status, and year unit built, where the dummy variable is equal to 1 if it applies to the homeowner and/or housing unit and 0 otherwise. Table 1 provides a detailed description of all variables used in the OLS model. The base group against which comparisons are made is homeowners age 35-44, who are white, live in the west, live in suburbs, are non-recent movers, and live in housing units built in the 1970s.

Table 1: Description of Variables

spending	natural log annual average remodeling spending, 2007$
immigrant	=1 if homeowner is an immigrant, 0 otherwise
income	natural log annual income, 2007$
value	natural log value of home, 2007$
age_<35	=1 if age of homeowner is less than 35, 0 otherwise
age_45-54	=1 if age of homeowner is 45-54, 0 otherwise
age_55-64	=1 if age of homeowner is 55-64, 0 otherwise
age_65+	=1 if age of homeowner is 65+, 0 otherwise
hispanic	=1 if race/ethnicity of homeowner is Hispanic, 0 otherwise
black	=1 if race/ethnicity of homeowner is Black, 0 otherwise
asian	=1 if race/ethnicity of homeowner is Asian, 0 otherwise
mixed	=1 if race/ethnicity of homeowner is Mixed, 0 otherwise
northeast	=1 if located in the Northeast region, 0 otherwise
midwest	=1 if located in the Midwest region, 0 otherwise
south	=1 if located in the South region, 0 otherwise
city	=1 if located in a central city, 0 otherwise
rural	=1 if located in a rural area, 0 otherwise
firsttimebuyer	=1 if homeowner is a recent first-time buyer, 0 otherwise
tradeupbuyer	=1 if homeowner is a recent trade-up buyer, 0 otherwise
yearsinhome	number of years homeowner has lived in current home
persons	number of people living in the home
built_2000s	=1 if unit was built in 2000-2007, 0 otherwise
built_90s	=1 if unit was built in the 1990s, 0 otherwise
built_80s	=1 if unit was built in the 1980s, 0 otherwise
built_60s	=1 if unit was built in the 1960s, 0 otherwise
built_50s	=1 if unit was built in the 1950s, 0 otherwise
built_pre50	=1 if unit was built before 1950, 0 otherwise
yearsinus	number of years immigrant owner has lived in the U.S.

Three variations on the basic OLS model of improvement spending are presented below in order to fully understand how differences in demographic, socioeconomic and locational characteristics impact immigrant and native home improvement spending (Table 2). The first model, called the Full Model, includes both immigrant and native homeowner observations and simply answers the question of how immigrant remodeling spending compares to native

spending when all differences in demographics, socioeconomics and location are accounted for simultaneously. The second and third models, Immigrants Only and Natives Only, can be used together to compare how these major characteristics impact immigrant and native improvement spending respectively.

OLS Estimation of Average Annual Homeowner Improvement Spending

Table 2: OLS Results[4]

Dependent Variable:
Average Annual Homeowner Improvement Spending

Independent Variables	(1) Full Model		(2) Immigrants Only		(3) Natives Only	
immigrant	-0.216	*	NA		NA	
	0.044		NA		NA	
log*(income)*	0.223	*	0.168	*	0.226	*
	0.007		0.025		0.007	
log*(value)*	0.250	*	0.221	*	0.252	*
	0.010		0.032		0.010	
age_<35	0.070	***	-0.055		0.084	***
	0.040		0.120		0.042	
age_45-54	-0.112	*	-0.184	***	-0.103	*
	0.033		0.103		0.035	
age_55-64	-0.054		-0.005		-0.053	
	0.037		0.127		0.039	
age_65+	-0.433	*	-0.583	*	-0.418	*
	0.040		0.154		0.042	
hispanic	-0.120	*	-0.043		-0.114	**
	0.045		0.099		0.053	
black	-0.281	*	0.269		-0.301	*
	0.041		0.174		0.042	
asian	-0.557	*	-0.399	*	-0.680	*
	0.073		0.106		0.128	
mixed	0.001		-0.185		0.042	
	0.098		0.286		0.104	
northeast	-0.105	*	-0.248	*	-0.109	*
	0.036		0.109		0.038	
midwest	0.009		0.296	**	-0.027	
	0.033		0.119		0.035	
south	-0.186	*	0.144		-0.224	*

[4] For dummy variables, as the change in log(*spending*) becomes larger and larger, the approximation becomes more and more inaccurate and it becomes necessary to calculate the exact percentage change in predicted spending using the following equation: $\%\Delta spending = 100 * (e^{\beta} - 1)$. The coefficients on all dummy variables presented in Table 2 were transformed using this formula.

	0.031		0.094		0.034	
city	-0.074	*	-0.200	*	-0.050	***
	0.028		0.082		0.030	
rural	-0.095	*	-0.037		-0.087	*
	0.027		0.144		0.028	
firsttimebuyer	-0.162	*	-0.369	*	-0.113	**
	0.048		0.123		0.053	
tradeupbuyer	0.476	*	0.168		0.513	*
	0.038		0.124		0.040	
yearsinhome	-0.006	*	-0.011	**	-0.006	*
	0.001		0.005		0.001	
persons	0.192	*	0.111	*	0.207	*
	0.009		0.024		0.009	
built_2000s	-0.855	*	-0.838	*	-0.859	*
	0.049		0.159		0.052	
built_90s	-0.634	*	-0.624	*	-0.637	*
	0.038		0.129		0.039	
built_80s	-0.016		-0.083		-0.014	
	0.040		0.136		0.041	
built_60s	-0.020		0.199		-0.041	
	0.040		0.135		0.041	
built_50s	-0.044		0.008		-0.045	
	0.041		0.136		0.043	
built_pre50	-0.149	*	-0.055		-0.155	*
	0.036		0.126		0.037	
yearsinus	NA		0.007		NA	
	NA		0.003		NA	
Observations	117,559		10,698		106,860	
Adj. R-Squared	5.8%		4.7%		6.0%	

Notes: Quantities below the estimates are the standard errors.
*significant at 1% **significant at 5% ***significant at 10%

The regression results from the first model indicate that average immigrant remodeling spending is estimated to be 21.6 percent less than native spending once all differences in age, race, income, house value, location, etc. are controlled for, or held equal. This finding suggests that average remodeling spending of immigrant homeowners is on par with that of native owners only because of the stark differences in the demographic, economic and locational characteristics of the foreign- and native-born that lift average spending among immigrants.

