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Cityscape

A Journal of Policy Development and Research

IMMIGRATION
VOLUME 11, NUMBER 3 • 2009

U.S. Department of Housing and Urban Development
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Guest Editor's Introduction

John I. Carruthers
U.S. Department of Housing and Urban Development

The opinions expressed in this article are those of the author and do not necessarily reflect the opinions of the U.S. Department of Housing and Urban Development or the U.S. government at large.

This issue of *Cityscape* is dedicated to various issues having to do with the public policy debate about immigration in the United States. The project was initiated in 2007, after a proposal for comprehensive immigration reform was not enacted. At that time, passions of those participating in the debate ran high, and it seemed that more and better information on immigrants and immigration outcomes was needed. Toward that end, the contributors to this *Cityscape* symposium have produced original, scientific research aimed at developing empirical evidence that may be useful to policymakers and other interest groups as the discussion is renewed.

The United States is indisputably a nation of immigrants, some legal and some not. As illustrated in exhibit 1a, since the early 1800s, nearly 75 million people have immigrated to the country and obtained legal, permanent resident status. The same exhibit also shows that two main booms in immigration have occurred: one beginning around 1900 and a second beginning around 1990. The top 10 years for new permanent residents are evenly split between the two eras, but the exhibit shows that the ongoing boom has sustained itself much longer than the earlier one and shows no signs of tapering off. Exhibit 1b shows that, since the early 1900s, about 23 million people have been naturalized; this number has increased greatly since 1990. In 2008, more than a million people were naturalized, a figure matched only in 1996. Exhibit 1c illustrates that, in another echo of the boom in new permanent residents, the number of deportable nonresidents located by the government has also surged in recent years. The government has documented more than 50 million cases since 1925—and an average of 1.3 million cases a year since 1990. Despite the number of people apprehended, the U.S. Department of Homeland Security estimates that currently some 12 million unauthorized people are living in the United States.

These numbers by themselves are dramatic enough to draw considerable attention, but they leave a trail of questions in their wake, which the authors of the articles in this symposium attempt to answer: Why do some immigrants become citizens while others fail to? How does immigration affect metropolitan economies? Where do immigrants cluster, and why? How do immigrants go about certain aspects of their daily lives, such as commuting?

The first article in this symposium, by Natasha T. Duncan and Brigitte S. Waldorf, addresses how immigrants' success in achieving naturalization is influenced by who people are and where they live. The second article, by Mark D. Partridge, Dan S. Rickman, and Kamar Ali, examines how recent immigration has influenced metropolitan labor market outcomes, including migration flows, wages, labor force participation, and housing costs. The third article, by Seryoung Park and

Geoffrey J.D. Hewings, uses a computable general equilibrium model of the Chicago and United States economies to explore how immigration affects a region's economy. The fourth article, by Casey J. Dawkins, probes immigrants' tendency to fan out of central cities and into suburban areas. The fifth article, by Victoria Basolo and Mai Thi Nguyen, examines the residential location choices of immigrants who receive housing choice vouchers. The sixth article, by Rolf Pendall and Rosanne Hoyem, explores the extent to which immigrants disperse across large, polycentric metropolitan areas (in the United States and two European Union countries). Finally, the seventh article, by Sungyop Kim, evaluates immigrant travel behavior by studying how people commute to work.

Each article has been developed over the past 2 years and was presented midway in a series of specially organized sessions at the 2008 meetings of The North American Regional Science Council in Brooklyn, New York. As a set, the articles shed new and important light on the many and diverse ways in which immigrants seek to assimilate and go about their daily lives. In addition, the articles discuss, explain, and describe the ways immigrants seek to change communities and the ways communities change them. It is the editor's hope that this special issue will highlight the complexity of some of the issues the country currently faces and underscore the need to develop a firm evidence base that can guide the variety of proposed public policy responses. Along the way, it is worth bearing in mind that many Americans began their lives in the United States as immigrants and, thus, although debating the immigration issues may be challenging, the issues are, by their nature, resolvable.

Exhibit 1

Immigrant Trends in the United States

Exhibit 1a

New Permanent Residents

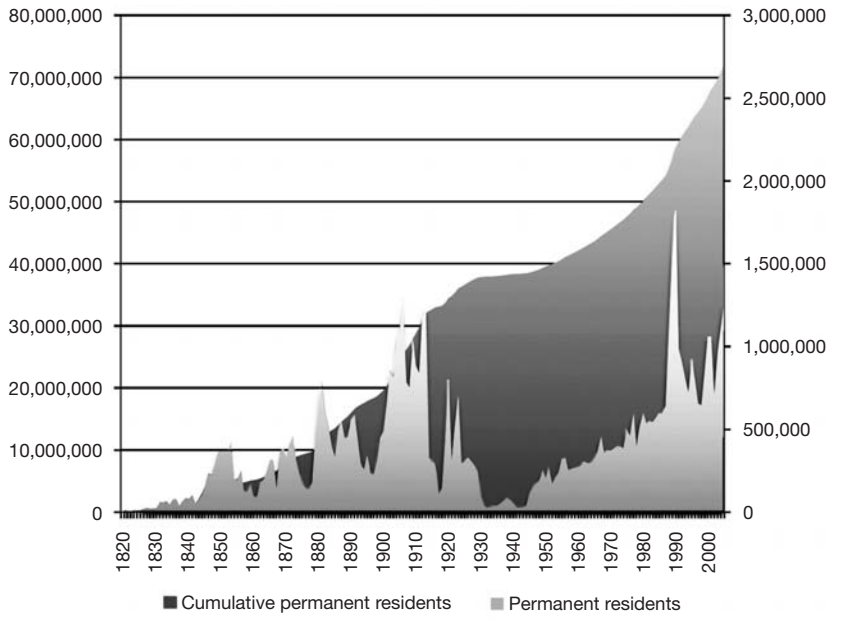


Exhibit 1b

Naturalizations

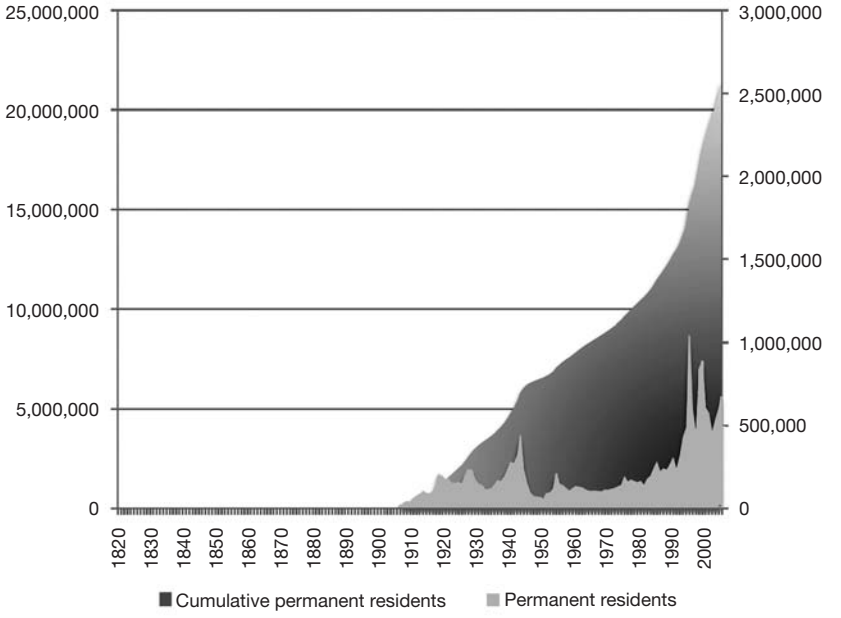
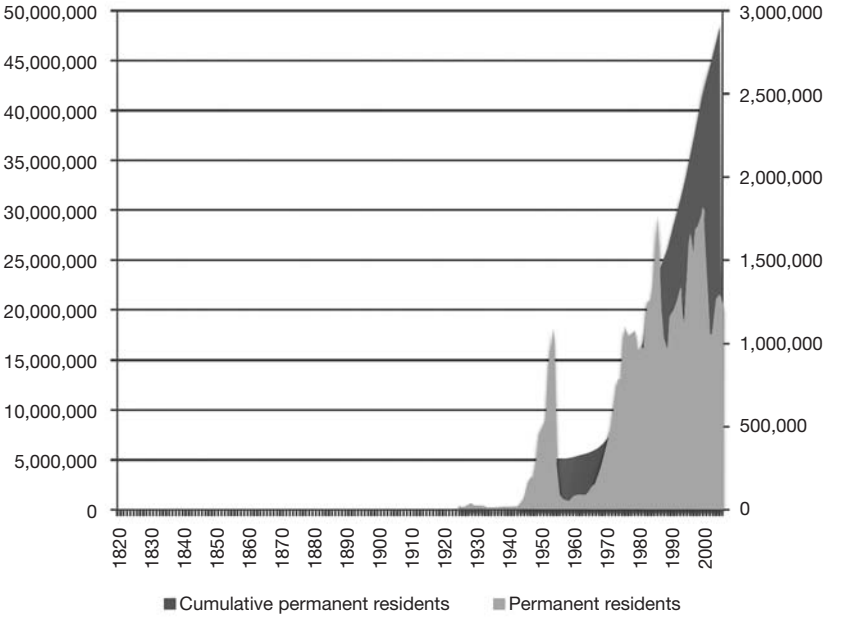


Exhibit 1c

Deportable Nonresidents



Source: U.S. Department of Homeland Security, 2008 Yearbook of Immigration Statistics

Becoming a U.S. Citizen: The Role of Immigrant Enclaves

Natasha T. Duncan
Brigitte S. Waldorf
Purdue University

Abstract

The United States provides a path to citizenship for its newcomers. Unlike other immigration countries, however, the United States does not have policies that ease assimilation or directly promote naturalization, such as easily accessible and widely advertised language and civic instruction courses. Immigrants are by and large left on their own when facing legal and financial barriers or seeking instruction to pass the citizenship test. Not surprisingly, we find that immigrants' attributes, such as educational attainment, English language proficiency, and income, affect naturalization rates. This article analyzes whether naturalization rates are also affected by neighborhood characteristics and informal networks for assistance and information. We estimate a binary model of immigrants' citizenship status, specifying the size of the immigrant enclave and its level of assimilation as key explanatory variables. The study uses 2005 American Community Survey data and focuses on immigrants from the Caribbean islands now living in the New York area. The results suggest that who they are and where they live substantially affect immigrants' propensities to have acquired U.S. citizenship. Citizenship is unlikely for recent arrivals and for people who speak English poorly or not at all, are poorly educated, and have a low income. Living in a neighborhood with a well-assimilated immigrant enclave enhances the chance of acquiring U.S. citizenship. This effect is stronger for highly educated immigrants than it is for poorly educated immigrants and, thus, misses the more vulnerable segments of the immigrant population. In poorly assimilated enclaves, enclave size has a positive effect on immigrants' propensities to become U.S. citizens, whereas we find the opposite effect in neighborhoods with well-assimilated enclaves.

Introduction

The United States' immigration system is one of paradoxes: It is relatively welcoming to immigrants, yet it is laissez-faire toward immigrant integration. Of the world's immigrant-receiving countries, the United States stands out for being the most popular destination but also for having one of the most immigrant-friendly immigration policies (Fix, 2007). Among other advanced industrialized countries, the United States is one of the few governments that permit high-immigrant intake numbers and opportunities for permanent settlement (Joppke, 1999). After immigrants arrive and settle, however, the generous host does not provide assistance on the path to citizenship. Settlement (integration) resources are not widely available to all categories of immigrants; rather, government-funded resources are limited to refugees.[1] Immigrants admitted in all other categories must rely on their personal skills or turn to resources provided by their neighborhoods or communities.

The lack of public assistance can be attributed to the imbalance in the priorities of policymakers and the public.[2] In the United States, the national discourse surrounding immigration is steeped unevenly in policymaking to curb and punish irregular immigration, often at the expense of other pressing immigration concerns, namely integration. Fix (2007) described immigrant integration as "an afterthought in immigration policy discussions; in fact, integration remains one of the most overlooked issues in American governance" (Fix, 2007: iii). This oversight is somewhat reflected in the low rates of naturalization, although the process for obtaining citizenship is relatively simple but costly.

Bearing in mind that the U.S. government does not give financial or institutional support to newcomers, the onus of doing so is on the immigrant[3] to integrate himself or herself and eventually to choose whether to become a U.S. citizen. Naturalization is a traditional indicator of integration[4] (Calavita, 2004; Fix, Zimmerman, and Passel, 2001; Garcia, 1981) and, accordingly, this article investigates factors that influence immigrants' naturalization rates. Although previous research (for

[1] Refugee resettlement is the closest program to an immigrant integration resource provided by the U.S. government. With the decrease in refugee intake, the funding associated with federally funded refugee resettlement programs also has been declining (Bloemraad, 2006; Fix et al., 2008).

[2] The Migration Policy Institute has researched the importance of emphasizing government-funded and government-led integration programs, not only for the sake of the socioeconomic well-being of the immigrant, but more so for the national interest. For a good evaluation and discussion of the necessity for prioritizing integration, see Fix et al., 2008; Papademetriou, 2003.

[3] The term "immigrant" is used in the context of the U.S. Department of Homeland Security's definition of the group, referring strictly to legal permanent residents (immigrants with a green card).

[4] As DeSipio and De la Garza (1998: 64) discussed, "Naturalization also involves an individual decision made by all immigrants, specifically to pledge loyalty or attachment to the sending country or to the United States. Throughout U.S. history, most immigrants have developed loyalty to the United States and many have thereupon sought citizenship, a pattern that continues today." In this article, we use this conventional view of the relationship between assimilation and naturalization as the development of new affinities to the host country and, thus, the desire to complete membership through naturalization. We do, however, recognize that naturalization may be acquired for practical purposes rather than to signify one's level of integration. In fact, with the adoption of policies that, among other things, exclude permanent residents from benefits or increase their risk of deportation, naturalization as a marker of integration is weakening (Fix, 2007).

example, Bloemraad, 2006) has convincingly shown that personal attributes, such as educational attainment, English proficiency, and sojourn length, are key drivers of naturalization, this article focuses on the role of immigrant enclaves in facilitating immigrant assimilation and, ultimately, their acquisition of citizenship. Specifically, we address three hypotheses. First, it is hypothesized that the immigrant's propensity to have acquired U.S. citizenship is related to the immigrant enclave size in the immigrant's neighborhood. A large enclave size provides the immigrant with support and opportunities within the community and, thus, lowers the need to take advantage of the benefits associated with citizenship; yet, a large enclave size may also foster naturalization because assimilation aid is plentiful. Second, we hypothesize that the maturity of the immigrant enclave, or the degree to which the immigrant enclave as a whole is integrated into the host society, increases the immigrant's propensity to choose citizenship. A mature and highly integrated ethnic enclave provides the know-how and support for immigrants seeking to naturalize and advocates the beneficial effects of naturalization. In particular, a mature enclave is prone to provide well-functioning immigrant networks with individuals, groups, and civic organizations dedicated to serving the immigrant community. Third, we are interested in the hypothesis that assimilation aid provided by the neighborhood benefits immigrants unevenly; therefore, we test whether the effects of enclave size and maturity vary across salient personal characteristics, namely immigrants' educational attainment levels.

The empirical analysis uses 2005 American Community Survey (ACS) data and focuses on immigrants from four Caribbean countries living in the New York area: (1) the Dominican Republic, (2) Haiti, (3) Jamaica, and (4) Trinidad and Tobago. We chose the four countries because they represent the linguistic diversity in the region. The people of the Dominican Republic speak Spanish; the population of Haiti speaks French or French Creole; and the people of Jamaica and of Trinidad and Tobago speak English. We estimate a series of logit models of immigrants' citizenship status, where the key explanatory variables are neighborhood characteristics referring to enclave size and enclave maturity.

This article is divided into four parts. Following this introduction, the second section provides the study background drawing on the literature on naturalization and integration and on information about Caribbean immigrants in the New York area. The third section presents the empirical analysis, with subsections on data, methods, and results. The article concludes with a discussion of findings and suggestions for future research.

Background

Many immigrants make the decision to give up loyalties to their countries of origin and become citizens of the United States. The literature suggests that the journey to citizenship, however, largely depends on the immigrant's personal characteristics or community support. The government's role in promoting naturalization is apparent with its provision of integration resources and with public policies that remove previously held benefits from noncitizens. The case of Caribbean immigrants in the New York area highlights the importance of these factors for the naturalization process.

Assimilation and Naturalization

The integration of immigrants is a necessary step in maintaining a cohesive nation. Otherwise, countries are confronted with marginalized groups, potential security threats, or social unrest. High rates of cross-border movements by migrants from the south to the north are increasing the salience of integration across developed countries. For many countries, integration is a new and continual challenge that they must confront with the appropriate policies to incorporate newcomers (legal and undocumented migrants) into the broader host society (Jacoby, 2007; Meissner, 2007). The process is best facilitated through the host society's government policies that encourage and help newly arrived immigrants incorporate themselves into the larger society's socioeconomic and political institutions. Integration is not a one-way process done only by newcomers; rather, it is a mutual responsibility with the host and the immigrants playing their roles of negotiation and accommodation (Fix, 2007; Papademetriou, 2003).

Current global migration trends make the issue of integration acute. About 3 percent of the world population lives outside its country of birth (Poot, Waldorf, and van Wissen, 2008). The number of international migrants is growing (GCIM, 2005), and we witness an increasing diversity in the ethnic composition of immigration flows. For example, the number of foreign-born people in the United States has been increasing; the total reached approximately 13 percent of the U.S. population in 2005 (OECD, 2008). In 2000, the foreign-born population in the United States was 10 percent, up from 8 percent in 1990 and 5 percent in 1970 (Aleinikoff, 2000; Lapham et al., 1993). At the same time, however, overall naturalization rates in the United States have been declining during the past 50 years. U.S. naturalization rates have dropped from 80 percent of the foreign-born population in 1950 to less than 40 percent in 2004 (Bloemraad, 2006)[5]. Over that same period, the native composition of immigrants in the United States has shifted. The 1965 Hart-Cellar Act made U.S. shores more accessible to people from non-European countries, and now most immigrants originate from Latin America, the Caribbean islands, and Asia. Immigrant groups from Europe naturalized at a higher rate, whereas the demographic shift in the native composition of immigrant flows was accompanied by lower naturalization rates.

Assimilation, although a politically charged concept, defines the American naturalization experience. Assimilation is not explicitly required for naturalization; however, by implication, it is expected that immigrants adopt the American way. Although the self-description of the United States as "a melting pot" suggests that immigrants add their individual cultural ingredients, the reality is that, ultimately, immigrants become Americans, leaving behind their former identities or traditions (Bloemraad, 2006). The expectation to assimilate is also deeply entrenched and epitomized in the oath of citizenship. Immigrants must "absolutely and entirely renounce and abjure all allegiance and fidelity to any foreign prince, potentate, state, or sovereignty of whom or which [they] have heretofore been a subject or citizen" (USCIS, 2009). Essentially, the decision of whether to naturalize implies that immigrants in the United States must make a choice to maintain allegiance with their countries of origin or give up those ties and declare loyalty to the

[5] In comparison with the United States, Canada has experienced higher naturalization rates. Between 1980 and 2001, naturalization in Canada was 70 percent and higher (Bloemraad, 2006).

United States. Compared with the two other traditional countries of immigration—Canada and Australia—the United States follows a more assimilationist model.[6]

Naturalization is a conventional marker of integration and assimilation. As Benhabib (2004) aptly put it, "political boundaries define some as members, others as aliens. Membership, in turn, is meaningful only when accompanied by rituals of entry, access, belonging, and privilege" (Benhabib, 2004: 1). Naturalization is a rite of passage through which immigrants and natives become indistinguishable under the law, and immigrants receive full membership in the state (Aleinikoff, 2000; Aleinikoff and Klusmeyer, 2002). It follows, then, that both the host country and the immigrant have an interest in encouraging and acquiring citizenship, respectively. Immigrants acquire citizenship and, thereby, become fully integrated, politically empowered members of the host society for one or two reasons or a combination of the reasons: self-interest or a genuine emotional tie with the host country. Host states permit naturalization as part of the process of nation building to form a cohesive nation in which members share a common identity that is distinct from the identity of other nations and whose members have a loyalty to the nation. Taken together, these motivations for the immigrant and the host country shape the outcome of naturalization.

In the United States, the path to citizenship is less restrictive than it is in other host societies. U.S. citizenship is acquired in one of three ways: (1) birthright, (2) blood, or (3) naturalization. For citizenship by birthright, U.S. policy is based on jus soli (a right of soil), which confers citizenship at birth on the country's territory. For citizenship through blood, U.S. policy is based on jus sanguinis, which holds that a child's country of citizenship is the same as that of his or her biological or adoptive parent. For citizenship through naturalization, which is the only channel through which immigrants can acquire citizenship, the process requires an immigrant to reside (permanent residence permit) on U.S. territory for 5 years (3 for spouses of U.S. citizens), after which he or she must pay a sizeable application fee and pass a civics and language test. The process also requires that an immigrant be of good moral character and have no criminal record. The final stage of naturalization involves taking the oath of loyalty and renouncing the country of origin.

