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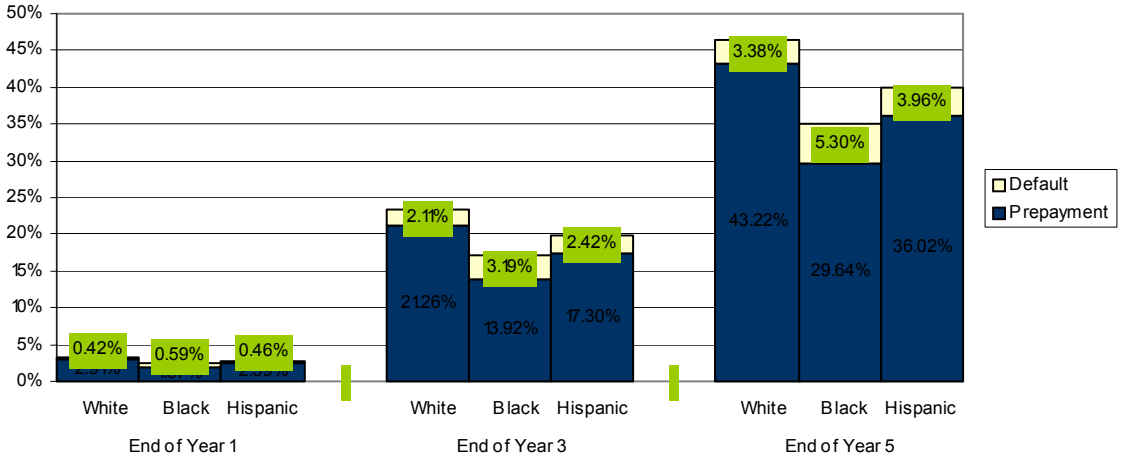
Enhancing Mortgage Credit Availability Among Underserved and Higher Credit-Risk Populations: *An Assessment of Default and Prepayment Option Exercise Among FHA-Insured Borrowers*

The extension of mortgage credit to underserved, minority, and higher credit-risk populations has been a topic of discussion among researchers and policymakers in recent years, as both the Clinton and Bush administrations have articulated policies that have sought to advance the homeownership opportunities of underserved and minority groups. Research accordingly has sought to identify the determinants of persistent disparities in both mortgage origination and homeownership attainment among targeted and non-targeted groups, (see, for example, Painter, Gabriel and Myers [2001], Coulson [1999], Deng, Quigley and Van Order [1996], and Rosenthal [2001]). On the mortgage side, studies have focused largely on the role of borrower credit risk and credit constraint in the analysis of mortgage loan origination and performance (see, for example, Ambrose and Capone [1998, 2000], Ondrich, Ross and Yinger [2000], Berkovec, Canner, Gabriel, and Hannan [1998], Avery, et al. [1996], Goering and Wienk [1996], Munnell, et al. [1996], Canner, Passmore, and Smith [1994], and Gabriel and Rosenthal [1991]).

While prior studies have provided substantial evidence of elevated default risk among lower-income, minority, and less creditworthy mortgage borrowers, little evidence exists about any offset of those risks via the slower prepayment speeds of underserved borrower groups. To mortgage lenders and investors, such an offset could serve to reduce total loan termination probabilities appreciably and boost investment returns. Indeed, analyses of loan termination probabilities should account for the joint and competing nature of borrower prepayment and default option exercise (see, for example, Deng, Quigley, and Van Order [2000]).

Predicted Cumulative Prepayment and Default Risks By Borrower Race



Our recent study applies a state-of-the-art statistical model to assess the competing risks of FHA-insured mortgage default and prepayment simul-taneously. Based on high-quality micro data, the study controls for borrower creditworthiness (credit scores) and other common underwriting variables among the approximately 30 contemporaneous indicators of borrower, loan, and locational risk.

The principal data used in this study consist of a large random sample of FHA-insured home purchase loans originated between 1992 and 1996. The FHA data are well suited for analyzing loan default, because

the program includes large numbers of borrowers with relatively high credit risk. The data also enable us to assess whether those borrowers who pose higher credit risk and who are underserved prepay their mortgages more slowly, due perhaps to problems of access to mortgage finance, difficulties in mortgage qualification, limited knowledge of mortgage refinance opportunities, or reduced residential mobility. The extent to which the prepayment risk of mortgages originated among lower-income, lower credit-quality, and minority borrowers is relatively damped should be reflected in the pricing of those loans. Indeed, from a mortgage pricing perspective, the reduced prepayment risk associated with those FHA-insured borrower groups may serve to mitigate their higher default probabilities.

Further, using a census tract indicator for each property location, each loan record file is matched to neighborhood socioeconomic and housing market indicators from the 1990 Census of Population and Housing. Other neighborhood or metropolitan area level variables, including unemployment rates, also are appended to the record file. FHA data on the race of the borrower and census measures of neighborhood racial composition enable us to assess race-related effects associated with the performance of FHA-insured loans. The FHA data set encompasses nearly 300 different metropolitan areas, allowing for substantial variability in the structure of local lending markets.

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Our results confirm that a lower interest rate and a higher likelihood that the borrower's equity value is negative are major factors driving prepayment and default; respectively. Our results also suggest that households with higher probability of negative equity have lower risk of mortgage prepayment.

In addition, our results point to the importance of other borrower, loan, and market characteristics in the estimation of mortgage termination risks. As expected, borrowers with higher credit scores are less likely to default, whereas borrowers with lower credit scores are less likely to prepay. Specifically, the five-year cumulative probability of prepayment is about 10 percentage points higher among borrowers with scores above 680 than among those with scores below 620. The five-year cumulative prepayment probabilities of black and Hispanic borrowers are about 14 and 7 percentage points lower than those of white borrowers, respectively.

The Analysis

Figures 1-3 report the simulated cumulative probabilities prepayment of and default by several borrower and loan The characteristics. probabilities are computed for one, three, and five years after loan origination. The simulations are based on a 10 percent random sample of loans originated in June 1992. The baseline borrower is assumed to be a white household purchasing an existing suburban home with a 30-year fixed-rate mortgage.

As expected, Figure 1 indicates that the five-year cumulative probability of prepayment rises substantially with borrower creditworthiness (as reflected in borrower credit scores). That probability is 23 percent higher among borrowers with scores above 680 than among those with scores below 620. Computing cumulative prepayment rates by race and creditworthiness illustrates the strikingly lower prepayment propensities of black borrowers relative to whites, Latinos, and Asians. For example, Figure 2 shows that, among white borrowers, the five-year cumulative probability of prepayment of 43.22% is about 1-1/2 times the 29.64% rate estimated for similarly creditworthy blacks. Likewise, cumulative default rates among black borrowers are estimated to be substantially in excess of those for other racial

groups. At 5.3%, the five-year cumulative default rate of highly creditworthy black borrowers is 36 percent higher than that of similarly qualified white borrowers.

