Misleading Comparisons of Homeownership Rates When the Variable Effect of Household Formation is Ignored: Explaining Rising Homeownership and the Homeownership Gap between Blacks and Asians

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Abstract

Despite ominous signs of housing market stress in the U.S., the homeownership rate reached an all time high in 2006. The conventional definition of homeownership, which is based on the share of households and ignores the effects of variable household formation, confounds the measurement of "success" in achieving homeownership. We find that, from 1990 to 2006, declining household formation led to an elevated homeownership rate in the U.S. and this effect varies substantially between racial/ethnic groups. Asians, who achieve high homeownership rates, have the lowest propensity to form independent households, in sharp contrast to African Americans. Asians do not have better access per capita to owner-occupied housing than do blacks. The conventional measure of homeownership is an incomplete measure of homeownership opportunity because it fails to account for variable household formation. The changing population mix in the U.S. includes groups with different propensities for household formation, thus confusing future assessments of homeownership.

"The more ownership there is in America, the more vitality there is in America, and the more people have a vital stake in the future of this country." –President George W. Bush, June 17, 2004 (The Bush Administration, 2004a)

Homeownership is an integral part of the American Dream (Rossi and Weber, 1996; Rohe *et al.*, 2002) and an important housing policy target (The Bush Administration, 2004a). Under both the Clinton and Bush administrations, a goal was set to increase the U.S. homeownership rate to a record high, primarily by extending homeownership to previously underserved groups (Gabriel, 2001). The housing crash of 2008 and election of the Obama administration is now leading to a reassessment of this policy. An underlying problem was the failure to accurately measure success in achieving homeownership.

The period from 1990 to the mid 2000s saw a concerted increase in homeownership rates across the United States (Myers *et al.*, 2005). The national rate increased by two percentage points in the 1990s and by another three points in the early 2000s and eventually reached a record high of 69.2 percent in 2006 (Myers *et al.*, 1992; Simmons, 2001; Woodward and Damon, 2001; U.S. Census Bureau, 2009c). The increase is remarkable given the large rise in immigration and housing prices in recent years. Rising homeownership has been touted as a sign of victory on the road to an "ownership society," in which individuals would take more responsibility through private ownership and individual assumption of risk (The Bush Administration, 2004b). The increase in homeownership has been explained by a

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number of factors, including the spread of innovative mortgage lending practices,

strong incentive for investment, and the economic prosperity during the late 1990s

(Eggers, 2001; Gabriel and Rosenthal, 2002).

What has not been generally recognized is how much the common definition

of homeownership rates may have distorted the measurement of these trends and their

interpretation. Conventionally defined as the share *of households* that are

owner-occupied, analysis of homeownership rates may be incomplete because it

ignores people who *do not* form independent households. The rate of household

formation is highly variable over time and between ethnic or age groups, and so

neglect of this factor can be misleading about the overall trend in housing

achievement.

The observed differentials or trends over time could derive from different

causes and have different implications than generally assumed. Simply stated, if most

foregone household formation is withdrawn from the rental category, then lower

household formation creates an upward distortion of homeownership rates. In this

view, rising homeownership rates might not indicate a trend of rising housing

prosperity; rather, it could reflect the growing *exclusion of renters* from the market

and *falling* housing prosperity. Another implication is that population groups with

higher homeownership rates might achieve that result by cultural practices that

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encourage sharing of living quarters rather than emphasizing independent living and the renting of separate dwelling units.

This paper explores potential biases stemming from the conventional formulation of homeownership rates through a comparison of conclusions drawn from the *per household* and the *per capita* methods. The paper proceeds as follows. We first review previous studies and look at alternative ways in which homeownership may rise. After a summary description of major trends in homeownership and household formation rates, we develop explanatory models of the propensities of people to form households and buy homes in the 100 most populous metropolitan areas of the U.S. Particular attention is given to racial/ethnic differences and changes over the decades. We then simulate household formation and homeownership rates under different assumptions. Finally, we conclude with a discussion of the implications from our findings.

Previous studies

Demographic effects on housing

There has been a long-standing recognition of demographic effects on housing (see e.g., Carliner, 1975; Borsch-Supan, 1986; Leppel, 1986; Hendershott, 1988; Pitkin, 1990; Ermisch, 1991). Fresh realization of the growing importance of demographic effects has spawned a new wave of research that pays close attention to

the demographic determinants of housing demand (see e.g., Green, 1996; Haurin *et al.*, 1997b; Masnick *et al.*, 1999; Skaburskis, 1999; Riche, 2003; Myers, 2004). There is a great diversity in the way different demographic groups adjust their household consumptions. For instance, the elderly who already own homes are largely insulated from market fluctuations, whereas young households and new immigrants, as new housing market entrants, directly encounter the full market forces (Borsch-Supan, 1986; Chevan, 1989; Kendig, 1990).

Demography has changed significantly over time in all industrialized nations. For instance, in the U.S., the married couple household share has declined to below 50 percent of total households in recent years, while the number of non-retired people who live alone has increased significantly over time (U.S. Census Bureau, 2009a). Other industrialized nations have experienced similar gradual changes in the demographic composition, principally the aging of the population, during the postwar period, and a substantial increase in household formation rates has ensued. These demographic changes have significant impacts on housing demand (e.g., Smith *et al.*, 1984; Burch and Matthews, 1987; Miron, 1988).

The role of household formation

It is challenging to pinpoint exactly how variable rates of household formation affect homeownership attainment, because the conventional homeownership rate that

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is widely reported is not based on all members of the population but only on those

who have formed households (or are householders [i]). As a result of this challenge,

only a few prior studies have addressed the relationship in any way.

Borsch-Supan (1986) controlled for the endogeneity of household formation in

estimating housing demand. A demand-side housing program was found to create a

substantially more housing demand than originally anticipated, because it also

encouraged the formation of independent households. Haurin, Hendershott, and Kim

(1994) examined the tenure choice of American youth by controlling for possible

sample selection biases associated with household formation and labor supply.

Household formation was found to have a significant effect on youth's housing

demand and the youth were particularly sensitive to market fluctuations.

Haurin and Rosenthal (2007) treated the household formation decision as

endogenous to the tenure choice decision and used Heckman's procedure to adjust for

household formation in the selection equation. They found that lower headship rates

were associated with lower homeownership rates and that declining household

formation reduced homeownership rates in the recent two decades. The

Haurin-Rosenthal finding is the opposite of the reasoning and hypothesis in the

present study, perhaps for the reason that the selection model does not differentiate

the formation of renter households from owner households. In addition, their selection

equation did not include personal income and housing price and rent, which are

important to the decision of household formation (Borsch-Supan, 1986; Miron, 1988;

Kent, 1992; Skaburskis, 1994; Ermisch, 1999). The Haurin and Rosenthal study is

further discussed for its methodology later in this paper.

Puzzling racial/ethnic differences in homeownership

The importance of addressing underlying variations in practices of household

formation takes on even greater importance in the case of ethnic groups that have

different cultural customs of living arrangements. In these cases, homeownership

attainment becomes more behaviorally complex and assumes added theoretical

meaning. Asian residents present a noteworthy case because they attain a very high

homeownership rate, even though most of them are immigrants and came to the U.S.

recently (Myers *et al.*, 1998; Painter *et al.*, 2003; Yu and Myers, 2007). Net of other

relevant factors, their homeownership rate is almost on par with that of native-born,

non-Hispanic whites. This has been widely touted as evidence of Asians' successful

adaptation to the U.S. and as an emblem of their so-called "model minority" status.

African-Americans or blacks, in contrast, have persistently low

homeownership rates, even though almost all of them were born in the U.S. The

literature has repeatedly documented the persistent black-white homeownership gap,

which can not be fully explained by blacks' low socioeconomic status (Bianchi *et al.*,

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1982; Horton, 1992; Wachter and Megbolugbe, 1992; Flippen, 2001). Although blacks have significantly improved their homeownership rates in recent years, the black-white homeownership gap remains wide (Bostic and Surette, 2001; Freeman, 2005). Another distinctive feature of African-American living arrangements that is well-recognized is their much lower prevalence of married couple households (U.S. Census Bureau, 2009b). The implications of this for homeownership are not generally recognized: a lower incidence of married couple households leads to a higher probability of forming independent households, many of whom will be renters. Contrary to our expectation, however, the Haurin-Rosenthal (2007) study showed that blacks' high rates of household formation *increased* their homeownership rates and implied that the black-white homeownership gaps would have been even larger had blacks had a similarly low propensity for household formation to whites.