In general, the task of naturalization rests on three actors: the host country's government, immigrant networks, and the newcomer. The host country's government defines the context in which the immigrant is received. By providing social services, civic education, and language classes, the host country's government chooses to proactively promote naturalization. In the United States, however, the sole emphasis is on testing for knowledge of U.S. civics and history and the English language on the naturalization examination. The government's role also comes into play when it enacts policies that restrict access to public goods and services for noncitizens and, thus, the state indirectly influences immigrants' decisions to naturalize. California's passage of Proposition 187 denying access to social and medical services for noncitizens spurred a rush to naturalize in that state and in many other states, including New York (Rumbaut, 1999). Similarly, in 1996, welfare

[6] Immigrants naturalizing in Canada pledge to be "faithful and bear true allegiance to Her Majesty Queen Elizabeth the Second, Queen of Canada, Her Heirs and Successors, and that I will faithfully observe the laws of Canada and fulfill my duties as a Canadian citizen" (CIC, 2008). Newly minted Australian citizens pledge their "loyalty to Australia and its people, whose democratic beliefs I share, whose rights and liberties I respect, and whose laws I will uphold and obey" (DIAC, 2008). Neither Canada nor Australia requires immigrants to "abjure all allegiance and fidelity" to their former home countries.

reforms under the Clinton administration denied noncitizens access to federally funded social benefits—benefits that were previously equally available to immigrants and citizens. Thus, the enactment of laws that significantly distinguish between immigrants and citizens makes naturalization the only channel to secure benefits and often produces a surge in naturalization rates (Fix, 2007).

An immigrant's personal attributes and self-interest[7] influence the decision to naturalize. Studies show that immigrants tend to be young, motivated, and skilled (Feliciano, 2005; Woodrow-Lafield, 2008). These attributes help immigrants integrate into the host society. Qualities including education, income, proficiency in the host language, gender, age, homeownership, and duration of stay are often cited as correlates of naturalization rates (Bloemraad, 2006; Rogers, 2006; Fix et al., 2008; Woodrow-Lafield, 2008). Education, a facilitator of social upward mobility, provides opportunities for higher paying employment, familiarity with host state civics, and language acquisition. Women see naturalization as a path to empowerment and as an opportunity to petition for the legal entry of relatives, particularly children, left behind. The older an immigrant is at the point of admission, the less likely it is that he or she will seek to naturalize. The socioeconomic benefits of naturalization lose their appeal with age because, as Woodrow-Lafield (2008: 68) explained, "younger immigrants … are more likely to be working and interested in seeking citizenship in order to obtain advantages in the labor market, such as governmental jobs [and] to have relatives abroad for whom they are seeking immigrant visas." The large financial investment that goes into owning a home suggests intent of long-term residence or the establishment of new roots in the adopted home country (Jacoby, 2007). Finally, although many years of residency in the host country diminish social and emotional ties to the home country, the duration increases these bonds to the newly chosen country of residence (Waldorf, 1994). As such, duration of stay is a popular predictor of naturalization.

Although sojourn length is considered the strongest predictor of naturalization, education has particular significance. As previously noted, education is a vehicle for social mobility and opportunities for higher paying jobs. For naturalization, education improves the likelihood of immigrants acquiring citizenship, because it eliminates some barriers associated with the naturalization process. Educated immigrants can draw on their own personal resources. First, the application costs of naturalization have increased continually in the United States over the years, and educated immigrants can better afford these high fees. Second, education prepares immigrants for the civics and language tests, making the naturalization examination less daunting. Third, educated immigrants might be more aware of political changes that affect their noncitizen status.

When the state plays a small or no active role in integration and individuals' personal attributes are not conducive to assimilation, immigrant networks and civic organizations take up the mantle. In the context of the United States, "immigrant integration has historically occurred at the local level, primarily through the efforts of families, employers, schools, churches, and communities"

[7] Citizenship provides more opportunities and rights than permanent residency does. Beyond access to public goods and services mentioned previously, being able to apply for and sponsor the entry of family members into the United States is particularly important for many immigrants. Citizens may sponsor more categories of relatives, namely brothers and sisters, than noncitizens are permitted to sponsor.

(Meissner, 2007: i). The centrality of immigration networks in chain migration is widely noted (Massey, 1988; Waldorf, 1996; Waldorf, Esparza, and Huff, 1990). In addition to functioning in the migration decisionmaking process, these groups play a salient role in the settlement of newcomers. The role of immigration networks is ambivalent, however, because immigrant enclaves can act as promoters or as inhibitors of naturalization. As promoters of naturalization, these groups serve as vital resources of information and encouragement to acquire citizenship. Immigration networks reduce the costs of naturalization and doubts about the process by providing information and legal advice on naturalization; informing immigrant communities about changes in laws that may adversely affect noncitizens; preparing immigrants for the citizenship test by giving classes in U.S. civics and the English language; promoting the benefits of naturalization, such as the right to vote; and serving as a reference point of naturalized U.S. citizens. Rogers (2006) wrote about the mobilization of these groups in promoting naturalization to the Caribbean immigrant community in 1996, when laws were enacted to restrict permanent residents' access to social services and welfare benefits.

In contrast, acting as inhibitors of naturalization, immigrant enclaves decrease noncitizens' incentives to assimilate by precluding the acquisition of "host country skill accumulation" (Edin, Fredricksson, and Aslund, 2004: 134); that is, immigrant networks enable newcomers to operate relatively successfully in the host country without having to adjust culturally or linguistically. Immigrant enclaves also allow for the maintenance of allegiance to the country of origin and the fostering of subcultures, which at times can become threatening to natives (Verbon and Meijdam, 2008). Borjas' (1998) assessment of ethnic enclaves seems quite fitting here: The externalities from immigrant groups are either good or bad, depending on the quality[8] of the enclave, or, as we describe it in this article, the so-called "maturity" of the group.

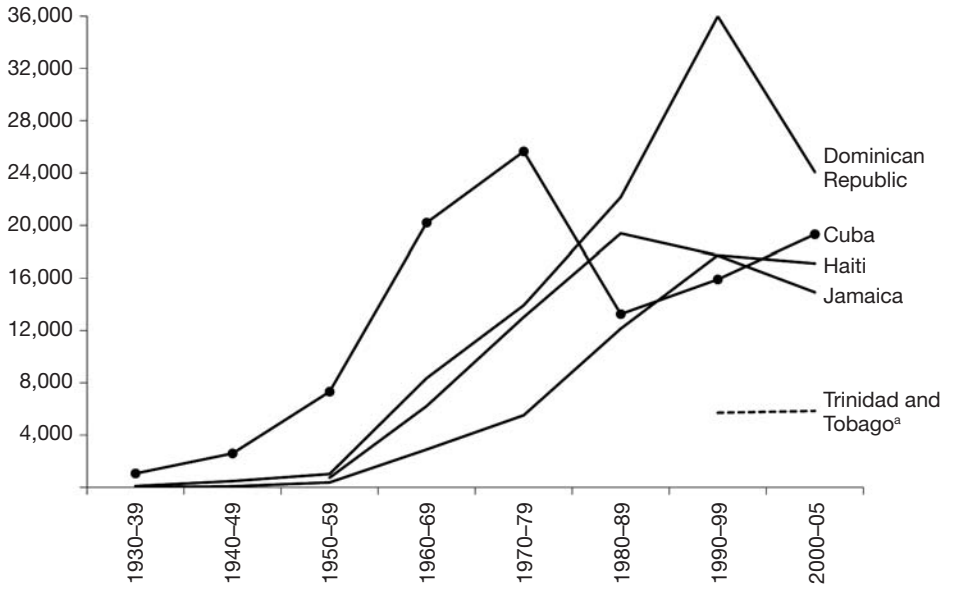
Caribbean Immigrants in the United States

Over the past 75 years, the number of immigrants from the Caribbean islands has been increasing significantly. As illustrated in exhibit 1, during the interwar years until the end of World War II, the number of immigrants originating from Cuba, Haiti, and the Dominican Republic that obtained legal, permanent status was quite low, less than 4,000 a year. After the enactment of the Hart-Cellar Act in 1965, the number of immigrants from most Caribbean countries began to increase significantly, increasing continually until the 1990s. The peak of Caribbean immigration in the 1990s corresponds to the passage of the Immigration Reform and Control Act in 1986, which regularized large numbers of undocumented migrants. In more recent years, especially following the terrorist attacks on September 11, 2001, the number of immigrants who obtained permanent residence tapered off. Immigrants from Trinidad and Tobago accounted for less than 10 percent of all immigrants from the Caribbean islands. Immigrants from Cuba constitute a special case, and their immigration status is different from requirements for immigrants from other Caribbean states. Most Cubans entered the United States as refugees, and the temporal trend for Cuban immigrants shown in exhibit 1 reflects the strained political relations that have existed between the United States and Cuba since the 1960s.

[8] Quality relates to the average skill level of the enclave. Skill level is measured by individuals' educational attainment.

Exhibit 1

Average Annual Number of People Obtaining Legal Permanent Resident Status by Selected Country of Last Residence, 1930 to 2005



[a] *The 1990–99 value for Trinidad and Tobago is estimated using information for 1996 to 1999.*

Source: U.S. Department of Homeland Security (2006)

Caribbean immigrants settle primarily in two traditional immigrant hubs—in Florida and in and around New York City. Florida has more than 1 million immigrants from the Caribbean, many of whom originate from Cuba, accounting for nearly 40 percent of all foreign-born people in the state. In the tristate area that includes the New York metropolitan area, New Jersey, and Connecticut (NY-NJ-CT tristate area), the absolute size of the Caribbean enclave is as big as in Florida, but the Caribbean immigrants in the tristate area account for only 20 percent of all foreign-born people in that area. In other traditional immigration hubs, such as California and Illinois, Caribbean immigrants account for a surprisingly low share (0.7 and 1.6 percent, respectively) of the foreign-born population. Although Florida has the strongest representation of Caribbean immigrants among its foreign-born population, it also is a special case because of the large number of Cuban refugees. In the remainder of this section, we focus exclusively on the NY-NJ-CT tristate area.

In New York, Kings County has the largest concentration of Caribbean immigrants, 312,075, followed by Bronx County, with 204,104, and Queens County, with 182,004. Counties in New Jersey and Connecticut host substantially smaller numbers of Caribbean immigrants; Hudson County, New Jersey, has the largest share, at 59,406. Looking at countries of origin individually, a slightly different picture emerges, because more than one-fourth of the immigrants from the Dominican Republic settle in New York County, New York, where they account for 82 percent of all Caribbean immigrants. In fact, the unusual concentration of Dominicans in New York County accounts for most dissimilarity in the location patterns of the four groups—immigrants from the Dominican

Republic, Jamaica, Haiti, and Trinidad and Tobago—across the 19 counties listed in exhibit 2. The dissimilarity index is highest for Dominicans and Haitians (DI = 0.6). Overall, however, collocation among immigrants from the various Caribbean islands is the norm, and the settlement patterns of immigrants from Haiti and Trinidad and Tobago are the most similar (DI = 0.19).

The literature indicates that Caribbean immigrants have low naturalization rates.[9] In particular, Rogers (2006) found that Afro-Caribbean noncitizens tend to have low to moderate, at best, naturalization rates, despite good education and high incomes that are traditionally associated with a higher likelihood of naturalization. Duration of stay remains positively associated with naturalization in the Caribbean immigrant experience, but only after extended periods of stay of 20 or more years. Furthermore, he found considerable variation among immigrant groups from different Caribbean countries of origin. It is obvious that, with the Caribbean immigrants, certain individual

Exhibit 2

Caribbean-Born Population, by Selected Countries of Birth, Rates of Naturalization, and Time of Entry

State and County	Number of Immigrants Born in—					Percent Naturalized Caribbean Immigrants by Time of Entry		
	Caribbean	Dominican Republic	Haiti	Jamaica	Trinidad and Tobago	1990–2000	1980–1989	Before 1980
New York								
Bronx	204,104	124,032	1,643	51,120	6,145	17.3	46.1	71.1
Kings	312,075	59,362	61,267	73,580	52,256	20.2	53.3	76.9
Nassau	42,649	8,844	11,793	12,861	3,507	21.4	58.0	79.5
New York	152,122	125,063	5,083	5,886	2,852	15.7	38.9	67.3
Putnam	434	51	50	133	51	20.0	46.4	83.6
Queens	182,004	59,444	27,212	47,145	26,255	21.0	52.3	77.9
Richmond	5,924	1,285	375	1,191	1,286	23.4	51.7	78.8
Rockland	14,931	3,587	8,217	2,130	184	21.2	50.6	70.8
Suffolk	23,891	8,041	4,716	5,371	2,437	20.9	50.0	74.1
Westchester	37,522	11,134	2,739	15998	1,607	19.0	49.1	76.4
New Jersey								
Bergen	19,890	6,669	669	4,420	1,675	20.2	55.6	84.2
Hudson	59,406	25,631	1,703	1,146	1,711	14.7	48.8	83.8
Middlesex	20,392	12,037	882	2,349	1,465	12.5	46.4	78.5
Monmouth	6,144	549	2,143	1,375	532	19.5	46.2	80.7
Ocean	2,188	449	66	615	228	41.3	53.7	80.8
Passaic	33,140	25,128	301	4,902	349	15.3	40.5	72.2
Somerset	3,554	798	222	1,359	204	14.0	55.6	88.1
Connecticut								
Fairfield	22,252	3,671	6,138	9,093	710	20.1	49.4	76.4
New Haven	7,591	2,276	407	3,186	431	20.5	50.8	74.8

Source: U.S. Census Bureau, 2000 census

[9] The Caribbean immigration rates are higher than the Mexican (Fix, Zimmerman, and Passel, 2001) and Canadian rates (Rumbaut, 1999), but they are lower than the Asian immigrant rates (Aleinikoff, 2000).

characteristics are necessary conditions for naturalization,[10] but they may not be sufficient conditions for acquiring citizenship.

In this article, we examine the role of neighborhood characteristics and network effects as they affect naturalization rates of immigrants from the Caribbean.[11] As shown in the right panel of exhibit 2, Caribbean migrants demonstrate wide variation in the naturalization rates across different locations in the NY-NJ-CT tristate area, even when controlling for time of entry. Not surprisingly, the data indicate that the longer the sojourn, the higher the rate of naturalization among Caribbean immigrants. Naturalization rates vary significantly across counties; for recent immigrants (year of entry between 1990 and 2000), the rates range from a low of 12.5 percent in Middlesex County, New Jersey, to a high of 41.3 percent in Passaic County, New Jersey. Naturalization rates increase for immigrants who entered the United States during the 1980s and the cross-county variation diminishes to a range of 15 percentage points. For immigrants who have been in the United States for more than 20 years (entry before 1980), citizenship is almost the norm, exceeding 70 percent. New York County is an exception; only 63 percent of long-term Caribbean immigrants have acquired citizenship. A moderate relationship (r = +0.39) exists between the naturalization rates of recent immigrants and immigrants who entered during the 1980s, but no connection exists between the naturalization rates of recent immigrants and immigrants who entered before 1980 (r = +0.08).

Comparing settlement patterns with naturalization rates highlights some interesting linkages. In general, a negative relationship exists between the counties' number of Caribbean immigrants and the naturalization rate. The data also indicate that the counties with a dominant Dominican presence have low naturalization rates. For example, consider New York and Passaic Counties, where Dominicans account for more than 75 percent of the Caribbean immigrant enclave. Naturalization rates in those counties are the lowest among all other counties for all categories of entry, except for immigrants entering Passaic County in the 1990s. These data tentatively suggest that Dominicans naturalize at a lower rate than do other Caribbean immigrants, perhaps because of the large size of their immigrant enclaves, the maturity of the enclaves, or even the difference in native and host languages.

Empirical Analysis

The preliminary evidence from the analysis discussed previously hints at the size and maturity of immigrant enclaves as factors playing a role in the rates of naturalization among Caribbean immigrant groups. We now rigorously test our hypothesis that the immigrant's propensity to naturalize is related to neighborhood characteristics and networks for assistance and information; that is, related to the size and maturity of the immigrant enclave in the immigrant's neighborhood.

[10] To qualify for naturalization, an immigrant must be a resident of the United States for at least 5 years, be economically endowed to pay the application fee, and be knowledgeable about U.S. civics and English to pass the examination.

[11] The effects of neighborhoods have been studied in various contexts, such as problem behaviors and health-related outcomes, violence, and poverty. For a detailed literature review on the topic, see Sampson, Morenoff, and Gannon-Rowley (2002).

Data

We used a sample of foreign-born people from the 2005 ACS, extracted from the Integrated Public Use Microdata Series (IPUMS) database of the Minnesota Population Center, and applied several selection criteria. The sample includes only people who were born in the Dominican Republic, Haiti, Jamaica, or Trinidad and Tobago and who were residing near New York City as of 2005. The sample area covers all of New Jersey and Connecticut as well as New York Public Use Microdata Areas (PUMAs)[12] that belong to the New York metropolitan area. For this analysis, our criteria required the survey data to apply to people who had resided in the United States for at least 7 years. This constraint ensures that immigrants included are indeed eligible for citizenship. Seven years is a somewhat arbitrary cutoff, because no universal minimum sojourn length exists for citizenship eligibility.[13] Our criteria required that, at the time of immigration, the selected people were at least 18 years of age, which ensured that the respondents experienced most of their upbringing outside the United States and could not have obtained citizenship as dependents of their parents. In total, the data set includes n = 4,517 observations.

Exhibit 3 shows the definitions and summary statistics of the variables in this study. The variable of interest is the person's citizenship status, categorized as a binary variable with "1" indicating that the respondent is naturalized. Overall, 62 percent of the sampled immigrants are naturalized. Exhibit 3 also shows means and standard deviations of the explanatory variables for the entire sample, as well as for the two subsamples defined by immigrants' citizenship status.

The pivotal explanatory variables are the immigrant enclave's size and maturity. The size of the ethnic enclave is defined as the number of immigrants of the same nationality as the respondent living in the respondent's neighborhood. The neighborhood is defined at the PUMA level.[14] The enclave's maturity is its aggregate level of assimilation as proxied by the percentage of immigrants living in the same neighborhood (PUMA) who are already naturalized. On average, immigrants live in neighborhoods where their ethnic enclave comprises 11,192 immigrants and where 53 percent of their ethnic community has taken on U.S. citizenship. People in the subsample of naturalized immigrants, however, tend to live in smaller but more mature ethnic enclaves than do immigrants who are not naturalized.

We also controlled for a battery of additional variables. The variables can be assigned to four types. First, we accounted for information that specifically affects an immigrant population, namely the immigrant's place of birth, the immigrant's length of stay in the United States, English language proficiency, and whether the respondent speaks English at home. Comparing the averages for the

[12] PUMAs, as defined by the Census Bureau, are areas with at least 100,000 residents. A county with a population of more than 200,000 is divided into more than one PUMA. For smaller counties, a PUMA may be a whole county or groups of counties in the same state. For a delineation of PUMAs, see http://www.census.gov/geo/www/maps/puma5pct.htm.

[13] Migrants who entered on temporary visas or who were undocumented for some time of their sojourn may need to stay in the United States for many years before becoming eligible for naturalization. The required 5-year sojourn before naturalization takes into account only those years during which the immigrant had a permanent residence permit (green card).

[14] We recognize that the PUMA is not an ideal operationalization of the category "neighborhood," because its delineation is void of any social and behavioral components that are relevant in neighborhood formation; however, published information for georeferencing census respondents is very limited, and the PUMA is the smallest spatial scale available.

Exhibit 3

Variable Definitions and Descriptive Statistics

Variable	Definition	Full Sample (n=4,517)				Subsample: Noncitizens		Subsample: Citizens	
		Minimum	Maximum	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation
Dependent variable									
citizen	Citizen: 1 = yes, 0 = no	0	1	0.624	0.484				
Immigration-related variables									
tnt[a]	From Trinidad and Tobago: 1 = yes, 0 = no	0	1	0.107	0.309	0.109	0.312	0.106	0.307
haiti[a]	From Haiti: 1 = yes, 0 = no	0	1	0.154	0.361	0.115	0.320	0.177	0.382
jam[a]	From Jamaica: 1 = yes, 0 = no	0	1	0.369	0.483	0.298	0.458	0.412	0.492
sojourn	Number of years in the United States	7	78	22.058	10.405	17.675	8.723	24.695	10.448
engl	Speaks English at home: 1 = yes, 0 = no	0	1	0.472	0.499	0.407	0.491	0.511	0.500
poorengl	Speaks English poorly or not at all: 1 = yes, 0 = no	0	1	0.251	0.434	0.374	0.484	0.177	0.382
Other personal attributes									
age	Age (years)	18	92	50.450	14.169	47.336	13.721	52.324	14.107
female	Female: 1 = yes, 0 = no	0	1	0.593	0.491	0.570	0.495	0.606	0.489
married	Married: 1 = yes, 0 = no	0	1	0.516	0.500	0.466	0.499	0.546	0.498
white	White: 1 = yes, 0 = no	0	1	0.102	0.303	0.128	0.335	0.086	0.281
lths[b]	Less than high school diploma: 1 = yes, 0 = no	0	1	0.276	0.447	0.361	0.480	0.226	0.418
bsplus[b]	Bachelor's degree: 1 = yes, 0 = no	0	1	0.158	0.365	0.100	0.300	0.193	0.395
Family attribute									
income	Family income as % of poverty threshold	0	501	282.831	158.594	245.934	149.416	305.035	159.841
Neighborhood characteristics									
size	Size of enclave: number of same origin residents at PUMA level	40	67,492	11,192	14,421	12,473	15,651	10,422	13,573
mature	Enclave maturity: % of enclave naturalized	0	1	0.533	0.180	0.464	0.161	0.575	0.178
highdens	> 5 families in structure: 1 = yes, 0 = no	0	1	0.436	0.496	0.513	0.500	0.390	0.488

PUMA = Public Use Microdata Area.

[a] *Reference group: Dominican Republic.*

[b] *Reference group: high school diploma or some college education.*

two subsamples suggests that naturalized immigrants have been in the United States about 7 years longer than immigrants without citizenship and that they are more likely to speak English at home (the difference amounts to about 10 percentage points, which is statistically significant). More than one-third (37 percent) of the noncitizens speak English poorly or not at all, compared with about 17 percent of people who have obtained U.S. citizenship. Both percentages are remarkably high considering that all sampled immigrants have lived in the United States for at least 7 years and, in the case of naturalized immigrants, have passed the English language test for the naturalization examination.