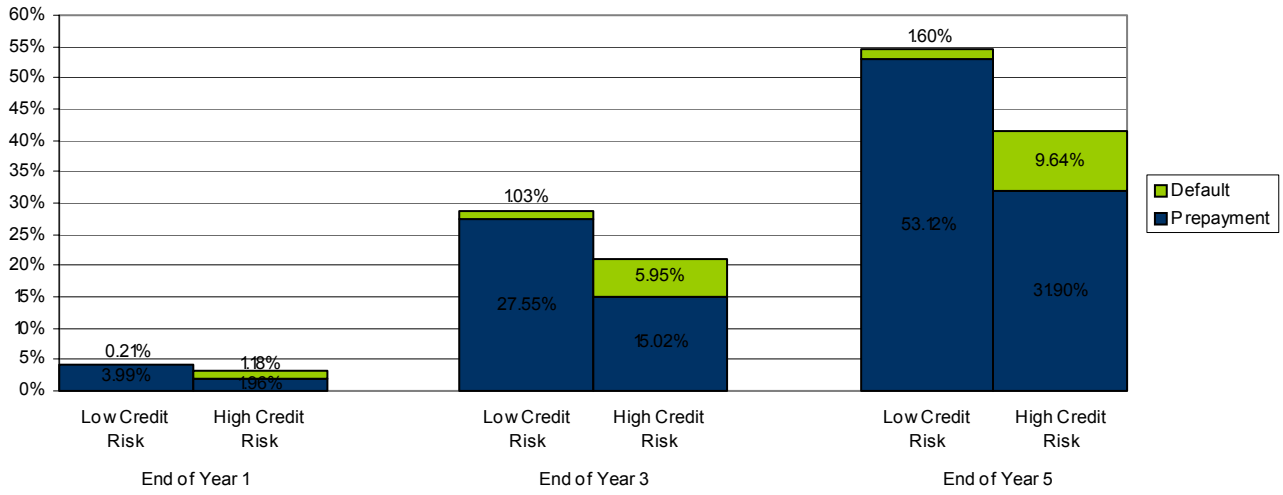
We also simulated the cumulative probability of prepayment and default by initial loan-to-value ratios. As expected, higher levels of credit risk serve both to elevate default likelihoods and to damp prepayment propensities. For example, at five years after loan origination, borrowers with high LTVs (95%) are characterized by 1.5 times the default risk of borrowers with lower LTVs. Also evident, however, are the substantially lower prepayment propensities of those borrowers with high LTVs; at five years after loan origination, the prepayment likelihoods of borrowers with high LTV were 20 percent below those of lower LTV loans. A similar outcome arises, for example, in the simulation of default and prepayment propensities among more or less creditworthy borrowers. Borrowers with credit scores < 620 are characterized by $3^{3/4}$ times the default risk of borrowers with credit scores 680, and they also pose damped prepayment risk relative to their higher credit score counterparts.[1]

Figure 3 shows simulations of default and prepayment propensities among borrowers with more fully specified high and low credit risk. In general, borrowers with high credit risk have lower levels of liquid assets, poor credit scores, and more aggressively underwritten mortgages (as regards loan-to-value and payments-to-income ratios). Borrowers with lower credit risk are the opposite.

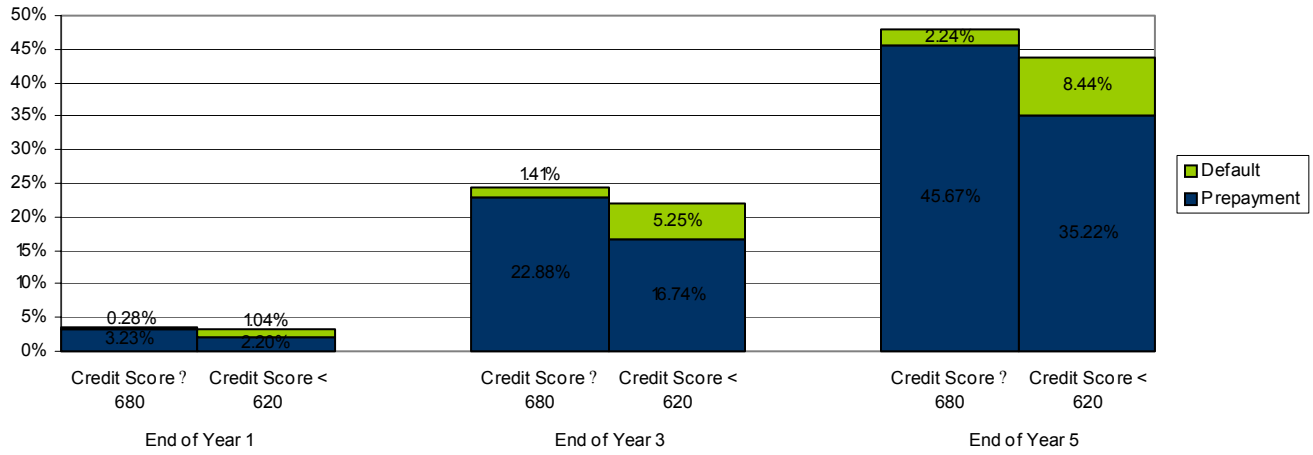
Loan performance differs markedly over these borrower risk profiles. For example, by end of year five after loan origination, the simulated prepayment propensity of the lower credit risk borrower is about 21 percentage points higher than that of the higher credit risk borrower. However, borrowers with lower credit risk are characterized by a five-year cumulative default propensity that is about 8 percentage points lower than that of their higher credit risk counterparts. On net, our results provide clear evidence of elevated total loan termination probabilities among the lower credit risk group.

The stacked bar charts in Figure 3 also provide an assessment of total termination risks of FHA-insured mortgage loans. Those risks are defined as the sum of the default and prepayment propensities at the end of years 1, 3, and 5. Total loan terminations (from all sources) are relevant to the profitability of investment in FHA-insured mortgages. Typically, those loans are not only FHA-insured, but, if pooled and sold, they also often are backed by a Ginnie Mae guarantee of timely repayment of principal and interest in the event of borrower default. Accordingly, from the perspective of the FHA-backed and Ginnie

Predicted Cumulative Prepayment and Default Risks
By Overall Credit Risks
Figure Three



Predicted Cumulative Prepayment and Default Risks
By Credit Score
Figure One



Mae-insured loan investor, a loan termination via default is equivalent to a prepayment. Clearly, borrower groups with lower total loan termination risks represent more profitable loan investment opportunities relative to those groups with higher total termination propensities.

As Figure 3 shows, total loan termination risk is substantially elevated among borrowers with lower credit risk. In that regard, total termination risk among such borrowers is about 32 percent higher than that of borrowers with high credit risk. Furthermore, the substantially elevated default probabilities among the high credit risk group are more than offset by the damped prepayment propensities, resulting in significantly lower loan termination propensities overall. Indeed, among borrowers with high credit risk, loan termination probabilities via prepayment at the end of year five after origination are about 3.3 times that of loan termination propensities from default, while among borrowers with credit risk, prepayment probabilities at the end of year five after origination are about 33 times that of default probabilities. Clearly, loans originated among borrowers with high credit risk are relatively more profitable to the investor, given their substantially depressed overall termination propensities.

Summary and Conclusion

This paper applies micro-data from the FHA to estimate the competing risks of mortgage default and prepayment. The results confirm that the prepayment activities are highly associated with declines in the mortgage market rates; similarly, declines in the market value of the property also are positive and highly significant in the exercise of the default option. Our results further suggest that a higher probability of negative equity reduces the risk of mortgage prepayment. Such an outcome is indeed plausible, in that households with poor equity positions may be less willing to exercise the refinance option if their equity values are insufficient to refinance the remaining loan balance. Our results also point to the importance of other borrower, loan, and market characteristics in estimating mortgage termination risks. For example, our findings indicate reduced consumer refinance propensity in more concentrated and less competitive loan markets. Among FHA borrowers, the initial LTV ratio is negatively associated with prepayment propensity and positively associated with default propensity. As expected, borrowers with higher credit scores are less likely to default, whereas borrowers with lower credit scores are less likely to prepay. In

that regard, the five-year cumulative probability of prepayment is 23 percent higher among borrowers with scores above 680 than among those with scores below 620. Relative to white borrowers, estimates suggest that black and Hispanic borrowers are statistically less likely to prepay. Indeed, computation of cumulative prepayment rates by race and creditworthiness illustrates the strikingly lower prepayment propensities of black borrowers, relative to whites, Latinos, and Asians.

Overall, our results indicate the appropriateness of the competing risk specification and indicate the importance of slower prepayment speeds among higher risk borrowers. As is evidenced, the substantially elevated default probabilities of higher credit risk borrowers are more than offset by their damped prepayment propensities, resulting in significantly lower loan termination propensities overall. Indeed, among high credit risk borrowers, at five years after loan origination, loan termination probabilities via prepayment are about 3.3 times those emanating from loan default, while for low credit risk borrowers, prepayment probabilities at the end of year five after origination are about 33 times that of default probabilities. For the investor in FHA-insured mortgage pools, the estimated five-year cumulative probability of mortgage termination among high default risk and minority borrowers is only about three-fourths that of low-default risk and non-minority borrowers, respectively. Recognition of this mortgage performance advantage should enhance the willingness of lenders and investors to originate and acquire such loans and at more competitive pricing. Findings suggest that the extension of mortgage credit to less creditworthy and underserved borrowers, in a manner consistent with their lower termination risks, would serve to advance both their homeownership opportunities and related federal housing policy objectives.