With the rapid changes in composition of the U.S. population, the relationship between household formation and homeownership is likely to have implications for trends in the overall rate of homeownership and housing consumption in the future. To address these issues, we must first examine how the conventional homeownership measure is constructed.

Deconstructing the conventional measure of homeownership achievement

There are two different ways in which the proportional achievement of

homeownership can increase—either by transfers of renters to homeowner status or

by elimination of renters from the housing market (Masnick *et al.*, 1999). This can be

understood from the conventional construction of the *homeownership rate,* as

presented in the following equation:

$$Ownership\_Rate = \frac{Owner\_HHs}{Owner\_HHs + Renter\_HHs},$$

where the number of owner-occupied households is divided by the sum of owner

(*Owner_HHs*) and renter-occupied households (*Renter_HHs*). The common

assumption is that homeownership increases because renters change to homeowners.

Given the same number of households in the denominator, the increase in the number

of owners in the numerator would increase the overall homeownership rate. This is a

favorable interpretation of what is indicated by homeownership increase, because

homeownership opportunities are expanded to more households.

In contrast, the removal of renters from the denominator (or a slower growth

in the number of renters than the number of homeowners) will also cause the

homeownership rate to rise, even if none of those renters transfer to homeownership

in the numerator. For instance, when housing prices increase rapidly and personal

incomes stagnate, many vulnerable individuals may postpone household formation or

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drop out of the housing market. They would live with their parents or other relatives, or they might double up with roommates. Instead of an increase in the numerator in the first scenario (more homeowners), there would be a decline in the denominator (or fewer renters added). In this case, a rising homeownership rate has an unfavorable interpretation because it does not reflect better access to owner-occupied housing but rather worse access for renters.

The most direct evidence to indicate that household formation operates through the rental tenure is provided by surveys of newly formed households. Although homeowners account for over two-thirds of all households in the U.S., they account for less than one-quarter of newly formed households. Cursory examination of the American Housing Survey shows, in fact, that 77.1% of newly formed households have moved into rental units.[ii] Therefore, when the household formation rate is falling, it is reasonable to assume that it is the ranks of renters or would-be renters that are being reduced most greatly. As a result, the overall homeownership rate can increase because fewer people are forming independent households. Such an aggregate relationship was reported in a study of changes from 1990 to 2000 in the 50 states with regard to rates of household formation and homeownership attainment. A substantial inverse correlation (—0.33) was found between changes in headship rates and changes in homeownership rates (Myers, 2001). Further, an analysis of the baby

boomer cohort in the 100 largest metropolitan areas found that, net of other factors, each one percentage point increase in the headship rate over the decade translated into a decrease of roughly one-half percentage point in the homeownership rate, although this varied by race/ethnicity and may change over time (Myers *et al.*, 2005).

The association between household formation and homeownership is likely moderated by cultural differences. For instance, Latinos are more likely to live with extended family and have lower headship rates, while African-Americans more frequently live in single-parent families and have high headship rates. The variable rates of household formation could be an important yet underappreciated factor in explaining racial/ethnic differences in homeownership rates.

An alternative, population-based measure of homeownership opportunity

One way to address the questions raised above is to look beyond the conventional definition of homeownership. An alternative to the almost-universal *per household* measure is the *per capita* measure of homeownership, which uses population instead of households as the denominator of homeownership (e.g., Myers and Lee, 1998; Myers and Park, 1999). We can term this measure the "owner headship rate," which denotes the percent of a given population that are householders of owner-occupied units. The higher the rate, the more owner households are formed.

Certain limitations to the dichotomous per capita homeownership measure should be noted. This method contrasts owners to all others and does not differentiate non-householders from renter householders. Therefore, it does not account for the large variations between racial/ethnic groups in their likelihood of forming independent households living in rental units versus living as dependents with others.

An alternative adopted for the present research takes account of fuller information to define a per capita measure that subdivides non-homeowner heads into renter heads and non-householders. We treat household formation here as an individual's decision whether to be a renter household, an owner householder, or a non-householder. In the present research, this is estimated as a trinomial logistic regression that explicitly models both renter householders and owner householders relative to non-householders. People make those decisions based on a set of personal demographic or socioeconomic factors and based on the alternative costs of renting and owning. Accounting for these factors, we can then compare racial/ethnic differences in household formation and homeownership. This general approach has been used in previous studies of household formation and living arrangement (e.g., Leppel, 1991; Hughes, 2003; Van Hook and Glick, 2007). More detailed discussion of the advantages of adopting the trinomial specification is reserved for the methods section.

Sample and data

The study uses the U.S. decennial censuses 5% Public Use Microdata Samples

(PUMS) in both 1990 and 2000 from the IPUMS data base (Ruggles *et al.*, 2003). We

also retrieve the American Community Survey (ACS) Microdata Samples in 2006

from the same source. The sample for analysis includes all persons who are age 18

years and older.

We limit our sample to the 100 most populous metropolitan areas, so that we

might capture the housing market effects of housing prices and rents on the formation

and tenure decision. Boundaries for the 100 metropolitan areas are specified in

accordance with the geographic definitions used in the 2000 census. The names of the

metropolitan areas are listed in Appendix 1. The areas are comprised of one or more

whole counties, with the exception of the New England region where metro areas are

built from aggregations of townships. Data from the 1990 census and 2006 ACS is

re-arranged to conform to these 2000 definitions. For this study we do not use primary

metropolitan statistical areas that are subsets of the larger consolidated metropolitan

statistical areas. Instead, we use the whole CMSA as a unit to represent the

metropolitan housing market area. Thus, our set of 100 most populous metropolitan

areas includes both CMSAs and freestanding MSAs. About 70 % of the total U.S.

population lives in these areas. (see Map 1)

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Map 1 about here

Descriptive findings

In this section, we first report housing consumption patterns in the year 2000

and then track changes from 1990 to 2006. Four indicators are used in this analysis.

The first indicator is the headship rate, which is used to measure household formation

and measured for the population universe. The result is reported in Column A in

Table 1. The headship rate is then partitioned into owner headship and renter headship,

separately reported in Columns B and C. The last indicator (Column D) is the

conventional homeownership rate measured with the household universe. Note that

the conventional homeownership rate can also be estimated by the ratio of the owner

headship to total headship (Column B/Column A).

Table 1 about here

Variable rates of homeownership and household formation

Large racial/ethnic differences can be observed in the headship rates, owner

headship rates, renter headship rates, and homeownership rates (Table 1). Whites had

the highest homeownership rate (71.4%), followed by Asians (53.5%), and the lowest

homeownership rates are found among Latinos (44.1%) and blacks (44.6%). Based on

the conventional homeownership rate alone, one would conclude that both Asians and

whites had better access to owner-occupied housing than blacks and Latinos.

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Once we take household formation into consideration, the conclusion becomes substantially different. First, we observe that whites had the highest headship rate of 50.1%. That is, there were roughly 50 households formed for every 100 whites. (See Table 1.) In contrast, Asians formed fewer independent households, only 38 households for every 100 Asians, 12 households fewer than for whites. In regard to homeownership, there were only 20.4 owner households for every 100 Asians, 15.4 fewer than for whites (Column C); however, the ratio of owners to the relatively low total number of householders yields a high homeownership rate (Column D). Thus it can be seen that the high homeownership rate alone does not necessarily suggest that Asians have superior access to owner-occupied housing.

In contrast, access to homeownership is much improved for blacks under this per capita assessment. Although this group had a very low homeownership rate and fully 26.8 renter households for every 100 blacks, the highest of the four racial/ethnic groups, black homeowners actually outnumbered Asian homeowners as a proportion to their population group, 21.7 per 100 versus 20.4 per 100. As a percentage of households, the black homeownership rate was lower than for Asians because blacks had many more independent households than did Asians, due to blacks' higher household formation rates, and many of those "extra" households were renters.

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Rising homeownership amidst declining household formation

With this understanding of the racial/ethnic differences, let us now address the

changes from 1990 to 2006. We disaggregate homeownership rates and headship rates

by three broad age groups and the four racial/ethnic groups (Figure 1).

Homeownership rates (per household) are shown on the top of the figure. Graphs on

the bottom show headship rates (per capita) presented in the same fashion.

Figure 1 about here

Figure 1 indicates that almost all demographic groups experienced increases in

homeownership rates from 1990 to 2006. As expected, whites had the highest

homeownership rates among all ethnic groups, followed by Asians who experienced

the largest percentage point increase in homeownership rate over the 16 year period.