Second, we accounted for traditional personal characteristics, namely age, sex, marital status, race, and educational attainment. It is worth noting that naturalized immigrants are significantly more likely to have a college degree than are immigrants without citizenship, and naturalized immigrants are about 5 years older, on average, than are immigrants who are not naturalized. In both subsamples, women outnumber men, but the percentage of women among the naturalized immigrants is slightly higher than it is among women without U.S. citizenship. Married immigrants form the majority among naturalized immigrants but not among people who have not acquired U.S. citizenship. The difference in proportions amounts to a statistically significant 8 percentage points.

Third, we added a family variable, income, that indicates the economic power of the respondent's family. The income variable is expressed as a percentage of the poverty threshold. Although the average family income in both subsamples far exceeds the poverty threshold, the average family income of naturalized citizens is 24 percent higher than is the average family income of people who are not naturalized.

Fourth, in addition to the enclave's size and maturity, we added another neighborhood variable that measures the neighborhood's density, proxied by a dummy variable that indicates whether the respondent lives in a building with more than five families. Overall, 44 percent of the respondents live in high-density neighborhoods. The percentage, however, is substantially higher for immigrants without U.S. citizenship than it is for naturalized immigrants.

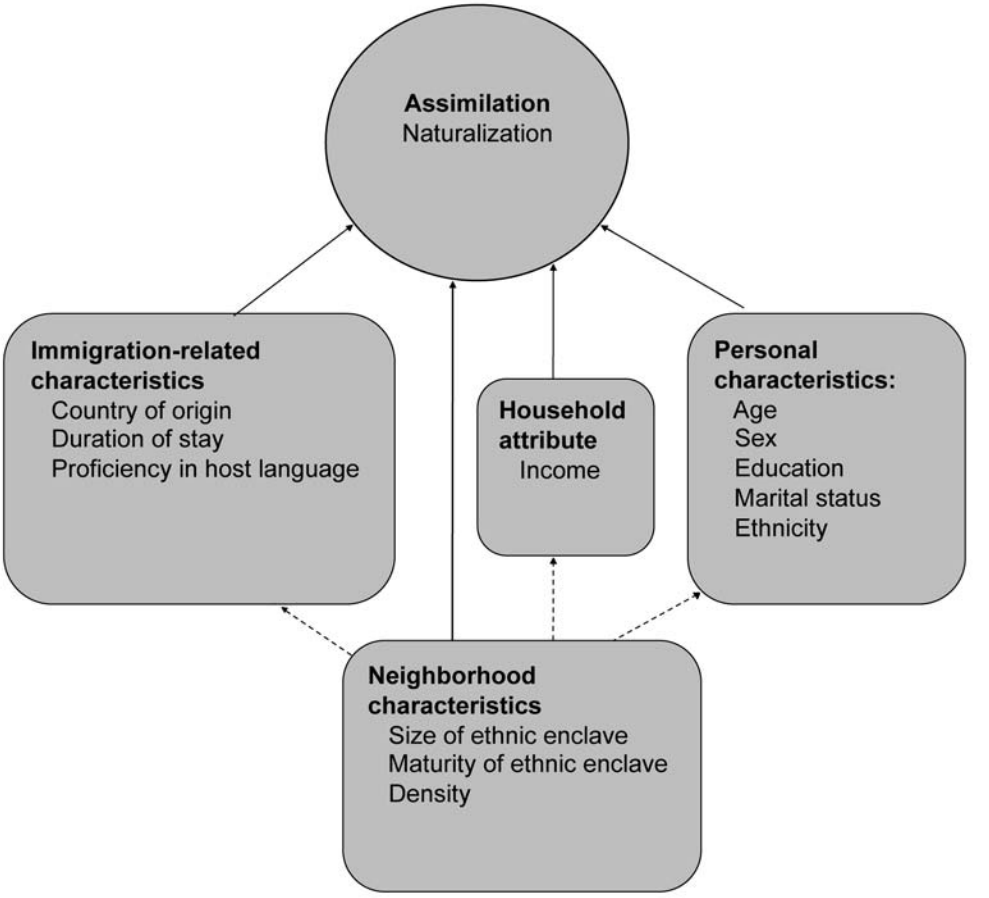
Methodology

The conceptual linkages underlying the citizenship model are summarized in exhibit 4. Naturalization, taken as an indicator of an immigrant's assimilation into the host society, is portrayed as a function of immigration-related characteristics, personal and household attributes, and, most important, neighborhood characteristics. We hypothesize that the influence of neighborhood characteristics, in particular the enclave's size and maturity, has a direct influence on assimilation. In addition, the influence of neighborhood characteristics may be mediated by other variables.

We use a series of binary choice models, in which the dependent variable indicates whether the immigrant is naturalized, for our estimates. The first model is a base model that expresses citizenship status as a function of the immigrant enclave size and maturity while controlling for the effects of all immigration-specific variables, other personal attributes, and family income. Note that the effect of sojourn length is allowed to be nonlinear. The subsequent models also include important interaction terms. Model 2 includes the interaction between enclave size and enclave maturity; model 3 accounts for possible joint effects of neighborhood characteristics and educational

Exhibit 4

Determinants of Immigrants' Assimilation



attainment; and model 4, the most comprehensive model, accounts for interactions between the two enclave characteristics and the interaction between enclave characteristics and educational attainment. All models are estimated as logit models, with observations weighted by *person weights*, as provided by the ACS.

Results

The results of the estimations, summarized in exhibit 5, show that, overall, the models perform well and support the notion that neighborhood characteristics affect immigrants' propensity to naturalize. Before discussing the effect of neighborhood characteristics in detail, we first focus on the influence of personal characteristics and begin with a few general observations that provide a consistent profile of immigrants' choice to acquire citizenship. Surprisingly, immigrants' national origin is only a weak predictor of naturalization rates. No significant difference exists between the

Exhibit 5

Estimation Results[a] (1 of 2)

	Model 1			Model 2			Model 3			Model 4		
	b	Standard Error		b	Standard Error		b	Standard Error		b	Standard Error	
constant	– 5.052	0.444	***	– 7.323	0.857	***	– 4.746	0.540	***	– 6.797	0.920	***
Immigration-related variables												
tnt	– 0.167	0.248		– 0.130	0.252		– 0.151	0.248		– 0.120	0.251	
haiti	– 0.317	0.164		– 0.233	0.168		– 0.308	0.162	*	– 0.233	0.165	
jam	– 0.190	0.239		– 0.116	0.244		– 0.178	0.239		– 0.112	0.244	
sojourn	0.138	0.017	***	0.137	0.017	***	0.139	0.017	***	0.138	0.017	***
sojourn-sq	– 0.001	0.000	***	– 0.001	0.000	***	– 0.001	0.000	***	– 0.001	0.000	***
engl	– 0.207	0.214		– 0.215	0.217		– 0.224	0.214		– 0.232	0.217	
poorengl	– 0.800	0.132	***	– 0.811	0.131	***	– 0.810	0.131	***	– 0.820	0.130	***
Other personal attributes												
age	0.011	0.004	***	0.011	0.004	***	0.012	0.004	***	0.012	0.004	***
female	0.505	0.089	***	0.505	0.090	***	0.499	0.089	***	0.501	0.090	***
married	0.371	0.089	***	0.376	0.090	***	0.371	0.090	***	0.374	0.090	***
white	– 0.088	0.139		– 0.070	0.138		– 0.082	0.138		– 0.066	0.138	
lths	– 0.429	0.106	***	– 0.434	0.106	***	– 0.584	0.770		– 0.590	0.799	
bsplus	0.374	0.141	***	0.365	0.142	***	– 1.397	1.014		– 1.367	1.063	
Family attribute												
income	0.001	0.000	***	0.001	0.000	***	0.001	0.000	*	0.001	0.000	***
Neighborhood characteristics												
size	0.061	0.034	*	0.343	0.100	***	0.043	0.046		0.299	0.106	***
mature	3.990	0.278	***	8.386	1.383	***	3.700	0.343	***	7.633	1.405	***
highdens	0.071	0.095		0.045	0.096		0.065	0.096		0.044	0.097	

Exhibit 5

Estimation Results[a] (2 of 2)

	Model 1		Model 2			Model 3			Model 4		
	b	Standard Error	b	Standard Error		b	Standard Error		b	Standard Error	
Interaction terms											
size*mature			– 0.557	0.183	***				– 0.502	0.186	***
lths*size						0.033	0.072		0.025	0.075	
bsplus*size						0.032	0.099		0.027	0.103	
lths*mature						– 0.298	0.595		– 0.165	0.623	
bsplus*mature						2.966	0.924	***	2.977	0.988	***
Wald	655.980		682.430			641.980			661.690		
Log pseudo-likelihood	– 2422		– 2417			– 2413			– 2409		
Pseudo-R2	0.205		0.206			0.208			0.209		

[a] *The dependent variable is* citizen.

*The asterisks identify significance at the 0.01, 0.05, and 0.10 levels using ***, **, and *, respectively (based on robust standard errors).*

The number of observations is (n=4,517).

naturalization rates of immigrants from the Dominican Republic and immigrants from Jamaica or Trinidad and Tobago. For Haitians, model 3 suggests that naturalization rates are significantly lower than they are for immigrants from the Dominican Republic, but the magnitude of the effect is small. What is of pivotal importance, however, is the effect of immigrants' sojourn length on naturalization rates. The propensity to be naturalized increases with increasing length of stay in the United States, but the propensity is at a decreasing rate. Whether an immigrant speaks English at home is not a significant predictor of citizenship. English proficiency, however, is salient for naturalization. In fact, the models predict that the odds of having acquired U.S. citizenship are more than twice as high for people who are proficient in English (poorengl=0) than they are for immigrants who speak English poorly or not at all.

The key demographic predictors of assimilation—sex, marital status, and education—strongly influence immigrants' propensity to be naturalized. Specifically, the odds of having adopted U.S. citizenship are estimated to be about 1.6 times higher for women than they are for men and 1.4 times higher for married immigrants than they are for their unmarried counterparts. Both estimates are surprisingly stable across the four model specifications. Models 1 through 4 also suggest that immigrants with less education (less than a high school diploma) have significantly lower naturalization rates than do more educated immigrants. In contrast to the finding by Rogers (2006), race does not influence naturalization rates.[15] Finally, the income variable is significant, and the propensity to be naturalized increases with increasing income.

Regarding the effects of neighborhood characteristics, we find that the ethnic enclave maturity is a powerful predictor of naturalization rates. Based on model 1, the estimated marginal effect suggests that a 1-percent increase in the maturity level raises the propensity of being naturalized by more than 0.9 percent. After inclusion of the interaction between the two enclave characteristics in model 2, enclave maturity remains a powerful predictor. Exhibit 6 shows the effect of enclave maturity on naturalization propensities for Dominican immigrants.[16] For very low levels of enclave maturity, the probability of being naturalized is less than 10 percent. The likelihood of naturalization increases to about 30 percent in neighborhoods with an average maturity level and reaches about 60 percent in highly mature enclaves.

Model 1 is insufficient to understand the effect of enclave size on naturalization propensities. It only weakly suggests that enclave size affects immigrants' propensities to become U.S. citizens and that the estimated effect size is small. After the interaction between the two enclave characteristics is accounted for (model 2), it becomes apparent that enclave size plays a highly significant role for naturalization propensities and that the direction of the effect varies, depending on the level of enclave maturity. As exhibit 7 shows, in neighborhoods with low levels of enclave maturity, natu-

[15] Rogers (2006) categorized Afro-Caribbean immigrants as Blacks from English-speaking Caribbean countries, such as Jamaica and Trinidad and Tobago, and considered immigrants from the Dominican Republic to be Latinos. The study's findings may thus suggest variations in naturalization rates by national origin rather than by race.

[16] The estimated probabilities shown in exhibit 6 refer to 40-year-old male, unmarried, non-White immigrants from the Dominican Republic who have been in the United States for 10 years, speak English well but do not speak English at home, have an average income, and do not have a high school diploma.

Exhibit 6

Probability of Being Naturalized as a Function of Enclave Maturity

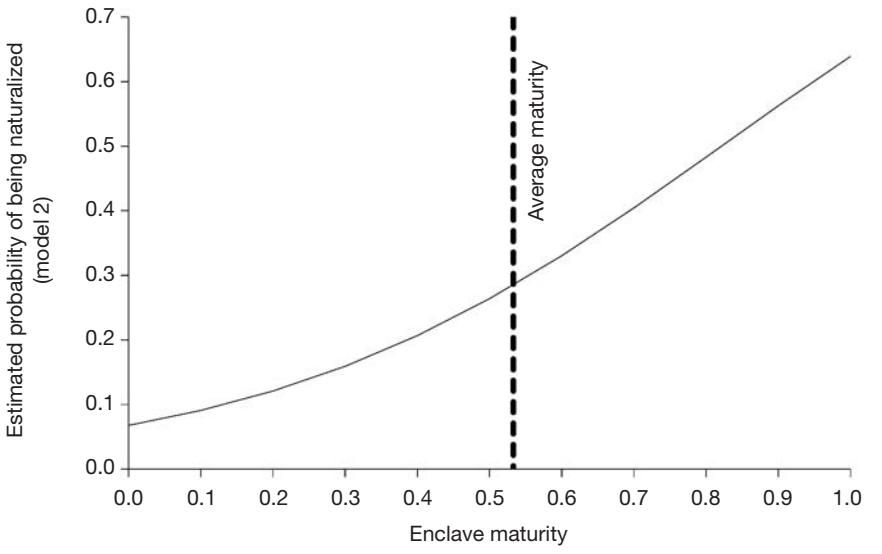
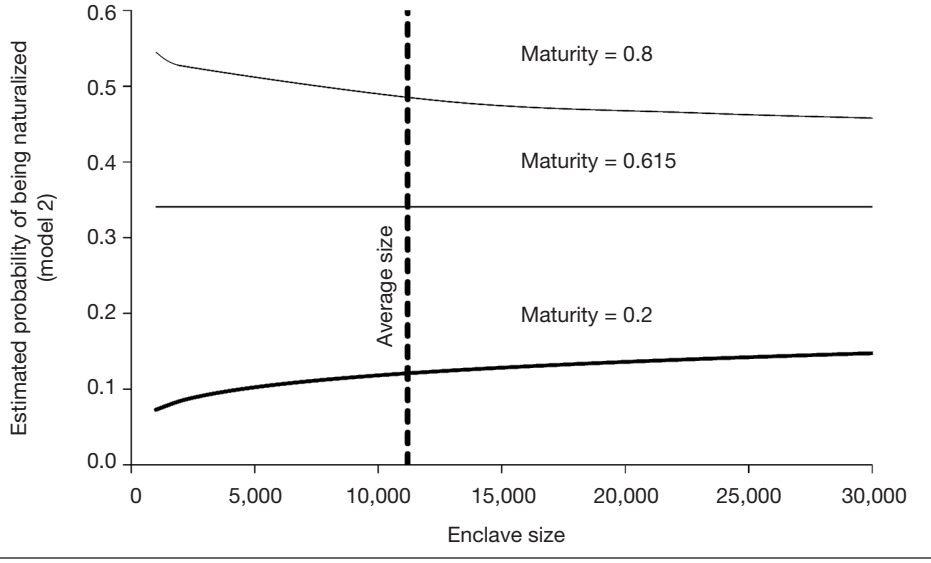


Exhibit 7

Probability of Being Naturalized as a Function of Enclave Size and Maturity

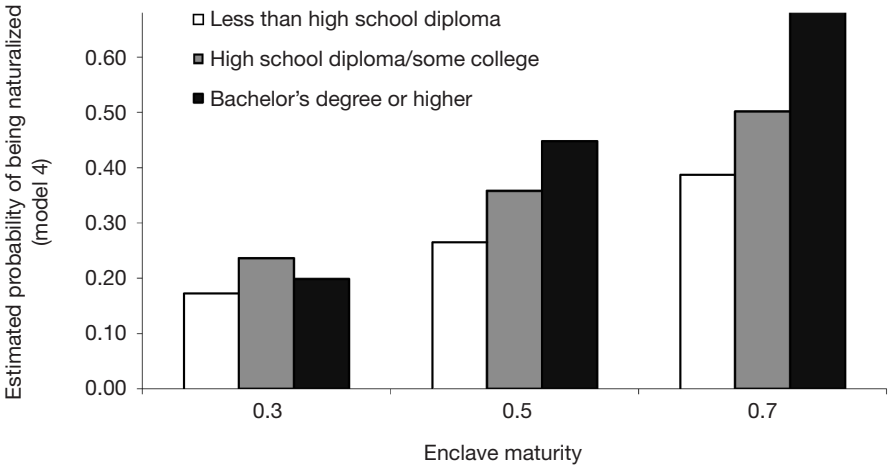


ralization rates increase with enclave size.[17] In contrast, in neighborhoods with a highly assimilated enclave, the probabilities of being naturalized are higher, but the enclave size has a detrimental effect on naturalization propensities. For neighborhoods with a medium level of maturity (maturity ≈ 0.6), the enclave size has no effect on naturalization rates.

Models 3 and 4 address the differential effect of enclave characteristics across educational attainment levels. Regardless of whether the interaction between enclave characteristics is taken into account, the results suggest an intricate interplay between education and enclave maturity. The mosaic of effects requires a more detailed disentanglement. Using model 4, exhibit 8 shows the estimated joint effects of changing enclave maturity and immigrants' educational status on their probability of having acquired U.S. citizenship. Again, the probabilities refer to Dominican immigrants, as specified in footnote 16. The immigrant enclave maturity and the immigrant educational attainment level are varied. Exhibit 8 shows that whether the most highly educated immigrants have the highest probabilities of being naturalized depends on the enclave maturity. In neighborhoods with very low enclave maturity, the probabilities are smaller for highly educated immigrants than they are for immigrants with a high school degree only. Exhibit 8 shows that, independent of educational attainment level, the probability of being naturalized goes up with increasing enclave maturity. Most important, this relationship between increasing naturalization rates and increasing enclave maturity is least pronounced for poorly educated immigrants. This somewhat troublesome result suggests that assimilation aid provided by the immigrant enclave benefits immigrants unevenly, favoring the highly educated rather than favoring immigrants who are most in need of assimilation aid.

Exhibit 8

The Joint Effect of Enclave Maturity and Education on Naturalization Rates



[17] The estimated probabilities shown in exhibit 7 refer to Dominican immigrants with attributes as specified in footnote 16. Enclave maturity and size vary.

Discussion and Conclusions

In this article, we examined the effect of neighborhood on naturalization rates. Specifically, we estimated a series of logit models with immigrant enclave characteristics (size and maturity) as key explanatory variables. We found that *who they are* and *where they live* substantially affect immigrants' propensities to have acquired U.S. citizenship, which is unlikely for recent arrivals and for people who speak English poorly or not at all, are poorly educated, and have a low income. Living in a neighborhood with a well-assimilated immigrant enclave enhances the chance of acquiring U.S. citizenship. Whether the immigrant enclave size has a beneficial effect on naturalization rates, however, depends on how well the enclave is assimilated. In well-assimilated enclaves, increased enclave sizes reduce the probability of naturalization. In poorly assimilated enclaves, enclave size has a positive effect on immigrants' propensities to become U.S. citizens.

Our findings also suggest that the meaning of immigrant enclaves for the individual's assimilation changes with education. We found that enclave maturity plays a bigger role for highly educated immigrants than it does for poorly educated immigrants and, thus, misses the more vulnerable immigrant population segments. The implications for the United States, where integration assistance is left to immigrant communities and local civic organizations, are troublesome. Not only can this strategy backfire to the extent that immigrants remain unassimilated, but it also implies that less-educated immigrants are at risk of being left behind. The government, therefore, should introduce programs that make easily accessible classes available to promote integration.[18] These courses should be geared toward improving immigrants' English language and vocational skills, which will expand their employment opportunities and earning potential and, ultimately, increase their propensity to naturalize. We do not suggest that network activities at the local level be replaced by government services; our research indicates that mature enclaves do positively affect naturalization rates for all immigrant population segments. Government services should be complementary to the existing aids in the integration process, not a substitute, as is the current practice. In this way, government programs act as a safety net that catches immigrants who do not reside in neighborhoods with mature ethnic enclaves.

A new focus on governmental integration support gains additional importance in light of recent developments that raised the bar for immigrants' naturalization in the United States. Fees have increased and the examination has been redesigned to require a better command of English and cognitive ability (Fix et al., 2008), thus putting naturalization farther out of the reach of immigrants who were unable to afford it economically before and who are less educated and have less proficiency in English.

Although this article attempts to analyze the role of neighborhood effects on rates of naturalization, the results are limited. This research would benefit from longitudinal data with the year in which citizenship was acquired and an immigrant's location before and after becoming a citizen.

[18] Americans can learn from the German integration initiative. Germany's Federal Office for Migration and Refugees is a clearinghouse for integration services provided by state and nonstate groups to immigrants. A similar agency in the United States would be useful for immigrants to access information on the naturalization process and gain assistance in preparing for the examination.

Such data would give a clearer understanding of the actual timing of the citizenship decision and the locational and personal attributes at the time of the decision. The complicated timelines of immigrant histories make it difficult to infer the proper causalities from cross-sectional data. The availability of such data would also enable researchers to take important sorting effects (Borjas, 1998) into account and investigate the possible interdependence of naturalization and neighborhood choice. In the absence of such data, future research should expand the analysis by including data from earlier years to complement the cross-sectional analysis with a synthetic cohort approach that might shed additional light on the relationship between the timing of the naturalization decision and neighborhood attributes.