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[1]Other simulations suggest that by the end the fifth year after origination, younger borrowers (household head is less than 25 years old) are characterized by 1.4 times the prepayment risks of older households (household head more than 45 years old). While the simulated risks of loan default similarly move up over the five-year period after origination, the differences between age groups is slight. Findings further suggest that the cumulative five-year risk of prepayment is relatively higher among married couples (41%) than single females (38%). In marked contrast, the five-year cumulative probability of default among single males is about 1.4 times that of single females. We further find little quantitative variation in the cumulative probabilities of default across first-time buyer status. Results of these analyses are available from the authors upon request.

A Test of Cultural Affinity in Home Mortgage Lending

National data on the disposition of applications for home mortgages revealwide disparities in rejection rates among racial and ethnic groups. Some have advanced race-based cultural affinity as a possible explanation for these disparities. The literature has developed two related, yet distinct, versions of cultural affinity. In the taste-based form of the theory, lenders have a preference, or "taste," for members of their group. In the common bond formulation, the affinity allows lenders to better assess the quality of members of their group.

This paper tests these theories by evaluating their differing implications for the experiences of *marginal applicants*, both in terms of where these applicants apply and how lenders evaluate their applications. This focus on marginal applicants differs from much of the earlier literature on these issues and yields more definitive conclusions on the existence of either type of cultural affinity. The results provide no evidence consistent with the common bond form of the theory. By contrast, there is some evidence consistent with the taste-based theory in three of the four sample years examined. These find-ings, which conform with those in other studies, are only weakly supportive of the taste-based theory, however.

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Cultural Affinity – The Theory and Its Implications

The theoretical literature on cultural affinity has developed two related, but distinct, formulations. In both, decision-makers have an affinity towards members of their own group ("same group members") and are indifferent or disaffected towards members of other groups. However, the two differ in the way the affinity affects decision-making. This section describes the two formulations and their main testable implications.

"Taste-based" cultural affinity. The early literature on discrimination, first developed in Becker (1971) and later applied to lending by Peterson (1981), argues that discrimination can occur if agents have a "taste" for discrimination, such that favoring same-group members or discriminating against other-group members maximizes utility. Clearly, taste-based cultural affinity will have its largest impact on applicants closest to the accept/reject threshold, whom I define as "marginal applicants." All applicants who are clearly qualified (unqualified) for a loan will be approved (rejected) by a lender regardless of the group they are in. However, marginal applicants can benefit or be harmed by affinities. For example, the affinity could cause a lender to increase its assessment of same-group applicants whose quality is just below the established accept/reject threshold such that they are viewed to be creditworthy. Similarly, marginal other-group applicants of a quality just above the threshold could be penalized by such lenders, such that they are no longer deemed worthy of credit. Thus, an implication of the theory is that lenders will favor marginal same-group applicants over marginal other-group applicants.

The taste-based cultural affinity hypothesis has an additional testable implication. If applicants recognize the presence of taste-based cultural affinity, one might expect them to act strategically to maximize their likelihood of success; that is, marginal applicants would try to apply to same-group lenders, because the lender's same-group affinity would improve the likelihood of the applicant's approval.

"Common bond" cultural affinity. More recently, a second cultural affinity literature has emerged. In this formulation, the same-group affinity allows agents to distinguish between high-quality and low-quality applicants better for those in the same group than for those in other groups. Cornell and Welch (1996) and Calomiris, Kahn, and Longhofer (1994) develop common bond-models of labor hiring and lending, respectively. More relevant for the current research, Calomiris, Kahn, and Longhofer (1994) focus on race as the dimension of discrimination. They assume that lenders (who are primarily white) can evaluate the credit quality of applicants with similar backgrounds and experiences more accurately than they can those with different histories, i.e., minorities; for minority applicants, lenders are forced either to gather additional information at extra cost or to rely on the less useful information from the application.

In both cases, screening leads to the following rank-ordering of applicants: high-quality same-group applicants, all other-group applicants, low-quality same-group applicants. Because agents are unable to distinguish between high- and low-quality other-group applicants, they will assign the average quality of the other-group applicants to every other-group applicant. Since this average quality will necessarily be higher than the low-quality same-group applicants, all other-group applicants will be ranked higher than the low-quality same-group applicants. Cornell and Welch (1996) refer to this "common bond" affinity mechanism as "screening discrimination."

Unlike the taste-based theory, the common bond theory of cultural affinity does not have definitive implications regarding the general treatment of other-group applicants. The theory can imply that lenders will in some cases favor same-group applicants over other-group applicants and in other cases favor other-group applicants over same-group applicants. The predicted outcome depends on whether the acceptance threshold is set above or below the average quality of the pool of other-group applicants. For example, if the threshold for acceptance is set below the average quality for the other-group applicants but above the quality of the low-quality same-group applicants, all high-quality same-group applicants and all other-group applicants are accepted and all low-quality same-group applicants are rejected. Thus, rejection rates are higher for same-group applicants than for other-group applicants. By contrast, if the acceptance threshold is set above the average quality of the other-group pool, then no other-group applicants are accepted.

The implication of this rank ordering for marginal applicants is that lenders will favor marginal other-group applicants over marginal same-group applicants. In other words, if lenders accept applicants beyond those they can clearly identify as high-quality, then low-quality other-group applicants will be accepted before any low-quality same-group applicants.

In terms of acting strategically, one would expect low-quality same-group applicants to seek out other-group lenders in deciding where to submit an application. Such applicants will recognize that same-group lenders will be better able to identify them as lower-quality and thus be more likely to reject their applications. For example, only a same-group lender might have negative information about an applicant's experience with transaction accounts, such as patterns of account management (e.g., "bouncing" checks), that may have accrued from its relationship with the applicant. By applying to the other-group lender, the low-quality applicant will, in effect, be moving from the lowest-ranked group from the perspective of the same-group lender to the middle-ranked group from the perspective of the other-group lender. More generally, the theory implies that marginal applicants will seek out other-group lenders.

Empirical Approach taste-based and common bond theories of cultural affinity have different implications for the approval (and thus rejection) and application patterns that should be observed for banks with different racial ownership. For example, consider the approval decision. Suppose there are two banks – one white-owned and one minority-owned – that are identical in all other respects and that the banks receive loan applications from identical pools of white and minority applicants. In the taste-based theory of cultural affinity, one should observe that (i) marginal white applicants are approved more often than marginal minority applicants at the white-owned bank, and (ii) marginal minority applicants

are approved more often than marginal white applicants at the minority-owned bank. In common bond theory of cultural affinity, the white lender can more easily identify marginal white applicants, so the marginal minority applicants will be approved more often than the marginal white applicants at the white-owned bank, and vice versa for the minority-owned bank. Similar reasoning yields predictions for the application decision.

Table 1 lays out the hypotheses for bank approval and applicant application patterns. Clearly, they are related, as they emerge from an explicit recognition that application patterns are likely to be influenced by the beliefs that applicants hold regarding their likely treatment by lenders of particular backgrounds. The empirical approach accounts for this using a two-stage selection model. In the first stage, applicants' decisions about where to submit their mortgage application are a function of characteristics of both the applicant and the bank. In the second stage, given an applicant's decision about where to apply, the bank that receives the application decides whether to approve it or not, which is a function of applicant and bank characteristics as well as of locational factors that could affect the lender's ability to recoup losses in the event of a loan default.

Table 2. Distribution of Conventional Loan Mortgage Applications and Denial Rates for Minority-Owned Banks and their Peers, by Applicant and Neighborhood Characteristics, 1994 and 1995
This table shows how conventional mortgage loan applications to the minority-owned and white-owned peer banks in the sample for 1994 and 1995 were distributed across various applicant and neighborhood characteristics. The table also shows the denial rates for applications with particular applicant and neighborhood characteristics at the two types of banks. For relative income levels, "Low" is defined as less than 50 percent of the MSA median, "Moderate" is between 50 and 79 percent of the MSA median, "Middle" is between 80 and 119 percent of the MSA median, and "High" is greater than 120 percent of the MSA median.