The results from the second and third models show that most characteristics impact immigrant and native remodeling spending in similar ways but with different magnitudes and statistical significance. For example, the results suggest that a 10 percent increase in income is expected to increase immigrant remodeling spending by 1.7 percent and native remodeling

spending by 2.3 percent, all else equal. Likewise, a 10 percent increase in house value is expected to increase immigrant spending by 2.2 percent compared to 2.5 percent for native homeowners.

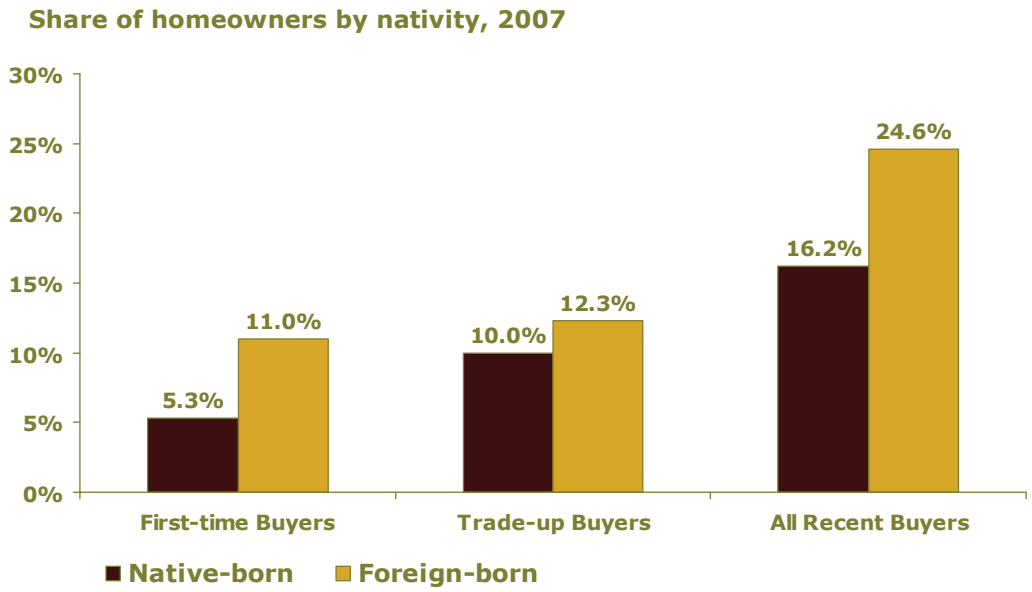
One factor that influences remodeling spending with a considerable difference in magnitude for foreign-born and native-born homeowners is recent mover status, or owners who moved into their home in the previous two years. Recent movers are separated into two distinct categories, recent first-time buyers and recent trade-up buyers, since there are significant differences in demographic and socioeconomic characteristics between these two groups. Whereas native owners who are recent first-time buyers are expected to spend 11.3 percent less than similar homeowners who are not first-time buyers (including both trade-up buyers and non-recent movers), recent first-time immigrant buyers are expected to spend fully 36.9 percent less than their equivalent non-first-time buyer counterparts. Likewise, native-born recent trade-up buyers are expected to spend over fifty percent more than non-trade-up buyers compared to only 17 percent for immigrant trade-up buyers.

A full analysis of the compositional differences in major demographic, socioeconomic and locational characteristics between immigrant and native homeowners help explain which specific characteristics of immigrant owners contribute to boosting their average remodeling spending to be on par with native spending.

IV. The Demographic, Socioeconomic and Locational Profile of Immigrant Homeowners

In looking at the significant ways in which the demographic and socioeconomic profile of immigrant homeowners varies from natives, it appears that on all scores but income (which is a wash), all the characteristics of immigrants contribute to bringing up their national average spending per owner to that of the native-born, even though they spend significantly less than comparably situated native-born homeowners, all else equal. First, immigrants have been relatively more active in the housing market and more mobile as evidenced by their higher shares of recent buyers, who are defined as owners who purchased their home within the previous two years (Figure 8). At 11 percent, the share of foreign-born homeowners that were first-time buyers was more than twice that of native-born owners in 2007, while almost one quarter of immigrant owners were recent buyers (both first-time and trade-up buyers) compared to 16 percent of native owners.

