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Social Influence in the Housing Market

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Abstract

We utilize the decennial U.S. Census to study social effects in housing consumption across 4 million households from 126 ethnic groups and 2,071 geographic locations in the United States. We find that the homeownership decisions within ethnic groups are locally correlated, after controlling for the homeownership rates within the group and the region. Social influence is stronger for younger, less educated, and lower-income individuals; immigrants; and Americans with ancestors from more unequal, uncertainty-avoiding, and collectivistic cultures. Our results suggest that both status and information considerations play an important role in the social comparison process in capital markets.

I. Introduction

Most neoclassical models in financial economics assume that individuals make independent investment and consumption decisions that maximize their lifetime utility. However, extensive evidence in economics and sociology suggests that people often condition their decisions on the behavior of others (e.g., Glaeser, Sacerdote, and Scheinkman (1996), Bertrand, Luttmer, and Mullainathan (2000), Duflo and Saez (2002), and Frank (2005)). Building on these insights, a new and fast-growing area of financial economics has emerged, which seeks to explain the financial behavior of individuals using social factors (e.g., Hong, Kubik, and Stein (2004), Campbell (2006)). Understanding the social aspects of financial decision making could deepen our understanding of major financial phenomena, such as portfolio choice, trading activity, and asset price dynamics.

In this article, we study the importance of social factors in the housing market. Buying a home is one of the most important investment and consumption decisions most people ever make.[1] Household homeownership decisions affect not only individuals' welfare but also the macro-economy, given the systemic

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[1] According to the Bureau of Labor Statistics, housing expenditure accounted for 32.8% of household expenses for the average U.S. family in 2003 (http://www.bls.gov/opub/uscs/).

link of the housing market to the financial sector and other industries in the economy. For instance, the 2008 subprime mortgage crisis and the sharp rise in U.S. mortgage default rates over the 2007–2010 period led to the most severe financial crisis since the Great Depression (Mian and Sufi (2009), Khandani, Lo, and Merton (2013)). Historically, the housing market has been subject to overvaluations and systemic defaults. The fact that social influence could result in excessive consumption and systematically correlated behavior across individuals also suggests that social influence could be an important background factor in the housing market (Dupor and Liu (2003), DeMarzo, Kaniel, and Kremer (2008)).

However, social influence has proven difficult to study, largely due to the challenge of identifying the appropriate reference groups of individuals. Social peers are often defined on the basis of geographic location (Glaeser et al. (1996), Grinblatt, Keloharju, and Ikäheimo (2008)), dwelling (Sacerdote (2001)), or socioeconomic status (e.g., Evans, Oates, and Schwab (1992), Borjas (1995)). Yet, being geographically and socially close to someone does not necessarily make that person an object for social comparison. As a result, a local correlation in behavior could be driven by omitted variables and/or self-selection (Manski (1993)).

In this article, we overcome this identification issue by utilizing cultural diversity in the United States to identify a large set of reference groups along two dimensions: *ancestry* and *geography*. Ancestry (or ethnicity) is an important dimension for socialization in an immigrant nation (Yancey, Ericksen, and Juliani (1976), Hogg and Abrams (1988), and Akerlof (1997)). We base our analysis on the 2000 Public Use Sample of the U.S. Census, which provides detailed information on respondents' ancestry, that is, the country where most of their ancestors originated (e.g., Ireland, Morocco, Japan, etc.). Detailed information on individual ancestry and residence allows us to define more than 50,000 reference groups that share the same ethnic background and geographic location across the entire United States.

Moreover, the breadth of the data allows us to explicitly control for both *ancestry*- and *geography*-fixed effects, which eliminates a wide range of potential omitted variables that could lead to correlated homeownership decisions at both the ancestral and regional levels. The choice of ancestry as a reference group also largely mitigates the self-selection problem because people cannot choose their ancestry. However, people can choose where to live, and such self-selection in geographic location could potentially affect our inferences. To address this concern, we exploit a naturally randomized subsample with respect to residence location: military families. The identification builds on the fact that military families are more likely to relocate for exogenous reasons related to their military duties than for personal reasons. Our results are robust to the use of this subsample.

We find that the home-buying decisions of individual households are significantly related to the homeownership rates of households' ethnic peers in the region. The social effect in housing consumption is economically significant: A 1-standard-deviation increase in the homeownership rate of the reference group results in an increase of 2.45 to 5.95 percentage points in the probability of owning a home for associated individuals.

What can explain the observed social effect in housing consumption? We consider two general channels: *status* and *information*. The idea that people tend to emulate the consumption patterns of their peer groups can be traced back to the works of Smith (1776/1981), (1776/1982) and Veblen (1899/1994). The housing market could be particularly sensitive to status considerations. Buying a home indicates that one has achieved the quintessential American Dream, a reliable signal that is easy to verify but costly to imitate. Moreover, because status considerations increase the reward in the upside disproportionately more than the cost in the downside, they create an additional incentive for the use of leverage (Chan and Kogan (2002), Roussanov (2010)). Thus, the inherent leverage of most home-buying transactions also makes the home a particularly suitable venue to increase status. A second motivation for social influence in the housing market is information. Imitation could allow individuals to exploit the information possessed by others (Banerjee (1992), Bikhchandani, Hirshleifer, and Welch (1998), and Banerjee and Fudenberg (2004)), a benefit that could be particularly important in the highly complex housing market, where information is often vague and fragmented.

To better understand the channels through which social influence affects individual homeownership decisions, we explore how the social effect in housing consumption varies with individual and ethnic characteristics. We find that social influence is stronger among lower-income, younger, and less educated individuals. These findings are generally consistent with both the status and information explanations. On the one hand, lower-income and less educated people, who tend to possess less private information about the housing market, are more likely to factor the information obtained from others into their own decisions. On the other hand, these individuals also could be more subject to status considerations because they have stronger incentives to improve their social status. These findings are consistent with Weinberg, Reagan, and Yankow (2004), who find that neighborhood effects in the labor market are stronger among the less educated workers in lower-income neighborhoods.

We also find that social influence is stronger among immigrants than among U.S.-born individuals. This is consistent with the choice of the reference groups. First-generation Americans are more strongly attached to their heritage than are later-generation Americans; they are also more likely to rely on their ethnic groups for information due to cultural and language barriers. This finding does not imply, however, that U.S.-born individuals are less subject to social influence in general, because once people integrate into society, their reference groups could change.

To evaluate the importance of ethnic characteristics for social influence, we match each ethnic group with its corresponding country of origin and derive basic cultural variables at the country level that could be related to individuals' propensity to engage in social comparisons. In particular, we use the four cultural dimensions of Hofstede (1980): power distance, individualism, masculinity, and uncertainty avoidance. We find that people from more unequal, masculine, and uncertainty-avoiding cultures are more likely to condition their home-buying decisions on the decisions of their peers. People from individualistic cultures, on the other hand, make more independent consumption decisions.

This article is part of a fast-growing literature that examines social effects in individual consumption and financial decisions.[2] We present empirical evidence for social influence in the acquisition of one of the most important household assets: housing. Our findings suggest that both status and information considerations are motivating factors for social comparison in capital market participation decisions. Furthermore, we identify one important dimension for social comparisons in financial markets: ethnicity.

This article also contributes to our understanding of homeownership. Existing literature suggests that the choice of owning a home versus renting ("tenure choice") is significantly affected by individual preference (taste) for housing (Tiebout (1956), Epple and Platt (1998), and Epple and Sieg (1999)). Yet little is known about what determines the taste for housing. Cronqvist, Münkel, and Siegel (2012) find that a significant part of individuals' preference for homeownership is driven by genetics. Our results show that one particular type of individual-specific life experience, the social influence an individual receives from his/her peers, also plays an important role.

Our results have policy implications. When people follow the behavior of others, they are prone to mistakes. Suboptimal behavior emerges because individuals do not take into account the effect of their own actions on others.[3] Increasing numbers of studies have questioned the ability of households to make optimal financial decisions (e.g., Madrian and Shea (2001), Lusardi and Mitchell (2007), Agarwal, Skiba, and Tobacman (2009), and Lusardi and Tufano (2009)). Our results suggest that many individuals could transact suboptimally in the housing market. Given that housing assets comprise a large fraction of household portfolios, even small consumer errors in this market could have strong welfare implications. As advocated by Campbell, Jackson, Madrian, and Tufano (2011), irrational behavior could create space for regulation, but effective financial regulation must be tailored to the uniqueness of each market.