	Year and bank ownership							
	1994				1995			
	Minority		Peer		Minority		Peer	
Characteristic of applicant	App. Pct.	Den. Rate	App. Pct.	Den. Rate	App. Pct.	Den. Rate	App. Pct.	Den. Rate
Race								
Asian	12.0	7.2	3.9	8.9	27.2	10.0	7.7	11.2
Black	20.4	31.9	5.2	14.2	23.6	34.5	6.6	17.2
Hispanic	49.8	16.3	40.7	13.7	26.8	16.4	27.7	12.8
White	13.9	9.0	45.6	8.4	10.0	12.3	50.3	8.7
N/A	3.8	16.4	4.6	13.4	12.4	3.7	7.7	17.5
Income (as pct of MSA median)								
Low	8.4	47.0	6.9	22.4	9.3	36.4	7.5	22.1
Moderate	15.7	27.8	14.2	20.2	16.9	24.5	16.0	16.4
Middle	17.2	20.0	17.7	13.7	18.6	21.3	17.6	11.6
High	56.8	8.9	59.0	7.1	44.5	11.9	55.9	7.4
N/A	1.9	30.0	2.2	5.3	10.8	1.8	40.1	21.8
Minority Pct. of Population in Census Tract								
Less than 10	3.0	4.2	11.9	9.1	2.7	7.3	16.8	7.9
10-19	8.3	15.0	15.3	8.0	10.0	16.1	17.9	10.8
20-49	15.2	12.3	23.1	9.1	23.3	15.3	28.8	11.9
50-79	20.6	11.2	26.6	10.9	31.3	11.4	22.3	11.9
80-100	52.9	22.3	23.1	16.5	32.7	24.6	14.1	13.5
Median Income in Census Tract (as percentage of MSA median)								
Low	7.4	40.7	2.8	4.8	17.8	10.9	5.3	15.9
Moderate	22.7	24.0	15.7	13.1	23.6	24.1	17.3	18.3
Middle	27.5	16.1	36.3	12.9	29.7	19.9	33.8	11.6
High	42.5	10.6	45.2	8.2	28.9	11.9	43.6	7.6
Memo:								
Total number of applications	1601		4360		1544		4074	

Analytical Results

The two-stage selection model was estimated using 1994 and 1995 conventional home purchase mortgage lending experiences of a sample of minority-owned and white-owned peer banks. Only banks identified as being majority-owned by blacks or Asians are included as minority-owned in the sample. To be included as a peer in the sample, the white-owned bank is required to have a head office or branch in the same state and county as the head office or branch of a minority-owned bank and to be of a similar asset size. For those minority-owned banks with multiple peer banks, only the three closest matches (by asset size) for a given minority-owned bank are included. For 1994, the final sample

includes 35 minority-owned and 92 white-owned peer banks. The corresponding numbers for 1995 are 40 minority-owned and 106 peer banks.

The data indicate that, even after controlling for the fact that both banks have offices located in the same state and county, the applicant pool for minority-owned banks is a very different segment of the population than that of their peer banks (Table 2). As compared with their peers, minority-owned banks receive far more applications from minorities, from neighborhoods with high minority concentrations, and from lower-income neighborhoods; to a lesser extent, they receive more applications from lower income applicants.

The operating assumption for all the analyses is that lenders of a given ethnicity have an affinity with applicants of that ethnicity. Thus, by assumption, white-owned banks have an affinity with white applicants, black-owned banks have an affinity with black applicants, and Asian-owned banks have an affinity with Asian applicants. Alternatively, it could be argued that all banks have an affinity toward white applicants, given that whites make up the bulk of all applications. If so, then no differences would be expected in the treatment of white applicants across banks with different racial ownership. Regarding Hispanic applicants, having no prior expectations, I assume that Hispanics have no affinity with any of these groups; thus no differences in treatment are expected.

Results for the sample of Asian-owned banks and peers. Two results are of note. First, in 1994 marginal white applicants are significantly less likely to apply to Asian-owned banks than are other applicants. Importantly, tests indicate that marginal white applicants in 1994 are significantly less likely to apply to Asian-owned banks than to white-owned peer banks. Second, in 1995 marginal Asian applicants are significantly less likely to apply to white-owned banks than they are to apply to Asian-owned banks. These results strongly contradict the cross-race predictions of the common bond theory. However, it is important to recognize that the evidence does not directly affirm the predictions of the taste-based formulation of the theory; none of the same-race application choice relationships differ significantly from relationships involving racial interactions that are not believed to involve any form of cultural affinity.

The evidence suggests that banking institutions do not treat marginal applicants differently based on sharing the applicant's racial background. In short, the data on denials of marginal applicants do not support either the taste-based or common bond formulation of cultural affinity.

Results for the sample of black-owned banks and peers. The bank choice results largely mirror those for the Asian-owned bank sample. Marginal black applicants are more likely to apply to black-owned banks than to white-owned banks in 1994, which contrasts with the predictions of the common bond theory but supports those of the taste-based theory. Aside from this, though, there is little support for either the taste-based or common bond forms of cultural affinity in the bank choice equations. The application patterns of marginal minority and white applicants are not significantly different from populations not thought to be affected by cultural affinity.

The results for the denial equation are quite similar to those for the sample of Asian-owned banks and their peers in that the coefficients on the marginal applicant variables do not suggest that either form of cultural affinity exists. Applications from marginal applicants have comparable likelihoods of being denied, independent of the race of the applicant and the race of the bank.

Summary and Conclusion

Cultural affinity has been put forward as a potential explanation for observed race-based disparities in denial rates for mortgage applications. Thetheoretical literature has developed two forms of cultural affinity. In the taste-based formulation of the theory, the affinity benefits all same-group members; in the common bond formulation, the affinity benefits only high quality same-group members and disadvantages low-quality same-group members.

By focusing on the behavior and treatment of marginal applicants of different racial backgrounds and recognizing that banks vary in their racial

makeup, this paper assesses the importance of each type of cultural affinity for mortgage markets. The tests capitalize on the fact that, if affinities are race-specific, the theories predict that we should observe specific, and contrasting, application and denial patterns for marginal applicants across banks whose owners have different ethnic backgrounds. These tests are implemented using data on conventional mortgage applications in 1994 and 1995 for a sample of black-owned and Asian-owned banks and comparable white-owned peer banks.

The results of the analysis provide no support for the common bond form of the theory. There are no cases that suggest that marginal applicants seek out lenders of a different ethnic background or that banks approve applications from opposite-race individuals with marginal credit quality more frequently.

By contrast, some evidence is consistent with the notion of taste-based cultural affinity in the application data. Marginal white applicants are found to be less likely to apply to Asian-owned banks than to white-owned peer banks in 1994, marginal Asian applicants are less likely to apply to white-owned banks than to Asian-owned banks in 1995, and marginal black applicants are less likely to apply to white-owned banks than to black-owned banks in 1994. However, in these cases, the estimates also generally show that the application propensities for same-race pairings are not significantly different from the application propensities for pairings not believed to have cultural affinity issues. Thus, the findings here regarding application patterns are only weakly supportive, as they imply a shying away from opposite-race pairings rather than a seeking out of same-race pairings.

The evidence from the denial equation estimates suggests no differences in application disposition for marginal applicants based on race, either that of the applicant or the bank, and thus offer no support for the taste-based form of the theory. In short, the denial rate equation findings offer little support for either the taste-based or common bond forms of cultural affinity. This result differs from those of Hunter and Walker (1996), who find evidence in denial-rate equations consistent with the view that taste-based cultural affinity exists. The divergence in results may arise for several reasons, with one important possibility being their use of a single-equation estimation structure, which admits the possibility of selection biases associated with applicant decisions on which bank to patronize. Such potential biases are absent in the current research.

In closing, I note issues that could explain the observed results while preserving the notion that both formulations of the cultural affinity hypothesis operate in mortgage markets, at least in some circumstances. While this study uses the race of the bank ownership as a signal of the affinity the bank will have with applicants, the race of the bank ownership need not correspond with the race of the loan officers and underwriters who interact with loan applicants. In addition, activities by market participants, such as lenders, brokers, and real estate agents, could shape mortgage application patterns, and thus the results, apart from any affinity effects that may exist. While not explored in the current study, potential explanations such as this have validity and should be empirically tested.