Figure 8: Immigrants are Relatively More Mobile and More Active Participants in the Housing Market

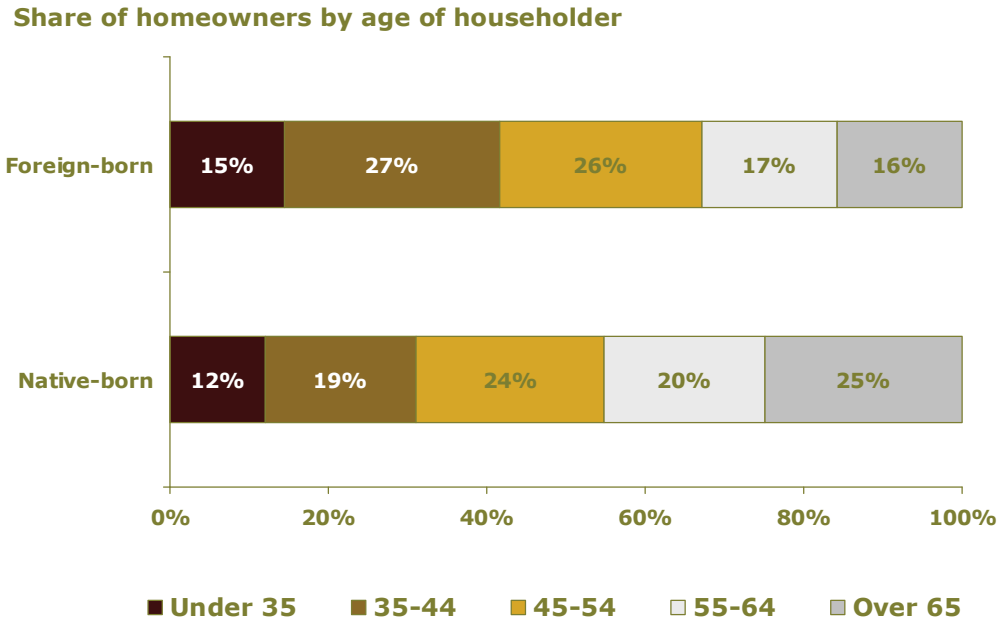


Note: Recent first-time and trade-up buyers are defined as those purchasing homes within the past two years.
Source: JCHS tabulations of the 2007 AHS.

One contributing factor to this considerable difference in the share of recent buyers is the younger age distribution of foreign-born homeowners. Overall, the immigrant population is

younger than the native-born population, and immigrants are now moving into prime household formation and home-buying ages. In 2007, the median age of native homeowners was 52 compared to just 47 for foreign-born owners. And the share of immigrant owners under the age of 45 was considerably larger at 42 percent compared to 31 percent of native-born owners (Figure 9). This is relevant for remodeling because the 35-44 age group traditionally spends heavily on home improvements, since these are years when families are typically growing and their space needs are changing.

Figure 9: Immigrant Homeowners are Disproportionately Younger than Native Owners



Source: JCHS tabulations of the 2007 AHS.

Other important measures by which to compare foreign-born and native-born homeowners include family size, income and house values (Figure 10). The average family size for immigrant homeowners is 3.7 people compared to only 3.0 for native owner households. Owner-occupied immigrant households also tend to have more adults living in the household, which reflects the higher propensity of immigrants to live with extended family or to double up families in one household. The greater numbers of adults in immigrant households are thus a possible source of new household formations and future housing demand. At $60,000 the

median income of immigrant homeowners was equal to the native-born in 2007, while median house values were considerably higher at $300,000 compared to $175,000 for native-born owners. Yet, this enormous difference in house value and the parity in incomes can at least be partly explained by the location choices of immigrants.

Figure 10: Immigrant Homeowners Tend to Have Larger Families and Significantly Higher House Values

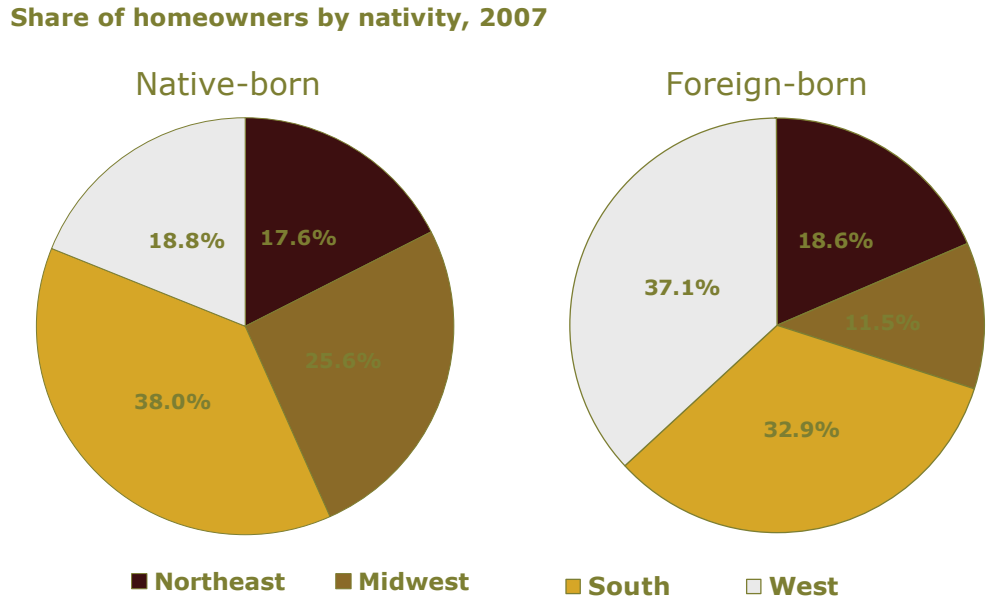
Owner-occupied households, 2007

	Foreign-born	Native-born
Family size (mean)	3.7	3.0
Number of adults in household (mean)	2.5	2.2
Income (median)	$60,000	$60,000
House value (median)	$300,000	$175,000

Source: JCHS tabulations of the 2007 AHS.