Within each racial/ethnic group, the elderly (age 65 and over) had the highest

homeownership rates of all age groups, except among elderly Asians.

Figure 1 also shows that the large increases in homeownership rates were

accompanied by declining headship rates in almost all age groups through the 16 year

period. Minority groups and the elderly experienced a more pronounced decline in

headship rates. Thus the decline in household formation occurred at the same time as

the rise in homeownership, possibly because renter households were being eliminated

at a rapid pace. Recall that 77.1% of new household formations occur in rental units

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and we presume that the bulk of reductions in household formation also come from this category. Thus under the observed conditions the rise in homeownership might reflect growing polarization rather than growing opportunity.

The foregoing descriptive analysis is very broad and does not control for other factors such as racial/ethnic differences in demographic composition and socioeconomic status, detailed age, incomes, or rents and housing prices. We proceed now to a more detailed examination of multiple determinants that shape household formation and tenure choice in the population.

Individual-level analysis of household formation

Methods

We employ the multinomial logistic regression used in previous studies, such as Clark and Mulder (2000) and Leppel (1986), to estimate the probability of an individual being a non-householder (non-head), a renter householder (renter head), or an owner householder (owner head). These three categories in the dependent variable account for the housing status of all people who are age 18 and older. Renting or owning is simultaneously compared to the status of non-household headship and we examine the effect of different determinants in increasing or decreasing the probability of renting or owning relative to not forming a household.

Previous studies have examined tenure choice while adjusting for the endogeneity of other decisions with the Heckman's sample selection model (e.g., Borsch-Supan, 1986; Haurin *et al.*, 1997a). The Heckman-style analysis has been very useful in many instances. However, research results based on the Heckman procedure are sensitive to the choice of variables in the selection model (Manski, 1989 ; Newey, 1999). The household formation model used in the selection equation in Haurin and Rosenthal (2007) does not differentiate the formation of owner households from renter households. In other words, the model assumes that all groups have the same relative rates of owner and renter household formation. This assumption is not valid in this case. Evidently both Latinos and Asians have low rates of household formation, but Asians are much less likely to form renter households than Latinos. It is therefore necessary to separately model the formation of owner households and renter households.

The multinomial modeling procedure is appropriate for assessing the determinants of household formation, which is an outcome with three or more unranked categories.   Rather than assume that household formation is a mere background condition that introduces error into understanding our main topic of interest, as does the sample selection correction procedure, we judge household formation to be of equal interest to tenure choice and we consider it to be a jointly

determined decision (Borsch-Supan, 1986). The multinomial specification allows us to look specifically at changes in household formation over time by examining the coefficients on key variables that influence people's decisions to rent or own relative to being a non-householder.

We specifically test the assumption of the independence of irrelevant alternatives (IIA) using the Small and Hsiao's test[iii] (1985). The test statistics show that the assumption of IIA is accepted and the three outcomes in the dependent variable are sufficiently dissimilar from each other. Therefore, the multinomial logit model is appropriate in this analysis.

Multinomial logit regression yields relative risk ratios, which are the exponentiated values of multinomial regression coefficients. The interpretation of relative risk ratios is similar to odds ratios in a logistic regression. While it is appropriate to use multinomial logit regression in this analysis, the method has its disadvantages. First, multinomial logit regression produces multiple comparisons and a large number of parameters, which could hamper interpretations. Second, relative risk ratios can not be easily compared and understood. As a partial remedy to these, we graph the relative risk ratios and then predict probabilities through simulations.

The model used in this analysis is specified as follows:

$$H = RACE + AGE + MG + GENDER + X + Y$$

H   =   householder status (Non-head or non-householder = 0, renter
householder = 1, and owner householder = 2),

RACE   =   racial/ethnic group,

AG   =   age group,

MG   =   immigrant group,

GENDER=   individual's gender,

X   =   individual's socioeconomic characteristics, and

Y   =   metropolitan housing context.

Variables

H is the outcome variable of interest. For the present analysis, we pay

particular attention to the effects of race/ethnicity. RACE includes four groups which

are non-Hispanic whites, blacks, Asian and Pacific Americans, and Latinos (reference

group = non-Hispanic whites). The behavior of racial groups in the sample is

expressed as a deviation from the reference group.

AG or age group is coded as 18-24, 25-34, 35-44, 45-54, 55-64, or 65-74

(reference group = 35-44). MG is the duration in the U.S. based on immigrant year of

arrival, coded as immigrants who came in last 10 years, in last 10-20 years, in last

20-30 years, and more than 30 years ago (reference group = the native-born).

Immigrant status and age are especially important dimensions of household formation,

because headship rates vary predictably by age and immigrant status (Smith *et al.*,

1984; Skaburskis, 1994).

Gender is also a key demographic determinant of householder status. We use

it as a control variable in the analysis. Before 1980, men were automatically

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designated as householders in married couple households. Since the 1980 census,

either husband or wife could be designated householder. Consequently, there has been

a gradual shift in the gender of householders. Women have become much more likely

to be householders over the years (Myers, 1992). There are also large racial/ethnic

variations in the likelihood that women are householders. For instance, 73 percent of

Asian householders were male in 2000. In comparison, only 46 percent of black

householders were male. Therefore, it is necessary to control for gender in the

estimation of household formation. Female will be the reference group in the model.

Individual characteristics

The second model controls a set of individual characteristics (*X),* which

include personal income, educational attainment, martial status, and English

proficiency. It also controls metropolitan context (*Y),* which includes metropolitan

housing prices (observed at the lower quartile), median rent, and percent changes in

housing prices by metropolitan areas in the last 5 years. (See Table 2 for a full list of

the variables). These variables are added to the first model.

Income is an important factor in the decision of forming independent

households. Rising real income has increased the real affordability of housing and

resulted in a steady increase in household formation after WWII (Carliner, 1975;

Hendershott, 1988; Miron, 1988). However, real income has stagnated in recent years,

which puts a damper on household formation in the U.S. Previous studies have shown that household income may be endogenous to the household formation decision among young people (Haurin *et al.*, 1994). Therefore, we use personal income in the estimation. This will serve to highlight the individual decision-making involved. Although personal income does not represent all the resources required to rent or buy homes, and pooling incomes with multiple earners remains an option, an individual with higher personal income is substantially more advantaged in decisions of housing consumption.

Educational attainment is the principal measure of human capital, serving as a proxy for future earnings. Therefore, the more educated should have a higher propensity to form independent households and to buy homes than the less educated. The three education categories are (1) no high school diploma, (2) high school diploma or some college, and (3) college degree or better. Those who have high school diploma or some college education will be the reference group.

Marital status is also a major determinant of household formation (Sweet, 1990). Married couples are more likely to form independent households and also buy homes, but the married partners do this jointly, which constrains their individual headship to no more than 50%. In contrast, previously married individuals have acquired housing experience living as a married couple but need no longer share their

headship with a partner. As a result their individual household formation and

homeownership may exceed that of married persons. The three categories

representing marital status are (1) never married, (2) currently married, and (3)

formerly married. Those who are currently married will be the reference group.

English proficiency, which is particularly important for immigrants, also is

included in the model. English proficiency supports socioeconomic incorporation of

immigrants in the U.S. Those who speak English well are expected to have higher

headship rates, because they are more adapted to the U.S. and less likely to have large

households than do their compatriots (Myers *et al.*, 1996). Moreover, English use in

the home (i.e. speaking only English) is the foundation of acculturation (e.g.Portes

and Hao, 2002), which may additionally enhance the prospects of household

formation. Once human capital and income are introduced, it is not clear how much

the differences in household formation due to English ability will remain. The three

categories of English proficiency are: (1) speak only English, (2) speak English well

but not exclusively, and (3) speak English poorly or speak no English. Those who

speak English well but not exclusively will be the reference group.