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Intra-Metropolitan Mobility, Residential Location, and Homeownership Choice Among Minority and White Households: Estimates of a Nested Multinomial Logit Model

The sizable and persistent gaps in homeownership attainment, particularly among racial and ethnic minorities, is the subject of substantial academic research and policy debate (see, for example, Gabriel and Painter (2002), Painter, Gabriel, and Myers (2001), Rosenthal (2001), Coulson (1999), Gyourko and Linneman (1996), and Wachter and Megbolugbe (1992). While the U.S. homeownership rate rose to a record high of almost 68 percent in 2002, the longstanding white-minority homeownership gap of 27 percentage points was little changed: about 74 percent of white households had achieved homeownership, compared with only about 48 percent of black and Hispanic households.

In 2002, the Bush administration articulated a policy goal of adding 5.5 million minority households to the ranks of U.S. homeowners by the end of the decade. That goal follows in the wake of similar policy initiatives by the Clinton administration, whereby the U.S. Department of Housing and Urban Development (HUD) specified a national homeownership goal of 70 percent by 2006. The HUD goal implied a full 15 percent reduction in the homeownership gap between white and minority households.

Homeownership is expected to confer significant benefits on minority populations and neighborhoods. Homeownership attainment typically is accompanied by increased consumption of housing services and improved housing conditions. Further, homeownership comprises a primary investment vehicle of American households; hence, elevated homeownership among minority households undoubtedly would serve to boost their wealth and economic status. Research also indicates that homeownership confers benefits to neighborhoods, in the form of improvements in property upkeep, safety, school quality, and other amenities (see, for example, Green and White (1997) and Coulson, et al. 2002).

While recent research provides new insights into the determinants of minority homeownership, the results do not fully explain the persistently damped homeownership rates of black households. To date, no studies have structured and jointly evaluated the mobility and residential location decisions that typically accompany the choice of housing tenure. The intra-metropolitan mobility and residential location choices of minority and white households may vary considerably, owing in part to those groups' different endowments, constraints, and locational preferences. Among minority households, various factors may work to limit mobility and choice of residential location, thus constraining the homeownership choice. An improved understanding of the linkages between those decisions and homeownership choice may yield new insights and better-informed policies to enhance minority homeownership.

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Our Approach

The study upon which this Brief is based estimates a three-level nested multinomial logit model of household intra-metropolitan mobility, residential location, and homeownership choice.[1] The study applies individual-level 1990 census data to test relevant economic, demographic, and neighborhood hypotheses in the Los Angeles Consolidated Metropolitan Statistical Area. The model is then simulated to assess the effects of changes in household endowments, neighborhood racial composition, and other amenities on the intra-metropolitan mobility, residential location, and tenure choices of minority and white households.

This framework allows location characteristics to influence the decision to own and the decision to move, while controlling explicitly for the role of mobility in homeownership choice. The integrated structure of the model also allows homeownership choice to affect location choice. Finally, this methodology allows us to simulate the impact of changes in household demographic, economic, and other characteristics on the likelihood that a household will choose to own a home and will choose to locate in a particular area. In that context, we evaluate the extent to which differentials between whites and minorities in household and locational characteristics affect the racial gap in homeownership.

Our data are drawn from the public use micro-data sample (PUMS) file of the 1990 decennial census. The data file is comprised of a 5% sample of all individuals living in Los Angeles, Orange, Ventura, Riverside, and San Bernardino counties. These counties of metropolitan Los Angeles comprise close to 11 million residents and are dramatically diverse in both their residential composition and in their array of neighborhood living environments. For purposes of residential classification, households are placed into groups that resided in the City of Los Angeles, other parts of Los Angeles County, or the counties of Orange, Ventura, San Bernardino or Riverside during 1985 – 1990.

The data are sufficiently rich and numerous to identify differences between minority and white households in the economic, demographic, and neighborhood characteristics governing mobility, residential location, and tenure choices. The data provide excellent information on demographic factors (race-ethnicity, age, marital status, persons per household, workers per household, migrant origin and history) and economic factors (salary income, asset and other income, occupation and education level of the householder) that may influence a household's choice to move or buy a house. In addition, location characteristics such as house prices, rents, and population racial composition drawn from the PUMS and county-level crime rates drawn from Department of Justice records are included in the location choice model to control for housing market differences and differences based on household preferences.

Results

The models were separately estimated for black, white, Latino, and Asian households. Sample sizes for the racially stratified models include 94,449 white households, 12,764 black households, 22,439 Latino households, and 12,158 Asian households. All variables are included in each racial grouping except that immigrant status is added for the Latino and Asian models for both the decision to own and the decision to move.

The results demonstrate that control variables are consistently important in decisions about homeownership, location, and mobility for each racial group. However, they also suggest numerous important variations across minority and white households. For example, marital status is much more important in lowering mobility for whites than for other ethnic groups. While income is important for all groups in determining the likelihood of buying a home, it was most important for black households. The study also demonstrates that Latino immigrants are much less likely to own a home than are Latino native-born households. This effect is insignificant for Asians and is consistent with recent studies of immigrant populations (see Painter, et al. (2001) and Painter, et al. (2003)).

Notable also were differences in the results concerning household location choice by ethnic group. As expected, the estimated coefficients on the house prices difference terms are negative and significant

Figure 1: African American Homeownership Rates With White Household Socioeconomic Characteristics

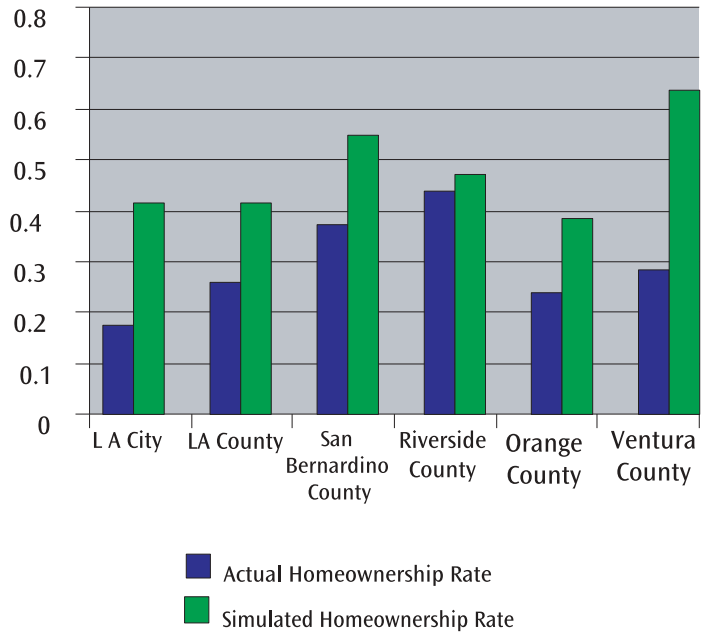
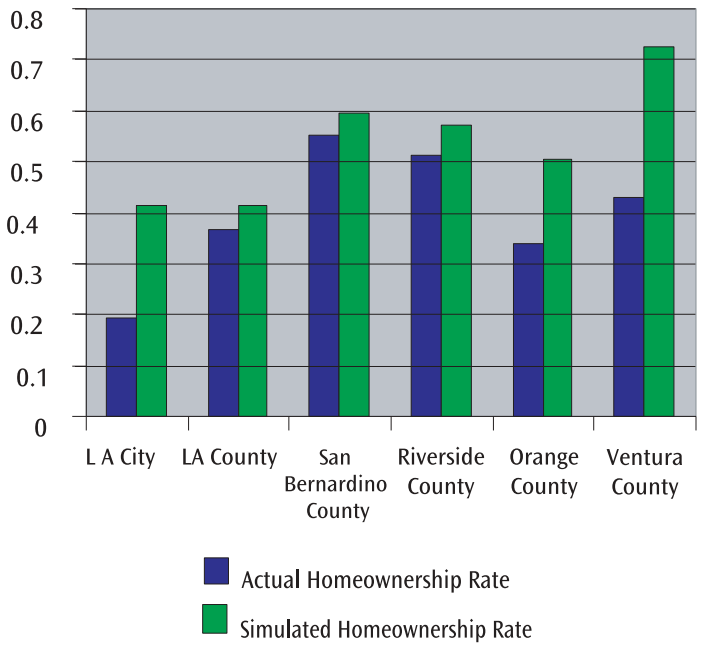


Figure 2: Latino Homeownership Rates With White Household Socioeconomic Characteristics



throughout, while black households are found to be most sensitive to differences in house prices and rents. In addition, the increased presence of a minority population in a county exerts the largest positive influence on the location choice of black households. Finally, the difference in county crime rates lessens the likelihood that a household will move to a particular area, but it is not statistically significant in the Latino and Asian sub-samples.