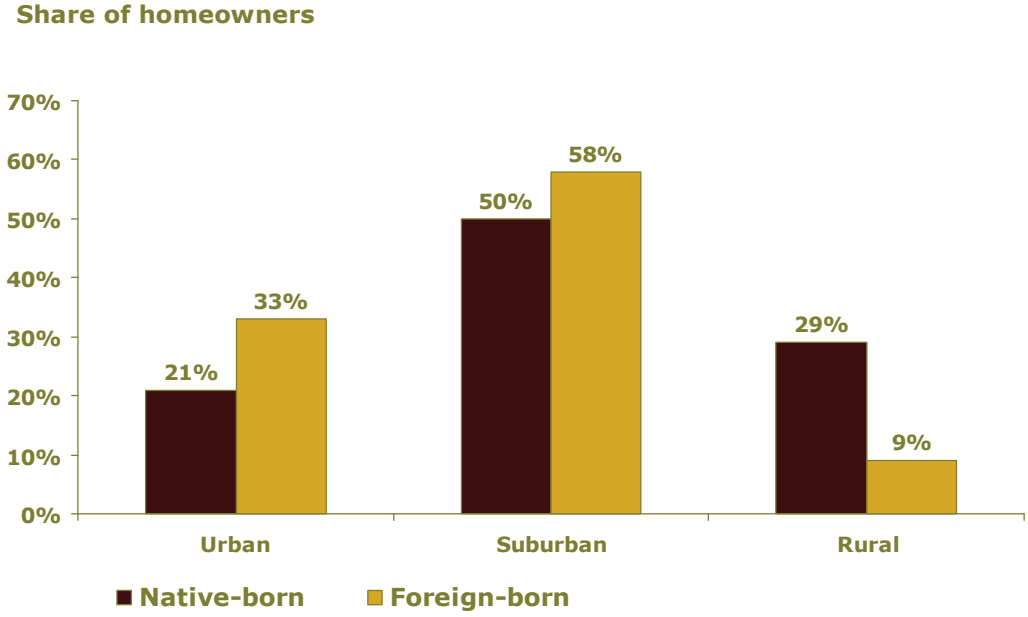
More than half of foreign-born homeowners live in the Northeast and the West—regions of the country that have higher housing costs overall—compared to 36 percent of native-born homeowners (Figure 11). In fact, in 2007, fully two-thirds of the immigrant population lived in just six states: California, New York, Texas, Florida, New Jersey and Illinois. Not only are the foreign-born concentrated on a regional and state basis, but immigrant homeowners are also much more heavily concentrated in urban and suburban parts of the country compared to native-born owners. Only nine percent of foreign-born owners are located in rural areas compared to almost a third of native owners (Figure 12). These major differences in location are an important reason for immigrants owning considerably higher value homes on average and, by extension, spending as much on remodeling as native owners when averaged nationally.

Figure 11: A Much Greater Share of Immigrants Own Homes in Regions with Higher Housing Costs



Source: JCHS tabulations of the 2007 AHS.

Figure 12: Immigrant Homeowners are Heavily Concentrated in Center Cities and Suburbs



Source: JCHS tabulations of pooled 2001-2007 AHS.

Traditionally, immigrants have entered the country through key gateway cities mostly along the coasts of the U.S., and in these generally high-cost housing markets, foreign-born homeowners are contributing to a much greater share of total improvement spending. Where the immigrant share of national remodeling spending was just over 10 percent in 2007, in gateway cities like Washington, DC; Miami; Houston; San Francisco; and San Diego immigrants are contributing about three times the national average (Figure 13). Yet, in recent years, immigrants have started to spread out more from established gateways to new "emerging" gateways, where immigrants are far more likely to live in the suburbs than in central cities (Singer 2004). This trend is important for the remodeling market since average improvement spending is about 25 percent greater for immigrant homeowners living in the suburbs than those living in cities (not controlling for any other differences).

Figure 13: Immigrants Contribute Considerably More to Improvement Spending in Gateway Cities

Foreign-born homeowner share of total spending, 2007

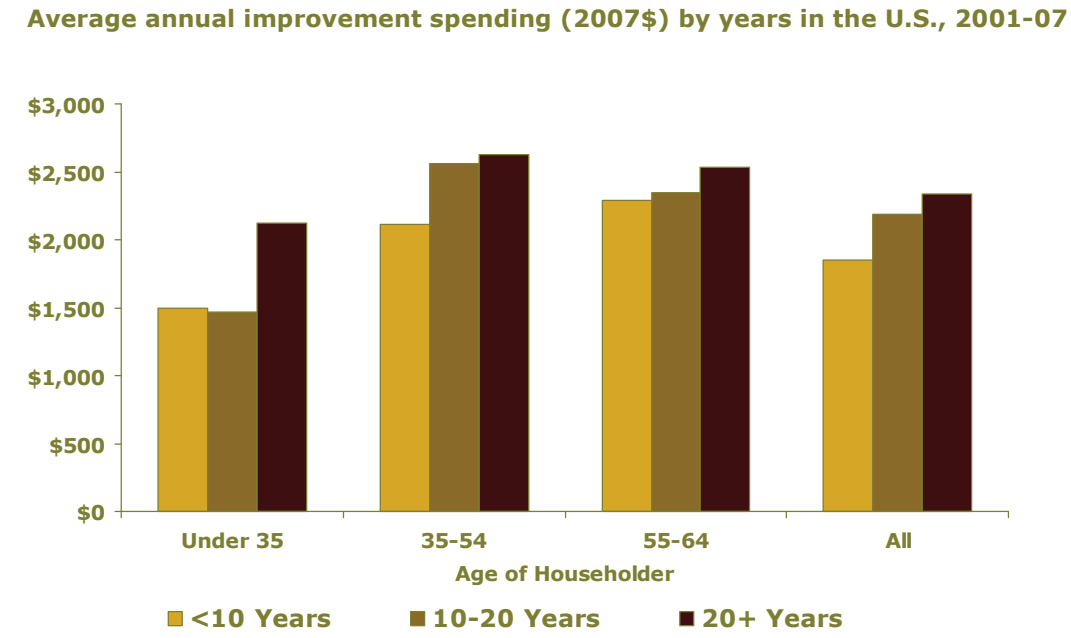
Source: JCHS tabulations of the 2007 AHS.