Finally, we include three variables to reflect the relative costs of renting or

owning in each metropolitan area. Housing price is measured as the 25th percentile

home price and rent as the median gross rent in each metropolitan area. [iv] The use of

these proxies follows Gyourko and Linneman (1996). Previous studies have shown

that both housing price and rent level affect household formation (e.g., Borsch-Supan,

1986; Kent, 1992; Skaburskis, 1994; Ermisch, 1999; Hughes, 2003). In addition, we

also include a variable that measures the recent rate of price appreciation in the

metropolitan area, i.e. the percent change in housing price over the five years

preceding the census observation, using the OFHEO Housing Price Index (HPI)

(Office of Federal Housing Enterprise Oversight, 2007). [v] While high housing prices

at one point of time may reduce the demand for owner occupied housing, rising

housing prices may generate an expectation of future appreciation. As a result, rising

prices serve to lower the expected user cost of housing and may encourage people to

form owner households and abandon both renting and non-householder status. The

reverse may be true in housing market downturns. Despite improved affordability,

people are reluctant to form new households or buy homes fearing further declines in

the economy and in housing prices (Myers *et al.*, 2005). Income, housing price, rent,

and HPI are all adjusted for inflation to constant 2005 dollars.

Summary statistics

Summary statistics are presented in Table 2, which also shows the variables

used in the multivariate analysis. The mean values are computed and reported in three

separate columns for the years 1990, 2000, and 2006. The percent share of each

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attribute is reported under each variable, excepting personal income, housing prices, rent, and changes in housing prices.

Table 2 about here

In the section of household membership, we can see that the percent share of owner householders has increased slightly, while the percent share of renter householders had declined from 18% to 16.1%. This corresponded to the increase in homeownership over the years. The percent shares of whites and the youth declined over time, so did the shares of the native-born and the currently married. Whites were still the largest racial/ethnic group. Because of the gradual increase in immigrant population in the U.S., the overall level of English proficiency had declined over the years. Most of the observations were born in the U.S., though the share of new immigrants who came to the U.S. in the last 10 years had increased over time. Average personal income reached its peak in 2000 and declined slightly from 2000 to 2006. Housing prices and rent changed little between 1990 and 2000, and increased significantly from 2000 to 2006. In particular, housing prices index from 2001 to 2006 increased by 53.4%, which is much larger than before.

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Coefficient estimates

Table 3 reports the relative risk ratios (RRR) of the determinants for 1990,

2000, and 2006 respectively. Sections I, III, and V present results from the

"demographic only" models of the three years, while Sections II, IV, and VI report

estimates from the models that introduce covariates for socioeconomic factors,

education, English proficiency, and metropolitan housing prices.

Each reported coefficient reflects the effect of a particular characteristic on

one of the three types of household status, relative to the probability of being a

non-householder. There are two columns for each model. The left column reports the

probability of being a renter householder, while the right column shows the

probability of being an owner householder. The baseline group is the probability of

being a non-householder, which is omitted from the table.

Table 3 about here

Interpretation of the coefficient estimates is straightforward. The status of

racial/ethnic, age, and immigrant groups observed in each year (1990, 2000, or 2006),

relative to male native-born whites who aged 35-44, is given by the relative risk ratios

for GENDER, RACE, AG, and MG. The reference group is given the value 1.000.

Ratios of less than 1.000 indicate a reduced likelihood of being a renter householder

or being an owner householder, whereas ratios greater than 1.000 indicate an

increased likelihood.

Demographic variables

Let us first examine the roles of demographic variables in household

formation. Tables 3 also report the odds ratios of gender, age groups, and immigrant

status. Males had a higher probability of forming independent households in general,

and forming owner households in particular. With respect to age groups, household

formation increased with age. More specifically, people increased their likelihood of

forming owner households steadily until age 65-74. In contrast, the likelihood of

forming renter households followed an "M" shape and gradually declined after age

25-34 until age 65-74, when retirement began to affect household formation.

Consequently, homeownership rates increased through the adulthood. Young people

had not only the lowest probabilities of household formation, but the lowest

likelihood of forming owner households.

With respect to immigrant status, newly arrived immigrants had very low

probabilities of owner household formation. Immigrants' likelihood of renter

household formation also declined over time. Comparing the results between the

estimates of renter householders and owner householders, we can conclude that

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homeownership is determined by the probabilities of both owner and renter household

formations.

Covariates

We compare the results between the first and the second models in each year

and examine how the inclusion of socioeconomic status and metropolitan context

affects household formation. Results in Sections II, IV, and VI show that higher

income, living in married or formally married households, having higher levels of

education are all positively associated with household formation. Speaking only

English reduces the likelihood of forming renter households, while speaking English

poorly or not at all reduces the likelihood of forming owner households.

With respect to metropolitan context, higher housing prices discourage the

formation of owner households but encourage renter household formation. The

opposite is true for changes in housing prices. Rising housing prices over time

encourage the formation of owner households as expected. Meanwhile, higher rent

retarded both types of household formation, expect for the year 1990. The results are

largely consistent in the three years.

While these results are expected, accounting for other demographic variables

and the covariates only slightly attenuates the racial/ethnic differences in household

formation. In comparison with the odd ratios reported in Sections I, III, and V, odds

ratios shown in Sections II, IV, and VI are smaller. The basic relationship across

demographic groups remains largely unchanged.

To better understand variable household formation, we graph the relative risk

ratios of racial/ethnicity just discussed. Figure 2 shows the results in 1990, 2000, and

2006. There are two sets of bars in the figures. The dark bar reports the relative risk

ratios of being an owner householder relative to being a white owner householder,

while the lighter bar shows the odds ratios of being a renter householder relative to

being a white renter householder.

Figure 2 about here

Evidenced in Figure 2, all dark bars have negative values indicating that

whites have the highest probability of being owner householders. This finding is not

surprising and consistent with previous studies, which show minorities have lower

homeownership probabilities than whites. What's interesting is that there are major

differences in the probability of being renter householders. All lighter bars have

positive values except for Asians. Asians were the least likely to form renter

households, while blacks had the highest likelihood.

After controlling for all other confounding factors, we can conclude that the

large racial/ethnic differences in homeownership stem mostly from variable rates of

renter household formation, not the likelihood of forming owner households. Despite

blacks' low homeownership rates per household, in population terms they were as

likely to form owner households as Asians in 2000 and 2006.

Simulations

The results reported in the tables are odds ratios which are not easily

compared. The results are for three points of time but do not directly reveal how

changing household formation has affected homeownership probabilities over time. In

this section, we simulate the probabilities of household formation and use the

predicted value to calculate homeownership rates. We follow a simulation method

used in previous studies (e.g., Wachter and Megbolugbe, 1992; Bostic and Surette,

2001), which is a variation of the decomposition approach pioneered by Oaxaca (1973)

and Blinder (1973). We address three specific questions.

First, what would Asian homeownership rates be in 2000 if they had formed

households at the same rate as blacks? We first use the logit estimates of the

parameters for the year 2000, assume the individual characteristics of Asians, and

predict the homeownership rates of Asians. We then compare the actual rates with the

simulated or predicted rates. This is to quantify the extent to which Asian and black

homeownership disparity is the result of their differences in household formation.

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Second, what would homeownership rates be if each minority group formed households as whites did in 2000? This allows us to examine the extent to which the white-minority homeownership gaps can be explained by their different propensities of household formation. We use the same procedure discussed above and compare actual rates with simulated or predicted rates. This is to quantify the extent to which Asian and black homeownership disparity is the result of their differences in household formation.

Third, what would the homeownership rates be in 2000 and 2006 if people had formed households in the same way they did in 1990? We use the logit coefficient estimates for the year 1990 and individual characteristics in 2000 and 2006 to simulate, or predict, the homeownership rates for each of the four racial/ethnic groups and also for the total. We then compare predicated rates with actual rates. In so doing, we study how much homeownership would have changed had all racial/ethnic groups formed households the way they did in 1990. In other words, we assume the same household formation behavior in 1990 while using the individual characteristics in 2000 and 2006 in the simulation.

The answer to the first question is that, in the year 2000, Asians' homeownership rate would only be 37.7 percent had Asians followed the same propensities for household formation as blacks. That would be 15.9 percentage points

lower than the observed homeownership rate in 2000 and 7.4 percentage points lower

than blacks' observed homeownership rate. Under this assumption, Asians would

have formed more households, or more specifically, far more renter households and

fewer owner households. Asians' headship rate would have been 43.7 percent, 5.3

percentage points higher than Asian's actual headship rate in 2000. Said alternatively,

the black-Asian homeownership gaps could be largely explained by their different

propensities of household formation. In fact, blacks would have a higher rate of

homeownership had Asians followed the same propensities of household formation as

blacks.

We address our second and third questions respectively in Figures 3 and 4.