The remainder of the article is organized as follows: Section II discusses social influence in the context of the housing market and outlines the methodology of our analysis. Section III describes our sample in detail. Section IV presents the main empirical results on social influence in the housing market, and Section V concludes.

II. Social Influence: Literature Review and Methodology

A. Social Influence

A long line of research in economics suggests that individual consumption and subjective well-being depend heavily upon the consumption of others

[2]Social influence has also been documented in other contexts, such as education outcomes (Sacerdote (2001)), crime rates (Glaeser et al. (1996), Kling, Ludwig, and Katz (2005)), and labor market activities (e.g., Topa (2001), Weinberg et al. (2004)).

[3]Indeed, both the status- and information-based theories on social comparisons predict that the equilibrium outcomes in the market could be suboptimal (e.g., Dupor and Liu (2003), Bikhchandani et al. (1998)).

(e.g., Hirsch (1976), Dupor and Liu (2003)). We consider two general motivations for social influence in the housing market: *status* and *information*.

Psychologists have recognized that people constantly engage in social comparisons. Festinger (1954) attributes this behavior to an inherent drive of humans to evaluate their opinions and abilities. He suggests that when objective means of evaluation are unavailable, people compare themselves with others, especially with those who are similar to themselves. Consistent with this research in psychology, economists have also contended that individuals tend to compare their economic decisions to the decisions of others. Indeed, the idea that people might copy the consumption decisions of others can be traced back to the works of Adam Smith, John Stuart Mill, and Thorsten Veblen. Currently, the academic literature identifies various nuances of this phenomenon under the names "conspicuous consumption," "keeping up with the Joneses," "quest for social status," "jealousy," and so forth.

The housing market could be particularly sensitive to status considerations. First, many economists have argued that housing is a major positional good; that is, its value is influenced by the owner's desire to demonstrate wealth or success (Hirsch (1976), Frank (2005)). Many in the United States consider homeownership a signal of achieving the American Dream of prosperity and success. Individuals who are motived by "keeping up with the Joneses" are also expected to take more risks because they value the rewards in the upside disproportionately more than the costs in the downside, which creates an incentive for leverage (Chan and Kogan (2002), Roussanov (2010)). Therefore, the inherent leverage in most home-buying transactions makes homeownership a particularly suitable venue to increase status.

A second motivation for social influence in the housing market is information. Imitating the actions of others could allow individuals to exploit their information (Banerjee (1992), Bikhchandani et al. (1998), and Banerjee and Fudenberg (2004)). The housing market is highly complex. Calculating the value of a house involves information on the supply side (e.g., existing housing stock), the demand side (e.g., local population growth, buyers' preferences and income), and the general market conditions (e.g., interest rates and tradeoffs between renting and buying). A large part of this information is not readily available, especially for first-time homebuyers and nonlocal buyers. The value of a home also significantly reflects the value of interest tax shields and various fees and penalties embedded in the mortgage contract. Carlin (2009) also argues that the price complexity in many financial markets is endogenous and reflects the strategic interactions among firms. To deal with this complexity, individuals may rely on the information of others. If friends and acquaintances are becoming homeowners, an individual who observes their actions may conclude that now is a good time to own a home instead of rent.

Information in the housing market could travel through various channels. First, people could obtain information through word-of-mouth (WOM) communications with others they know. A large body of marketing research shows that WOM communications in social networks influence household consumption decisions (e.g., Arndt (1967), Brown and Reingen (1987), Herr, Kardes, and Kim (1991), and Laczniak, DeCarlo, and Ramaswami (2001)). Individuals may

also actively seek advice from homeowners they know. Consistent with this idea, Celen, Kariv, and Schotter (2010) show that people are more willing to follow the advice given by their predecessors than to copy their actions.

B. Methodology

The traditional approach for evaluating social influence involves regressing an outcome for an individual on the average outcomes for the reference group of the individual (Evans et al. (1992), Borjas (1995)). We thus estimate the following baseline model:

$$(1) \qquad \text{OWN}_{i,p,a} = \alpha + \beta\, c_{i,p,a} + \gamma\, C_{P,A} + \delta\, \text{OWN}_{P,A} + \text{PFE} + \text{AFE} + \varepsilon_i,$$

where $\text{OWN}_{i,p,a}$ is an indicator variable for homeownership of household head i from Public Use Microdata Area (PUMA) p with ancestry a; $\text{OWN}_{P,A}$ is the ownership rate of the reference group for household head i, all individuals who share the same PUMA and ancestry; $c_{i,p,a}$ is a set of personal characteristics, such as income, age, education, gender, and so forth for the head of household i; $C_{P,A}$ is a vector of average personal characteristics of the reference group; and PFE and AFE are PUMA- and ancestry-fixed effects. When calculating the homeownership rate of the reference group, we exclude the ownership of household head i. The main coefficient of interest is δ, which provides information about the sensitivity of individual homeownership decisions to the ownership decisions of individuals' reference groups.

There are two major econometric problems associated with this approach: omitted variables and self-selection (Manski (1993)). In the context of the housing market, omitted variables are unobserved characteristics that could simultaneously affect all residents in an area (e.g., local economic opportunities or banking development) or all people of the same ethnicity (e.g., cultural values and socioeconomic status). The second factor complicating inferences about social influence is self-selection into the corresponding reference groups.

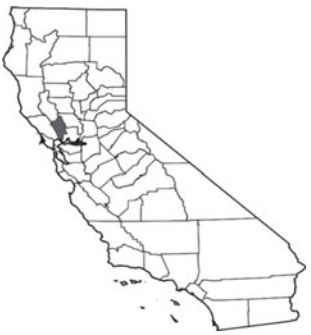
To address the omitted variables problem, we take advantage of the richness of the census data across ethnicity and geography. In particular, we are able to identify 126 distinct ethnic groups residing across 2,071 regional districts (PUMAs) that span the entire country, which allows us to control for ancestry- and geography-fixed effects. Most regional factors affecting homeownership in an area are expected to extend their influence beyond a single ethnicity, given that the median PUMA region has 28 different ethnic groups. For example, consider Napa County in California, which maps perfectly into one PUMA (Figure 1). In Napa County, we identify 60 different ethnic groups, 25 of which are represented by fewer than 5 households and are excluded from our sample. The remaining 35 ancestral groups account for 97.8% of the county's population.

Similarly, most factors that could affect homeownership within ethnic groups are also expected to extend beyond one particular area, given that the typical ancestral group in the United States spreads into 91 different PUMA regions. Thus, the introduction of regional and ancestral fixed effects allows us to control for a wide range of omitted factors at both the regional level (e.g., housing supply, weather conditions, etc.) and the ancestral level (e.g., cultural heritage).

FIGURE 1

Napa County, CA

Figure 1 presents the ethnic distribution of Napa County, CA, across settlements with at least 5 households in the 2000 U.S. Census.



Rank	Ancestral Group	Percentage of Population	Rank	Ancestral Group	Percentage of Population
1	German	15.35	19	Dutch	1.07
2	English	13.15	20	British Islands	0.75
3	Mexican	12.99	21	Swiss	0.70
4	Irish	8.80	22	Welsh	0.70
5	Italian	8.27	23	Hungarian	0.64
6	American	6.28	24	Chinese	0.54
7	Scotch Irish	3.33	25	African American	0.54
8	French	2.84	26	Greek	0.48
9	Norwegian	2.84	27	Finnish	0.43
10	Scottish	2.47	28	Yugoslavian	0.43
11	Spanish	2.47	29	Austrian	0.38
12	Swedish	2.20	30	Ukrainian	0.38
13	American Indian	1.61	31	Japanese	0.38
14	Danish	1.45	32	Czechoslovakian	0.32
15	Polish	1.40	33	Indian	0.32
16	Portuguese	1.29	34	Lithuanian	0.27
17	Filipino	1.29	35	Romanian	0.27
18	Russian	1.13		Total	97.76

These fixed effects represent a particularly strong control given the relatively small size of the PUMA areas. They are also a conservative control, as they could absorb some social influence effects that go beyond the narrow ethnic circle within the area. For example, families of mixed ethnicity could be sensitive to the actions of multiple ethnic groups, and such influence would be generally subsumed by the fixed effects in equation (1).