V. Differences among Immigrant Homeowners

Not only do immigrant homeowners vary considerably from native-born owners along many key dimensions, but immigrant owners themselves are a very diverse group. Newer arrivals tend to have different demographic and economic profiles from immigrants who have lived in the U.S. for several decades. Likewise, the age at arrival will influence the acclimation and assimilation of immigrants, as those arriving at a younger age are expected to adjust faster or more fully to living in a new country. Another factor along which immigrant profiles vary is country of origin, which is closely linked with race and ethnicity.

Improvement spending by immigrant homeowners rises steadily with more time spent in the U.S., regardless of the age of the homeowner, and at a faster rate than growth in income over time (Figure 14). So even though incomes also tend to rise with time spent in the U.S., the more moderate income growth of immigrant owners does not fully explain their much stronger growth in remodeling spending. For example, the average income of foreign-born owners who have been in the U.S. for 20 years or more is only 4.5 percent greater than those who have been in the U.S. less than 10 years, while improvement spending is 26 percent more. And this pattern holds true for immigrant homeowners of all age groups.

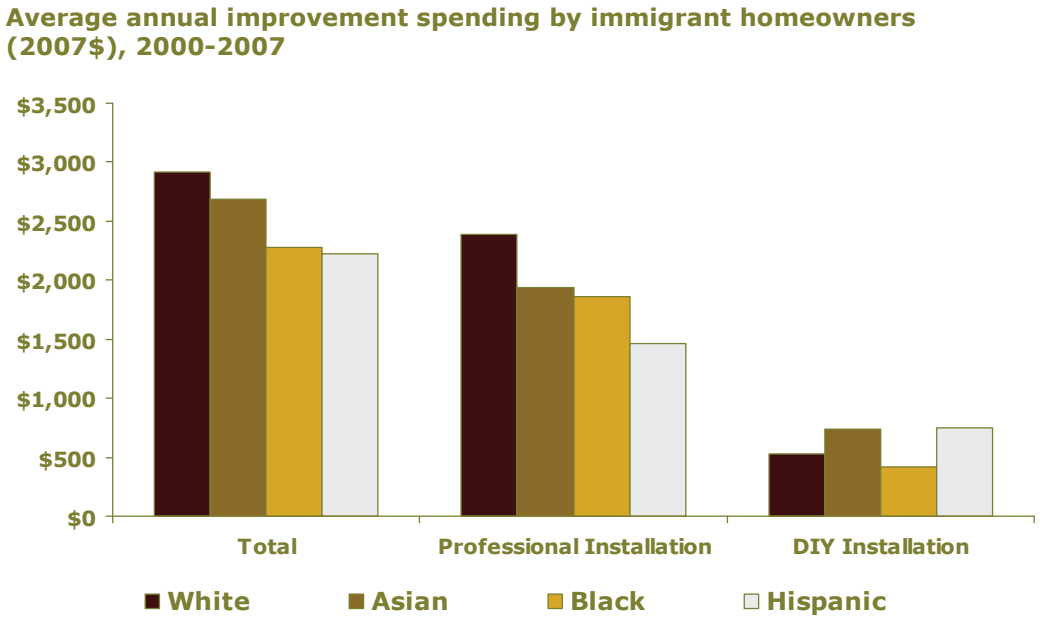
Figure 14: Immigrant Homeowners Spend More on Improvements With More Time in US



Source: JCHS tabulations of the pooled 2001-2007 AHS.

Another key measure that differentiates immigrants is race, with white immigrant owners spending the most on average for professionally-installed remodeling projects and Hispanic immigrants spending the least (Figure 15). It is important to note, though, that Hispanic immigrant owners are younger on average and tend to be more recent arrivals to the U.S. compared to white immigrant owners. Yet, Hispanics make up the largest share of immigrant homeowners at 38 percent in 2007, with whites making up another 30 percent and Asians 26 percent of immigrant homeowners.

Figure 15: Immigrant Spending Varies By Race



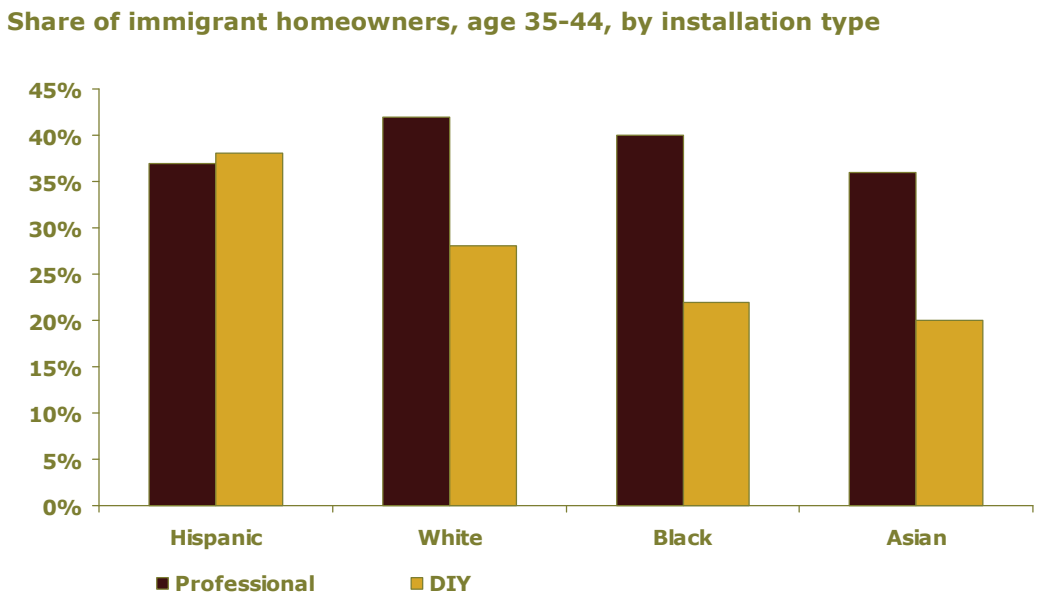
Note: Whites, blacks and Asians are non-Hispanic, while Hispanics may be of any race.
Source: JCHS tabulations of the 2001-2007 AHS.