Figure 3 illustrates the homeownership rates of all racial/ethnic groups had they had

the same propensities of household formation as did whites in 2000. Results show that

all minority groups would have had higher homeownership and headship rates. In

particular, blacks would have had the largest increases in homeownership rates (11.8

points), followed by Latinos (2.9 points). Asians would have only seen an increase of

1.0 point over their actual rate. Assuming whites' propensities for household

formation, minority-white homeownership disparity would significantly attenuate.

The overall homeownership rate would have increased by about 2.0 percentage points.

Minorities' headship rate would also have been higher. In other words, there would

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have been more minority households had minorities shared the same propensity for

household formation as whites.

Figure 3 about here

Figure 4 illustrates that had all racial/ethnic groups in 2000 and 2006 followed

the same propensities of household formation as they did in 1990, homeownership

rates would have been lower than the observed rates. In fact, on average, the rates

would have dropped by 0.7 to 3.8 percentage points relative to the observed rates in

2006. The overall homeownership rate would have only increased slightly from 1990

to 2000 and decreased by 0.8 percent points from 2000 to 2006.

Figure 4 about here

Discussion

Most groups would have formed more households, had they retained the same

propensity of household formation in 1990; the overall headship rates would have

been about 1.0 point higher than the actual rates in both 2000 and 2006. From 1990 to

2006, all racial/ethnic groups experienced declines in the probability of renter

household formation. In other words, people became less likely to form renter

households over time. This would be good news if all the renters were converted to

owners and homeownership rates increased accordingly. In reality, this analysis

shows that few groups experienced any increases in the probability of owner

household formation. Therefore, homeownership increases in recent years were largely an artifact of declining renter household formation. This reflects a pattern of polarized success in the housing market: both ownership and non-household formation increased, while the intermediate category of renter household formation declined. Some of this pattern may reflect economic stress and some may be cultural practice.

The high homeownership rates among Asians and their presumed success are due in large part to their very low rates of renter household formation. In fact, on a per capita basis, Asians have a number of homeowners similar to blacks and Latinos and far fewer than whites. For Asians, their high ownership rate comes as an outcome of low renter household formation and high rates of non-household formation. In contrast, blacks and Latinos seem to have formed far more renter households, which have led to their relatively low homeownership rates.

While we can not completely separate the cultural preferences of low household formation from structural barriers, the low rate of household formation has clearly inflated the homeownership rates of Asians. The differences between blacks and Asians would be much smaller had we measured homeownership on a per capita basis or taken household formation into consideration. Minority-white

homeownership disparity is largely attributable to variable rates of household

formation.

From 1990 to 2006, most demographic groups witnessed a gradual decline in

the rates of household formation. Such decline occurred mostly among renters.

Therefore, declining household formation may have increased the aggregate

homeownership rates by as much as 3.8 percentage points in 2006 (Figure 4).   This

suggests that renter failure, not homeowner success, is what underpinned the rising

homeownership rate in recent years.

Conclusions

Research findings show that rising ownership rates do not necessarily signal

more access to owner-occupied housing. Once we take household formation into

consideration, Asians do not seem to be much better adapted to the U.S. housing

market than Latinos, and minority-white homeownership gaps are not as large as the

observed rates suggest. These results are in stark contrast to those reported in Haurin

and Rosenthal (2007).

The preceding analysis has introduced a method that separately identifies

household formation and homeownership attainment. The per-capita procedure is an

improvement over the currently used per-household based homeownership measure.

Once we examine homeownership through the lens of household formation, and

include decisions of renting versus non-household formation, we gain a better understanding of the dynamics of homeownership attainment.

Research findings underscore that the current homeownership measure, defined as the percent of households that are owners, is a deficient, if not flawed, indicator of access to owner-occupied housing in the U.S. A rise in that indicator can reveal two contradictory trends—either the success in the ownership society, or the elimination of households from the housing market. To more fully represent housing choices available, it is necessary to track homeownership by an alternative measure that is expressed relative to the entire population of each age group and not simply relative to the number of householders. Rates of renting per capita also must be included. Immigrants have dramatically changed the population mix of the U.S.; they tend to have propensities for household formation different from U.S.-born residents. Without considering the variable rates of household formation, assessments of future housing demand can not be successful.

Future research should also examine whether variable rates of household formation have similar effect on housing demand in other industrialized nations. And the trends following the economic collapse and deep recession beginning in 2008 require very close monitoring. New attention is now deserved to renting as well as home buying.

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NOTES

[i] According to the Census Bureau, A *householder* in the U.S. census refers to the person (or one of the people) in whose name the housing unit is owned or rented (maintained). If the house is owned or rented jointly by a married couple, the householder may be either the husband or the wife. There is only one householder per household. The Census Bureau formerly used the term *head of the household* to describe householders. Renter householders refer to householders who live in rental households, while owner householders refer to householders who live in owner households.

[ii] Authors' calculations from the 2007 American Housing Survey found that homeowners were 68.3% of all households in 2007 and renters accounted for 31.7% of households, but rental units were home to 77.1% of all householders who had moved from housing units rented or owned by someone else or whose previous residence was in institutional quarters (U.S. Census Bureau 2008).

[iii] The test was described in Long and Freese (2006). The test results are available upon request.

[iv] To make the housing quality consistent across metropolitan areas, we restrict the sample to rental units that only include two or three bedrooms, and owner units that only include three or four bedrooms.

[v] In 1990, the change in Housing Price Index was measured from 1985 to 1990; in 2000, it was from 1995 to 2000; in 2006, it was from 2001 to 2006.

Table 1. Summary profiles by racial/ethnic groups, 2000

	Headship rates (%)	Owner headship rates (%)	Renter headship rates (%)	Homeownership rates (%)
	A	B	C	D
White	50.1	35.8	14.3	71.4
Black	48.5	21.7	26.8	44.6
Asian	38.2	20.4	17.8	53.5
Latino	37.5	16.6	21.0	44.1
Total	**47.5**	**30.4**	**17.1**	**64.0**

Note: A. The percentage of people who are householders.

B. The percentage of people who are owner householders.

C. The percentage of people who are renter householders.

D. The percentage of all occupied housing unites that are owner-occupied.

Table 2. Variable summary statistics

Variable Description	1990	2000	2006
Household membership	100%	100%	100%
Owner householder	28.8	30.4	30.2
Renter householder	18.0	17.1	16.1
Non householder	53.1	52.5	53.7
Gender (GENDER)	100%	100%	100%
Male	48.0	48.2	48.7
Female	52.0	51.8	51.3
Race/ethnicity (RACE)	100%	100%	100%
Non-Hispanic white	72.7	67.2	63.4
Black	12.9	13.1	13.5
Asian	3.9	5.3	6.3
Latino	10.4	14.3	16.8
Age group (AG)	100%	100%	100%
18-24	18.5	17.3	17.6
25-34	23.7	19.1	17.3
35-44	19.9	21.6	19.5
45-54	13.2	17.2	18.5
55-64	10.6	10.7	13.2
65-74	8.9	7.9	7.6
75+	5.2	6.2	6.3
Immigrant status (MG)	100%	100%	100%
Native-born	86.9	82.8	80.3
Came in last 10 yrs.	5.4	6.6	7.0
Came in last 10-20 yrs.	3.5	5.0	5.5
Came in last 20-30 yrs.	2.0	2.9	3.7
Came in 30 yrs. Ago	2.2	2.7	3.6
Total personal income (in $1,000)	29.49	34.20	33.35
Educational attainment	100%	100%	100%
No high school diploma	26.2	23.5	19.8
High school dip. w/ college	53.3	52.3	53.6
College degree or better	20.5	24.2	26.5
Marital status	100%	100%	100%
Never married	28.6	28.8	32.2
Currently married	53.6	53.2	49.5
Formerly married	17.9	18.0	18.3
English proficiency	100%	100%	100%
Speak only English	82.4	77.8	75.2
Speak English well but not exclusively	13.5	16.4	17.9
Speak English poorly	4.2	5.9	6.9
The 25th percentile housing price (log)	11.67	11.68	12.15
Metropolitan median rent (log)	6.60	6.59	6.70
% change in metropolitan Housing Price Index over the last 5 yrs.	19.88	12.78	53.40
Number of Observations	118,682,577	139,996,249	152,662,605

Note: Income, housing price and rent are adjusted to 1999 dollars using the CPI . Sample only includes people who are age 18 and older.