Model Simulation

One benefit of estimating homeownership in the context of the nested logit model is that we can simulate changes in household characteristics and location characteristics on the decisions to own, on where households locate, and on whether they are likely to move. Figures 1-4 highlight the results of two sets of simulations for blacks and Latinos that chose to move during the study period.[2] These include both adjusting the socioeconomic characteristics of blacks and Latinos to that of whites and lowering crime rates in the City of Los Angeles to determine the effect of each simulation on the choice to own a house and on the choice of location.

Figure 1 shows the results of simulations that increase incomes and equate other socioeconomic characteristics to that of whites; specifically, homeownership rates for blacks more than double in the City of Los Angeles and Ventura County and experience substantial gains in all areas except Riverside County. The gaps fall most in those areas that are most expensive. Overall, the gaps in homeownership rates between whites and blacks falls from 29 to 12 percentage points. Figure 2 depicts a

similar simulation for Latinos. As with blacks, Latino homeownership rises dramatically in the City of Los Angeles and Ventura County, but Latinos experience larger gains in Orange County than do blacks. Overall, the gaps in homeownership rates between whites and Latinos falls from 18 percentage points to 6.

Figures 3 and 4 show a simulated 20 percent reduction in overall crime rates in the City of Los Angeles also has important implications for household moves. Among blacks and Latinos, the sizable reduction in the citys crime rate results in an approximate doubling its share of movers choosing to own, while the share of movers choosing to rent doubles (**not shown**) for blacks as well. Households are drawn from all areas, largely including Orange, Ventura, and other parts of Los Angeles County. Among other things, this simulation points to the substantive local economic and development externalities of city policies to enhance public safety.

Figure 3: Simulated Change in African-American Homeownership and Location Choice due to a 20% Reduction in Crime Rates in Los Angeles City

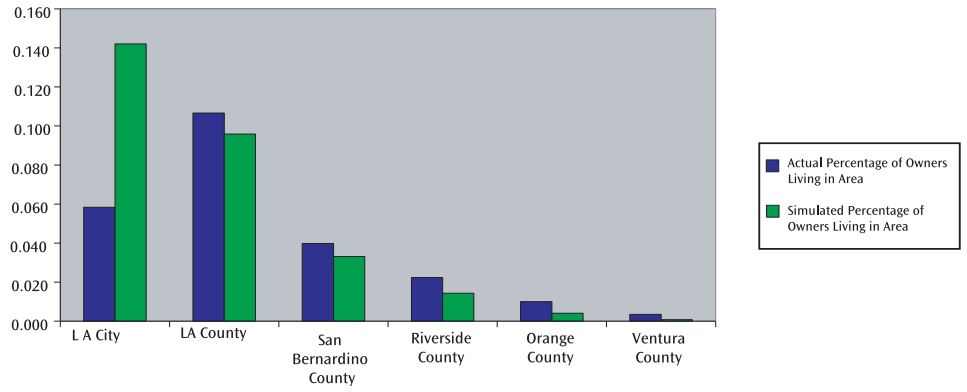
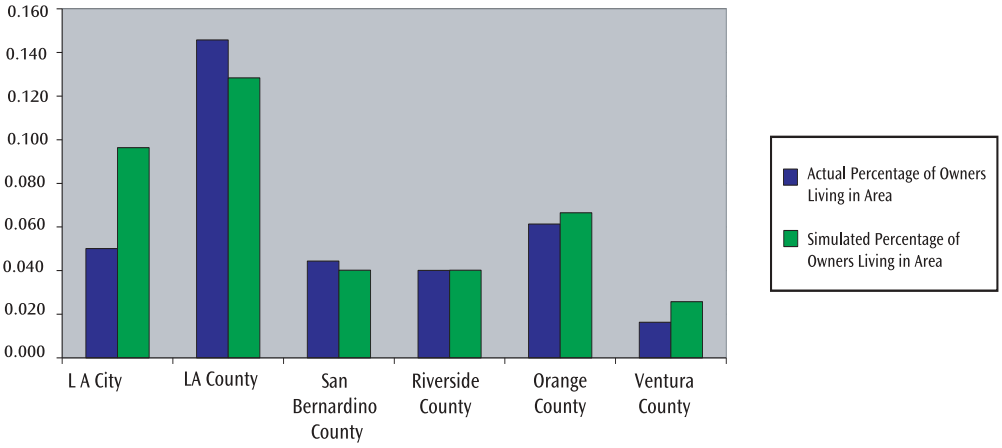


Figure 4: Simulated Change in Latino Homeownership and Location Choice due to a 20% Reduction in Crime Rates in Los Angeles City



Finally, other simulations that highlight potential changes in house prices and rents and of minority concentrations in each study area show that renters are much more likely to respond to these changes than are owners. One would expect this to be the case, as it is easier for renters than for owners to adjust their locational choice.

Summary and Conclusions

This analysis is the first to model the household mobility, residential location, and homeownership deci- sions jointly. In so doing, the study applies individual level census data from the Greater Los Angeles Metropolitan region to estimate a three-level nested multinomial logit model of household mobility, homeownership tenure, and residential location choice. The approach recognizes that the

tenure choices of minority and white households may vary importantly owing to the different preferences and constraints of those groups concerning intra-metropolitan mobility and residential location choice. The model is then simulated to assess the effects of changes in household endowments, neighborhood racial composition and other amenities on the intra-metropolitan mobility, residential location, and tenure choices of minority and white households.

Three primary findings emerge from the analysis:

Blacks have greater sensitivity to house price and income changes than do other groups. This suggests that blacks are more likely to increase homeownership as their economic status improves than are Latinos.

1) Equating the socioeconomic characteristics of minorities and whites closes the homeownership gap by more than 70 percent. The gains in homeownership are found primarily in the more costly areas of the Los Angeles Metropolitan area

2) Changes in location characteristics can have dramatic impacts on households' residential choices. Changing house prices or minority concentrations have immediate impacts on the location of renter households but little impact on homeowners' residential choices. On the other hand, lowering crime rates will cause some renter households to become owners, and they will change owners' location choices.

In sum, our research findings underscore the fundamental importance of gains to minority economic status in the advancement of the homeownership goal. Perhaps more than any existent policy, the upward economic mobility of minorities would aid in their attainment of homeownership. This study also has important implications for real estate professionals who can use it to evaluate the impact of demographic trends on the demand for single-family and multi-family rental housing in different locations. In addition, this study finds important dynamics with respect to changing demand for owner-occupied and rental housing as locational characteristics change.

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[1] The full study can be found at http://www.usc.edu/schools/sppd/lusk/research/papers/pdf/wp_2003-1003.pdf.

[2] Many more simulations are discussed in the full study, available at http://www.usc.edu/schools/sppd/lusk/research/papers/pdf/wp_2003-1003.pdf.