As for the very different pattern of spending for DIY improvements, this may be explained by age and skill. White immigrant homeowners tend to be much older and thus less likely to undertake DIY projects, while Hispanic immigrants may spend disproportionately more on DIY because of their skill level with remodeling and construction activities. According to the Pew Hispanic Center, in 2007 more than 15 percent of the adult Hispanic immigrant population worked in the construction trades compared to only 1.6 percent of immigrants from Asia, 2.6 percent of those from the Middle East, and 5 percent from all other nations.[5] In fact, the share of

[5] "Statistical Portrait of the Foreign-Born Population in the United States, 2007" based on Pew Hispanic Center tabulations of the Census Bureau's 2007 American Community Survey.

foreign-born homeowners who installed DIY projects between 2000 and 2007 varies considerably by age and race. For example, in looking at younger immigrant homeowners, age 35-44, about 20 percent of Asian and black owners undertook a DIY project compared to 28 percent of whites and fully 38 percent of younger Hispanic immigrant homeowners. Of this age cohort, only Hispanics had a greater share of owners who installed projects DIY than professionally (Figure 16).

Figure 16: Hispanic Immigrant Homeowners Are Much More Likely to Undertake DIY Projects



Source: JCHS tabulations of the pooled 2001-2007 AHS.

Lastly, immigrant homeowners have large differences in income levels, house values, and improvement spending by region of birth (Figure 17). Of course, where immigrants originated is also related to time spent in the U.S. as well as where in the U.S. they reside, since the composition of immigrants by country of origin has changed dramatically over time and different nationalities exhibit different settlement patterns. The share of immigrants coming from Europe has fallen steadily since the 1965 Immigration Act, while the share of Asian and Hispanic immigrants has grown considerably. Therefore, some of these differences in income, house values and remodeling spending also reflect the fact that immigrant homeowners from Europe and Canada are 10 years older on average than immigrants from other parts of the world, and have been in the country much longer (38 years on average) and are more established households

compared to the typical Hispanic and Asian immigrant homeowner (about 25 years on average). Likewise, some differences in the socioeconomic profile of foreign-born homeowners will be due to the fact that immigrants from different regions of the world have traditionally settled in different parts of the country. For example, homeowners originally from Europe and Canada are much more likely to live in the Northeast and Midwest, whereas those from Asia are more likely to live in the West, and immigrant owners from Hispanic nations are more likely to reside in the South and Southwest.

Figure 17: Immigrant Homeowners Differ Along Key Measures by Region of Birth

Owner-occupied foreign-born households, 2001-2007

Region of Birth	Share of Immigrant Owners	Income ($000s) median	House Value ($000s) median	Number of Projects Per Year average	Annual Improvement Spending average
Hispanic Countries	43%	51.0	186	1.5	2,200
Europe & Canada	25%	62.0	250	1.4	3,010
Asia	24%	82.1	318	1.0	2,660
Africa & Middle East	7%	79.5	300	1.3	2,570
Elsewhere	1%	63.2	208	1.3	2,820
All		61.4	234	1.3	2,550

Notes: Asia includes a small number of immigrants from Australia/Oceania. All dollar values are in 2007 dollars.
Source: JCHS tabulations of pooled 2001-2007 AHS.

Previous research by the Joint Center also found that citizenship of immigrant households is highly correlated with homeownership over time, and in this way citizenship may indirectly impact remodeling spending of immigrant homeowners (Masnick, 1997). In fact, in 2007 average homeowner improvement spending by foreign-born naturalized citizens was more than twice that of non-citizen foreign-born homeowners.

VI. Conclusion

A major finding of this research on immigrant remodeling trends is that foreign-born homeowners spend the same amount on average on home improvements and on similar types of jobs as native-born homeowners, even though immigrant homeowners have very different demographic, socioeconomic and locational profiles compared to native owners. In particular, immigrant homeowners tend to be younger and have larger families, own higher-valued homes, have higher shares of recent movers, and are concentrated in center cities and suburbs, as well as parts of the country with higher housing values and that experienced some of the most rapid price appreciation in the first half of the 2000s—all of which are characteristics that are expected to positively influence remodeling activity. Simply looking at the differences in these important characteristics would lead one to believe that immigrant homeowners as a whole should spend more on average compared to native-born owners. Yet, once all of the major differences between immigrant and native homeowners are controlled for, then immigrant remodeling spending is estimated to be fully 22 percent less than native spending. This finding suggests that immigrant homeowner remodeling spending is on par with that of native owners precisely because of key differences in composition along demographic, economic and geographic dimensions. Specifically, the younger age composition of immigrant homeowners, their concentrated location within cities in high housing cost regions of the country, and their above average house values are the most salient characteristics for positively impacting immigrant remodeling spending.