Table 3. The relative risk ratios of the determinants of household formation, 1990, 2000, and 2006

Section	1990 I Renter head	1990 I Owner head	1990 II Renter head	1990 II Owner head	2000 III Renter head	2000 III Owner head	2000 IV Renter head	2000 IV Owner head	2006 V Renter head	2006 V Owner head	2006 VI Renter head	2006 VI Owner head
Obs.:	118,682,577				139,996,249				152,662,605			
Log likelihood :	-94,947,766		-84,980,161		-115,500,000		-106,000,000		-133,000,000		-125,000,000	
Pseudo R2 :	0.203		0.286		0.176		0.244		0.119		0.172	
Gender (GENDER)												
Male	3.440 ***	11.144 ***	3.799 ***	9.140 ***	2.697 ***	7.544 ***	3.084 ***	7.343 ***	1.306 ***	2.291 ***	1.413 ***	2.079 ***
Female (Ref.)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Race/ethnicity (RACE)												
White (Ref.)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Black	1.753 ***	0.641 ***	1.629 ***	0.840 ***	1.937 ***	0.702 ***	1.779 ***	0.854 ***	2.011 ***	0.677 ***	1.811 ***	0.834 ***
Asian	0.856 ***	0.817 ***	0.873 ***	0.984 ***	0.939 ***	0.707 ***	0.904 ***	0.818 ***	0.923 ***	0.757 ***	0.910 ***	0.806 ***
Latino	1.207 ***	0.529 ***	1.265 ***	0.845 ***	1.141 ***	0.539 ***	1.191 ***	0.842 ***	1.245 ***	0.620 ***	1.240 ***	0.936 ***
Age groups (AG)												
18-24	0.219 ***	0.016 ***	0.332 ***	0.076 ***	0.267 ***	0.023 ***	0.281 ***	0.066 ***	0.258 ***	0.026 ***	0.241 ***	0.062 ***
25-34	1.007 ***	0.391 ***	1.143 ***	0.589 ***	1.129 ***	0.465 ***	1.137 ***	0.590 ***	1.115 ***	0.521 ***	1.080 ***	0.638 ***
35-44 (Ref.)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
45-54	0.876 ***	1.373 ***	0.870 ***	1.321 ***	0.923 ***	1.342 ***	0.862 ***	1.203 ***	0.897 ***	1.210 ***	0.845 ***	1.150 ***
55-64	0.831 ***	1.651 ***	0.893 ***	1.983 ***	0.866 ***	1.623 ***	0.830 ***	1.592 ***	0.819 ***	1.382 ***	0.754 ***	1.342 ***
65-74	1.166 ***	2.210 ***	1.137 ***	3.000 ***	1.028 ***	2.057 ***	0.922 ***	2.244 ***	0.854 ***	1.562 ***	0.753 ***	1.728 ***
75+	1.818 ***	2.248 ***	1.132 ***	2.413 ***	1.541 ***	2.170 ***	1.008 ***	2.046 ***	1.152 ***	1.494 ***	0.748 ***	1.583 ***
Immigrant status (MG)												
Native-born (Ref.)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Came in last 10 yrs.	0.965 ***	0.245 ***	1.199 ***	0.406 ***	1.009 ***	0.265 ***	1.200 ***	0.389 ***	1.095 ***	0.328 ***	1.301 ***	0.450 ***
Came in last 10-20 yrs.	0.984 ***	0.723 ***	1.174 ***	0.988 ***	1.093 ***	0.692 ***	1.328 ***	1.012 ***	1.011 ***	0.699 ***	1.191 ***	0.955 ***
Came in last 20-30 yrs.	0.958 ***	0.972 ***	1.045 ***	1.148 ***	1.021 ***	0.931 ***	1.178 ***	1.261 ***	0.969 ***	0.909 ***	1.107 ***	1.208 ***
Came in 30 yrs. Ago	0.949 ***	0.941 ***	0.971 ***	1.083 ***	0.967 ***	1.041 ***	1.004 *	1.233 ***	0.889 ***	0.957 ***	0.967 ***	1.146 ***
Total personal income (in $1,000)			1.019 ***	1.032 ***			1.009 ***	1.016 ***			1.004 ***	1.010 ***
Educational attainment												
No high school diploma			0.891 ***	0.797 ***			0.764 ***	0.639 ***			0.739 ***	0.615 ***
High school dip. w/ college (Ref.)			1.000	1.000			1.000	1.000			1.000	1.000
College degree or better			1.127 ***	1.086 ***			1.149 ***	1.211 ***			1.083 ***	1.306 ***
Marital status												
Never married			1.784 ***	0.488 ***			2.495 ***	0.674 ***			2.492 ***	0.724 ***
Currently married (Ref.)			1.000	1.000			1.000	1.000			1.000	1.000
Formerly married			8.488 ***	4.057 ***			8.264 ***	3.712 ***			6.253 ***	2.279 ***
English Proficiency												
Speak only English			0.973 ***	1.033 ***			0.935 ***	1.098 ***			0.942 ***	1.033 ***
Speak English well but not exclusively (Ref.)			1.000	1.000			1.000	1.000			1.000	1.000
Speak English poorly			1.162 ***	0.686 ***			1.135 ***	0.695 ***			1.136 ***	0.677 ***
Housing price and rent												
The 25th percentile housing price (log)			1.377 ***	0.593 ***			1.239 ***	0.725 ***			1.310 ***	0.797 ***
Metropolitan median rent (log)			0.543 ***	1.051 ***			0.577 ***	0.621 ***			0.468 ***	0.833 ***
Percent changes in metroplitan HPI			0.700 ***	1.115 ***			0.991 **	1.450 ***			0.930 ***	1.020 ***

* p<0.05 **p<0.01 ***p<0.001 Two-tailed tests

Note: Non-head is the baseline group.

The reference group for gender is "female"; for age groups, the reference is "ages 35-44"; for race/ethnicity, the reference group is "white"; for immigrant status, the reference group is native-borns; for educational attainment it is "High school dip. w/ college"; for marital status, it is "currently married"; for English proficiency, it is "Speak English well but not exclusively."