In our setting, the self-selection problem is substantially mitigated by the fact that people cannot choose their ancestry. Nevertheless, people can choose where to live, and such self-selection could potentially affect our inferences. Evans et al. (1992) point out that the direction of the bias introduced by self-selection depends on the relationship between the unobserved factors that determine the peer group and the unobservable factors that determine performance. The direction of the bias in our setting is unclear. Individuals choose geographic location for various reasons (e.g., employment opportunities, climate, cost of living, quality of local school districts, and so forth). Some of these factors are not correlated with individual preferences for owning a home, whereas others could exhibit both positive and negative correlations with homeownership; for example, some individuals could choose to relocate away from expensive areas, whereas others could be attracted by regions with high living cost due to their better opportunities.

To mitigate potential concerns with self-selection, we exploit a randomized subset of our sample. Ideally, in a well-designed experiment, all individuals should be randomly allocated across treatment groups. Such randomization enables unbiased estimation of the treatment effect (Montgomery (2005)). Unfortunately, in most observational studies, the assignment of treatments to subjects is not randomized. One solution is to look for "natural experiments" or "quasi experiments" that provide random allocation of the treatment across groups (Manski (2000)). We use as a natural experiment the subsample of military families. Military families are more likely to relocate for exogenous reasons related to their military duties. We note that this subsample does not eliminate self-selection

completely, as military families could choose between different PUMAs around the military base. Nevertheless, we believe that within this subsample there will be relatively less self-selection with respect to location than within the general sample.

Throughout the article, we estimate the model in equation (1) as a linear probability model. We do not use a nonlinear estimation for two reasons, one technical and one methodological. First, the model is estimated over approximately 4 million observations with thousands of variables and clusters (of standard errors), which requires substantial computational resources. Even in the ordinary least squares (OLS) estimation, in order to achieve convergence of the algorithms, we demean all variables within PUMA and ancestry clusters to reduce the number of fixed effects. Unfortunately, such an approach is not applicable in nonlinear models, which are even more computationally intensive than linear models. Second, a major advantage of linear probability models relative to nonlinear models emerges in the case of interactions on the right-hand side, which are used extensively in this article. As Ai and Norton (2003) show, interactions are difficult to interpret in nonlinear models.

As an additional robustness check of our results, we estimated probit versions of the baseline model in equation (1) with smaller numbers of fixed effects (by replacing PUMA-fixed effects with state-fixed effects) over various randomized subsamples. The results from these tests are qualitatively similar to the results reported in this article.

III. Data and Summary Statistics

A. Data

We construct our sample from multiple sources. First, we obtain individual homeownership data, ancestry information, and other demographic characteristics from the 2000 U.S. Census. The 5% sample of the 2000 U.S. Census is available from the Integrated Public Use Microdata Series (IPUMS) project from the Minnesota Population Center at the University of Minnesota (see Ruggles, Alexander, Genadek, Goeken, Schroeder, and Sobek (2010)). The sample contains about 14 million observations from 5 million households. Respondents are identified by a household and a person number as well as their geographic location, which includes the state and the Public Use Microdata Area (PUMA). There are a total of 2,071 PUMAs, which were created to maintain a level of geographic detail while protecting the anonymity of respondents in small counties. PUMAs have about 150,000 inhabitants on average.[4]

Throughout the article, we work only with heads of household. We are interested in home-buying decisions, and the head of the household is expected to have the strongest input on this decision. There are 5.2 million heads of household, which account for approximately 37% of the 2000 U.S. Census. To be included in the sample, we require the head of household to have valid ancestral information. Questions with regard to ancestry appeared on the long census form between

[4]Throughout the article, we refer to a PUMA as a region, area, or district.

1980 and 2000.[5] We use the census variables that record answers to this question to capture the respondent's self-reported ancestry or ethnic origin. In cases in which the respondent gives more than one ancestry, the census records the first two responses. We build our analysis based on the first response and present some robustness tests based on the second response. We also exclude all ancestries that refer to country groups, such as Scandinavian, Eastern European, Asian, and so forth. It is clear that such respondents do not exhibit a strong ethnic identity, which is a necessary condition for the empirical design of this article.[6] Applying these restrictions reduces the sample to 4.02 million. Finally, we exclude 0.11 million observations for ancestries that are represented by fewer than five households in a region. Our basic sample consists of approximately 4 million households from 126 different ancestral groups in 2,071 PUMA regions.

In addition to ancestry, we draw other data on individuals from the census as well. These include the dependent variable for our analysis (homeownership), as well as a set of control variables that may influence homeownership decisions, such as household income, the age of the head of household, and whether the head of household is an immigrant, employed, college-educated, female, single, or white.

For each ancestral group that could be traced to a single country, we derive four cultural variables developed by Hofstede (1980). Based on survey results conducted among IBM employees of different foreign subsidiaries, Hofstede classifies national cultures along four dimensions: power distance (PD), individualism (IDV), masculinity (MAS), and uncertainty avoidance (UA).[7] Power distance refers to the degree of inequality that exists, and is accepted, among people within (the organizations in) a country. A high PD score indicates that a society accepts an unequal distribution of power, whereas a low PD score means that power is well dispersed and that society members view themselves as equals. Individualism refers to the strength of ties among people in the community. A high IDV score indicates a low degree of interpersonal connection, whereas a low IDV score indicates strong group cohesion and shared responsibility among members of the group. Masculinity refers to how much a society values traditional male and female roles. High MAS scores correspond to countries where men are expected to be strong, assertive, and the main provider in the family. Low MAS societies, on the other hand, are more gender-equal (they do not reverse the gender roles). Finally, uncertainty avoidance relates to the degree of anxiety society members feel in uncertain or unknown environments. It captures the extent to which people feel uncomfortable in unstructured situations. According to Hofstede (1980),

[5]In the 2000 U.S. Census: Question 10. What is this person's ancestry or ethnic origin? (For example: Italian, Jamaican, African American, Cambodian, Cape Verdean, Norwegian, Dominican, French Canadian, Haitian, Korean, Lebanese, Polish, Nigerian, Mexican, Taiwanese, Ukrainian, and so on.)

[6]In addition, we aggregate a few ancestral groups that could be associated with a single country or a major ethnic group within a country. For example, respondents are given 22 options to declare an Italian heritage (e.g., Italian, Abruzzi, Rome, Tuscan, Venetian, and so on). We aggregate all of them into an Italian ethnicity.

[7]Hofstede added a fifth dimension, long-term orientation, in the 1990s. We do not include this variable in the analysis because it covers a relatively small number of countries.

uncertainty-avoiding cultures try to minimize uncertainty by promoting strict laws, rules, and beliefs in absolute truth.

B. Summary Statistics

Table 1 summarizes our sample by states. We report the homeownership rate, the number of PUMAs, the number of ancestral groups, and the two largest ancestral groups for each one of the 50 states as well as the District of Columbia (DC). We observe that the homeownership rate in our sample varies significantly

TABLE 1

Sample Characteristics

Table 1 reports the homeownership rate, the number of PUMA regions, the number of ancestral groups, and the names of the two largest ancestral groups in each state across all heads of household in the 2000 U.S. Census.

Rank	State	Home-ownership Rate	No. of PUMAs	No. of Ancestral Groups	Largest Ancestral Group	Second-Largest Ancestral Group
1	Minnesota	0.806	37	54	German	Norwegian
2	Michigan	0.779	68	69	German	African American
3	Maine	0.771	10	30	English	French
4	Iowa	0.767	19	40	German	Irish
5	Utah	0.765	16	53	English	German
6	Wisconsin	0.758	31	52	German	Norwegian
7	West Virginia	0.757	12	37	American	German
8	Pennsylvania	0.757	92	63	German	Irish
9	Vermont	0.751	4	34	English	Irish
10	New Hampshire	0.749	11	38	English	Irish
11	Delaware	0.749	6	38	African American	Irish
12	Idaho	0.747	9	39	German	English
13	Indiana	0.744	48	49	German	American
14	North Dakota	0.742	5	29	German	Norwegian
15	South Dakota	0.734	7	27	German	Norwegian
16	Alabama	0.734	30	36	African American	American
17	Wyoming	0.733	4	34	German	English
18	Kansas	0.732	21	45	German	American
19	South Carolina	0.732	27	42	African American	American
20	Montana	0.731	7	36	German	Norwegian
21	Missouri	0.730	41	48	German	American
22	Nebraska	0.728	14	38	German	Irish
23	Illinois	0.723	87	76	German	African American
24	Kentucky	0.721	30	40	American	German
25	Ohio	0.721	91	63	German	American
26	Oklahoma	0.721	18	45	American	German
27	New Mexico	0.720	15	45	Mexican	Spanish
28	Florida	0.717	127	82	German	English
29	Mississippi	0.713	23	28	African American	American
30	Arizona	0.711	36	53	Mexican	German
31	Arkansas	0.711	19	34	American	African American
32	Maryland	0.710	44	78	African American	German
33	Tennessee	0.709	44	39	American	African American
34	Colorado	0.705	38	58	German	English
35	Connecticut	0.703	25	69	Italian	Irish
36	North Carolina	0.699	58	55	African American	American
37	New Jersey	0.692	61	80	Italian	Irish
38	Virginia	0.692	42	77	African American	American
39	Louisiana	0.691	36	39	African American	American
40	Georgia	0.684	63	68	African American	American
41	Washington	0.675	46	63	German	English
42	Texas	0.674	153	72	Mexican	German
43	Oregon	0.673	27	53	German	English
44	Massachusetts	0.651	52	76	Irish	Italian
45	Rhode Island	0.638	7	53	Italian	Irish
46	Alaska	0.634	5	39	German	American Indian
47	Nevada	0.634	15	58	German	Mexican
48	New York	0.603	143	101	Italian	Irish
49	Hawaii	0.602	9	39	Japanese	Filipino
50	California	0.589	233	102	Mexican	German
51	DC	0.439	5	64	African American	Irish