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Recent Immigration: The Diversity of Economic Outcomes in Metropolitan America[1]

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Abstract

Immigration to the United States is a hotly debated political topic that also generates considerable academic study. Studies routinely examine subnational areas to take advantage of the widely varying local concentrations of immigrants. Yet their conclusions are wide ranging. One reason why the regional influence of immigrants is so hard to assess is the varied economic responses that can occur. For example, in response to an influx of recent immigrants, natives and previous immigrants may out-migrate to produce no net effect on total labor supply and, hence, no net effect on employment or wages. Moreover, differences in industry composition, amenities, and housing stocks can lead to heterogeneous labor market effects of immigration across regions. Using county- and metropolitan area-level data, this study examines the effects of recent immigration on U.S. metropolitan labor market outcomes, such as internal migration, wages, labor force participation, and housing costs. Using instrumental variables estimation, the study detects large net out-migration responses of nonimmigrants to recent immigration. The analysis also finds that recent immigration has heterogeneous effects across different-sized metropolitan areas. Finally, the study detects threshold effects beyond which nonimmigrants become more responsive to immigration.

[1] The authors presented an earlier version of this article at the 55th North American Regional Science Association Meetings, New York, New York; the 48th Western Regional Science Association Meetings, Napa Valley, California; and the 2009 Annual Meeting of the Association of American Geographers, Las Vegas, Nevada.

Introduction

Immigration has become a hot-button issue in most advanced economies. A widely held view in many quarters is that immigrants take jobs away from native workers, create crime, and place burdensome demands on public services (for related discussion, see Borjas, Grogger, and Hanson, 2006; Cutler, Glaeser, and Vigdor, 2007). Others point to favorable aspects of immigration, including providing new labor supply, attracting needed residents to declining communities, and providing a source of new ideas and innovation (Chellaraj, Maskus, and Mattoo, 2005). Not surprisingly then, the controversy surrounding immigration has drawn renewed academic attention regarding its effect on labor and housing markets (Borjas 2003, 2005; Card, 2001; Card and DiNardo, 2000).

Regarding the overall national labor market effects of immigration, Borjas (2003, 2005) argued that a 10-percent increase in immigration reduces the wages of low-skilled workers by 3 to 4 percent. Most of the literature, however, argues that immigration has a very small effect on native workers' wages (Card, 2005). Rather than examining national effects, recent studies have primarily appraised the so-called "area" effects of immigration by examining its effects on local labor markets. These studies examine whether wages of native workers in areas that have received more immigrants have responded differently than areas that have not received as many immigrants (Borjas, 2005; Card, 1990). The studies have produced varied findings, however, although most tend to find very little effect on wages and very little offsetting migration behavior of native-born residents (for example, Card, 2005; Peri, 2007).

Area studies face a host of complexities that complicate discerning the effects of immigration. The major complexity perhaps is whether native workers migrate elsewhere in response to immigrants, which would diffuse the labor market effects across the country (Borjas, Freeman, and Katz, 1997; Frey, 1995). To the extent that immigrants depress local wages, native workers would have incentives to relocate to different areas. A critical factor then is the degree of substitutability between immigrants and native workers. So, studies in recent years have focused on the effects of immigration on particular education/experience cohorts (Borjas, 2003; Card and Lewis, 2005) to assess the degree of substitutability between immigrant and native workers. A general finding is that immigration has relatively small effects on even the most directly affected workers, such as native high school dropouts (Card, 2005), although research by Borjas (2003, 2005) is a notable exception.

Card and Lewis (2005) noted that one explanation for the relatively small area effects for native workers is that immigration has widespread effects beyond those with low skill levels in the local area. This point motivated Ottaviano and Peri (2005) and Peri (2007) to consider how low-skilled immigrants may even be complementary for a wide range of higher skilled native workers. Immigrants bring different cultures, skills, and languages than those possessed by natives. Ottaviano and Peri contended that too much emphasis had been placed on the income distribution effects of immigrants, with the focus on the wages of low-skilled versus high-skilled cohorts. Rather, they argued that more attention should be paid to the *aggregate* effects to reflect these complementarities. Consistent with low-skilled immigrants being complementary to higher skilled native workers,

their findings suggest that an 8-percent increase in immigration reduces the wages of native high school dropouts by about 2 percent, but *overall* wages of native workers increase by 2 percent.

An aggregate focus seems prudent for understanding the widespread angst that many native residents—even those who appear only tangentially affected in the labor market—feel regarding immigration. Recent studies found that immigrants have wide-ranging effects on local housing markets (Glaeser and Gyourko, 2005; Saiz, 2003), public service provisions such as schools, and possibly crime, as previously mentioned. Thus, all residents may be affected by recent immigrants, which could alter their residential location decisions within and between urban areas.

Our point of departure is that if immigrants have such far-sweeping socioeconomic effects within and between metropolitan areas, assessments of aggregate outcomes would help inform the overall adjustments that are taking place within local communities. With the weaker economy during the current decade and the fact that immigrants are becoming a larger share of the workforce, it is also possible that immigration's influence differs from that in past decades; that is, rather than having very little effect as in the past, the effect may become more important as immigration levels cross certain thresholds.

Perhaps more important is the possibility that, given the differences in geographic location, industry and skill compositions, urbanization, and so forth, immigration has heterogeneous effects across different metropolitan areas. Partridge et al. (2008a) found that immigration has diverse effects across the country, with the Eastern United States having a more favorable link between immigration and job growth.[2] Indeed, given differing housing markets and access to jobs, distinctive effects may even exist *within* given metropolitan areas, such as between the suburbs and the central city. For example, as reported in the 2000 census, although the percentage of the population that was foreign born in the Chicago metropolitan area was 16 percent, it varied from 20 percent in Cook County (22 percent in the city of Chicago) to 1.5 percent in suburban Jasper County. Only considering aggregate-metropolitan area-level analysis as done in the past literature may be obscuring important *intrametropolitan area* effects. Such disparate patterns within and between metropolitan areas could explain why the relative political support for immigration can vary greatly by place.

Therefore, this study examines the effect of immigration on economic outcomes across and within U.S. metropolitan areas. Within metropolitan areas, the study differentiates central city from suburban responses to immigration. Given the need to understand the effects of immigration on existing residents, it stresses their response to recent immigration. It also considers heterogeneous responses across different-sized metropolitan areas, between high- and low-immigrant destinations, and the eastern and western regions of the nation. Finally, because the past literature has generally examined the effects of immigration at the aggregate metropolitan level, we compare our within-metropolitan area (county) results to aggregate metropolitan area results to show some key labor market adjustments missed in the past literature. The results point to heterogeneous responses that show how immigration has more complex implications than previously assumed.

[2] Past small area studies have tended to focus on the effects in high-immigration areas, such as California or Miami (Borjas, 2005; Card, 1990; Peri, 2007).

In the remainder of this article, the section on past research and theory describes the model used in the study, followed by the section on empirical implementation. The next section presents the empirical results, which is followed by a section containing summary and concluding thoughts.

Past Research and Theory

Immigration has been modeled in numerous ways, but this study focuses on models that inform econometric efforts. Card's (2001) model has become a workhorse for assessing the effects of immigrants on local labor markets. It is based on an aggregate production function that allows for substitutability between different labor-skill cohorts. Card specified a constant elasticity of substitution production function for a single good, which implies a common elasticity of substitution between occupation/skill cohorts. He showed that wages in occupation or skill cohort *j,* city *c* depend on the foreign worker employment share f_{jc}, fixed effects for city *c* (u^w_c), and fixed effects for occupation *j* (u^w_j). Likewise, he also showed that the native labor-force participation function for cohort *j* (N_{jc}/P_{jc}) also is a function of the same variables (where P_{jc} is the native population). The wage and labor-force participation equations Card used for estimation can be written as:

$$\log w_{jc} = u^w_c + u^w_j + d_1 f_{jc} + e^w_{ij}, \quad (1)$$

$$\log (N_{jc}/P_{jc}) = u^N_c + u^N_j + d_2 f_{jc} + e^N_{ij}, \quad (2)$$

where *e* is the residual. The regression coefficient on the foreign worker share *d* reflects how wages and native labor force participation are affected by changes in immigration.

Ottaviano and Peri (2005) argued that a key disadvantage of the common form of Card's model is that it assumes a common elasticity of substitution between all skill cohorts. In particular, they noted that, (1) even within the same skilled cohort, immigrants and native workers may not be perfect substitutes, and (2) it is quite plausible that, across cohorts, immigrants and native workers may be complements (for example, immigrant high school dropouts and native college graduates). Thus, in trying to assess aggregate labor market outcomes, simply aggregating the various *within*-cohort effects may lead to a form of aggregation bias.[3] Further reinforcing this effect, as noted previously, when one considers that immigration possibly affects a host of offsetting factors outside the labor market, including government services and quality of life, examining particular subgroups in isolation may further give a misleading picture of the role of immigrants on aggregate-native migration patterns.

To provide a more generalized assessment of immigration, then, the framework of this study starts with a model developed by Borjas (2003, 2005). His model differs from the one just described; it directly focuses on how existing-resident migration patterns respond to new immigrants. The key feature is that increases in labor supply, whether from foreign or domestic sources, reduce

[3] Industry composition may change in response to local businesses anticipating more immigrant inflows; for example, food processors may expand in high-immigrant receiving areas or areas with high concentrations of low-skilled workers in general. Yet, Card and Lewis (2005) and Card (2005) found that no more than about 25 percent of relative difference in the shares of high school dropouts across regions can be explained by between-industry composition differences, while at least 75 percent is due to within-industry differences in high school dropout employment shares.

local wages. The decline in wages induces net out-migration until nominal wages are equalized across locations and the long-run equilibrium is restored. For example, when assuming native and immigrant labor are nearly perfect substitutes, an influx of immigrants produces a correspondingly equal (net) out-migration of native workers and past immigrants. In the medium to long term, the offsetting net out-migration implies that local wages are not affected, unemployment (or employment) rates are unchanged, and long-term population growth is unaltered.

Aside from native worker out-migration, if natives and immigrants are nearly perfect substitutes, the local labor market would then appear to be unaffected by a surge in recent immigrants. For this reason, Borjas' model can explain why past studies tend to find that influxes in immigration have little effect on local labor markets (for example, Card's 1990 study of the influence of Mariel Boatlift on Miami). Indeed, Partridge and Rickman (2006) found almost one-for-one offsetting native out-migration in response to new immigrants when considering counties of metropolitan areas. Note that, although local labor markets may appear to be *relatively* unaffected by immigration, in this formulation the net out-migration of native workers spreads the labor market effects of immigration across the country until the spatial equilibrium is restored. Although Borjas' approach may more accurately represent regional labor market dynamics, it may still be too narrowly focused on particular labor market interactions.

In this study, we use Borjas' labor market model and also extend it to consider immigrant effects that occur outside the labor market. Following Borjas (2005), we write labor demand for location *i* (which can be a county or metropolitan area), period *t* as:

$$w_{it} = \boldsymbol{X}_{it}\boldsymbol{L}^{\eta}_{it,}\ \mathbf{L}_{it} = \mathbf{M}_{it} + \mathbf{N}_{it}, \tag{3}$$

where *w* is the average wage in location *i*, and $\boldsymbol{X}$ is a demand shifter. We allow labor demand to be affected by total labor force size to account for agglomeration economies ($X(\mathbf{L}), X_L > 0$). One possible shortcoming in past efforts to model immigration is that they typically overlook the observation that immigrants can improve labor market outcomes because of favorable net agglomeration effects and complementarities (or worsen outcomes if there are severe congestion effects).[4] The elasticity of labor demand is η, and $\boldsymbol{L}$ is the total labor supply composed of $\boldsymbol{M}$ and $\boldsymbol{N}$, which are, respectively, the stocks of immigrants and natives.

We treat past immigrants as part of the native stock $\mathbf{N}$ after a sufficient lapse of time, and thus $\boldsymbol{M}$ represents recent immigrants in our empirical assessment, becoming a flow. That is, while Borjas (2003, 2005) stressed the stock of immigrants, we focus on the marginal effects of recent immigrants. One reason to focus on the recent immigrants is that it is more consistent with policy proposals that seek to limit or alter new immigrant inflows, which immediately have much stronger effects on flows rather than on stocks. Another reason is that the longer immigrants remain in the country, the more they assimilate into the labor market by learning the language and culture and receiving specific workplace training.

[4] Immigrants can favorably affect agglomeration effects by increasing the size of the local labor market and labor productivity and by increasing the variety of consumption amenities that are available; for example, the number of Thai restaurants (Ottaviano and Peri, 2005).

If recent immigrants in equation (3) push wages below those found in other regions, there would be some offsetting migration flows of natives and past immigrants away from location *i*. Borjas assumed that the net native migration rate at location *i* is a positive function of the difference between local wages w_{it} and the national equilibrium wage w^*_{t-1}:

$$\Delta \mathbf{N}_{it}/\mathbf{L}_{it-1} = v_{it} = \sigma(w_{it-1} - w^*_{t-1}), \quad (4)$$

where σ is the labor supply elasticity. Migration is assumed to respond to wage differentials after a lag due to moving costs and information decay. The period of time that we consider is sufficiently long so that almost all such offsetting migration generally should be completed.

Borjas (2005) solved equations (3) and (4), leading to expressions in which local wages and net migration are reduced-form functions of immigrant inflows. Because he assumed that immigrant and native workers are perfect substitutes, he showed that, as the local market approaches a new long-run equilibrium, net native migration entirely offsets new immigrants, with wages fully returning to the initial level *w**. Given our focus on immigrant flows, it should be noted that, in the interim, if supply adjusts sluggishly, influxes of migrants may increase the local unemployment rate and reduce local wages and the employment rate (employment/population).

A weakness of using equation (4) for our empirical estimation is that native migrants respond only to labor market effects that are manifested through *nominal* wage differentials. Immigrants also can affect *real* wages through altering the cost of housing (Saiz, 2007). Moreover, migration responses in general are associated with utility differentials that cause households to "vote with their feet" in a Tiebout fashion (Banzhaf and Walsh, 2008). If immigration affects regional *utility* differentials, such as by altering quality of life, native migration may still respond even if nominal/real wages do not change. Note that offsetting native migration may simply be in the form of prospective in-migrants avoiding areas with high rates of immigration (Keeton and Newton, 2005).

To reflect these additional considerations, we rewrite equation (4) to show that migration positively responds to differentials between indirect utility in region *i* (V) and the representative national level V*:

$$\Delta \mathbf{N}_{it}/\mathbf{L}_{it-1} = v_{it} = \sigma^{U}(V_{it-1}(w_{it-1}, \mathbf{A}_{it-1}, \mathbf{Z}_{it-1}, \Delta \mathbf{M}_{it}/\mathbf{L}_{it-1}) - V^*(w^*_{t-1}, \mathbf{A}^*, \mathbf{Z}^*)), \quad (5)$$

where σ^{U} is the migration response to utility differentials, $\boldsymbol{A}$ represents a vector of constant and time-varying amenity and quality-of-life attributes, and $\mathbf{Z}$ depicts other shifters that affect migration behavior, such as moving costs, industry composition, or cost of living. New immigration is denoted by $\Delta \mathbf{M}_{it}$, which affects native migration through changing labor market conditions, as well as through other quality-of-life changes that immigration may induce. Likewise, because other labor market indicators, such as employment/population rates, are affected by the same underlying factors, we include the same $\boldsymbol{A}$ and $\mathbf{Z}$ variables in corresponding empirical models that follow.

Estimating a more general reduced-form model based on equation (5) rather than the labor market model in (4) requires including more underlying factors of the region than local labor market conditions. The interpretation of the empirical results also differs in the more general formulation. For example, by allowing for potential agglomeration economies, local wages may be only modestly depressed below *w** after an influx of immigrants. Thus, fewer natives would out-migrate

to restore equilibrium. Similarly, if immigrants are substitutes for low-skilled natives but complements for the remaining native workforce, immigration may lead to net native *in*-migration in the aggregate. Finally, if immigrants also increase the costs of public-service provision, then a larger out-migration response of native residents would occur than would otherwise.

Empirical Implementation

In this study, we examine both samples of U.S. metropolitan counties (excluding those in Alaska and Hawaii) and aggregations of these counties into their metropolitan areas, as defined by the U.S. Office of Management and Budget in 2003 using population from the 2000 census (OMB, 2003). To allow for spatial heterogeneity in the labor market effects of immigration, we also construct several subsamples of metropolitan counties and metropolitan areas.

We examine the effects of immigration on several labor market indicators during the 2000-to-2005 period for each sample and subsample. The change in the labor market indicator (Y) for county or metropolitan area *i* over the period is regressed on a vector of location-specific fixed or predetermined factors (**X**), immigration over the period (*Immigrant*), state fixed effects (σ_s), and a stochastic term (ε):

$$Y_{i,00\text{-}05} = \alpha + \gamma \mathbf{X}_i + \beta Immigrant_{i,'00\text{-}05} + \sigma_s + \varepsilon_{i,} \quad (6)$$

where **X** includes the variables in the **A** and **Z** vectors in equation (5). One difference from equation (5) is that, in equation (6), we are estimating a reduced form model that omits wages.

In specifying the **X** variables, along with the need to fully model a community's quality of life, we agree with Borjas' (2005) point that omitting key time-varying factors associated with an area's persistent growth could lead to greater contemporaneous levels of both native and international migration—in which this bias from omitting these lagged time-varying factors could positively bias the *Immigrant* coefficient in the native migration model. In fact, many of these omitted time-varying factors could be demographic in nature. Thus, by more fully specifying the **X** variables than is common in the literature, we are more likely to detect that native migration is more responsive than the relative small response that characterizes much of the literature (Card, 2005). To be sure, the omitted variable bias we are referring to is different than a contemporaneous reverse causality that would positively bias international immigration effect (for example, contemporaneous demand shocks that lift both native and international migration that are only emphasized in the past literature). In exhibits 1A and 1B, we describe the specific **X** variables, showing the descriptive statistics for the major variables by all county and metropolitan subsamples, respectively.

The labor market indicators include net internal migration over the period as a percentage of the beginning population level as reported by the Census Bureau, the change in the Bureau of Labor Statistics employment/population rate, the percentage of change in Bureau of Economic Analysis wage rates, and the percentage of change in the median Fair Market Rent of two-bedroom apartments by the U.S. Department of Housing and Urban Development.

We expect *Immigrant* to induce native out-migration. The greater the native out-migration response, the smaller will be the expected negative effects of *Immigrant* on the employment and

Exhibit 1A

Mean and Standard Deviations (in parentheses) of Major Variables by Subsamples: Metropolitan Counties (1 of 2)

Variable	Description	All MA	Large	Medium	Small	High Mig	Low Mig	Eastern	Western
Internal migration%	Net internal migration during 2000-to-2005 period as percent of 2000 population	3.22 (7.42)	5.19 (9.76)	3.41 (6.24)	1.61 (5.52)	2.36 (8.58)	3.66 (6.71)	3.17 (7.44)	3.31 (7.38)
Population growth	Percent change in estimated population during 2000-to-2005 period	6.32 (7.85)	9.38 (9.65)	6.15 (6.69)	4.13 (6.14)	8.25 (8.51)	5.34 (7.30)	5.77 (7.78)	7.33 (7.88)
Change in employment rate	Change in BLS employment rate during 2000-to-2005 period	– 0.006 (0.02)	– 0.015 (0.02)	– 0.007 (0.01)	0.002 (0.02)	– 0.009 (0.02)	– 0.004 (0.02)	– 0.007 (0.02)	– 0.003 (0.02)
% change in wage	Percent change in BEA wage rate during 2000-to-2005 period	17.84 (6.85)	17.29 (5.23)	18.10 (8.97)	18.08 (6.23)	17.14 (5.37)	18.20 (7.47)	17.78 (7.28)	17.96 (5.99)
% change in house rent	Percent change in HUD Fair Market Rent for two bedrooms ($/month)	18.98 (11.52)	24.47 (12.81)	18.51 (10.09)	15.18 (9.67)	19.37 (11.37)	18.79 (11.60)	18.05 (10.68)	20.71 (12.76)
Immigrant	Net international migration during 2000-to-2005 period as percent of 2000 population	1.06 (1.47)	1.55 (1.87)	0.88 (1.07)	0.82 (1.27)	2.59 (1.58)	0.29 (0.46)	0.94 (1.44)	1.29 (1.51)
Centrality	If a county is within 16 km (10 mi) of the center of the MA	0.41 (0.49)	0.18 (0.38)	0.35 (0.48)	0.62 (0.49)	0.60 (0.49)	0.31 (0.46)	0.39 (0.49)	0.45 (0.50)
Immigrant x centrality	Immigrant-centrality interaction	0.63 (1.35)	0.62 (1.66)	0.56 (1.08)	0.69 (1.24)	1.66 (1.86)	0.11 (0.41)	0.51 (1.25)	0.86 (1.48)
% foreign born 1970	1970 population share that is foreign born or has foreign-born parents	9.03 (9.13)	11.73 (10.74)	8.23 (8.67)	7.55 (7.56)	13.75 (10.81)	6.63 (7.02)	8.27 (9.58)	10.44 (8.05)
House rent 1970	Weighted average owner- and renter-occupied house rent ($/month)	91.92 (28.73)	106.42 (33.71)	87.74 (24.25)	83.87 (22.85)	109.58 (30.90)	82.93 (22.82)	93.39 (29.00)	89.23 (28.06)
% foreign born 1980	Foreign-born population in 1980 census as percent of 1980 population	2.88 (3.65)	4.09 (4.93)	2.49 (2.87)	2.23 (2.63)	5.32 (5.13)	1.63 (1.45)	2.58 (3.37)	3.43 (4.07)

Exhibit 1A

Mean and Standard Deviations (in parentheses) of Major Variables by Subsamples: Metropolitan Counties (2 of 2)

Variable	Description	All MA	Large	Medium	Small	High Mig	Low Mig	Eastern	Western
Dist to Mexico border	Distance to the nearest major U.S.-Mexico border cross point	1,626.41 (675.26)	1,707.02 (722.63)	1,628.39 (709.12)	1,564.48 (606.40)	1,553.00 (790.11)	1,663.80 (605.71)	1,959.04 (498.64)	1,013.02 (508.11)
Dist to center of own MA[a]	Distance (in km) between the county and the center of the MA	25.78 (22.22)	41.02 (24.40)	25.80 (18.54)	14.32 (14.67)	17.71 (19.18)	29.89 (22.55)	26.02 (21.53)	25.34 (23.47)
Inc dist to MA>350k	Incremental distance to the nearest MA with >350,000 population	51.28 (83.21)	NA	NA	124.73 (87.64)	35.43 (62.46)	59.36 (90.98)	39.76 (57.91)	72.53 (113.29)
Inc dist to MA>1.3mil	Incremental distance to the nearest MA with >1.3 million population	82.08 (115.10)	NA	183.03 (122.90)	75.09 (99.62)	76.94 (127.85)	84.70 (108.04)	63.55 (78.02)	116.25 (157.16)
Inc dist to MA>2.5mil	Incremental distance to the nearest MA with >2.5 million population	111.05 (156.23)	133.77 (191.8)	105.53 (125.22)	97.73 (143.41)	98.77 (168.60)	117.31 (149.27)	108.00 (127.87)	116.68 (198.25)
Number of counties		1,058	327	296	435	357	701	686	372

BEA = Bureau of Economic Analysis, Regional Economic Information Service. BLS = Bureau of Labor Statistics, U.S. Department of Labor. HUD = U.S. Department of Housing and Urban Development. MA = metropolitan area, following 2003 definitions. NA = Not applicable.