Figure 1. Homeownership Rates and Headship Rates by Age and by Race/ethnicity, 1990-2006
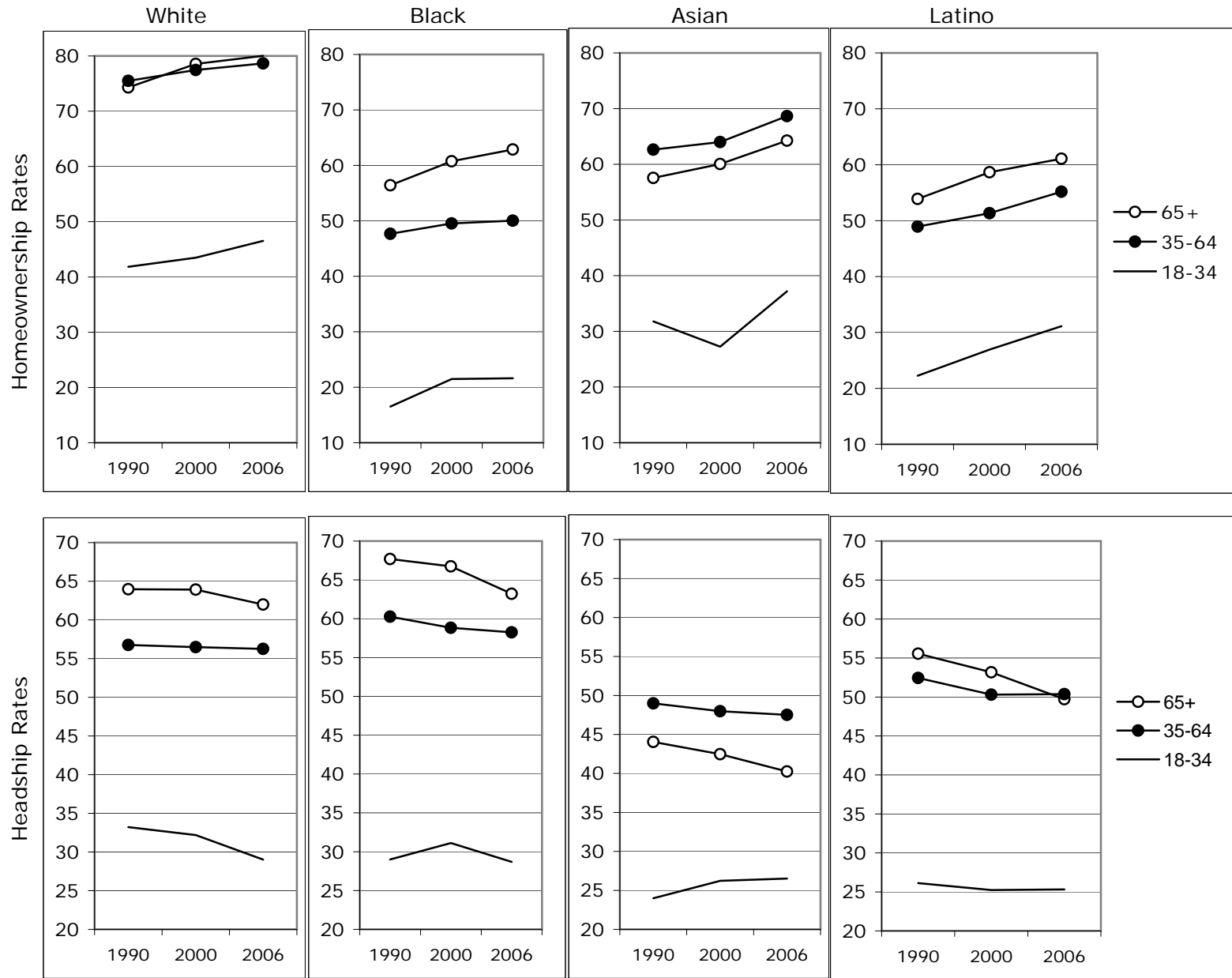
Figure 2. Relative Risk Ratios by Race/ethnicity, 1990-2006: Assessing Variable Household Formation
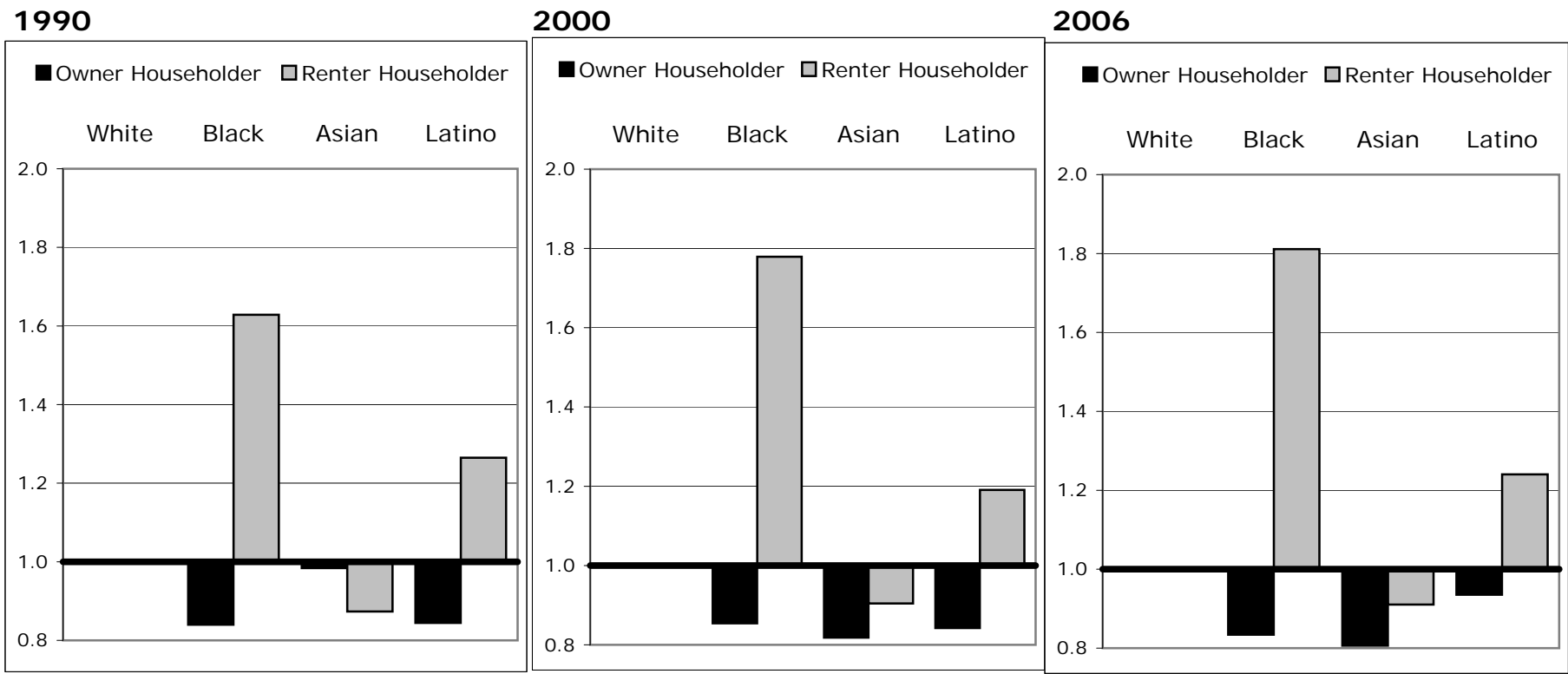
Figure 3. Actual vs. Simulated Homeownership Rates, 2000: Assessing Factors behind Minority-White Homeownership Gaps
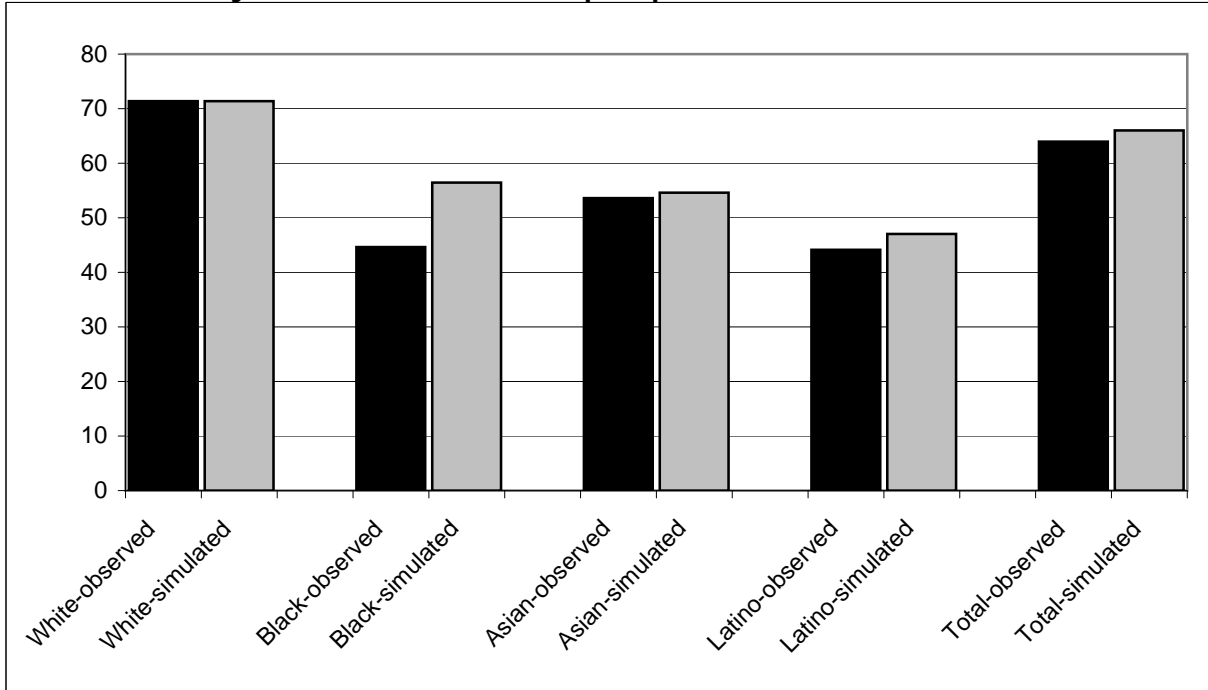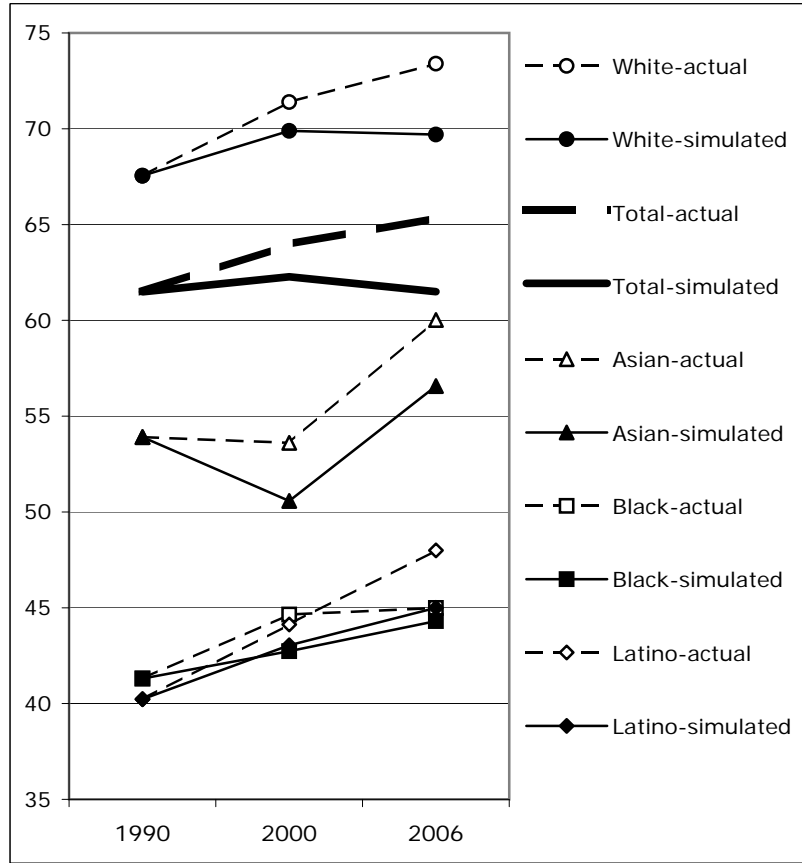
Figure 4. Simulated vs. Actual Homeownership Rates, 1990-2006: Assessing the Effects of Variable Rates of Household Formation