across states. The highest homeownership rate is in the state of Minnesota (over 80%), followed by Michigan and Maine. DC, on the other hand, has the lowest homeownership rate in the country at 43.9%. California is the only state with a homeownership rate below 60%.

On average, there are around 40 different PUMAs and 53 different ancestral groups in a state. Large states tend to be more diverse. For example, California has 233 PUMAs and 102 ancestral groups. German is the largest ancestral group in 22 states, African American is the largest group in 10 states, and English is the largest group in 4 states. Although Irish is the largest ethnic group only in the state of Massachusetts, it is the second largest ethnicity in 11 other states.

Table 2 presents distributional characteristics of the basic variables in the sample. It also reports the states with the smallest and largest average characteristics. All variables exhibit substantial variation across households and regions. The state with the highest average income is Connecticut, and the state with the lowest average income is Mississippi. New Jersey (North Dakota) has the largest (smallest) fraction of high-income individuals (household income of more than $100,000). Approximately 26% of the heads of household have college degrees, and 12% are immigrants. Female heads of household account for 34% of the sample, and roughly 56% of the household heads are married. With respect to ancestral attributes, Hawaii, with a large population of Japanese and Filipino descendants, ranks high in power distance, masculinity, and uncertainty avoidance, but low in individualism. The most individualistic communities are found in Maine, where English and French are the two largest ancestral groups.

TABLE 2

Summary Statistics

Table 2 reports statistics for the following head-of-household variables: homeownership; household income; indicator variables (equals 1 if true, and 0 otherwise) for high income (more than $100,000), employment status, college degree, immigration, gender, family status, and white ethnicity; age; and four cultural characteristics derived from the corresponding country of origin for the ancestral group of each respondent, power distance (HOFSTEDE-PD), individualism (HOFSTEDE-IDV), masculinity (HOFSTEDE-MAS), and uncertainty avoidance (HOFSTEDE-UA). The first (last) column lists the states with the smallest (largest) average values of the corresponding characteristic. The sample covers all heads of household from the 2000 U.S. Census, excluding ethnic groups with fewer than five households in a PUMA.

	State with Lowest Characteristic	5th Percentile	Population Average	95th Percentile	State with Highest Characteristic
Homeownership	DC	0.000	0.692	1.000	Minnesota
Household income	Mississippi	$7,500	$58,386	$152,000	Connecticut
1 if high income	North Dakota	0.000	0.132	1.000	New Jersey
1 if employed	West Virginia	0.000	0.671	1.000	Colorado
1 if college degree	Arkansas	0.000	0.263	1.000	DC
1 if immigrant	South Dakota	0.000	0.121	1.000	California
1 if female	Utah	0.000	0.336	1.000	DC
1 if married	DC	0.000	0.560	1.000	Utah
1 if white	Hawaii	0.000	0.807	1.000	Vermont
Age	Alaska	25.000	49.541	80.000	Florida
Ethnicity: Trust	Louisiana	0.186	0.303	0.618	North Dakota
Ethnicity: HOFSTEDE-PD	North Dakota	0.280	0.453	0.810	Hawaii
Ethnicity: HOFSTEDE-IDV	Hawaii	0.230	0.659	0.890	Maine
Ethnicity: HOFSTEDE-MAS	North Dakota	0.140	0.606	0.700	Hawaii
Ethnicity: HOFSTEDE-UA	Utah	0.350	0.586	0.930	Hawaii

Panel A of Table 3 reports the relative size and homeownership rates for the 10 largest ancestral groups across the entire country, as well as in their most

TABLE 3

Homeownership of the Largest Ancestral Groups

Table 3 reports the 10 largest ancestral groups based on the 2000 U.S. Census. Columns 1 and 2 report the fraction of the corresponding ancestral group relative to total population and the portion of homeowners within the group; columns 3–5 report the state with the largest concentration of population for the corresponding group, its fraction of total state population, and its homeownership rate within the state. Panel A reports all variables for the whole sample; Panel B, for the subsample of immigrants; and Panel C, for the subsample of military families.

	United States		State with Largest Concentration		
	Fraction of Population	Portion of Homeownership	State Name	Fraction of Population	Homeownership Rate
	1	2	3	4	5
Panel A. Whole Sample					
German	0.167	0.766	Wisconsin	0.428	0.786
African American	0.103	0.508	DC	0.561	0.423
American	0.101	0.741	Kentucky	0.322	0.745
Irish	0.099	0.721	Massachusetts	0.211	0.698
English	0.096	0.790	Utah	0.311	0.823
Italian	0.063	0.734	Rhode Island	0.216	0.711
Mexican	0.057	0.512	Texas	0.236	0.605
Polish	0.033	0.765	Michigan	0.087	0.833
French	0.025	0.719	Maine	0.142	0.749
American Indian	0.023	0.611	Alaska	0.149	0.617
Average [Total]	[0.769]	0.687	—	0.267	0.699
Panel B. Immigrants					
Mexican	0.270	0.459	New Mexico	0.719	0.658
Chinese	0.052	0.593	Hawaii	0.114	0.583
Indian	0.046	0.505	West Virginia	0.102	0.607
German	0.044	0.731	North Dakota	0.311	0.660
Puerto Rican	0.042	0.355	Connecticut	0.190	0.249
Filipino	0.039	0.635	Hawaii	0.464	0.686
Italian	0.034	0.774	West Virginia	0.120	0.788
Spanish	0.030	0.529	Florida	0.082	0.657
Cuban	0.027	0.593	Florida	0.213	0.633
English	0.026	0.720	Maine	0.212	0.783
Average [Total]	[0.608]	0.589	—	0.253	0.630
Panel C. Military Families					
German	0.180	0.400	Wisconsin	0.415	0.692
African American	0.178	0.285	DC	0.400	0.300
Irish	0.105	0.358	Oregon	0.225	0.375
American	0.083	0.381	West Virginia	0.325	0.615
English	0.075	0.440	Idaho	0.143	0.643
Italian	0.054	0.370	Rhode Island	0.147	0.357
Mexican	0.045	0.277	Arizona	0.121	0.400
Scottish	0.029	0.380	South Dakota	0.057	0.000
American Indian	0.026	0.324	Oregon	0.056	0.500
French	0.025	0.418	Vermont	0.235	0.500
Average [Total]	[0.798]	0.363	—	0.213	0.438

representative states. The 10 largest ancestries account for 77% of the population, indicating that the distribution of the U.S. population is biased toward the largest ancestral groups, but there is still a nontrivial representation of all other ethnic groups. The largest ancestral group is German (16.7% of the population), followed by African American, American, Irish, and English ancestries. Three of the 10 largest ancestral groups are linked to the United States: American, African American, and American Indian. For all of our analysis from now on, we exclude the American group because it very likely represents a mixture of many different ethnicities.[8] We keep the African American and American Indian ancestries

[8]We also exclude Canadian ancestry from the analysis due to its cultural and geographical proximity to the United States.

in the sample because they could exhibit distinct values and attitudes. However, all major results in the article remain qualitatively similar if we exclude all three U.S.-related ancestries from the analysis.