Another important consideration for how recent trends in immigrant remodeling behavior are expected to shape the future of the home improvement industry is the second generation of immigrants, or the native-born children of today's immigrant families. While the American Housing Survey does not identify second generation immigrants, some assumptions can be drawn from the analysis of how time spent in the country impacts remodeling spending. A strong positive correlation was found such that regardless of the homeowner's current age (which is indicative of how old the owner was when they first arrived in the country), average annual improvement spending was on average 26 percent greater for those foreign-born natives who had been in the country for more than 20 years compared to those who had been here for less than 10 years. What's more, this growth in remodeling spending occurred at a faster rate than growth in immigrant incomes over the same time period.

Certainly, if the past decade is any indication, foreign-born households will continue to be an active force in the housing and home improvement markets and should therefore provide a strong and growing source of remodeling demand moving forward. Over the coming decades immigration is expected to be a major driver of household growth in the U.S., and the rapidly expanding market of foreign-born homeowners as well as their native-born children will likely have a significant impact on the future strength of the home improvement industry.

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Appendix

A1: Immigrant Remodeling Data and Research Methodology

While the American Housing Survey (AHS) is usually a very rich dataset for analyzing national remodeling activity, homeowner sample sizes became a concern in researching immigrant remodeling trends. In the 2007 AHS, for example, 2,700 immigrant homeowners were surveyed, of which only 1,400 had made any type of improvement to their home in the previous two years. And while this sample is nationally representative, it is nonetheless a very small sample size for studying remodeling behavior, especially as the data on immigrant homeowners are further cross-tabulated by economic and demographic characteristics.

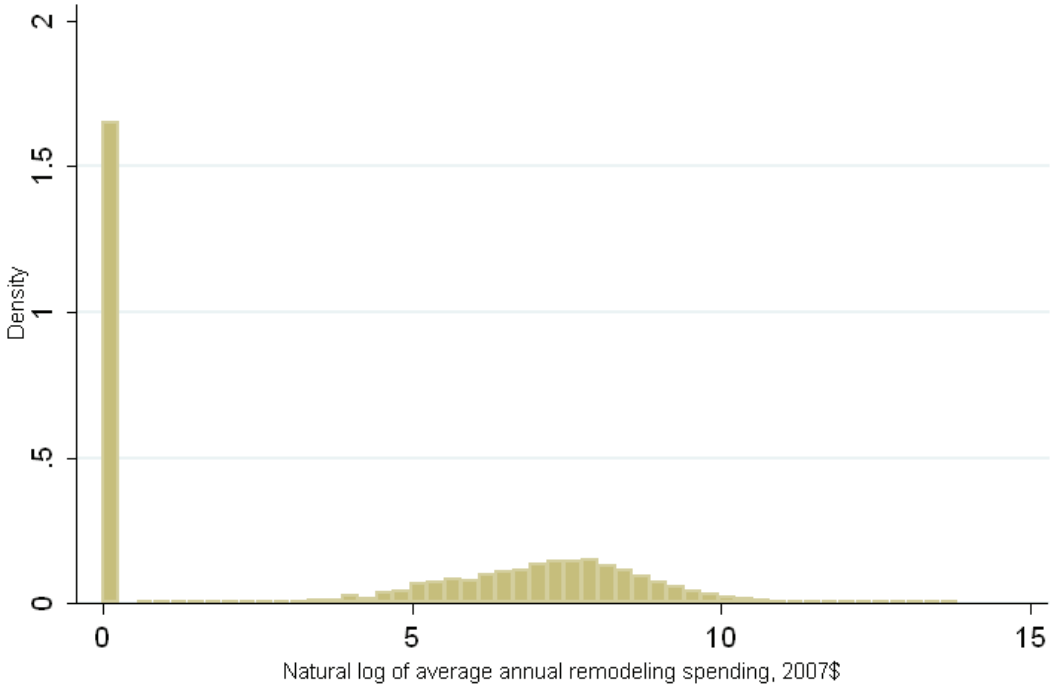
To correct for the small sample size of immigrant homeowners with remodeling expenditures, four waves of the AHS—the 2001, 2003, 2005 and 2007 surveys—were pooled for some of the analyses presented herein. Since the AHS tracks the same housing units over time, this data structure is technically a pooled panel dataset. However, for the purposes of this research, the time series component of a panel dataset is unimportant, because remodeling projects are typically large and infrequent expenditures for households and there is little reason to believe that spending for remodeling in one time period necessarily influences spending in another time period.[6] For this reason, the dataset is treated as a pooled cross-section of observations instead of a pooled panel, where each homeowner household from each survey is treated as an individual observation independent of a specific time period. In this way, it is possible for the same household to be included in the pooled dataset up to four times if the household was interviewed in each of the four surveys from 2001 to 2007. Pooling the four surveys provides a total of 117,563 homeowner observations. More than a third of these observations are unique households. Of the unique household observations, 22 percent were surveyed only once between 2001 and 2007, 17 percent were surveyed twice, 21 percent were surveyed three times and 40 percent were surveyed four times.

[6] Undertaking a remodeling project in one time period may lead to more or less remodeling spending in the following time period depending on whether the homeowner is able to complete the desired renovations or improvements, or instead works on projects in a more piece-meal fashion as time and funds allow.