[a] *The distances are measured from the population-weighted center of the county and the metropolitan area, respectively.*

Notes: Percent foreign born 1970 and 1980 and house rent 1970 are from GeoLytics data. Large MAs: population >1.3 million. Medium MAs: 350,000< population <1.3 million. Small MAs: population <350,000. High Mig is Immigrant *>1%. Low Mig is* Immigrant *<1%. Eastern MA is for metropolitan area counties east of the Mississippi River. Western MA is for metropolitan area counties west of the Mississippi River.*

Exhibit 1B

Mean and Standard Deviations (in parentheses) of Major Variables by Subsamples: Metropolitan Areas (1 of 2)

Variable	Description	All MA	Large	Small	High Mig	Low Mig	Eastern	Western
Internal migration	Net internal migration during 2000-to-2005 period as percent of 2000 population	1.21 (4.86)	1.36 (5.11)	1.09 (4.65)	1.69 (5.60)	0.77 (4.04)	1.07 (4.41)	1.42 (5.48)
% population growth	Percent change in estimated population during 2000-to-2005	4.99 (5.50)	5.83 (5.65)	4.26 (5.28)	7.32 (5.87)	2.84 (4.12)	3.78 (4.73)	6.79 (6.07)
Change in employment rate	Change in BLS employment rate during 2000-to-2005 period	– 0.001 (0.02)	– 0.006 (0.02)	0.003 (0.02)	– 0.005 (0.02)	0.002 (0.02)	– 0.004 (0.02)	0.004 (0.02)
% change in wage	Percent change in BEA wage rate during 2000-to-2005 period	17.44 (4.78)	17.00 (4.63)	17.82 (4.89)	17.22 (4.68)	17.64 (4.88)	17.07 (4.82)	17.99 (4.69)
% change in house rent	Percent change in 2000-to-2005 period in HUD Fair Market Rent for two bedrooms ($/month)	16.16 (9.60)	17.94 (10.38)	14.65 (8.63)	17.91 (10.80)	14.55 (8.05)	15.36 (7.84)	17.35 (11.68)
Immigrant	Net international migration during 2000-to-2005 period as percent of 2000 population	1.39 (1.42)	1.81 (1.50)	1.03 (1.24)	2.48 (1.30)	0.40 (0.50)	1.10 (1.27)	1.83 (1.52)
% foreign born 1970	1970 population share that is foreign born or has foreign-born parents	11.23 (9.01)	13.71 (9.98)	9.13 (7.50)	14.12 (10.02)	8.58 (7.01)	9.97 (8.91)	13.11 (8.86)
House rent 1970	Weighted average owner- and renter-occupied house rent ($/month)	99.47 (20.35)	106.26 (22.47)	93.71 (16.32)	106.41 (22.86)	93.10 (15.21)	99.09 (19.17)	100.04 (22.05)
% foreign born 1980	Foreign-born population in 1980 census as percent of 1980 population	3.83 (3.86)	4.92 (4.36)	2.90 (3.09)	5.54 (4.84)	2.25 (1.35)	2.95 (2.64)	5.14 (4.89)
Dist to Mexico border	Distance to the nearest major U.S.-Mexico border cross point	1,574.73 (725.26)	1,591.71 (791.57)	1,560.28 (665.44)	1,429.39 (793.90)	1,708.40 (628.87)	1,998.11 (492.83)	942.59 (530.54)
Dist to the nearest MA>350k[a]	Distance (in km) between MA and its nearest MA with >350,000 population	83.90 (97.30)	26.67 (55.53)	132.58 (98.78)	58.74 (73.68)	107.04 (110.03)	64.83 (61.34)	112.38 (129.26)
Inc dist to MA>1.3mil	Incremental distance to the nearest MA with >1.3 million population	96.16 (121.81)	118.72 (134.65)	76.98 (106.35)	96.71 (136.66)	95.66 (106.71)	76.74 (79.37)	125.16 (162.18)

Exhibit 1B

Mean and Standard Deviations (in parentheses) of Major Variables by Subsamples: Metropolitan Areas (2 of 2)

Variable	Description	All MA	Large	Small	High Mig	Low Mig	Eastern	Western
Inc dist to MA>2.5mil	Incremental distance to the nearest MA with >2.5 million population	104.21 (159.17)	115.96 (169.57)	94.21 (149.48)	98.54 (167.25)	109.41 (151.63)	95.70 (117.08)	116.90 (206.50)
Number of MAs		359	165	194	172	187	215	144

BEA = Bureau of Economic Analysis, Regional Economic Information Service. BLS = Bureau of Labor Statistics, U.S. Department of Labor. HUD = U.S. Department of Housing and Urban Development. MA = metropolitan area, following 2003 definitions.

[a] *The distances are measured between respective population-weighted centroids of each metropolitan area.*

Notes: Percent foreign born 1970 and 1980 and house rent 1970 are from GeoLytics data. Large MAs: population >250,000. Small MAs: population <250,000. High Mig is Immigrant *>1%. Low Mig is* Immigrant *<1%. Eastern MA is for metropolitan areas east of the Mississippi River. Western MA is for metropolitan areas west of the Mississippi River.*

wage rates, and the less will be the positive effect on housing rents. Thus, to the extent there is heterogeneity in the native migration response, there will be heterogeneity in the responses of the other labor market indicators.

Fixed location-specific factors (**X**) include natural amenities, measured by a 1-to-7 amenity scale constructed by the U.S. Department of Agriculture based on climate, topography, and percentage of water area. To control for market threshold and urban-hierarchy effects on labor market outcomes, three fixed factors also include distances between the population-weighted centroids of the county and the nearest higher tiered metropolitan statistical areas (MSAs) of various population thresholds (Partridge et al., 2008b): (1) the incremental distance to the nearest MSA containing at least 350,000 people, (2) the incremental distance to the nearest MSA containing at least 1.3 million people, and (3) the incremental distance to the nearest MSA containing more than 2.5 million people.[5]

We also include several variables controlling for preexisting demographic and economic conditions, which are from the 1990 census to reduce the potential for statistical endogeneity. To control for industry composition, we include the three 1990 census employment shares comprising agricultural, manufacturing, and mining. Likewise, we control for education composition by including four 1990 educational attainment shares among the adult population.

To control for disequilibrium effects, we include the 1990-level variable that corresponds to the dependent variable in changes. (We use the log 1990 population level in both the migration and population equations.) In addition, we also include the industry mix employment growth rate from shift-share analysis as an exogenous measure of local demand shocks that are national in origin (for example, see Blanchard and Katz, 1992).[6]

For each county-level regression, we also separately add an interaction term between *Immigrant* and an indicator for whether the county is a central county, which is defined as being near the center of the metropolitan area.[7] Partridge and Rickman (2008) found that labor supply, especially among low-skilled workers, appears to be less responsive in central counties to labor demand shocks. Thus, the native migrant response may be more muted in the central part of larger metropolitan areas, which in turn means that immigration would lead to a greater net increase in labor supply, yielding more adverse effects on wages and employment rates.

Immigrant is the net in-migration of the foreign born during the 2000-to-2005 period as a percentage of the population level in year 2000. Net international immigrants are those who crossed the U.S. border (in all 50 states and the District of Columbia) during the specified period.[8] Net internal

[5] If the nearest metropolitan area has a population of more than 2.5 million, all incremental distance variables equal 0. The same principle applies to the calculated incremental distances if the nearest metropolitan area in the next higher tier is of yet a higher tier. See Partridge et al. (2008b) for a similar formulation.

[6] In the county-level model, we include the county's own log population and the overall metropolitan area's log population, as well as the corresponding county-level and metropolitan area-level industry mix growth rates. The metropolitan area-level models include only the corresponding metropolitan area-level measures.

[7] We define a county as being near the center of a metropolitan area if its population-weighted centroid is within 16 kilometers (10 miles) of the population-weighted centroid for the corresponding metropolitan area.

[8] The Census Bureau calculates net international immigration as the sum of three components: (1) net migration of the foreign born, (2) emigration of natives, and (3) net movement from Puerto Rico to the United States (U.S. Census Bureau, 2008a).

migration is defined by moves in which both the origin and destination are within the United States (excluding Puerto Rico) (U.S. Census Bureau, 2008b). In our definition, native migrants can include people who were international immigrants in a previous period. Immigrants include both low-skilled and high-skilled workers, although the foreign born in the United States have lower than average educational attainment levels (Ottaviano and Peri, 2005), among which recent immigrants are increasingly undocumented and uneducated (Passel, 2006).

A primary econometric concern in the past literature is that the *Immigrant* variable may be contemporaneously endogenous. For example, if immigrants chose to locate in areas that face favorable labor demand shocks, the ordinary least square (OLS) estimate of immigration effects on net native migration would be biased upward. Indeed, controlling for the long-term determinants of growth (as we do) will be insufficient if the demand shocks are contemporaneous. Thus, in addition to using ordinary least squares to estimate equation (6), we also estimate equation (6) using the instrumental variables (IV) approach. Our identifying instruments for immigration are the 1970 share of the population that is either foreign born, or people with one foreign-born parent, and the 1980 population share that is foreign born. These two instruments follow other studies that used past immigration patterns to predict current locations (for example, Card and DiNardo, 2000; Saiz, 2007). Basing our selection on the joint strength of the instruments in the first stage in most models, we also select as additional instruments the 1970 median housing costs in the county-level model and the distance to the nearest major Mexican border crossing in the metropolitan area-level model.[9]

We create the subsamples of metropolitan counties and metropolitan areas based on size, intensity of immigration, and geographic proximity. First, we divide metropolitan counties and metropolitan areas into subsamples according to population. We divide metropolitan counties according to whether the county is located in a metropolitan area of 350,000 people or fewer (*Small*), in a metropolitan area between 350,000 and 1.3 million people (*Medium*), and in a metropolitan area of 1.3 million people or more (*Large*). We divide metropolitan areas into only two sizes (*Large* and *Small*), using the population of 250,000 as the dividing point. The past literature suggests that low-wage metropolitan labor markets respond differently, depending on size (Bartik, 2001; Partridge and Rickman, 2008; Weinberg, 2004). In particular, issues of metropolitan job accessibility and potential spatial mismatch appear to increase when the population reaches approximately more than 500,000 residents.

Second, we divide metropolitan area counties and metropolitan areas according to whether immigration during the 2000-to-2005 period constituted 1 percent or more of the 2000 population level (*High*) or not (*Low*). Adverse effects of immigrants are more likely to be observable in areas that have high rates of immigration (Peri, 2007). For example, if there is just a trickle of immigrants, local labor markets and quality of life would change imperceptibly, which would suggest that original native residents would not find it worthwhile to expend the moving costs to relocate.

[9] Except for the distance variables, we obtained the values for the regression variables from the GeoLytics database. We also experimented with distances from the county to various immigrant gateway communities in New York, Miami, Chicago, and San Francisco, as instruments, but they, in general, had weak explanatory power.

We create additional subsamples of metropolitan area counties and metropolitan areas based on whether they were located east (*East*) or west of the Mississippi River (*West*). Many metropolitan areas in the East have long experienced population stagnation or loss, potentially providing housing opportunities for immigrants (Glaeser and Gyourko, 2005). In such cases, the influx of immigrants could improve economic prospects and reduce the likelihood of adverse effects of immigrants on previous residents. Indeed, Partridge et al. (2008a) found immigration to more likely be associated with positive employment growth in the East.

Empirical Results

The empirical results for the entire sample of counties and subsamples described previously appear in exhibits 2 and 3. Exhibit 2 provides results for all metropolitan counties and for subsamples organized by metropolitan size. For each sample, exhibit 2 shows the coefficients and corresponding t-statistics estimated by both OLS and IV for the various labor market effects of recent immigration, including for regressions containing the interaction of recent immigration with central county status. The exhibit reports a chi-square statistic for the joint significance of the immigration variable and its interaction with central county status in this IV regression, followed by the F-statistic for the instruments in the first-stage IV regression, where the interaction term is omitted. The final line of results for each sample reports the centered R-squared for the corresponding second-stage IV regression model without the central county interaction. Exhibit 3 reports the same information for the remaining subsamples of counties but, to conserve space, only for the regressions omitting central county interactions. Exhibit 4 shows corresponding results for all metropolitan areas and selected subsamples.

All Metropolitan Counties

As shown in the first two lines of results in exhibit 2, the OLS estimates for the entire metropolitan county sample suggest that immigrant inflows are associated with significant net native out-migration. Yet, the less-than-proportionate response of native migrants is associated with significantly positive population growth, reduced wages, and a negative (although insignificant) effect on the employment rate.

To account for the possibility that immigrants are attracted to areas where the demand for labor is relatively strong (Card, 2005), we also employ IV estimation. Because the first-stage results help inform our analysis, exhibit 1 in the appendix reports these results in which *Immigrant* for the 2000-to-2005 period is the dependent variable for the all-metropolitan area county model. The first-stage results suggest that immigrants prefer to locate in central counties and in metropolitan areas that are either more populous themselves or closer to successively larger metropolitan areas. Likewise, immigrants appear to prefer to locate in more populous counties and more populous metropolitan areas (all else being constant). Immigration rates also are positively associated with counties and metropolitan areas with greater industry mix employment growth in the 1990s and with counties with greater intensities of agriculture and mining. Finally, the immigration rates for the 2000-to-2005 period also are positively associated with a greater 1990 college graduate share and negatively associated with the 1990 African-American population share. The positive link with college graduates is consistent with immigrants being complements to more highly skilled labor.

The subsequent second-stage IV estimates in exhibit 2 reveal a significantly greater native out-migration in response to immigration. The out-migration response is sufficient to produce no net population growth, an insignificant effect on wages, and an increased employment rate. The greater-than-proportionate response of native migration may be attributable, in part, to three different circumstances: (1) census underestimates of illegal immigration, which means that more immigrants are actually moving to a given location than reported; (2) greater natural population growth among an immigrant population that is younger than natives and has more children; and/or (3) utility and quality-of-life effects that are external to the labor market.[10]

The large estimated out-migration response relative to estimates in the past literature also may be due simply to differences in specifications. Our specification accounts for more persistent time-varying lagged effects. For example, due to complementarities between skilled native workers and immigrants—as well as the link between skilled workers and local growth—omitting lagged educational attainment variables may have positively biased the immigration coefficient in the migration equation in past studies (for example, immigrants and native migration may be greater in areas with historically higher levels of college graduates). To consider this possibility, we reestimated the migration equation after omitting all the other variables except for state fixed effects and international immigration (not shown). In the county-level results, the native migrant response moderated slightly to -2.13.

Exhibit 2

Metropolitan County Results by Metropolitan Area Population[a] (1 of 3)

Sample	Net Native Migration/ Population	%ΔPopulation	ΔEmployment Rate	%ΔWages	%ΔRent
All metropolitan counties (N=1,058)					
Immigration-OLS[b]	β = – 0.62 (2.21)	β = 0.88 (3.09)	β = – 0.001 (1.49)	β = – 0.63 (2.42)	β = 0.25 (0.72)
Interaction model-OLS[c] *Immigration*	β = – 0.57 (1.59)	β = 0.82 (2.09)	β = – 0.001 (0.72)	β = – 0.56 (1.64)	β = – 0.06 (0.11)
Central cty × immigration	β = – 0.11 (0.29)	β = 0.10 (0.25)	β = – 0.001 (0.62)	β = – 0.11 (0.34)	β = 0.49 (0.92)
Immigration-IV[b]	β = – 2.25 (5.31)	β = – 0.13 (0.30)	β = 0.0025 (2.27)	β = 0.25 (0.63)	β = 0.23 (0.36)
Interaction model-IV[c] *Immigration*	β = – 6.64 (4.49)	β = – 5.11 (3.18)	β = 0.007 (2.15)	β = – 2.31 (1.85)	β = 0.19 (0.11)
Central cty × immigration	β = 7.14 (3.19)	β = 8.08 (3.33)	β = – 0.007 (1.45)	β = 4.44 (2.19)	β = 0.06 (0.02)
χ^2 –Immig & interaction[d]	27.32***	11.11***	6.94**	5.12*	0.31
Inst. F-stat. on immigration[e]	20.47***	20.47***	20.47***	20.47***	20.47***
R^2-2nd stage-IV immigration[f]	0.42	0.41	0.49	0.20	0.31

[10] Dye (2008) reported that, in 2006, fully 20 percent of births were to foreign-born women 15 to 50 years old. The fertility rate corresponds to 71 per 1,000 foreign-born women and 52 per 1,000 domestic-born women, or a 37-percent greater birth rate among immigrant women.

Exhibit 2

Metropolitan County Results by Metropolitan Area Population[a] (2 of 3)

Sample	Net Native Migration/ Population	%ΔPopulation	ΔEmployment Rate	%ΔWages	%ΔRent
Large MAs pop>1.3 million (N=327)					
Immigration-OLS[b]	β = – 1.63 (4.63)	β = – 0.04 (0.12)	β = – 0.002 (2.36)	β = – 0.51 (1.65)	β = – 0.66 (1.27)
Interaction model-OLS[c] *Immigration*	β = – 1.58 (3.69)	β = – 0.13 (0.27)	β = – 0.002 (2.07)	β = – 0.58 (1.46)	β = – 1.26 (1.73)
Central cty × immigration	β = – 0.10 (0.17)	β = 0.17 (0.32)	β = – 0.00 (0.21)	β = 0.15 (0.39)	β = 1.25 (1.94)
Immigration-IV[b]	β = – 1.72 (3.12)	β = – 0.29 (0.48)	β = – 0.002 (2.61)	β = – 0.13 (0.40)	β = – 0.65 (0.88)
Interaction model-IV[c] *Immigration*	β = – 4.58 (3.38)	β = – 3.70 (2.46)	β = – 0.004 (2.21)	β = – 1.11 (1.68)	β = – 1.64 (1.27)
Central cty × immigration	β = 5.94 (2.42)	β = 7.03 (2.60)	β = 0.03 (1.13)	β = 2.30 (1.77)	β = 2.41 (0.93)
χ^2 –Immig & interaction[d]	12.61**	6.94*	7.60**	3.26	1.65
Inst. F-stat. on immigration[e]	5.48***	5.48***	5.48***	5.48***	5.48***
R^2-2nd stage-IV immigration[f]	0.59	0.49	0.75	0.40	0.49
Medium MAs 350,000<pop<1.3 million (N=296)					
Immigration-OLS[b]	β = – 0.24 (0.29)	β = 1.09 (1.22)	β = – 0.001 (0.94)	β = – 1.37 (1.34)	β = 0.84 (0.95)
Interaction model-OLS[c] *Immigration*	β = 0.78 (0.72)	β = 1.85 (1.59)	β = – 0.001 (0.41)	β = – 1.29 (0.92)	β = 0.91 (0.68)
Central cty × immigration	β = – 1.68 (1.74)	β = – 1.25 (1.25)	β = – 0.001 (0.64)	β = – 0.11 (0.12)	β = – 0.12 (0.07)
Immigration-IV[b]	β = 0.42 (0.31)	β = 2.25 (1.50)	β = 0.005 (2.00)	β = – 0.25 (0.12)	β = 4.64 (1.91)
Interaction model-IV[c] *Immigration*	β = 12.97 (1.35)	β = 8.53 (1.06)	β = 0.003 (0.27)	β = – 10.39 (0.97)	β = 26.28 (1.68)
Central cty × immigration	β = – 11.94 (1.34)	β = – 5.97 (0.80)	β = 0.002 (0.17)	β = 10.38 (0.97)	β = – 22.33 (1.42)
χ^2 –Immig & interaction[d]	1.83	2.41	4.10	0.95	3.53
Inst. F-stat. on immigration[e]	3.61***	3.61***	3.61***	3.61***	3.61***
R^2-2nd stage-IV immigration[f]	0.50	0.47	0.63	0.26	0.25

Exhibit 2

Metropolitan County Results by Metropolitan Area Population[a] (3 of 3)

Sample	Net Native Migration/ Population	%∆Population	∆Employment Rate	%∆Wages	%∆Rent
Small MAs pop<350,000 (N=435)					
Immigration-OLS[b]	β = 0.62 (1.5)	β = 2.11 (5.40)	β = – 0.001 (0.82)	β = – 0.41 (1.14)	β = 0.33 (0.57)
Interaction model-OLS[c] *Immigration*	β = – 0.31 (0.6)	β = 1.15 (2.35)	β = 0.003 (1.96)	β = 0.27 (0.46)	β = 1.57 (2.00)
Central cty × immigration	β = 1.21 (1.78)	β = 1.24 (1.92)	β = – 0.005 (2.80)	β = – 0.87 (1.15)	β = – 1.60 (1.77)
Immigration-IV[b]	β = – 0.63 (0.60)	β = 4.42 (3.60)	β = 0.002 (0.50)	β = 2.00 (1.56)	β = – 4.07 (1.91)
Interaction model-IV[c] *Immigration*	β = 6.12 (0.29)	β = 5.79 (0.27)	β = – 0.09 (0.43)	β = – 2.03 (0.12)	β = 98.37 (0.49)
Central cty × immigration	β = – 6.41 (0.32)	β = – 1.30 (0.06)	β = 0.083 (0.44)	β = 3.71 (0.24)	β = – 93.70 (0.51)
χ^2 –Immig & interaction[d]	0.34	11.95***	0.23	2.48	0.40
Inst. F-stat. on immigration[e]	5.03***	5.03***	5.03***	5.03***	5.03***
R^2-2nd stage-IV immigration[f]	0.40	0.35	0.58	0.21	0.17

MA = metropolitan area.