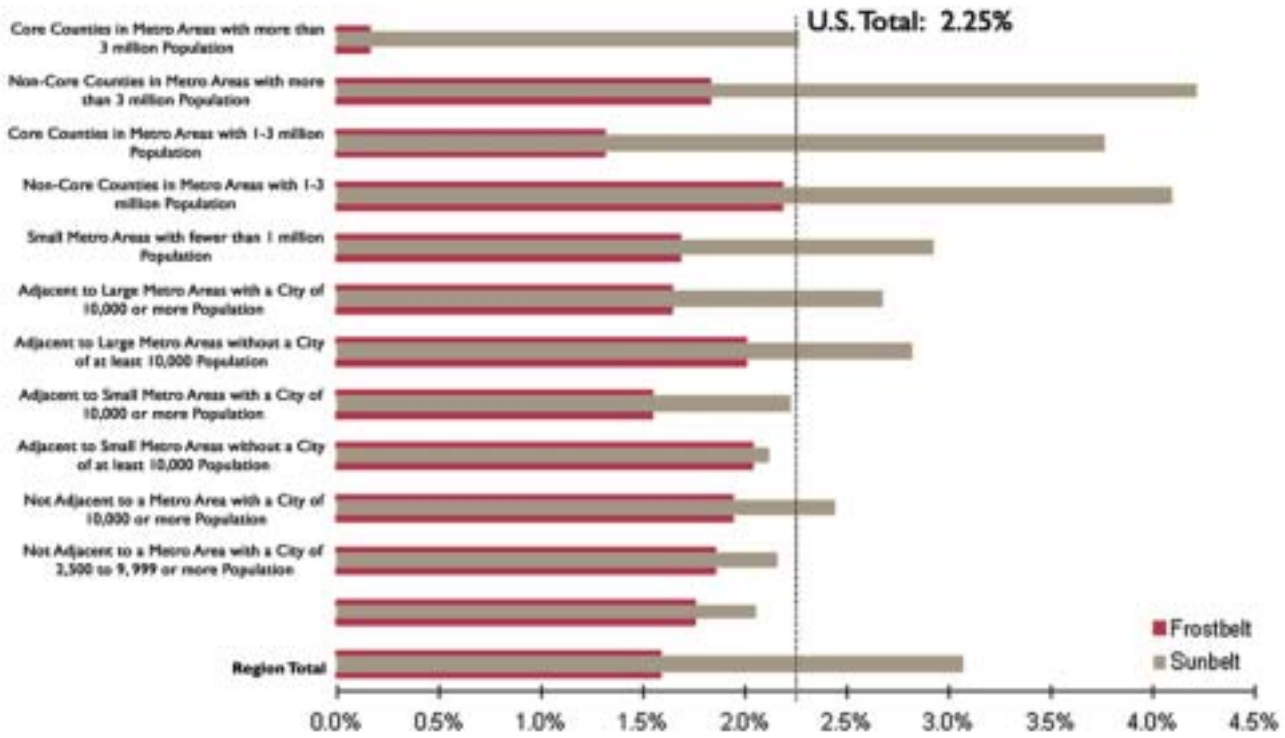
The Contnuing Decentralization of People and Jobs in the United States

Introduction

The census of 2000 reported that since 1990 the U.S. population had grown by slightly more than 13 percent. Most of the nation's cities did not grow by this much, while most of their suburbs grew by as much or more. Of the largest 50 cities, only 13 exceeded national population growth (of the top 20, only four did). Predictably all of these were in the Sunbelt states.

The census occurs every ten years and simply provides snapshots. This report offers a fuller picture of how population and employment in the 3,132 counties of the U.S. are decentralizing rather than clustering. We base this on an analysis of a 31-year series of annual data from the Regional Economic Information System (REIS) by the Bureau of Economic Analysis (BEA, U.S. Department of Commerce) that describes population, as well as employment and income for seven major economic sectors for all counties for the years 1969-1999. The employment data, which cover both full-time and part-time jobs reveal several major economic trends over the 31-year period: the wage and salary employment share fell (from 86.5 percent to 83.4 percent), while the nonfarm proprietors' share rose (from 10.5 percent to 15.2 percent); the services sector's share of jobs

Figure 2a. Sunbelt and Frostbelt Private Employment Growth Rates, 1969-1999



grew significantly (from 18.4 percent to 31.6 percent); the share of jobs in finance, insurance, and real estate (FIRE) also expanded (from 6.5 percent to 7.9 percent); at the same time, the shares of farming and manufacturing jobs fell (from 4.4 percent to 1.9 percent and from 22.6 percent to 11.8 percent, respectively).

We use these data to study agglomeration economies and their evolution. People may choose to live and work in clusters for a number of reasons, including opportunities for social interaction and economic interactions. Economists and others have made much of agglomeration economies as a source of economic growth because interactions facilitated by proximity spawn and develop ideas. The clustering of high-tech firms in Silicon Valley and the clustering of the film industry in the Los Angeles area are examples of such agglomeration economies. But clustering may be costly because it can become too dense, resulting in congestion.

The benefits of dispersal are expanded by increased connectivity, i.e., cheaper modes of moving people, goods, and (especially) ideas. The marginal costs of moving the latter are now close to zero. This is confirmed by our analysis which reveals substantial decentralization, much of it away from metropolitan areas in general and especially from their cores.

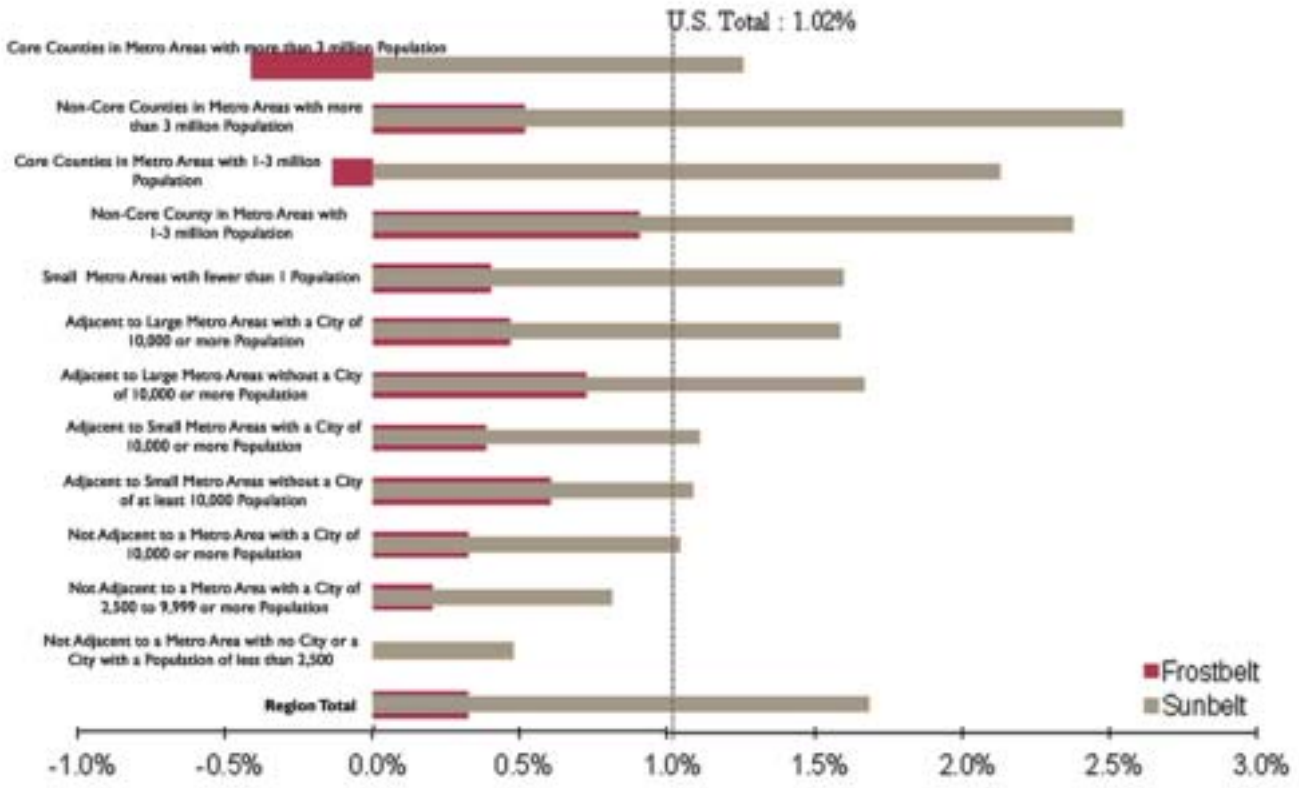
The broad overall trends in U.S. settlement patterns are well known, and include the following:

i. The westward movement of population and employment, in more recent decades to the Sunbelt.

ii. Persistent rural-urban migration of jobs and people to the cities.

iii. Suburbanization (and, more recently, exurbanization) out of cities.