A2: A Tobit Model of Home Improvement Spending

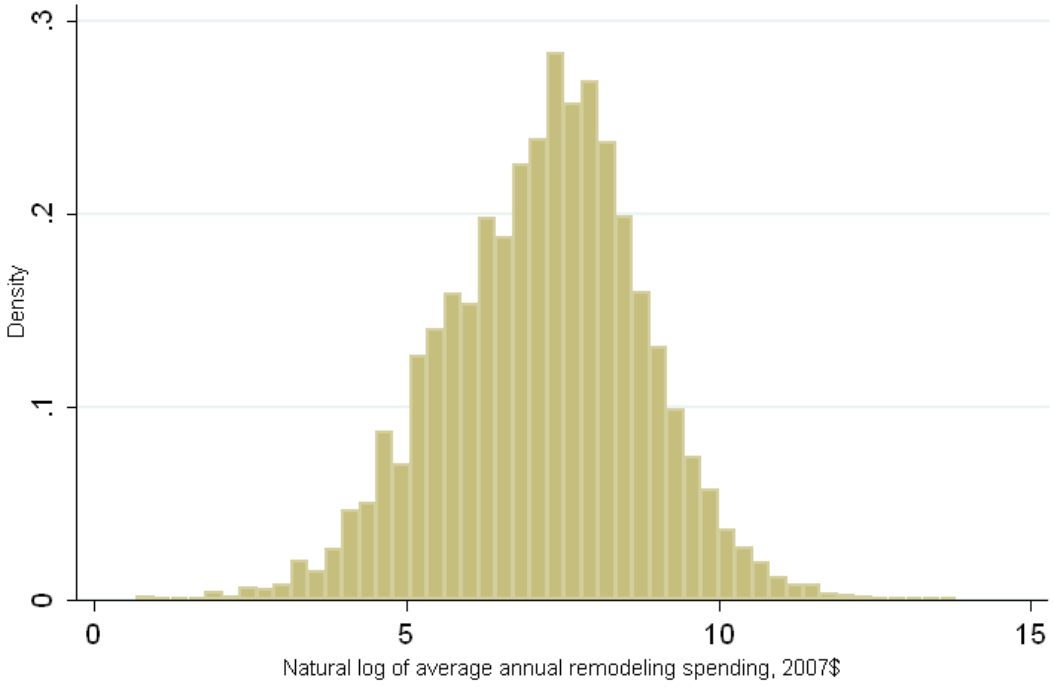
Since home improvements tend to be large and infrequent expenditures for most households, it is not surprising that during any given year a significant number of owners will not make any home improvements and will therefore report zero dollars in remodeling expenditure. In this way, the population distribution of annual homeowner remodeling spending is spread out over a large range of values, but with a considerable pileup at $0 (Figure A2-1). Yet while remodeling spending across all homeowners does not have a normal distribution due to the pileup at $0, spending is otherwise continuously distributed over positive values (Figure A2-2).

Figure A2-1: Home Improvements are Infrequent Expenditures for Most Households



Note: The height of the bars are scaled so that the sum of their areas equals 1.
Source: JCHS tabulations of the pooled 2001-2007 AHS.

Figure A2-2: Remodeling Spending is normally Distributed Over Positive Values



Note: The height of the bars are scaled so that the sum of their areas equals 1.
Source: JCHS tabulations of the pooled 2001-2007 AHS.

This optimizing behavior of homeowners leads to a "corner solution response" for some nontrivial fraction of the homeowner population, where it is optimal to choose a zero dollar value for remodeling. Although a linear regression model could be appropriate for capturing the expected value of remodeling spending, a linear model will likely lead to negative spending predictions for some homeowners. According to Wooldridge (2006), a standard linear regression model using the ordinary least squares (OLS) estimation method will provide inconsistent estimates of coefficients on independent variables. Therefore, a corner solution linear regression model, otherwise known as a Tobit model, which uses a maximum likelihood estimation (MLE) method, should be used instead. MLE is used for estimating limited dependent variable models, such as a Tobit model of improvement expenditures where the estimation of improvement expenditures is limited to values greater than or equal to zero. Because MLE is based on the distribution of y given **x**, the heteroskedasticity in Var(y|x) is automatically accounted for. The general theory of MLE for random samples implies that, under very general conditions, the MLE is consistent, asymptotically normal and asymptotically efficient. Unlike with OLS estimates, Tobit estimates are not chosen to maximize an R-squared value, or the measure of how much

variation in remodeling spending is explained by the chosen independent variables, but instead Tobit estimates maximize the log-likelihood function (Wooldridge 2006).

HISpend is an observable outcome describing average annual homeowner improvement spending where *HISpend* takes on the value 0 with some probability, but is otherwise normally distributed over positive values. Typically the Tobit model expresses the observed outcome, *HISpend*, in terms of an underlying latent variable, *HISpend**. The following is an equation for a Tobit model of home improvement spending:

$$HISpend^* = \beta_0 + \mathbf{x}\boldsymbol{\beta} + u,$$

where $\mathbf{x}$ denotes the set of improvement spending explanatory variables and u is an error term that represents all factors other than $\mathbf{x}$ that affect *HISpend**. The underlying latent variable *HISpend**, which is observed for values greater than 0 and "censored" otherwise (i.e. has a lower limit of 0), satisfies the classical linear model assumptions; in particular it has a normal, homoskedastic distribution with a linear conditional mean.

The observed variable *HISpend* is thus defined by the following equation:

$$HISpend = \begin{cases} HISpend^* \; if \; HISpend^* > 0 \\ 0 \quad if \; HISpend^* \leq 0 \end{cases}$$

While the Tobit model is explicitly designed to model corner solution dependent variables such as homeowner remodeling spending, interpreting the maximum likelihood estimates for Tobit models is more challenging than with an OLS model. A comparison of the OLS and Tobit models of average annual homeowner improvement spending found that both models produced coefficients on independent variables of the same sign and with similar statistical significance. For these reasons, it was decided that an OLS model was preferred over the Tobit model.