[a] *The model is based on the component metropolitan area counties for the dependent variable shown in each column heading. OLS refers to ordinary least squares and IV refers to instrumental variable estimation in which, depending on the model, the* Immigrant *and/or the* Central cty × immigration *variables are treated as endogenous. The identifying instruments are described in the text. The following variables are also included in each OLS/IV specification: centrality indicator (if within 16 km (10 mi) of metropolitan area centroid), log (county population 1990), log (own metropolitan area population 1990), industry mix employment growth 1990 to 2000, industry mix employment growth 1990 to 2000 of own metropolitan area, percent agricultural employment 1990, percent mining employment 1990, percent manufacturing employment 1990, percent high school graduate 1990, percent with some college 1990, percent with associates degree 1990, percent college graduate 1990, percent African American 1990, amenity rank, incremental distance to metropolitan area with population >350,000, incremental distance to metropolitan area with population >1.3 million, incremental distance to metropolitan area with population >2.5 million, an intercept, and state fixed effects. The IV models further used* percent foreign born 1970, house rent 1970, *and* percent foreign born 1980 *as instruments for* Immigration *and* Central cty × immigration *variables.*

[b] *The* Immigrant *variable is 2000-to-2005 international immigration as a share of 2000 population.*

[c] *The model includes the* Central county *indicator interacted with the* Immigrant *variable.*

[d] *The* χ^2 *statistic testing the joint significance of the* Immigrant *and the* Central cty × immigration *variables.*

[e] *The F-statistic testing the joint significance of the identifying instruments in the first-stage model for the* Immigration *variable. The F-statistic measures the strength of the identifying instruments.*

[f] *The* R^2 *statistic for the second-stage IV* Immigration model *shown in the first row.*

*Notes: Absolute value of robust t-statistics (from STATA cluster command) for OLS models and z-statistics for IV models are reported in parentheses. ***, **, * denote significance at the .01, .05, and .10 levels.*

The overall IV pattern is consistent with Frey (1995), Borjas (2005), and Borjas, Freeman, and Katz (1997), whereby native out-migration mostly offsets the labor market effects of new immigrants. The rise in the employment rate may be a sign of revitalization associated with immigration or may indicate that sufficient native out-migration resulted in increased employment rates. For example, over this time period, low-skilled immigrants had higher labor force participation rates and lower unemployment rates than low-skilled natives (Capps, Fortuny and Fix, 2007). Also, complementarity in production may cause immigration of the low-skilled to increase high-skilled employment rates (Peri, 2007).[11] Overall, OLS estimates appear to underestimate the native migration response and overestimate the adverse effects on employment and wage rates.

Differences Between Central and Suburban Counties

The interaction of central county status and immigration reveals heterogeneous effects within metropolitan areas. The positive coefficient on the interaction between immigration and central county status in the IV native migration equation is consistent with the view that native migration in central counties is less responsive to labor market shocks (Partridge and Rickman, 2008). Only in central counties then is immigration associated with positive population growth. Increased labor supply in central counties also eliminates any positive compositional effects of immigrants on the employment rate, although wages increase, perhaps through either demand- or supply-induced changes in industry composition. Recent immigration is associated with large net out-migration flows from suburban counties, which appear to reflect additional self-sorting.

The IV results for counties in large metropolitan areas generally mirror those for all metropolitan counties, including those for the regressions, including central county interaction terms. The exception is that immigration significantly reduces the employment rate in large metropolitan counties. Yet, in small- and medium-sized metropolitan area samples, immigration is not statistically significant in the IV results. Likewise, central counties are not statistically different than suburban counties in terms of how immigration affects native migration. Thus, the overall IV findings in the panel of exhibit 2 appear to be more due to the behavior of large metropolitan area counties, not due to patterns in small- and medium-sized metropolitan area counties.

For counties in small- and medium-sized metropolitan areas, we found no significant negative effects on native migration that indicate immigration spurs population growth in these counties (significantly in small metro counties). The immigration variable for most other labor market variables in the small- and medium-sized metropolitan area counties is insignificant; the primary exception being the positive effect on the employment rate in medium-sized metropolitan area counties. Thus, the positive compositional effect on the employment rate of immigration occurs primarily in medium-sized metropolitan area counties, whereas, in large metropolitan area counties, we found the traditional negative effect. We suggest taking the subsample results with some caution, though, because the first-stage F-test suggests that the instruments are weaker than for the full sample.

[11] We also attempted to capture production complementarity between low- and high-skilled labor by adding the interaction of the 1990 share of college graduates with the 2000-to-2005 immigration variable; however, the interaction term was, in general, very insignificant.

Metropolitan Area Counties: High and Low Rates of Immigration and Threshold Effects

Exhibit 3 displays the results for the *high/low* immigration and *East/West* subsamples. Immigration significantly reduces net native migration in high-immigration counties, producing no net effect on population growth, the employment rate, the wage rate, and housing costs. In low-immigration counties, immigration positively affects native migration and population growth (although the IV results are insignificant). Immigration reduces nominal wages, although insignificantly, and the employment rate. The weakness of the instruments for low-immigration counties may occur because of a lack of historical variation in their values across low-immigration counties, suggesting these results should be viewed with caution; however, these results suggest an immigration threshold above which natives begin to consider out-migrating (or not in-migrating).[12]

Such threshold effects may somewhat explain why we find a larger native migration response than in the past literature that considered earlier decades. As immigration flows increase over time,

Exhibit 3

Metropolitan County Results by Region and Immigration Intensity[a] (1 of 2)

Sample	Net Native Migration/ Population	%ΔPopulation	ΔEmployment Rate	%ΔWages	%ΔRent
High-immigration counties *Immigrant* >1% (N=357)					
Immigration-OLS[b]	β = – 1.38 (5.18)	β = 0.19 (0.60)	β = – 0.001 (0.68)	β = – 0.40 (1.59)	β = 0.74 (1.64)
Immigration-IV[b]	β = – 2.09 (4.55)	β = – 0.63 (1.24)	β = 0.002 (1.30)	β = – 0.34 (1.00)	β = – 0.32 (0.45)
Inst. F-stat. on immigration[c]	27.05***	27.05***	27.05***	27.05***	27.05***
R^2-2nd stage-IV immigration[d]	0.60	0.50	0.52	0.38	0.43
Low-immigration counties *Immigrant* <1% (N=701)					
Immigration-OLS[b]	β = 3.10** (4.37)	β = 3.48 (4.39)	β = – 0.007 (3.93)	β = – 4.38 (4.31)	β = 0.64 (0.66)
Immigration-IV[b]	β = 3.19*** (0.94)	β = 6.23* (1.61)	β = – 0.023** (2.36)	β = – 9.51 (1.57)	β = – 8.60 (1.00)
Inst. F-stat. on immigration[c]	1.83	1.83***	1.83***	1.83***	1.83***
R^2-2nd stage-IV immigration[d]	0.50	0.46	0.51	0.17	0.24

[12] We also experimented with including a quadratic (*Immigrant2*) term to the all-metropolitan area county-level model and the all-metropolitan-area-level model to examine other nonlinearities, but the quadratic term was statistically insignificant in both cases, suggesting that nonlinearities better reveal themselves when dividing the sample.

Exhibit 3

Metropolitan County Results by Region and Immigration Intensity[a] (2 of 2)

Sample	Net Native Migration/ Population	%ΔPopulation	ΔEmployment Rate	%ΔWages	%ΔRent
Eastern U.S. MA counties (N=686)					
Immigration-OLS[b]	β = – 0.63 (1.88)	β = 0.84 (2.63)	β = – 0.000 (0.43)	β = – 0.61 (1.76)	β = 0.94 (2.97)
Immigration-IV[b]	β = – 2.23 (4.99)	β = – 0.59 (1.24)	β = 0.005 (3.88)	β = 0.54 (1.12)	β = 2.52 (3.64)
Inst. F-stat. on immigration[c]	33.65***	33.65***	33.65***	33.65***	33.65***
R^2-2nd stage-IV immigration[d]	0.46	0.43	0.47	0.20	0.27
Western U.S. MA counties (N=372)					
Immigration-OLS[b]	β = – 0.70*** (1.46)	β = 0.81 (1.49)	β = – 0.003 (3.96)	β = – 0.68 (1.65)	β = – 1.10 (2.30)
Immigration-IV[b]	β = – 2.51 (2.32)	β = 0.28 (0.24)	β = – 0.001 (0.43)	β = 0.42 (0.52)	β = – 4.12 (2.81)
Inst. F-stat. on immigration[c]	7.34***	7.34***	7.34***	7.34***	7.34***
R^2-2nd stage-IV immigration[d]	0.38	0.47	0.63	0.26	0.25

MA = metropolitan area.

[a] *The model is based on the component metropolitan area counties for the dependent variable shown in each column heading. OLS refers to ordinary least squares and IV refers to instrumental variable estimation in which the* Immigrant *variable is treated as endogenous. The identifying instruments are described in the text. The following variables are included in each OLS/IV specification: centrality indicator (if within 16 km (10 mi) of MA centroid), log (county population 1990), log (own metropolitan area population 1990), industry mix employment growth 1990 to 2000, industry mix employment growth 1990 to 2000 of own metropolitan area, percent agricultural employment 1990, percent mining employment 1990, percent manufacturing employment 1990, percent high school graduate 1990, percent with some college 1990, percent with associates degree 1990, percent college graduate 1990, percent African American 1990, amenity rank, incremental distance to metropolitan area with population >350,000, incremental distance to metropolitan area with population >1.3 million, incremental distance to metropolitan area with population >2.5 million, an intercept, and state fixed effects. The IV models further used* percent foreign born 1970, house rent 1970, *and* percent foreign born 1980 *as instruments for* Immigration *variable.*

[b] *The* Immigrant *variable is 2000-to-2005 international immigration as a share of 2000 population.*

[c] *The F-statistic testing the joint significance of the identifying instruments in the first-stage model for the* Immigration *variable. The F-statistic measures the strength of the identifying instruments.*

[d] *The R^2 statistic for the second-stage IV* Immigration model *shown in the second row.*

*Notes: Absolute of robust t-statistics (from STATA cluster command) for OLS models and z-statistics for IV models are reported in parentheses. ***, **, * denote significance at the .01, .05, and .10 levels.*

native residents may be becoming more sensitive to their effects. To examine such threshold effects further, we divided the all-metropolitan area county model into the 671 counties with less than 4 percent of the 2000 population that was foreign born and the 387 counties with greater than 4 percent of the 2000 population that was foreign born. Although we note that these results (not shown) should be cautiously interpreted, the IV native migration results suggest that virtually no statistically detectable native response to immigrants existed in traditionally low-immigrant

metropolitan area counties, but a relatively large response occurred in traditionally high-immigrant counties. For example, in the migration equations, in the less-than-4-percent foreign-born sample, the immigrant coefficient was *positive*, suggesting immigrants were associated with more native migration (t=1.82). In the above 4-percent sample, this coefficient equaled -2.59 (t=4.24), which is a little larger than the overall sample. Thus, our findings suggest threshold effects that are likely increasingly being exceeded this decade.

Differences Between Eastern and Western Metropolitan Area Counties

Immigration does not generally appear to have differential effects in western counties when compared with eastern counties, although the instruments are much stronger in the East. The exceptions are that the IV results suggest positive effects of immigration on the employment rate and housing costs in the East. The positive effects on housing in the East may be attributable to immigrants absorbing vacated housing (Glaeser and Gyourko, 2005), supported by the increase in the employment rate. The negative housing cost effect in the West may result from an increase in the supply of new lower cost housing relative to the county average (Saiz, 2007) for two-bedroom apartments.

Aggregate Metropolitan-Level Results

Because of potential *within* metropolitan area migration and commuting responses to immigration, we next estimate the effects of immigration at the aggregate metropolitan level to consider how much of the county-level results simply reflect sorting within given metropolitan areas. Moreover, our aggregate metropolitan area results enable us to compare our findings with the past literature, which usually employs aggregate metropolitan area-level data (or state-level data). In general, the labor market effects of immigration may vary with geographic scale as local labor market adjustments diffuse the effects across a broader area (Borjas, 2003; Borjas, Freeman, and Katz, 1997). Native migration responses are usually thought to be smaller in larger geographies because some of the offsetting native migration would be *intraregional* when considering larger geographies. Yet, at the county level, there may be a smaller response than at the metropolitan area level, because commuting and migration are more likely to be substitutes within a given metropolitan labor market (Eliasson, Urban, and Olle, 2003).

As shown in exhibit 4, the pattern of results for the all metropolitan area sample generally comports with those for the sample of all metropolitan counties. The OLS results suggest no native out-migration, positive population growth, and negative effects on the employment rate and nominal wages. Correspondingly, the IV results suggest significant net native out-migration and an absence of effects on the employment rate and wages. The more negative IV estimated native migration response at the metropolitan area level suggests that commuting may serve as a potential substitute for native migration at the county level *within* a given metropolitan area (which is less feasible when considering *between* metropolitan-area adjustments; that is, commuting is the response *within* a metropolitan area, but migration is the response *between* metropolitan areas). The positive employment rate effect at the county level, but the lack of significance at the metropolitan level, may be related to natives who possess lower employment rates than the immigrants (Capps, Fortuny and Fix, 2007) moving to other counties *within* the metropolitan area.

Exhibit 4

Metropolitan-Level Results[a] (1 of 2)

Sample	Net Native Migration/ Population	%ΔPopulation	ΔEmployment Rate	%ΔWages	%ΔRent
All MAs (N=359)					
Immigration-OLS[b]	β = – 0.06 (0.16)	β = 1.69 (4.52)	β = – 0.004 (3.20)	β = – 0.53 (2.16)	β = 0.27 (0.48)
Immigration-IV[b]	β = – 3.64 (4.75)	β = – 0.94 (1.31)	β = 0.001 (0.43)	β = 0.20 (0.40)	β = 1.87 (1.49)
Inst. F-stat. on immigration[c]	8.35***	8.35***	8.35***	8.35***	8.35***
R^2-2nd stage-IV immigration[d]	– 0.13	0.22	0.38	0.43	0.17
Large MAs pop>250,000 (N=165)					
Immigration-OLS[b]	β = 0.16 (0.36)	β = 1.72 (3.33)	β = – 0.004 (2.42)	β = – 1.07 (3.84)	β = – 0.94 (1.04)
Immigration-IV[b]	β = – 2.98 (3.08)	β = – 1.24 (1.26)	β = 0.005 (1.60)	β = 0.36 (0.56)	β = 1.87 (1.19)
Inst. F-stat. on immigration[c]	8.95***	8.95***	8.95***	8.95***	8.95***
R^2-2nd stage-IV immigration[d]	0.08	0.23	0.17	0.46	0.28
Small MAs pop<250,000 (N=194)					
Immigration-OLS[b]	β = 0.02 (0.05)	β = 1.76 (4.27)	β = – 0.002 (1.57)	β = 0.06 (0.19)	β = 0.71 (0.86)
Immigration-IV[b]	β = – 4.06 (2.90)	β = – 0.40 (0.32)	β = – 0.003 (0.65)	β = 1.38 (1.28)	β = 1.27 (0.56)
Inst. F-stat. on immigration[c]	6.26***	6.26***	6.26***	6.26***	6.26***
R^2-2nd stage-IV immigration[d]	– 0.15	0.31	0.45	0.42	0.17
High immigration *Immigrant* >1% (N=172)					
Immigration-OLS[b]	β = – 0.24 (0.62)	β = 1.41 (3.28)	β = – 0.003 (2.04)	β = – 0.54 (1.75)	β = – 0.08 (0.10)
Immigration-IV[b]	β = – 2.87 (3.22)	β = – 0.93 (1.01)	β = 0.001 (0.33)	β = – 0.21 (0.35)	β = 1.26 (0.76)
Inst. F-stat. on immigration[c]	6.71***	6.71***	6.71***	6.71***	6.71***
R^2-2nd stage-IV immigration[d]	0.25	0.27	0.34	0.48	0.27

Exhibit 4

Metropolitan-Level Results[a] (2 of 2)

Sample	Net Native Migration/ Population	%ΔPopulation	ΔEmployment Rate	%ΔWages	%ΔRent
Low immigration *Immigrant* <1% (N=187)					
Immigration-OLS[b]	β = 1.75 (2.13)	β = 2.49 (2.85)	β = – 0.008 (1.87)	β = – 1.79 (1.81)	β = 1.83 (1.14)
Immigration-IV[b]	β = – 3.26 (0.90)	β = 0.27 (0.08)	β = – 0.04 (2.15)	β = – 0.47 (0.15)	β = 1.00 (0.15)
Inst. F-stat. on immigration[c]	1.98	1.98	1.98	1.98	1.98
R^2-2nd stage-IV immigration[d]	0.23	0.35	0.24	0.50	0.17
Eastern U.S. MAs (N=215)					
Immigration-OLS[b]	β = 0.18 (0.51)	β = 1.68 (4.04)	β = – 0.003 (2.50)	β = – 0.28 (1.16)	β = 1.43 (2.68)
Immigration-IV[b]	β = – 0.93 (1.69)	β = 0.34 (0.56)	β = – 0.000 (0.15)	β = 0.65 (1.13)	β = 1.94 (1.60)
Inst. F-stat. on immigration[c]	36.36***	36.36***	36.36***	36.36***	36.36***
R^2-2nd stage-IV immigration[d]	0.47	0.46	0.49	0.52	0.17
Western U.S. MAs (N=144)					
Immigration-OLS[b]	β = – 0.04 (0.08)	β = 1.63 (2.95)	β = – 0.005 (2.36)	β = – 0.40 (1.36)	β = – 1.96 (2.13)
Immigration-IV[b]	β = – 4.13 (2.61)	β = – 1.24 (0.82)	β = 0.005 (0.90)	β = 1.92 (1.90)	β = – 3.99 (1.43)
Inst. F-stat. on immigration[c]	4.07***	4.07***	4.07***	4.07***	4.07***
R^2-2nd stage-IV immigration[d]	0.013	0.27	0.23	0.33	0.28

MA = metropolitan area.

[a] *The model is based on the aggregate* MA-level *observations for the dependent variable shown in each column heading. OLS refers to ordinary least squares and IV refers to instrumental variable estimation in which the* Immigrant *variable is treated as endogenous. The identifying instruments are described in the text. The following variables are included in each OLS/IV specification: log (population 1990), industry mix employment growth 1990 to 2000, percent agricultural employment 1990, percent mining employment 1990, percent manufacturing employment 1990, percent high school graduate 1990, percent with some college 1990, percent with associates degree 1990, percent college graduate 1990, percent African American 1990, amenity rank—all measured at the metropolitan area level plus distance to the nearest metropolitan area with population >350,000, incremental distance to nearest metropolitan area with population >1.3 million, incremental distance to nearest metropolitan area with population >2.5 million, and an intercept. The IV models further used* percent foreign born 1970, percent foreign born 1980, *and* distance to the nearest U.S.-Mexico border cross point *as instruments for* Immigration *variable.*

[b] *The* Immigrant *variable is 2000-to-2005 international immigration as a share of 2000 population.*

[c] *The F-statistic testing the joint significance of the identifying instruments in the first-stage model for the* Immigration *variable. The F-statistic measures the strength of the identifying instruments.*

[d] *The R^2 statistic for the second-stage IV* Immigration Model *shown in the second row.*

*Notes: Absolute value of robust t-statistics (from STATA cluster command) for OLS models and z-statistics for IV models are reported in parentheses. ***, **, * denote significance at the .01, .05, and .10 levels.*

As we considered with the county-level analysis, we also consider the scaled-back migration model that included only *Immigrant* and state fixed effects. The native migration response now becomes insignificant in the metropolitan-level regression with a coefficient of -0.32. Thus, because of the emphasis on aggregate metropolitan-area-level data, past area studies of immigration may understate the native out-migration response by omitting important control variables such as education.

Different-Sized Metropolitan Areas

Regarding the subsamples of metropolitan areas, the results for large metropolitan areas generally fit the results for all metropolitan areas and those for the subsample of large metropolitan area counties. The native out-migration IV response is somewhat larger in small metropolitan areas, and the other IV coefficients are insignificant.

Metropolitan Areas and Threshold Effects for Immigration

The native net out-migration response similarly is significantly negative for the high-immigration metropolitan area subsample but insignificant for low-immigration metropolitan areas, which further suggests a threshold effect in which native residents do not consider immigration until it reaches some level. The significant negative effect on the employment rate for low-immigration metropolitan areas fits the insignificant native migration response; that is, greater labor supply.