Figure 1a. Sunbelt and Frostbelt Population Growth Rates, 1969-1999



However, the more detailed analysis made possible by the huge REIS data set (over one million observations on employment alone) suggests a much more complex picture. Although only the highlights are discussed in this brief, they are revealing.

Population

U.S. population growth from 1969 to 1999 averaged a little over 1 percent per year (Figure 1a). Was there an unequivocal redistribution of people towards cities? The answer is more complex than a simple urbanization trend or even a post-1970 "counterurbanization" phenomenon. The fastest growth occurred in the suburbs of the middle-sized metro areas (1.63 percent; average annual growth rates are used throughout). The second-fastest growth occurred in the exurbs of the large metro areas without a city of 10,000 or more (1.22 percent). Close behind were the suburbs of the largest metro areas (1.18 percent). The three other categories that grew faster than the national average were core counties of the middle-sized metros (1.1 percent), small metro areas (1.1 percent), exurbs of the large metros with a city of 10,000 or more (1.04 percent).

The major population losers were the core counties of the largest metro areas (-0.52 percent), exurban areas of the small metro areas, and rural counties. There was an overall redistribution of population towards the urban areas but not to the core counties of the largest metropolitan areas. Growth was strong in the suburbs as well as in the exurban areas of the large metropolitan areas.

Employment

Alternating periods of clear dominance in metro or nonmetro growth are much more evident for employment than for population. National job growth over the 31 years averaged 2.25 percent, substantially higher than population growth because of the well-documented increase in female labor force participation (Figure 2a). The county group leaders are similar to for population: the noncore counties of the middle-sized metro areas grew fastest (3.09 percent), followed by the suburbs of the largest metro areas (2.58 percent), the core counties of the middle-sized metro areas (2.57 percent), the exurbs of the large metros (without a city of 10,000 or more; 2.43 percent), and the smallest metro areas (2.37 percent).

The laggards were the rest of the exurban and rural areas and the core counties of the largest metro areas (the latter grew the least, 1.25 percent). Central cities vs. the suburbs is apparently no longer the key issue in the spatial competition for jobs: the more interesting comparisons are among suburbs, exurban areas, and rural counties.

The analysis so far suggests that clustering remains important, as evidenced by the success of the suburbs of middle-sized metro areas. However, significant job growth is also possible in the lower density exurban areas and even in some remote rural areas. But aggregates do not tell the full story. Ways of digging deeper include examining the growth of proprietor employment, sectoral employment, and regional differentials. We perform this in the following sections.

Proprietorships

Proprietorships are one of the three major forms of legal business entities. They tend to be smaller than the other two groups (partnerships and incorporated businesses). In 1997, the IRS reported that there were 17.2 million businesses of this type; more than 72 percent of all enterprises that filed returns were nonfarm proprietorships. Yet they accounted for less than 5 percent of all business receipts in that year. We suggest that the growth of proprietorships can serve as a proxy for the vitality of small, start-up firms. In what spatial settings have they performed best?

In 1999, total U.S. full-time and part-time employment was 163.8 million. The split between wage and salary employees and proprietors was 136.6 million vs 27.1 million. Of the latter, 2.2 million were farm proprietors. The growth of nonfarm proprietors' employment occurred primarily in metro areas and at rates that varied little between metro county types. For the years 1969-99, proprietor employment grew fastest in the suburbs of the middle-sized metros (3.6 percent), but almost as fast in the core and noncore

counties of the large and middle-sized metros. Elsewhere, only the small metros exhibited proprietorship growth faster than the national overall rate (2.79 percent).

Major Sectors

The REIS series provides employment data for seven major (excluding mining and agricultural services, forestry and fishing) private industrial sectors. For the nation, over the 31 years, employment in four industries grew faster than private employment (2.25 percent): services (3.85 percent), FIRE (2.65 percent), construction (2.49 percent), and retail trade (2.35 percent). The other three sectors lagged behind national job growth: wholesale trade (2.03 percent), transportation and public utilities (1.70 percent), and manufacturing which declined absolutely (-0.19 percent). Because our metric is jobs, we must qualify these descriptors of growth in the sense that industries can hire less labor either because they are declining or because they are becoming more efficient.

Sunbelt services grew fastest in the suburbs of the largest metro areas for the first two periods and in the exurban areas of the large metro areas in the second and third periods. Growth in the core counties of the largest metro areas lagged in the third and fourth periods. Frostbelt services sector growth also was fastest in noncore counties (most often in the suburbs of the middle-sized metros) or in the exurban areas surrounding the large metro areas.

The most visible vigorous exurban and rural growth is for employment in the FIRE sector. For the Sunbelt, this was true in three of the four periods studied, including the most recent periods, where exurban growth surpassed suburban and core county growth. High growth rates also occurred in the most rural areas. Similar patterns also occurred in the Frostbelt areas.

Both the services and FIRE sectors are perceived to be the most dependent on agglomeration economies. If so, they appear able to be found in locations far from the traditional core metro areas. At the same time, low-cost communications have allowed some firms to de-couple back-office from headquarters operations and locate in both a core area and in the periphery.

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Construction job growth in the Sunbelt has been a complex story, but in most periods the suburbs, exurban areas, and even the rural areas performed better in both the Sunbelt and the Frostbelt.

Retail trade is the only other of the seven sectors analyzed where jobs grew faster than private jobs overall in the 31-year span (2.35 percent vs. 2.25 percent). The Frostbelt experience is straight-forward; growth was fastest in the suburbs of the middle-sized metro areas in every period. Performance in the Sunbelt was more varied, but growth was faster in the suburbs and exurban areas. Wholesale activities increasingly serve large-scale regional or national markets. It is no surprise, therefore, that wholesale jobs tended to grow fastest in the rural areas of both regions. Another slower growing sector with substantial exurban and rural growth was transportation and public utilities.

Changes in the status of the manufacturing sector during the 20th century are well known; manufacturing is highly decentralized compared with

services and other sectors, typically explained by weakening agglomeration opportunities in cities. Manufacturing often functioned as a "leading sector", inducing substantial rural growth in other employment sectors. But manufacturing has been leaving population centers ever since the highway system gave truck transport dominance over rail or waterways (in dollar value of freight shipped). An increasing "footlooseness" in the manufacturing sector means that businesses are much more likely to follow the locational preferences of their workers than to determine them. The strength of household preferences for suburban and exurban settings is well known and is a governing determinant of industrial location.

In addition, manufacturing was the only one of the seven major economic sectors that *declined* absolutely through the 31-year span. But most of the decline was in the Frostbelt, and there were positive signs of growth in the Sunbelt. Nevertheless, in both regions manufacturing firms continued to relocate out of the core centers.

The overall history of sectoral employment change confirms the importance of exurban and rural, and sometimes suburban, growth across all sectors. The signs of any recentralization of employment are negligible.

Conclusions

What preliminary conclusions can we draw? First, Frostbelt-Sunbelt migration remains a powerful trend. Climate counts. Second, the facts do not support the idea of a "return to the cities," "regeneration," or any resurgence of compact development, so often mentioned in recent years in the media and by planners. While pockets of spontaneous development activity exist in various core areas, these are statistically few and are overwhelmed by the widespread decentralization trends documented here. Third, the dominant trends show an ebb and flow over time between growth in exurban and in suburban locations. Suburban growth tended to be concentrated in the middle-sized metro areas. Exurban areas and rural counties usually performed better than core counties. Consistently, the core counties of the largest metro areas have fared worst, even in the most recent period (1995-99) when they did a little better. Fourth, most firms no longer have to seek locations in traditional high-density centers to achieve agglomeration economies; they can either do without them or find them in low-density regions – Silicon Valley is perhaps the first and most famous example. Finally, most planners who seek the holy grail of "smart growth" are, somewhat desperately, attempting to counter the potent market trends that favor more dispersal. Given their extent, as monitored here, planned reversals would be very costly.

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