We observe that there is some clustering of ancestries across regions. For example, Germans dominate Wisconsin, African Americans concentrate in DC, Irish people in Massachusetts, Italians in Rhode Island, Polish people in Michigan, and French people in Maine. It is also interesting to note that the largest metropolitan areas in the United States, such as New York, Los Angeles, and Chicago, are diverse and not dominated by any major ancestral group.

The highest homeownership rate is found among English people (79%), and the lowest among African Americans (51%). Interestingly, for 7 out of the 10 largest ancestral groups, their homeownership rates increase with state-level concentration. For example, on average, 76% of Polish people own homes. In Michigan, the state with the highest representation of Polish people, their homeownership rate is 83%. This observation illustrates the main idea of the article, but also raises a question regarding to what extent this local correlation is affected by regional conditions in the state of Michigan or by self-selection, that is, the possibility that the more educated or entrepreneurial Polish people, who are also more likely to own a home, tend to live in Michigan. Controlling for these effects is a major objective in our empirical design.

In Panels B and C of Table 3, we report the same statistics for the subsamples of immigrants and military families, respectively. The immigrant subsample differs significantly from the full sample. Mexicans are the largest ancestral group among immigrants, accounting for 27% of the immigrant sample, followed by Chinese (5.2%) and Indians (4.6%). Although Mexican immigrants account for 72% of the immigrants in the state of New Mexico, immigrants with other ancestral backgrounds do not cluster in a particular state at a significantly higher rate than the full sample average. We also observe that immigrants are less likely to own a home; only 59% of immigrants are homeowners, a lower fraction than the 69% homeownership rate in the full sample.

The military subsample consists of 23,549 households and appears to be a representative subset of the full sample, with similar composition of ancestral groups. However, military families are significantly less likely to be homeowners. Only 36% of military families are homeowners, a rate that is less than half of the national average, perhaps due to the fact that military families often relocate as a result of changes in their military duties.

IV. Results

A. Social Influence in the Housing Market

We estimate the baseline model from equation (1) in Table 4. Column 1 shows that the homeownership decisions of individual households are positively and significantly related to the homeownership rates of their reference groups after controlling for both personal characteristics and average personal characteristics of the reference group. In column 2, we include both ancestry- and PUMA-fixed effects to address the concern of potential omitted variables. We find a significant

TABLE 4

Social Effect in Homeownership

Table 4 reports the coefficient estimates and standard errors from individual-level OLS regressions of an indicator for homeownership of the heads of household in the 2000 U.S. Census on the homeownership rate of households' reference group, defined as all residents who share the same ancestry and geographic PUMA district ($OWN_{P,A}$), excluding the corresponding household; log(household income); log(age); and indicator variables for high income (more than $100,000), employment status, college degree, immigration status, gender, family status, and white ethnicity. Columns 1 and 2 estimate the model across all households from the 2000 U.S. Census, and column 3 estimates for the subsample of military families. Standard errors, reported beneath the regression coefficients, are adjusted for clustering at the PUMA and ancestry levels. The last two rows report the number of observations and R^2 in each regression. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	All Households		Military Families
	1	2	3
$OWN_{P,A}$	0.71***	0.34***	0.14***
	0.004	0.005	0.036
log(Household income)	0.11***	0.11***	0.13***
	0.001	0.001	0.001
1 if high income	−0.01***	−0.01***	0.01
	0.001	0.001	0.015
log(Age)	0.39***	0.39***	0.54***
	0.001	0.001	0.015
1 if employed	0.03***	0.03***	−0.06***
	0.001	0.001	0.012
1 if college degree	0.03***	0.02***	−0.03***
	0.001	0.001	0.007
1 if immigrant	−0.04***	−0.04***	−0.01
	0.001	0.001	0.012
1 if female	0.01***	0.01***	0.03***
	0.001	0.001	0.001
1 if married	0.16***	0.16***	0.07***
	0.001	0.001	0.007
1 if white	0.01***	0.03***	0.02**
	0.001	0.001	0.012
Reference group characteristics	Yes	Yes	Yes
Ancestry-fixed effects	No	Yes	Yes
PUMA-fixed effects	No	Yes	Yes
No. of obs. (mil.)	3.508	3.508	0.021
R^2	0.306	0.311	0.368

positive relation between individual homeownership and the homeownership rate of the reference group. The effect is also economically significant: A 1-standard-deviation increase in the homeownership rate of the reference group (17.5%) is associated with a 5.95-percentage-point increase in the probability of owning a home for the associated individuals.

In column 3 of Table 4, we report results from the subsample of military families. We find that the social effect in homeownership persists in this subsample; the coefficient of the homeownership rate of the reference group is 0.14, statistically significant at the 1% level. The effect remains economically meaningful: A 1-standard-deviation increase in the homeownership rate of the reference group is associated with a 2.5-percentage-point increase in the probability of owning a home for members of the military. The smaller coefficient on $OWN_{P,A}$ is expected because this estimation eliminates some potential self-selection biases. However, we note that the military subsample could be also biased against finding social influence because people who join the military are more likely to associate with "national" values rather than the values of a particular ethnic group. Despite these biases, we find that social influence is statistically and economically significant in this subsample.

Military families are identified as household heads employed in the armed forces. The census data distinguish among the following branches of the military: Army, Air Force, Navy, Marines, Coast Guard, Armed Forces (branch not specified), and Military Reserves or National Guard. Given that the last category could exhibit a greater amount of flexibility in residence location, we have replicated our tests while excluding this group from the estimation, and all statistical inferences are not significantly affected by the exclusion.

All control variables in the regressions have the expected signs. The likelihood of becoming a homeowner increases with income and age, although in a nonlinear fashion with income, as high-income households are not more likely to become homeowners once income level is controlled for.[9] People who are currently employed are more likely to own the home they live in, as are people with a college degree. When everything else is equal, married people are more likely to own a home, whereas immigrants and minorities are less likely. Female heads of household are also more likely to be homeowners. However, the economic significance of gender is relatively small.

We conduct a series of robustness tests for our baseline results. Table 5 summarizes some of these tests. First, it is possible that the locally correlated ownership decisions we find in Table 4 are due to discrimination in the mortgage lending market, especially against minorities (Black, Schweitzer, and Mandell (1978), Munnell, Tootell, Browne, and McEneaney (1996)). To control for this effect we estimate equation (1) for the subsamples of white households and minority

TABLE 5

Social Effect in Homeownership over Subsamples

Table 5 reports the coefficient estimates and standard errors from individual-level OLS regressions of an indicator for homeownership of the heads of household in the 2000 U.S. Census on the homeownership rate of households' reference group, defined as all residents who share the same ancestry and geographic PUMA district ($OWN_{P,A}$), excluding the corresponding household. Columns 1 and 2 estimate the model across white households and all other households (minorities); columns 3 and 4 estimate the model across the five largest ancestral groups and all other ancestral groups in a PUMA region; and columns 5 and 6 estimate the model across the PUMA regions within the five most populous states (California, Texas, New York, Florida, and Illinois) and across the PUMA regions within all other states. All models include log(household income); log(age); and indicator variables for high income (more than $100,000), employment status, college degree, immigration status, gender, family status, and white ethnicity. All models also contain average demographic characteristics of the reference group and PUMA- and ancestry-fixed effects. Standard errors, reported beneath the regression coefficients, are adjusted for clustering at the PUMA and ancestry levels. The last two rows report the number of observations and R^2 in each regression. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	White Households	Minority Households	5 Largest Ancestral Groups in a PUMA	Excluding the 5 Largest Ancestral Groups in a PUMA	5 Largest States	Excluding the 5 Largest States
	1	2	3	4	5	6
$OWN_{P,A}$	0.22***	0.47***	0.56***	0.19***	0.35***	0.32***
	0.006	0.009	0.015	0.006	0.009	0.007
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Reference group characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Ancestry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
PUMA-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs. (mil.)	2.765	0.743	2.384	1.125	1.314	2.194
R^2	0.277	0.298	0.334	0.319	0.332	0.291

[9]We have also controlled for a potential nonlinear relation between age and homeownership by including age squared in the regression. All results remain quantitatively and qualitatively similar.

households separately. In columns 1 and 2 of Table 5, we observe that although the homeownership rate of the reference group is statistically and economically significant for both subsamples, the effect is twice as strong among minorities as among whites (0.47 vs. 0.22). To the extent that minorities are more status conscious than are majorities (Grier and Deshpandé (2001)), the relatively higher local correlations in the home-buying decisions across minorities could be also consistent with the social influence hypotheses proposed in the article.