The larger estimated negative effect for high-immigration metropolitan areas relative to high-immigration counties (shown in exhibit 3) follows the same result for all counties in which the commuting response likely reduces out-migration in counties relative to metropolitan areas. Yet, because the instruments for the low-immigration sample are weak—as was true for the low-immigration county sample—their results should be interpreted with greater caution. Nonetheless, to reinforce the possible threshold pattern, we again find that when we divide the sample into the 170 metropolitan areas with less than 4 percent foreign born and the 189 metropolitan areas with more than 4 percent foreign born (in 2000), we again find a large native net out-migration response in traditionally high-immigration counties but virtually no response in traditionally low-immigration counties (not shown).[13]

Differences Between Eastern and Western Metropolitan Areas

Finally, the metropolitan area-level analysis reveals the expected larger net out-migration response in the West (Partridge et al., 2008a). Thus, the negative county-level native net out-migration response found in the East in exhibit 3 appears to result primarily from within metropolitan area county migration. The within-metropolitan area adjustments in the East are associated with an increase in the employment rate, where, at the metro level in the East, there is no change in the employment rate; that is, those with lower employment rates moved to other counties *within* the same metropolitan area.

Consistent with county results, immigration leads to higher housing costs in the East and lower housing costs in the West, although the IV estimates are statistically insignificant. It appears then

[13] In the 2000-to-2005 population change model, we also find that immigration is associated with a statistically significant positive effect in low-immigrant metropolitan areas (<4 percent) but a statistically insignificant influence in high-immigrant metropolitan areas.

that immigrants are more likely serving as needed labor supply and absorbing excess durable housing (Glaeser and Gyourko, 2005) in the East, consistent with the immigrant-employment grsowth findings of Partridge et al. (2008a).

Summary and Conclusion

This study examined the effect of immigration on economic outcomes across and within U.S. metropolitan areas during the 2000-to-2005 period. A key factor that underlies the overall labor market effects of immigration is the native migration response to higher immigration. Furthermore, we allowed for geographic heterogeneity in the native migration response to immigrants and, hence, in other labor market effects of immigration both within and across metropolitan areas. We also searched for threshold effects that may affect native migration responses.

Using IV estimation, we found significantly greater net native out-migration in counties experiencing higher immigration. Greater native out-migration neutralized other potential adverse effects on employment and wage rates. Within metropolitan areas, however, the native migrant response largely appeared to be absent in central counties. This result is consistent with the spatial mismatch literature that focuses on potentially limited central city commuting and migration responses to local labor market shocks. We also find evidence of threshold effects, above which immigration had larger marginal effects on native migration.

Across metropolitan areas, the native out-migration response was proportionately greater in metropolitan areas with high rates of immigration, suggestive of a threshold effect in the labor market or in other factors affecting utility of residence. The native out-migration response also was larger in metropolitan areas west of the Mississippi River, in which wages also declined. The older, declining cities in the East appeared to provide sufficient employment opportunities and affordable durable housing to the immigrants.

We generally find a larger native migration response to immigration than in past studies. One reason may be differences in specification where, beyond contemporaneous endeogeneity, we found that controlling for lagged factors associated with contemporaneous native and international migration led to larger net out-migration responses to immigration. Another possible reason for our larger responses is threshold effects, in which these thresholds are increasingly being crossed in our latter sample period. A final reason could be that the response is simply larger this decade than in the past decades considered by past research. The results also generally suggest significant heterogeneity in the labor market effects of immigration beyond that typically considered.

Our findings of significant heterogeneities and threshold effects help explain why public reactions to immigration are so diverse. Future studies could further consider heterogeneities and probe deeper into the underlying reasons. Spatially varying regression analysis, possibly combined with case study analysis, appears well suited to this purpose. Future analysis should assess the possible threshold effects uncovered in our analysis. In general, we see research more focused on the spatial variation in labor market processes surrounding immigration as essential to informing both regional and national immigration policymaking.

Appendix

Exhibit A-1

First-Stage Regression of Percent Immigrant 2000 to 2005 for All Metropolitan Area Counties

Variable	Coefficient	Robust-t
Centrality indicator (if within 16 km (10 mi) of MA centroid)	0.272	2.70***
Log (county population 1990)	0.314	4.40***
Log (own MA population 1990)	0.002	0.04
Industry mix employment growth 1990-00	3.547	1.60
Industry mix employment growth 1990-00 of own MA	5.485	1.98**
% agricultural employment 1990	0.073	4.20***
% mining sector employment 1990	0.040	1.99**
% manufacturing sector employment 1990	0.036	4.11***
% high school graduate 1990	– 0.013	– 1.10
% with some college education 1990	– 0.123	– 6.45***
% with associates degree 1990	– 0.036	– 1.01
% college (4-yr) graduate 1990	0.063	5.90***
% african American 1990	– 0.007	– 2.72***
Amenity rank	– 0.149	– 3.05***
% foreign born 1970	– 0.043	– 4.26***
House rent 1970	0.004	1.48
% foreign born 1980	0.240	7.53***
Incremental distance to MA>350k	– 0.002	– 2.25**
Incremental distance to MA>1.3mill	– 0.001	– 2.17**
Incremental distance to MA>2.5mill	– 3.6E-04	– 1.12
Intercept	– 2.364	– 2.38**
Number of counties	1,058	
R-squared	0.698	
F-stat of the instruments *(in italics)* = 0	20.47***	

MA = metropolitan area.

*Notes: Robust t-statistics from STATA cluster command are reported. ** and *** indicate significance at the 1-percent and 5-percent levels, respectively. State fixed effects were also included in the model. Distances are measured in kilometers between the centroid of the county and the 2000 population-weighted centroid of the metropolitan area. Demographic (population, education, and race) and employment (agriculture, mining, and manufacturing) shares are from the 1990 census. Education variables are defined as percent of 1990 population more than 25 years. Industry mix employment growth is calculated by multiplying each industry's national employment growth (between 1990 and 2000) by the initial period (1990) county industry employment shares in each one-digit sector and summing across all sectors. Amenity rank ranges from 1 to 7, with 7 being the highest natural amenity as defined by the Economic Research Services, U.S. Department of Agriculture.* Percent foreign born 1970, percent foreign born 1980, *and* house rent 1970 *are from GeoLytics data.*

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Immigration, Aging, and the Regional Economy

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Abstract

*Using a two-region computable general equilibrium model (*Chicago *and* Rest of the United States*) integrated with an Overlapping Generations model, this analysis explores the implications of various indicators for changes in the level of immigration in Chicago. Initially, and not surprisingly, wages fall as a result of increased immigration. This finding is consistent with an equilibrium view of a market receiving a supply shock and a fall in the capital/labor ratio; but after 2040, the effects appear to be reversed. One reason for this reversal can be traced to the retirement of the first wave of immigrants, but more important, increasing numbers of immigrants will provide contributions to taxes that will reduce the social security tax burden and thus increase the after-tax income of native workers. Over time, the model assumes that immigrants and their offspring begin to accumulate skills so that they become undifferentiable from the native population. In terms of regional macroeconomic impacts, immigration would appear to reverse a projected decline in gross regional product (GRP) that would occur essentially as a result of an aging population with no stimulus provided by immigration. In per capita GRP terms, however, the positive effects occur only after the immigrants (cumulatively) acquire skills to elevate their productivity levels. The Chicago region, under an asymmetric immigration policy (Chicago gains more immigrants as a percentage of its base population than the United States as a whole), actually increases its share of gross national domestic product. One might expect that, given these findings, the effect on the social security tax rate would be positive in the sense of either muting increases or actually decreasing the rate. This impact is true until the immigrants start to retire in significant numbers after 2050; this result stems from the fact that, over time, the effects of immigration begin to diminish—a finding that is revealed in the results for the United States as a whole.*

Introduction

Yoon and Hewings (2006) found significant evidence for the presence of nonhomothetic consumption preferences by age and income distribution in the Chicago regional economy.[1] Over a 30-year period, 2000 to 2030, these differences were estimated to generate a statistically different impact on the growth and structure of the region's economy. The econometric input-output model that was used, however, failed to fully explore the implications of changes in migration behavior, especially the significant influx of younger immigrants and the out-migration of retirees. Expanding and elaborating on these findings, Park and Hewings (2007) examined the effect of an aging population, using an Overlapping Generations (OLG) framework in a two-region computable general equilibrium model (Chicago and the Rest of the United States [ROUS]) built on the same database. Absent significant in-migration of largely younger aged people of working age and the continued out-migration of retirees, the Chicago region could expect to experience generally negative effects from an aging population, especially in terms of economic growth. The previous simulation results point out two factors—the labor shortage and insufficient savings—as the main reasons for the economic downturn. In addition, according to the results, the aging could be expected to generate a fiscal burden that would become too onerous for the government to manage, given the current structure of the pension system. Recognizing these concerns, both federal and local governments have been exploring options for handling problems related to an aging population.

Therefore, it is useful to assess the potential benefits and costs of policy reforms and find alternative solutions. At the national level, the existing literature investigating the economic impacts of policy reforms with an aging population has grown explosively since the 1990s and substantially sharpened our understanding of the potential effects. For example, Denton and Spencer (2005) noted that although population growth and technological change were the principal drivers of economic growth, attempting to change population fertility would generate uncertain responses and take several years to have an effect on the economy (through labor force expansion). On the other hand, an increase in immigration of, for example, people aged 20 to 35 would have an immediate effect on the economy. The results of national policy changes may not apply at the regional level, however, because diverse regional effects stemming from variations in economic and demographic structure could exist. In particular, federal government policies that respond to the aging population problem may have different implications across regions. For example, there could be *regional* wage and employment effects of international immigration that are different from those at the *national* level. These differences stem, in part, from differential rates of interregional migration that may respond (with some lag) to changes in regional labor market conditions (crowding out by immigrants in one region perhaps leading to depressed wages or enhanced wages in others due to relative labor shortages).

This article explores the effects of changes in immigration policies; the model assumes that the immigration policies between local and federal government are differentiated. This differentiation occurs because of quotas, visa requirements, or guest worker programs (regions have no power to act in these domains); it is more in terms of a region's ability to compete more effectively for the

[1] The Chicago region is the metropolitan statistical area comprising Cook, DuPage, Kane, Lake, McHenry, and Will Counties.

pool of in-migrants. Focusing on the Chicago region, this analysis assumes that the local government implements a more favorable set of incentives to attract more immigrants than other regions do, with the result that the inflows, as a percentage of the base population, may be higher than those recorded at the national level. These incentives might include housing subsidies, enhanced social and healthcare programs, proactive recruiting policies (through public-private partnerships), and general enhancement of the current process of channelization of immigrant flows. Regions with high existing levels of immigrants have a higher probability to compete more effectively for new immigrants using family and community ties to provide information to potential in-migrants from their home countries. Roseman (1971) identified this process in examining the immigration flows in the United States from the South to specific Midwest cities in an earlier period; it is likely that such processes characterize international immigration flows to the United States. Of course, another potential source of increased regional immigration could result from the increased attraction of migrants from other regions in the United States. As Plane (1992) and Plane and Heins (2003) have demonstrated, striking age effects are evident in the characterization of these flows. Considering both in- and out-migrants, over the period 1985 to 1990, Illinois reported a net loss of 70,000 retirees aged 60 and older, ranking the state as second largest among all the states. Further, the Chicago area accounts for more than 80 percent of the older migrants who leave Illinois; for example, the Chicago region loses about 0.9 percent of its older population, or about 12,000 retirees, every year.

The next section of this article provides a brief review of the model and summarizes previous analyses of the effects of aging alone on the Chicago economy. The section after that considers some plausible scenarios for the regional effects of different volumes of in-migration, and the following section reports the results. The article concludes with a summary evaluation.

The Model[2]

The model is presented in more detail in Park and Hewings (2007); the critical components are reviewed here in terms of the immigration impact analysis. The model is represented by a two-region dynamic general equilibrium model with an OLG framework, drawing on Auerbach and Kotlikoff (1987). Individual earnings heterogeneity, demographic transitions, and the existence of a social security system are assumed. There are two major differences to the prior OLG framework, the first being the specification in a two-region context (Chicago and the ROUS), in which each region is interlinked with the other by migration, trade, and the social security system. Labor is assumed to be partially mobile in domestic regions, while immobile internationally (immigrants enter but no consideration of international out-migration is provided), taking into account people's preference for staying in the region where they originally reside.[3] This locational preference is represented by the wage elasticity of labor migration. With partial mobility of the labor, wage differentials between regions take multiple periods to adjust because of the lagged responses of the

[2] This section draws on Park and Hewings (2007).

[3] According to Jones and Whalley (1986), perfect labor mobility is not useful in analyzing the region-specific effect of government policies because, under perfect mobility, the policy effect might be underestimated with complete labor movement between regions.

labor market. Capital, however, is assumed to be immobile interregionally.[4] This immobility results in the return on capital being different across the regions. The second difference is that the model features age-specific mortality and borrowing constraints, which are critically important to generate realistic implications of the effects of demographic changes.

Households (this model has a one-to-one mapping between individual agents and households) maximize their utility by choosing a profile of consumption over the life cycle and firms demand factors of production following from profit maximization, responding to differences in goods and factor prices. Prices adjust in both goods and factor markets to clear the excess demand. A nesting structure is assumed for the household's decision process, since both regions trade in goods and each individual considers products from different regions as imperfect substitutes following the familiar Armington assumption, thus ensuring that consumers demand goods produced in both regions. The hierarchy in the nesting structure of this model consists of the following two steps. In the first step, each agent determines the aggregated consumption path over time, maximizing a time-separable utility function subject to lifetime income. Time separability allows a separation between intertemporal and intraperiod decisionmaking in the nesting structure. After optimal conditions governing the aggregate consumption levels are established, the second step is to allocate these expenditure levels among differentiated goods in terms of geographic origin—that is, goods produced in Chicago versus goods from the ROUS. In this step, substitution elasticities play an important role in determining each agent's optimal choice; thus, the values of elasticities between two regions are very important to influence the magnitude of the regional effects. For example, even if the aging population changes the age structure in a similar pattern across the nation, the effect on regional economies will depend on this elasticity.

To measure the effects of the demographic change on the behavior of different generations, it is necessary for the model to be disaggregated by the age cohorts as well as the dynamic processes that describe the path of consumption and savings behavior of each age cohort over time. Three types of agents are in each region: (1) households, (2) firms, and (3) government. Each sector represented by these agents has stylized components, but their interactions can be quite complex. By solving for the economy's general equilibrium transition path, the model takes into account all relevant feedback among these agents, according to demographic changes and relevant government policies.

In this model, each region is populated by individual agents who live up to age 85. This limited age does not appear to be crucial because, under this assumption, less than 3 percent of the U.S. population is not considered.[5] The individual agent enters the labor market at age 21 and retires mandatorily at age 65. Because all the individuals up to age 20 are considered not to perform economic activities, reflecting that their parents support them, this model deals only with the individual agents age 21 and older. Lifetime uncertainty is considered in this model; that is, each individual faces a different probability of death in every period, which becomes higher as he or

[4] The treatment of capital mobility is important when assessing the regional investment policies.

[5] Evidence indicates that the migration behavior of retirees is not homothetic regarding age, with out-migration in the early 60s age group accompanied by significant return migration in the 70s and 80s age groups. Frey (2007) recently estimated that many people aged 75 and older moved from the South to the Midwest between 2000 and 2005.

she ages. Therefore, in every period, some fraction of people dies earlier than at age 85 and leaves accidental bequests since annuity markets are assumed to be missing.[6] Total accidental bequests are distributed evenly over all the agents alive in the next period. Moreover, each individual is assumed to face borrowing constraints. Under borrowing constraints, social security could further distort the intertemporal consumption allocation by levying a higher payroll tax on younger generations that face binding borrowing constraints.

Individuals are endowed with one unit of time and supply the labor inelastically. Because all agents in the same age cohort are identical in terms of preferences, individual heterogeneity is present only across age cohorts with respect to labor productivity; wage income depends on the individual's productivity, which is assumed to be identical across regions. Wage income might differ across regions, however, because the wage rate per unit of effective labor is region specific due to the partial labor mobility. Because of wage differences by age, the life cycle of an individual is described by a hump-shaped income profile. The individual agent starts to work at age 21 and receives the highest wage income during middle age. Retirement terminates the flow of wage income and entitles the individual to pension benefits. As a result of the uneven pattern of wage rates over their working lifetime and borrowing constraints, individuals save during middle-aged working periods and dissave in retirement, which results in uneven distribution of wealth by age cohorts.

The working population in the model age comprises the groups from 1 to 44 (ages 21 to 65) and is assumed to be partially mobile across domestic regions. The net out-migration of labor is determined by the wage elasticity of labor migration, as seen in equation (1):

$$M_t^w = POP_t^w\left(1-\frac{w_t^{CHI}}{w_t^{ROUS}}\right)^{\eta} \tag{1}$$

where M_t^w denotes the number of net out-migration of labor at time t, POP_t^w is the aggregate stock of labor given at the beginning of time t, w_t^{CHI} and w_t^{ROUS} are the wage rates in Chicago and the ROUS, and η refers to the wage elasticity of labor migration.

In equation (2), the stock of effective labor, L_e, is defined as the number of net workers $\left(N_t^w\right)$ times their corresponding productivity level (e_j) as follows:

$$\begin{aligned} L_{e,t} &= \sum_{j=1}^{44}\left(POP_{j,t}^w - M_{j,t}^w\right)e_j \\ &= \sum_{j=1}^{44} N_{j,t}^w \cdot e_j \end{aligned} \tag{2}$$

In equation (3), retirees 65 and older are assumed to migrate from one region to another region with an exogenously given rate, ε, where M_t^R and POP_t^R are the number of retiree migrants and total retirees population at time t, respectively:

$$M_t^R = \varepsilon \cdot POP_t^R \tag{3}$$

The appendix provides more details of the model structure.

[6] With perfect annuity markets, each individual does not leave unintended bequests; however, the social security system substitutes partially for the missing annuity system and reduces unintended bequests.

Increasing Immigrants

The issues surrounding international immigration have become some of the most debated topics, because international immigration has both positive and negative effects on the host economy. One of the biggest costs that immigration might create would be through adverse effects on the local labor market by crowding out native workers; increased immigration could reduce wages and exhaust employment opportunities for native workers, especially for those who are young and have low skills. Also, high-income disparities could be generated due to the large decline in the income of low-skilled workers. On the other hand, immigration fundamentally changes the age structure and may be very helpful in contributing to a solution to the demographic imbalance caused by an aging population. Also, one of the most common arguments in favor of immigration is that it will significantly alleviate the potential insolvency problem of the social security program, because immigrants pay social security tax and usually have no parents in the country who are currently drawing on the system. Of course, this argument assumes that the immigrants participate in the formal economy (whether they are legal or not) and thus contribute through direct and indirect taxes.

Over the past decade, about 800,000 legal immigrants have been newly admitted in the United States every year, according to the Department of Homeland Security. Among U.S. states, Illinois has long been a major immigrant settlement place as the fifth leading immigrant-receiving state. It has admitted nearly 0.4 million legal immigrants in the past decade, an average of 40,000 immigrants a year. The cumulative total of legal immigrants in Illinois between 1965 and 2002 was estimated to be 1.3 million. In addition, according to the U.S. Citizenship and Immigration Services (formerly the Immigration and Naturalization Service), more than 0.4 million illegal immigrants reside in Illinois; most of them are concentrated in Chicago region. Since 1993, more than three-fifths (64.7 percent) of all immigrants have come from China, India, Mexico, the Philippines, Poland, and the former Soviet Union. Mexico alone has accounted for nearly one-fourth of all new immigrants (24.8 percent). This influx of new immigrants will account for a much more significant share of Chicago's population in the next decade; currently, the Latino population of Chicago slightly exceeds that of the African-American population and is growing more rapidly as a result of higher rates of natural increase, as well as through in-migration (including both interregional and international contributions).

Simulations for impact analysis were conducted using the following three scenarios, which are differentiated by the number of immigrants for both regions, Chicago and the ROUS. Scenario 1 assumes that each region admits new immigrants, amounting to 0.6 percent of the regional population every year, which is equivalent to the historical average of immigrants entering the Chicago region between 1993 through 2002. Scenario 2, in contrast to the first scenario, assumes that only the Chicago region admits more immigrants, while the rest of the United States fixes the share of immigrants at 0.6 percent. That is, in scenario 2, the proportion of newly admitted immigrants into the Chicago region is adjusted to 1.2 percent of the population, or about 0.1 million per year.[7] Scenario 3 assumes that the local government for Chicago adopts more favorable immigration

[7] Storesletten (2000) found that the minimum number of immigrants required to balance the fiscal budget is 1.08 percent of the population in the United States.