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Appendix 1. The top 100 most populous metrpolitan areas, 2000

Metropolitan Area

Albany--Schenectady--Troy, NY MSA	Lexington, KY MSA
Albuquerque, NM MSA	Little Rock--North Little Rock, AR MSA
Allentown--Bethlehem--Easton, PA MSA	Los Angeles--Riverside--Orange County, CA CMSA
Atlanta, GA MSA	Louisville, KY--IN MSA
Augusta--Aiken, GA--SC MSA	Madison, WI MSA
Austin--San Marcos, TX MSA	McAllen--Edinburg--Mission, TX MSA
Bakersfield, CA MSA	Melbourne--Titusville--Palm Bay, FL MSA
Baton Rouge, LA MSA	Memphis, TN--AR--MS MSA
Birmingham, AL MSA	Miami--Fort Lauderdale, FL CMSA
Boise City, ID MSA	Milwaukee--Racine, WI CMSA
Boston--Worcester--Lawrence, MA--NH--ME--CT CMSA	Minneapolis--St. Paul, MN--WI MSA
Buffalo--Niagara Falls, NY MSA	Mobile, AL MSA
Canton--Massillon, OH MSA	Modesto, CA MSA
Charleston--North Charleston, SC MSA	Nashville, TN MSA
Charlotte--Gastonia--Rock Hill, NC--SC MSA	New Orleans, LA MSA
Chattanooga, TN--GA MSA	New York--Northern New Jersey--Long Island, NY--NJ--CT--PA CMSA
Chicago--Gary--Kenosha, IL--IN--WI CMSA	Norfolk--Virginia Beach--Newport News, VA--NC MSA
Cincinnati--Hamilton, OH--KY--IN CMSA	Oklahoma City, OK MSA
Cleveland--Akron, OH CMSA	Omaha, NE--IA MSA
Colorado Springs, CO MSA	Orlando, FL MSA
Columbia, SC MSA	Pensacola, FL MSA
Columbus, OH MSA	Philadelphia--Wilmington--Atlantic City, PA--NJ--DE--MD CMSA
Dallas--Fort Worth, TX CMSA	Phoenix--Mesa, AZ MSA
Daytona Beach, FL MSA	Pittsburgh, PA MSA
Dayton--Springfield, OH MSA	Portland--Salem, OR--WA CMSA
Denver--Boulder--Greeley, CO CMSA	Providence--Fall River--Warwick, RI--MA MSA
Des Moines, IA MSA	Raleigh--Durham--Chapel Hill, NC MSA
Detroit--Ann Arbor--Flint, MI CMSA	Richmond--Petersburg, VA MSA
El Paso, TX MSA	Rochester, NY MSA
Fort Myers--Cape Coral, FL MSA	Sacramento--Yolo, CA CMSA
Fort Wayne, IN MSA	Salt Lake City--Ogden, UT MSA
Fresno, CA MSA	San Antonio, TX MSA
Grand Rapids--Muskegon--Holland, MI MSA	San Diego, CA MSA
Greensboro--Winston-Salem--High Point, NC MSA	San Francisco--Oakland--San Jose, CA CMSA
Greenville--Spartanburg--Anderson, SC MSA	Sarasota--Bradenton, FL MSA
Harrisburg--Lebanon--Carlisle, PA MSA	Scranton--Wilkes-Barre--Hazleton, PA MSA
Hartford, CT MSA	Seattle--Tacoma--Bremerton, WA CMSA
Honolulu, HI MSA	Spokane, WA MSA
Houston--Galveston--Brazoria, TX CMSA	Springfield, MA MSA
Indianapolis, IN MSA	St. Louis, MO--IL MSA
Jackson, MS MSA	Stockton--Lodi, CA MSA
Jacksonville, FL MSA	Syracuse, NY MSA
Johnson City--Kingsport--Bristol, TN--VA MSA	Tampa--St. Petersburg--Clearwater, FL MSA
Kalamazoo--Battle Creek, MI MSA	Toledo, OH MSA
Kansas City, MO--KS MSA	Tucson, AZ MSA
Knoxville, TN MSA	Tulsa, OK MSA
Lakeland--Winter Haven, FL MSA	Washington--Baltimore, DC--MD--VA--WV CMSA
Lancaster, PA MSA	West Palm Beach--Boca Raton, FL MSA
Lansing--East Lansing, MI MSA	Wichita, KS MSA
Las Vegas, NV--AZ MSA	Youngstown--Warren, OH MSA

Map 1. The top 100 most populous metropolitan areas in the United States, 2000
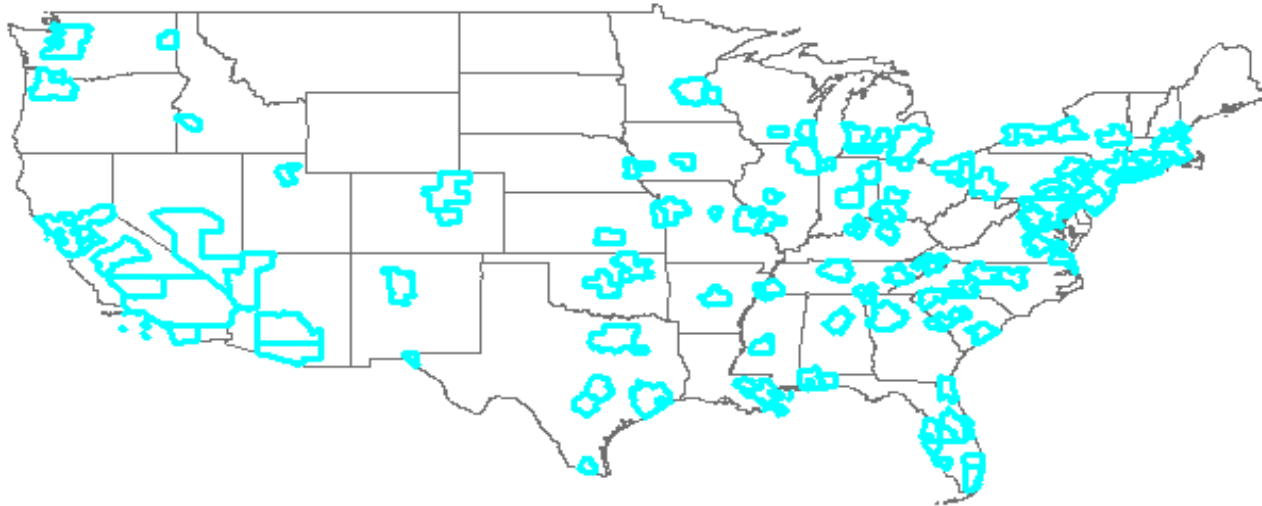
Note: Honolulu, HI MSA is not shown in the map.