Second, we investigate whether our results are driven by the largest ancestral groups in each PUMA. As Figure 1 shows, even in ethnically diverse counties such as Napa, the five largest ethnicities account for almost 60% of county population (with Germans alone representing over 15%). Lazear (1999) argues that the assimilation of minority groups into the mainstream society is slower if their culture and language are broadly represented in society, whereas the assimilation for smaller minority groups is much faster. In this respect, if we find correlated ownership decisions even among small ancestral groups, we would be more confident to conclude that social influence exists broadly in the housing market. To assess this possibility, we identify the five largest ancestral groups for each PUMA and conduct our analysis for two subsamples, one that includes only the five largest ancestries in each PUMA, and another that excludes the five largest ancestral groups in each PUMA. Columns 3 and 4 of Table 5 show that although social influence is stronger among the largest ancestral groups (as expected), it is also well pronounced in the subsample of smaller ancestral groups.

Next, we investigate the potential effect of agglomeration on social influence in the housing market. In column 5 of Table 5, we present results for the subsample of the five largest states in the country: California, Texas, New York, Florida, and Illinois. In column 6, we report results for the subsample of all other states. We find that the social effect in housing consumption is well articulated across both large and small states.

We also estimated the baseline model i) with and without the five largest ancestral groups in the country, German, African American, Irish, English, and Italian; ii) without the African American and American Indian ancestries; and iii) with the American ancestry. All results are robust across these subsamples. In addition, we estimated the baseline model separately for each state and DC. The sensitivity of individual homeownership decisions to the homeownership rates of households' reference groups is positive in 37 of the 50 states plus DC, and positive and significant (at the 10% level) in 30 out of the 50 states plus DC. The states with the strongest social influence in housing consumption are New York, Georgia, Texas, California, Maryland, and Illinois. The states with the weakest social influence are Vermont, North Dakota, and Wyoming. Overall, our evidence suggests that individual homeownership decisions are strongly related to the homeownership decisions of households' ethnic peers in the region.

Finally, in Table 6 we examine the social influence among families of mixed ethnicity. Approximately 25% of census respondents report more than one ancestry. In all of these cases, the census records the first two responses. In column 1 of Table 6, we estimate the baseline model among single-ancestry heads of household; in column 2, we estimate the model across multiple-ancestry heads

TABLE 6

Social Effect in Homeownership: Multiple-Ancestry Households

Table 6 reports the coefficient estimates and standard errors from individual-level OLS regressions of an indicator for homeownership of the heads of household in the 2000 U.S. Census on the homeownership rate of households' reference group, defined as all residents who share the same ancestry and geographic PUMA district ($OWN_{P,A}$), excluding the corresponding household. Column 1 reports results estimated using the subsample of households that report a single ancestry; columns 2 and 3 report results with the subsample of households that report multiple ancestries. In column 2 (3), ancestry is the first (second) ancestry reported. All models include log(household income); log(age); and indicator variables for high income (more than $100,000), employment status, college degree, immigration status, gender, family status, and white ethnicity. All models also contain average demographic characteristics of the reference group and PUMA- and ancestry-fixed effects. Standard errors, reported beneath the regression coefficients, are adjusted for clustering at the PUMA and ancestry levels. The last two rows report the number of observations and R^2 in each regression. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

		Multiple-Ancestry Households	
	Single-Ancestry Households	First Ancestry Reported	Second Ancestry Reported
	1	2	3
$OWN_{P,A}$	0.39***	0.06***	0.02*
	0.006	0.008	0.008
Individual characteristics	Yes	Yes	Yes
Reference group characteristics	Yes	Yes	Yes
Ancestry-fixed effects	Yes	Yes	Yes
PUMA-fixed effects	Yes	Yes	Yes
No. of obs. (mil.)	2.536	0.972	0.972
R^2	0.318	0.283	0.284

of household based on their first response; and in column 3, we estimate the model across multiple-ancestry heads of household based on their second response.

We identify the strongest social influence among individuals with a single ancestry. The social effect in housing consumption remains statistically significant among multiple-ancestry households, although its economic significance is substantially weaker (0.06 vs. 0.39). This is expected because multiple-ancestry individuals could exhibit weaker attachment to one particular ancestry than single-ancestry individuals. In column 3 of Table 6, we find that the social effect in housing consumption is the weakest when we use the second response instead of the first for all respondents who report multiple ethnicities. Taken together, these results suggest that the social influence in housing consumption is robust across people with multiple ancestries.

B. Conditioning on Personal Characteristics

To shed additional light on the social influence hypothesis, in this section we examine how the sensitivity of individual homeownership to the ownership of the reference group varies with personal characteristics. In particular, we focus on wealth, age, education, immigration status, and gender. The results are summarized in Table 7.

As noted earlier, there are two general motivations for social comparison in the housing market: *status* and *information*. We expect the social influence in the housing market to be weaker among wealthier individuals. On the one hand, wealthy individuals could obtain information on the real estate market from alternative sources who charge a fee (e.g., realtors, accountants, or financial advisors). In contrast, lower-income individuals may rely more heavily on social peers to obtain information. On the other hand, if social influence is motivated by

TABLE 7

Social Effect in Homeownership Conditional on Personal Characteristics

Table 7 reports the coefficient estimates and standard errors from individual-level OLS regressions of an indicator for homeownership of the heads of household in the 2000 U.S. Census on the homeownership rate of households' reference group, defined as all residents who share the same ancestry and geographic PUMA district ($OWN_{P,A}$), excluding the corresponding household; log(household income); log(age); and indicator variables for high income (more than $100,000), employment status, college degree, immigration status, gender, family status, and white ethnicity. The models also include interaction terms of $OWN_{P,A}$ with age and the indicator variables for high income, college degree, immigrant, and gender. All models include average demographic characteristics of the reference group and PUMA- and ancestry-fixed effects. Standard errors, reported beneath the regression coefficients, are adjusted for clustering at the PUMA and ancestry levels. The last two rows report the number of observations and R^2 in each regression. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6
$OWN_{P,A}$	0.38***	0.89***	0.39***	0.30***	0.34***	0.91***
	0.005	0.033	0.005	0.005	0.005	0.033
$OWN_{P,A}$ × high income	−0.27***					−0.23***
	0.005					0.005
$OWN_{P,A}$ × log(age)		−0.15***				−0.14***
		0.009				0.009
$OWN_{P,A}$ × college degree			−0.14***			−0.11***
			0.004			0.004
$OWN_{P,A}$ × immigrant				0.12***		0.11***
				0.005		0.005
$OWN_{P,A}$ × female					0.01***	0.00
					0.003	0.004
1 if high income	0.18***	−0.01***	−0.01***	−0.01***	−0.01***	0.16***
	0.004	0.000	0.004	0.000	0.000	0.004
log(Age)	0.39***	0.49***	0.39***	0.39***	0.39***	0.49***
	0.004	0.007	0.001	0.001	0.001	0.007
1 if college degree	0.02***	0.02***	0.10***	0.02***	0.02***	0.07***
	0.001	0.001	0.003	0.001	0.001	0.003
1 if immigrant	−0.04***	−0.04***	−0.04***	−0.15***	−0.04**	−0.14***
	0.001	0.001	0.001	0.003	0.001	0.004
1 if female	0.01***	0.01***	0.01***	0.01***	0.01***	0.02***
	0.001	0.001	0.001	0.001	0.003	0.003
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Reference group characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Ancestry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
PUMA-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs. (mil.)	3.508	3.508	3.508	3.508	3.508	3.508
R^2	0.312	0.311	0.312	0.311	0.311	0.313

status considerations, we would also expect wealthy individuals to be less sensitive to such influence, given that they already have high status. Column 1 of Table 7 shows that this is indeed the case. We find that high-income households are 71% less likely to condition their homeownership decisions on the decisions of their peer group than are other households (marginal effect of 0.11 vs. 0.38). Of course, as people climb the income distribution, they could become more sensitive to the actions of other nonethnic reference groups, such as colleagues, alumni, and so forth.

Next, we look at homeownership decisions conditional on education and age. People with higher education not only have access to more sources of information, but are also better able to process that information. More educated people also tend to enjoy higher status in society. As a result, we expect social influence to be weaker among more educated individuals. Older people, having accumulated more knowledge about the housing market over time, are also less likely to obtain information from their ethnic peers. Moreover, older people are less subject to behavioral biases and social influence (e.g., List (2003), Dhar and Zhu (2006)).

Columns 2 and 3 of Table 7 reveal that, indeed, both older and more educated people are less likely to be influenced by the behavior of their ethnic peers in their homeownership decisions.

In column 4 of Table 7, we show that social influence is stronger for immigrants than for U.S.-born individuals. To control for self-selection in immigration, we also estimated model 4 in Table 7 separately across each of the 121 ancestral groups with nonmissing immigrant information (these results are unreported). We find that in 86 ethnicities (71%) the interaction term between the immigrant indicator and the ownership rate of the reference group is positive, and in 48 ethnicities (40%) it is positive and significant at the 10% level.

The immigration results are consistent with the choice of reference groups, given that first-generation Americans are expected to be more attached to their heritage than are later-generation Americans. Immigrants are also more likely to obtain information from others in their ethnic communities due to stronger cultural and language barriers. Therefore, a stronger social influence among immigrants is consistent with the information motive for social influence. This result does not imply, however, that immigrants are more subjected to social pressure than U.S.-born individuals, but simply that they are more sensitive to ethnic delineations. Finally, we show that social influence tends to be stronger among women, but the gender difference is economically small.

C. Conditioning on Reference Group Characteristics

How does the social effect in housing consumption vary across ethnicities? Cultural values vary substantially across ethnic groups, which could be related to their propensity to engage in social comparisons. To evaluate the importance of these characteristics, we match ancestral groups with their country of origin and derive basic cultural values from the corresponding country.

We examine four country-level cultural measures developed by Hofstede (1980): power distance (PD), individualism (IDV), masculinity (MAS), and uncertainty avoidance (UA).[10] The first three cultural dimensions affect how people interact with one another, and have a clear prediction for social influence via the status channel. In particular, in societies with low power distance, where citizens are perceived equal, people should care less about social status. As a result, we expect social influence to be stronger in societies with high power distance. People from collectivistic societies (low IDV scores) are also expected to be less subject to social comparison because collectivism promotes in-group cooperation. Next, we expect social influence to be stronger in societies exhibiting masculinity because countries with high MAS scores share a preference for achievement and

[10]Although Hofstede's (1980) cultural dimensions have been widely used, recent research has raised several concerns. Hofstede derived these four cultural dimensions from survey results on work-related values from more than 117,000 IBM employees working in 40 different countries between 1967 and 1973. Schwartz (1994) argues that Hofstede's cultural dimensions are not exhaustive to identify dimensions of *national* culture because i) the survey questions are about work-related values, and ii) Hofstede's sample countries did not reflect the full spectrum of national cultures. Furthermore, IBM employees surveyed by Hofstede were not representative of the general population of their countries, and the extent of this misrepresentation is likely to vary across countries.

personal success, whereas countries with low MAS scores value cooperation and modesty. Finally, we do not predict any direct connection between uncertainty avoidance and status-seeking behavior.

The information channel for social comparisons suggests a link between social influence and both individualism and uncertainty avoidance. With respect to individualism, the weak interpersonal ties in individualistic societies imply that in these societies people do not share their private information to the same extent as do people in more collectivistic societies. As a result, people from such self-reliant cultures are expected to make more independent decisions. Thus, if social influence is motivated by information, we would expect *weaker* social influence in more individualistic communities. With respect to uncertainty avoidance, the information channel predicts that individuals from uncertainty-avoiding cultures would be *more* likely to copy the behavior of others in order to reduce the uncertainty and anxiety associated with being different.

Columns 1–4 in Table 8 present our results. We find that the homeownership decisions of individuals are more sensitive to the homeownership decisions of their reference groups in cultures with higher power distance, collectivism

TABLE 8

Social Effect in Homeownership Conditional on Reference Group Characteristics

Table 8 reports the coefficient estimates and standard errors from individual-level OLS regressions of an indicator for homeownership of the heads of household in the 2000 U.S. Census on the homeownership rate of households' reference group, defined as all residents who share the same ancestry and geographic PUMA district ($OWN_{P,A}$), excluding the corresponding household; log(household income); log(age); and indicator variables for high income (more than $100,000), employment status, college degree, immigration status, gender, family status, white ethnicity; and four ancestral cultural characteristics, power distance (HOFSTEDE-PD), individualism (HOFSTEDE-IDV), masculinity (HOFSTEDE-MAS), and uncertainty avoidance (HOFSTEDE-UA). The cultural characteristics are measured from the ancestral country of each respondent. All models include interaction terms of $OWN_{P,A}$ with the ancestral characteristics. All models also include average demographic characteristics of the reference group within the PUMA and PUMA- and ancestry-fixed effects. Standard errors, reported beneath the regression coefficients, are adjusted for clustering at the PUMA and ancestry levels. The last two rows report the number of observations and R^2 in each regression. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5
$OWN_{P,A}$	0.10***	0.51***	0.29***	0.20***	0.32***
	0.010	0.008	0.009	0.011	0.020
$OWN_{P,A}$ × HOFSTEDE-PD	0.36***				0.10***
	0.012				0.018
$OWN_{P,A}$ × HOFSTEDE-IDV		−0.38***			−0.33***
		0.015			0.017
$OWN_{P,A}$ × HOFSTEDE-MAS			0.08***		0.11***
			0.012		0.012
$OWN_{P,A}$ × HOFSTEDE-UA				0.20***	0.05***
				0.012	0.012
Ethnicity: HOFSTEDE-PD	−0.26***				−0.08***
	0.009				0.013
Ethnicity: HOFSTEDE-IDV		0.24***			0.17***
		0.009			0.013
Ethnicity: HOFSTEDE-MAS			−0.04***		−0.06***
			0.009		0.010
Ethnicity: HOFSTEDE-UA				−0.14***	−0.06***
				0.009	0.010
Individual characteristics	Yes	Yes	Yes	Yes	Yes
Reference group characteristics	Yes	Yes	Yes	Yes	Yes
Ancestry-fixed effects	No	No	No	No	No
PUMA-fixed effects	Yes	Yes	Yes	Yes	Yes
No. of obs. (mil.)	2.356	2.356	2.356	2.356	2.356
R^2	0.227	0.227	0.226	0.227	0.228

(the opposite of individualism), masculinity, and uncertainty avoidance. The first three results are consistent with the status explanation of social influence. The stronger social influence among individuals from collectivistic and uncertainty-avoiding cultures also supports the information explanation of social comparisons in the housing market.

V. Conclusion

Individual consumption and investment decisions can be significantly affected by the actions of others. Although the underlying reasons for such behavior, even its rationality, are difficult to understand, social influence appears to be an essential part of economic interactions.

In this article, we contend that such social forces significantly affect the housing market. We find that individuals' homeownership decisions depend on their exposure to homeowners of the same ethnicity in the region. The effect is stronger for younger, less educated, and lower-income individuals, as well as immigrants. Cultural background matters as well. We find that people from more unequal, uncertainty-avoiding, and collectivistic cultures are more likely to condition their homeownership decisions on the decisions of their ethnic peers. We consider two possible channels for social influence in the housing market: *status* and *information*. Our evidence suggests that both channels play an important role in the social comparison process in capital markets.

References

Agarwal, S.; P. M. Skiba; and J. Tobacman. "Payday Loans and Credit Cards: New Liquidity and Credit Scoring Puzzles?" *American Economic Review*, 99 (2009), 412–417.

Ai, C., and E. Norton. "Interaction Terms in Logit and Probit Models." *Economics Letters*, 80 (2003), 123–129.

Akerlof, G. "Social Distance and Social Decisions." *Econometrica*, 65 (1997), 1005–1027.

Arndt, J. "Role of Product-Related Conversations in the Diffusion of a New Product." *Journal of Marketing Research*, 4 (1967), 291–295.

Banerjee, A. "A Simple Model of Herd Behavior." *Quarterly Journal of Economics*, 107 (1992), 797–817.

Banerjee, A., and D. Fudenberg. "Word-of-Mouth Learning." *Games and Economic Behavior*, 46 (2004), 1–22.

Bertrand, M.; E. Luttmer; and S. Mullainathan. "Network Effects and Welfare Cultures." *Quarterly Journal of Economics*, 115 (2000), 1019–1057.

Bikhchandani, S.; D. Hirshleifer; and I. Welch. "Learning from the Behavior of Others: Conformity, Fads, and Informational Cascades." *Journal of Economic Perspectives*, 12 (1998), 151–170.

Black, H.; R. L. Schweitzer; and L. Mandell. "Discrimination in Mortgage Lending." *American Economic Review*, 68 (1978), 186–191.

Borjas, G. "Ethnicity, Neighborhoods, and Human-Capital Externalities." *American Economic Review*, 85 (1995), 365–390.

Brown, J. J., and P. H. Reingen. "Social Ties and Word-of-Mouth Referral Behavior." *Journal of Consumer Research*, 14 (1987), 350–362.

Campbell, J. "Household Finance." *Journal of Finance*, 61 (2006), 1553–1604.

Campbell, J.; H. Jackson; B. Madrian; and P. Tufano. "Consumer Financial Protection." *Journal of Economic Perspectives*, 25 (2011), 91–114.

Carlin, B. "Strategic Price Complexity in Retail Financial Markets." *Journal of Financial Economics*, 91 (2009), 278–287.

Celen, B.; S. Kariv; and A. Schotter. "An Experimental Test of Advice and Social Learning." *Management Science*, 56 (2010), 1687–1701.

Chan, Y. L., and L. Kogan. "Catching Up with the Joneses: Heterogeneous Preferences and the Dynamics of Asset Prices." *Journal of Political Economy*, 110 (2002), 1255–1285.

Cronqvist, H.; F. Münkel; and S. Siegel. "Genetics, Homeownership, and Home Location Choice." *Journal of Real Estate Finance and Economics*, May (2012), 1–33.
DeMarzo, P.; R. Kaniel; and I. Kremer. "Relative Wealth Concerns and Financial Bubbles." *Review of Financial Studies*, 21 (2008), 19–50.
Dhar, R., and N. Zhu. "Up, Close and Personal: An Individual Level Analysis of the Disposition Effect." *Management Science*, 52 (2006), 726–740.
Duflo, E., and E. Saez. "Participation and Investment Decisions in a Retirement Plan: The Influence of Colleagues' Choices." *Journal of Public Economics*, 85 (2002), 121–148.
Dupor, B., and W. Liu. "Jealousy and Equilibrium Overconsumption." *American Economic Review*, 93 (2003), 423–428.
Epple, D., and G. Platt. "Equilibrium and Local Redistribution in an Urban Economy When Households Differ in Both Preferences and Income." *Journal of Urban Economics*, 43 (1998), 23–51.
Epple, D., and H. Sieg. "Estimating Equilibrium Models of Local Jurisdictions." *Journal of Political Economy*, 107 (1999), 645–681.
Evans, W. N.; W. Oates; and R. M. Schwab. "Measuring Peer Group Effects: A Model of Teenage Behavior." *Journal of Political Economy*, 100 (1992), 966–991.
Festinger, L. "A Theory of Social Comparison Processes." *Human Relations*, 7 (1954), 117–140.
Frank, R. "Positional Externalities Cause Large and Preventable Welfare Losses." *American Economic Review Papers and Proceedings*, 45 (2005), 137–141.
Glaeser, E.; B. Sacerdote; and J. Scheinkman. "Crime and Social Interactions." *Quarterly Journal of Economics*, 112 (1996), 507–548.
Grier, S. A., and R. Deshpandé. "Social Dimensions of Consumer Distinctiveness: The Influence of Social Status on Group Identity and Advertising Persuasion." *Journal of Marketing Research*, 38 (2001), 216–224.
Grinblatt, M.; M. Keloharju; and S. Ikäheimo. "Social Influence and Consumption: Evidence from the Automobile Purchases of Neighbors." *Review of Economics and Statistics*, 90 (2008), 735–753.
Herr, P. M.; F. R. Kardes; and J. Kim. "Effects of Word-of-Mouth and Product Attribute Information on Persuasion: An Accessibility-Diagnosticity Perspective." *Journal of Consumer Research*, 17 (1991), 454–462.
Hirsch, F. *The Social Limits to Growth*. London, UK: Routledge & Kegan Paul (1976).
Hofstede, G. *Culture's Consequences: International Differences in Work-Related Values*. Beverly Hills, CA: Sage (1980).
Hogg, M., and D. Abrams. *Social Identification: A Social Psychology of Intergroup Relations and Group Processes*. London, UK: Routledge (1988).
Hong, H.; J. D. Kubik; and J. C. Stein. "Social Interaction and Stock Market Participation." *Journal of Finance*, 59 (2004), 137–163.
Khandani, A.; A. Lo; and R. Merton. "Systemic Risk and the Refinancing Ratchet Effect." *Journal of Financial Economics*, 108 (2013), 29–45.
Kling, J. R.; J. Ludwig; and L. F. Katz. "Neighborhood Effects on Crime for Female and Male Youth: Evidence from a Randomized Housing Mobility Experiment." *Quarterly Journal of Economics*, 120 (2005), 87–130.
Laczniak, R. N.; T. E. DeCarlo; and S. N. Ramaswami. "Consumers' Responses to Negative Word of Mouth Communication: An Attribution Theory Perspective." *Journal of Consumer Psychology*, 11 (2001), 57–73.
Lazear, E. "Culture and Language." *Quarterly Journal of Economics*, 107 (1999), S95–S126.
List, J. "Does Market Experience Eliminate Market Anomalies?" *Quarterly Journal of Economics*, 118 (2003), 41–71.
Lusardi, A., and O. Mitchell. "Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education Programs." Michigan Retirement Research Center Research Paper No. WP 2006-144 (2007).
Lusardi, A., and P. Tufano. "Debt Literacy, Financial Experiences, and Overindebtedness." National Bureau of Economic Research Working Paper No. 14808 (2009).
Madrian, B., and D. Shea. "The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior." *Quarterly Journal of Economics*, 116 (2001), 1149–1187.
Manski, C. "Identification of Endogenous Social Effects: The Reflection Problem." *Review of Economic Studies*, 60 (1993), 531–542.
Manski, C. "Economic Analysis of Social Interactions." *Journal of Economic Perspectives*, 14 (2000), 115–136.
Mian, A., and A. Sufi. "The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis." *Quarterly Journal of Economics*, 124 (2009), 1449–1496.
Montgomery, D. C. *Design and Analysis of Experiments*, 6th ed. Hoboken, NJ: John Wiley & Sons (2005).

Munnell, A.; G. Tootell; L. Browne; and J. McEneaney. "Mortgage Lending in Boston: Interpreting HMDA Data." *American Economic Review*, 86 (1996), 25–53.
Roussanov, N. "Diversification and Its Discontents: Idiosyncratic and Entrepreneurial Risk in the Quest for Social Status." *Journal of Finance*, 65 (2010), 1755–1788.
Ruggles S.; J. T. Alexander; K. Genadek; R. Goeken; M. B. Schroeder; and M. Sobek. *Integrated Public Use Microdata Series: Version 5.0*. Minneapolis, MN: University of Minnesota (2010).
Sacerdote, B. "Peer Effects with Random Assignment: Results for Dartmouth Roommates." *Quarterly Journal of Economics*, 116 (2001), 681–704.
Schwartz, S. "Beyond Individualism/Collectivism: New Cultural Dimensions of Values." In *Individualism and Collectivism: Theory, Methods, and Applications*, U. Kim, H. C. Triandis, C. Kagitcibasi, S. C. Choi, and G. Yoon, eds. Thousand Oaks, CA: Sage (1994).
Smith, A. (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations*, Vol. I, R. H. Campbell and A. S. Skinner, eds. Indianapolis, IN: Liberty Fund (1981).
Smith, A. (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations*, Vol. II, R. H. Campbell and A. S. Skinner, eds. Indianapolis, IN: Liberty Fund (1982).
Tiebout, C. "A Pure Theory of Local Expenditures." *Journal of Political Economy*, 64 (1956), 416–424.
Topa, G. "Social Interactions, Local Spillovers, and Unemployment." *Review of Economic Studies*, 68 (2001), 261–295.
Veblen, T. (1899). *The Theory of the Leisure Class: An Economic Study of Institutions*. New York, NY: Penguin (1994).
Weinberg, B.; P. Reagan; and J. Yankow. "Do Neighborhoods Affect Hours Worked? Evidence from Longitudinal Data." *Journal of Labor Economics*, 22 (2004), 891–924.
Yancey, W. L.; E. P. Ericksen; and R. N. Juliani. "Emergent Ethnicity: A Review and Reformulation." *American Sociological Review*, 41 (1976), 391–403.