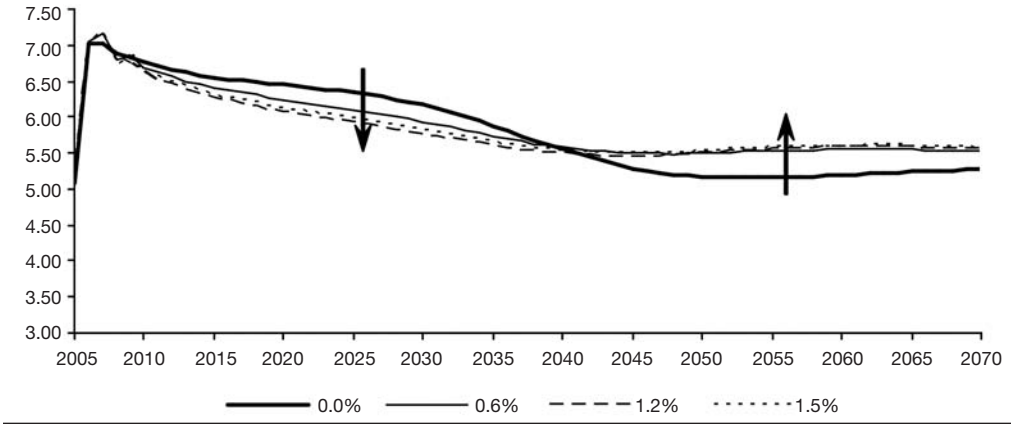
attraction policies, whereby the number of annual immigrants entering the Chicago region increases to 1.5 percent of its population, or about 0.12 million a year. According to these scenarios, the dependency ratio (the percentage of the dependent old-age populations, aged ≥65, to the population in the working age groups, (aged 15 to 64) in the Chicago region is expected to be substantially reduced over the next several decades. For example, without immigration, the model projects a significant increase in the dependency ratio from 19 to 32 percent over the next 30 years, whereas in scenario 3, new immigrants contribute to dropping the dependency ratio in the 2030s to 19 percent, about the same level (in 2005) as before the effects of an aging population. Taking into account the characteristics of immigrants that are assumed to be younger and lower skilled than the resident population, newly admitted immigrants are assumed to be equally distributed between the ages of 21 and 35, with an average productivity of about 60 percent of the peak at 47 years of age. The baseline scenario, used to compare its results with scenarios 1 through 3, assumes an aging population with no immigration.

Results

Exhibits 1 and 2 provide plots of the transitional profiles for the capital/labor ratio and wages, respectively. Initially, the inflow of young immigrants lowers the capital/labor ratio, and that, in turn, contributes to decreases in wages. After the initial period, however, the fall in the capital/labor ratio corresponding to accumulating immigrants begins to decrease and ceases its downward trend around 2040, about 5 years earlier than the baseline scenario (no immigration). After 2040, the wages under favorable immigration remain higher than the baseline scenario. This result is somewhat counterintuitive because large immigration should be expected to exert a strong downward effect on wages. One possible reason for this result is because the first immigrants start to retire in the early 2040s, resulting in an increase in the capital/labor ratio. For this result to happen, however, two more important factors are at work. The first factor is that the more immigrants that are admitted, the more native workers can save, because immigrants will significantly reduce the social security tax burden (by increasing the after-tax income of native workers). Second, at the time

Exhibit 1

Capital/Labor Ratio (Chicago)



of immigration, it is assumed that the capital does not flow into the host country with immigration, but once immigrants start to work and acquire the higher levels of productivity, they can accumulate more savings, thereby increasing aggregate capital stock. This is a critical assumption, especially as it pertains to the second and succeeding generations of offspring from the original immigrants.

These dynamic changes of the capital/labor ratio over the transition period might imply different effects of immigration between the short run and the long run. Exhibit 3 shows how the regional output would be changed by immigration streams over time. According to the simulation results, an increase in immigrants appears to have more positive effects on regional output growth. For example, in the case of the maximum contribution by the most favorable policy (scenario 3), the Chicago region appears to grow annually by 0.9 percent between 2005 and 2070, while without immigration, it will face negative growth (-0.2 percent per year) over the same period due to the

Exhibit 2

Wages (Chicago)

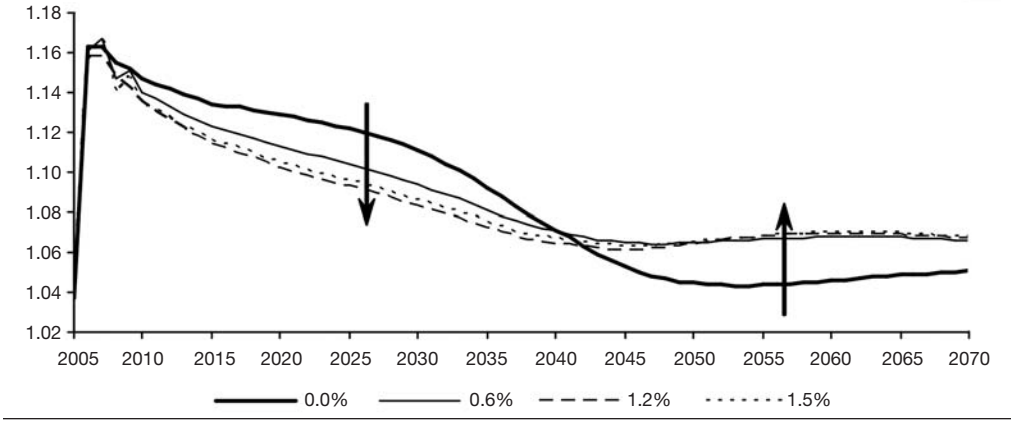
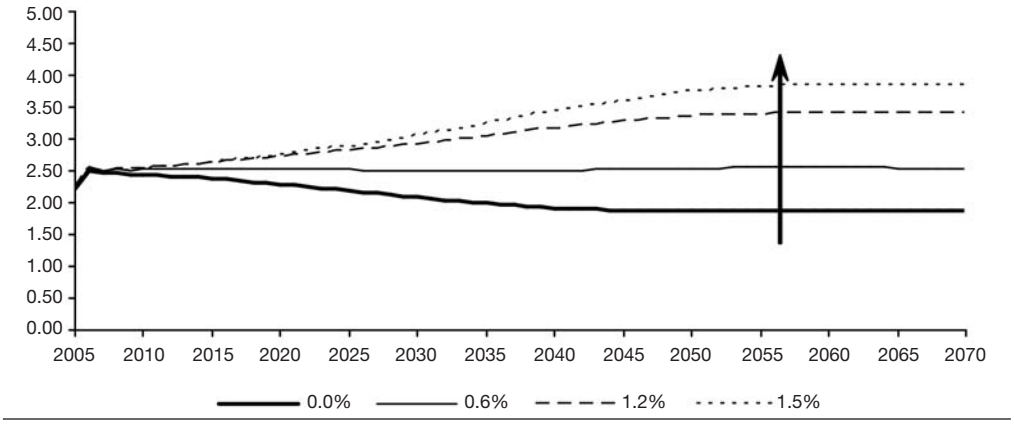


Exhibit 3

GRP (Chicago)

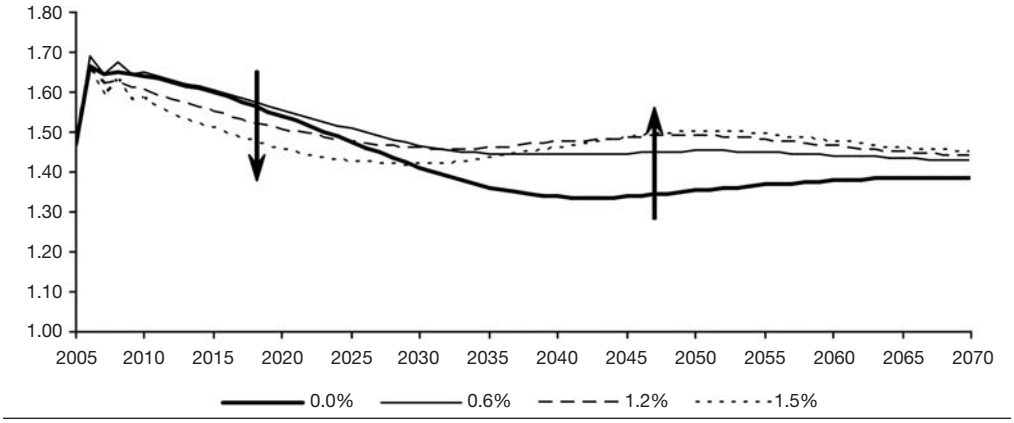


GRP = gross regional product.

effects of an aging population. This result can be fully expected because immigration provides a positive labor supply shock to the local economy. The transitional profile of per capita gross regional product (GRP), however, is not similar to that of aggregate GRP, as shown in exhibit 4. During the initial period, relatively larger immigration, in scenarios 2 and 3, keeps the per capita GRP remaining at a lower level than that of the baseline scenario because the immigration increases (by assumption) only the supply of low-skilled workers. After the 2030s, however, when the first immigrants really begin to acquire higher levels of productivity, per capita GRP assumes an upward trend and grows faster than the baseline scenario. This positive trend also substantially contributes to reducing the decline of per capita GRP under an aging population. For example, between 2005 and 2070, negative 5.5 percent of per capita GRP growth under an aging population is reduced to a range of values from negative 2.6 percent in scenario 1 to negative 1.9 and negative 1.2 percent in scenarios 2 and 3, respectively. Exhibit 5 reveals that the GRP share of the GNP for the Chicago

Exhibit 4

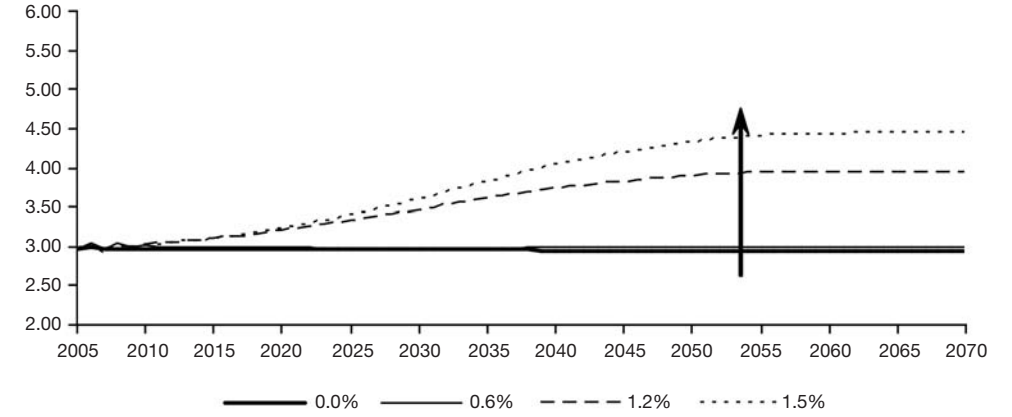
Per Capital GRP (Chicago)



GRP = gross regional product.

Exhibit 5

GRP Share (Chicago)



GRP = gross regional product.

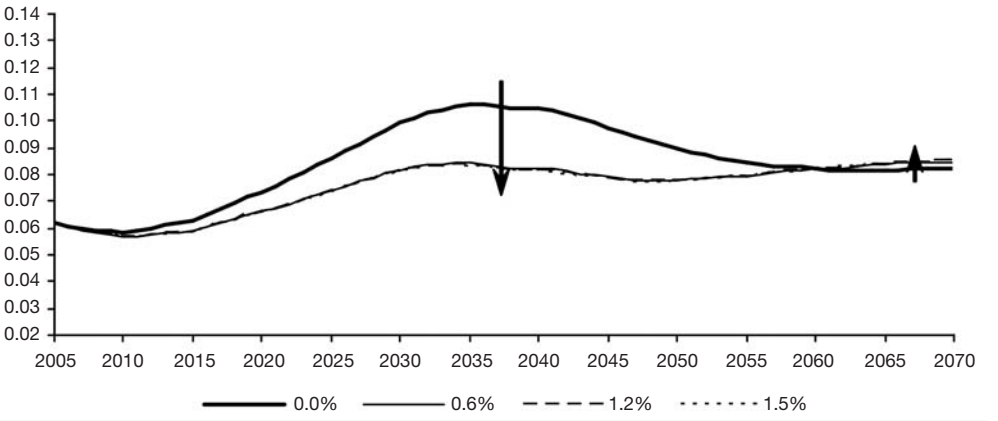
region noticeably increases from 3.0 percent to around 3.5~4.0 percent in scenarios 2 and 3, because both scenarios assume a relatively higher share of immigrants are admitted only in the Chicago region.

Exhibit 6 shows the projected effect on the social security tax rate. Not surprisingly, a larger number of working-age immigrants appears to have a significant downward effect on the social security tax rate. Because of this downward pressure, in 2050 the social security tax rate is projected to return to the level established before the effects of an aging population. This benefit is one of the most significant to be generated from immigration. On closer look, however, the benefit for the social security system is reversed when the immigrants start to retire. After 2050, the social security tax rate starts to increase and eventually converges to around 9 percent, which is higher than the rate expected under no immigration. This result reveals that, in the longer run, immigration could generate a different effect; as immigrants age, like everyone else, a sustained policy of immigration has little long-run effect on the age structure of the population, and thus its benefit declines. Another important policy implication, especially for local governments, arises from the different stance on immigration between Federal and local governments. In the case of scenarios 2 and 3, only the Chicago local government optimistically attracts more immigrants than does the national average. The social security tax rate changes insignificantly, however, because the additional working-age immigrants in Chicago region are not of a significant size to decrease the tax rate, which is influenced by changes in the national population. Therefore, locally increased immigration may only hurt the local labor market without generating additional tax benefits. This point is important; local autonomy in the case of a small region has limited effect on national policy that, in turn, could affect the outcome in Chicago.

Exhibits 7 and 8 present the effects of immigration on both income and asset distribution, respectively. Immigration has a negative effect on equality in terms of income distribution; that is, the income Gini coefficient becomes larger as more immigrants are admitted. This increase in inequality can be explained by the following two reasons. First, younger, lower income groups substantially rely on labor income, while middle-aged populations earn larger incomes from both asset holdings and labor earnings. Thus, the younger populations become relatively poorer as more

Exhibit 6

Social Security Tax Rate



immigrants decrease wage income, whereas richer, middle-aged populations are not much affected by immigration because they earn larger capital income as a result of the increases in the interest rate. The second reason is closely related to the change in the demographic structure associated with immigration. Before the first immigrants start to retire around the 2040s, the share of the population with larger income increases relatively faster than the younger and older poor populations because more immigrants acquire higher skills and become richer. This structural change in population increases the aggregate income gap between the richer middle-aged population and the poorer young and old populations. After the 2040s, however, because wages start to increase and immigrants starts to retire, the Gini coefficients in all immigration scenarios start to fall. In contrast to the income distribution effect, immigration improves the equality of asset distribution until the mid 2030s; that is, the asset Gini coefficient falls. The effect of immigration on asset distribution, however, is reversed during the subsequent period. Basically, immigration has an upward pressure

Exhibit 7

Income Gini Coefficient (Chicago)

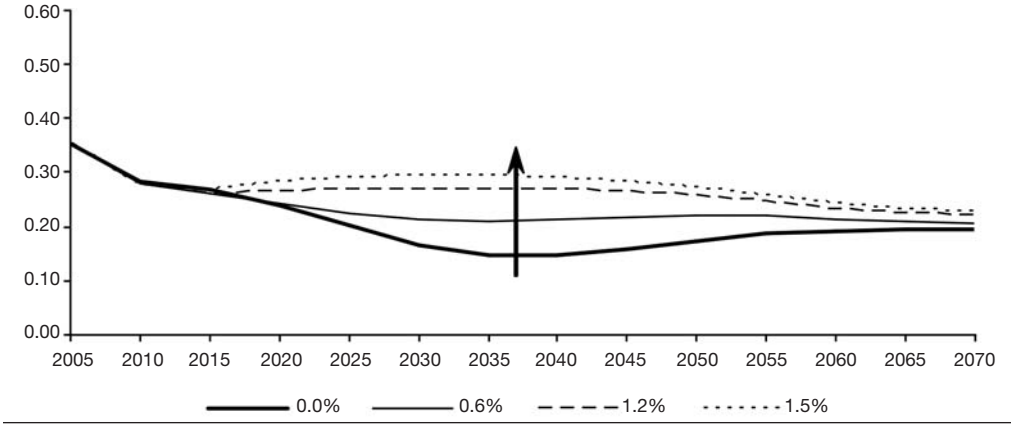
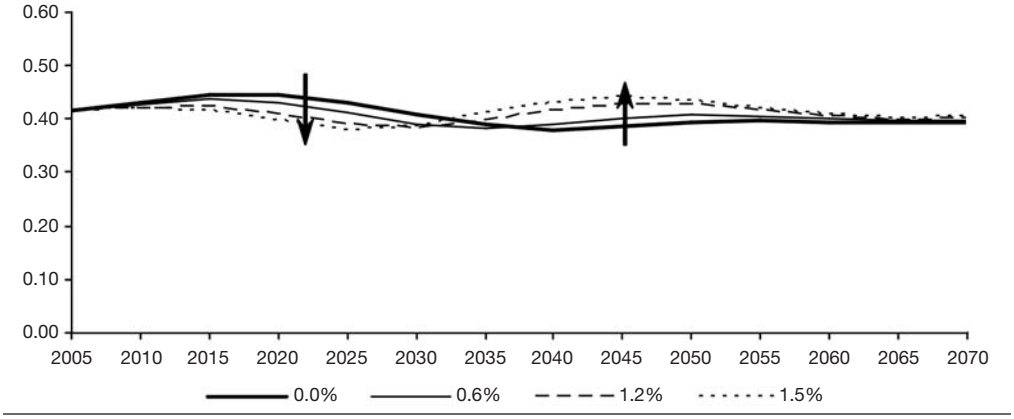


Exhibit 8

Asset Gini Coefficient (Chicago)

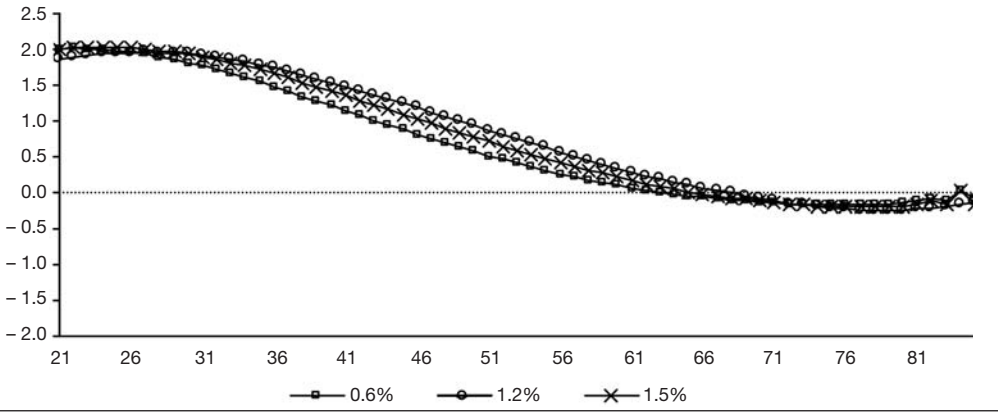


on the asset Gini coefficient, because it increases the asset holdings of the wealthiest group without significant changes in asset holdings of younger generations that face liquidity constraints. In the initial period, however, the increasing number of younger populations associated with new immigrants drives the asset Gini coefficient down, reflecting the reduced gap of the aggregate asset between the middle-aged, wealthy population and the younger, poor population.

Exhibit 9 shows how the welfare effects of immigration vary over the transition periods.[8] The welfare benefit is measured by a consumption equivalent variation (EV),[9] which computes the consumption change required to keep the expected utility in the initial condition equal to that achieved in the new condition under immigration policies. Given the form of the utility function, a positive (negative) EV implies that the long-term benefit (cost) in terms of welfare would be provided as a result of more favorable immigration policies. According to the simulation results, the current young populations appear to be big gainers of the favorable immigration policy. The rationale for this is that, even with the wage declines in the initial period, the prospect of higher disposable income for the rest of their lives obtained by both increased interest rates and reduced social security tax outweighs the negative effect from the wage loss. This outcome is good news for current young generations. Unlike the assumption of this model, however, if more immigrants fail to adapt to conditions in the host region's labor market, and thus remain lower skilled workers, then immigration cannot make a sufficient contribution to increasing tax contributions.

Exhibit 9

Equivalent Variations (Chicago)



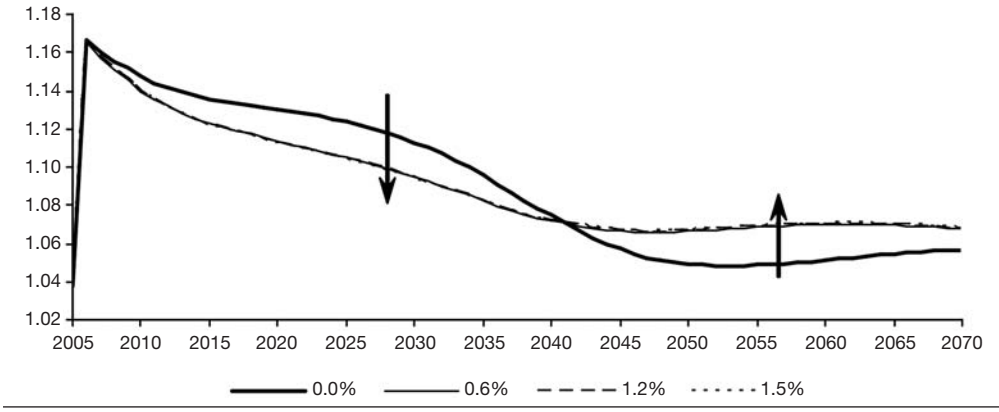
[8] Welfare effects of the policy reforms between steady states, which does not consider the welfare changes during the transition periods, are reported in the policy mix.

[9] Equivalent variation is calculated as $EV = \left(\frac{v(a, j, t+1)}{v(a, j, t)} \right)^{1/(1-\gamma)}$, where a is asset holdings, j is age, and t is time.

The last five exhibits, exhibits 10 through 14, show how the increase in the number of immigrants affects the economy of the ROUS. As in the Chicago region, the immigration fundamentally changes the age structure of the ROUS and is generally helpful in solving the economic growth problems of an aging population. It appears, however, that the immigration policy of the Chicago region has only a marginal effect on the economic growth and welfare of the ROUS. Of course, this result is due to the relatively modest size of the Chicago region compared to the ROUS. Thus, the reverse is not true as shown in scenario 1.

Exhibit 10

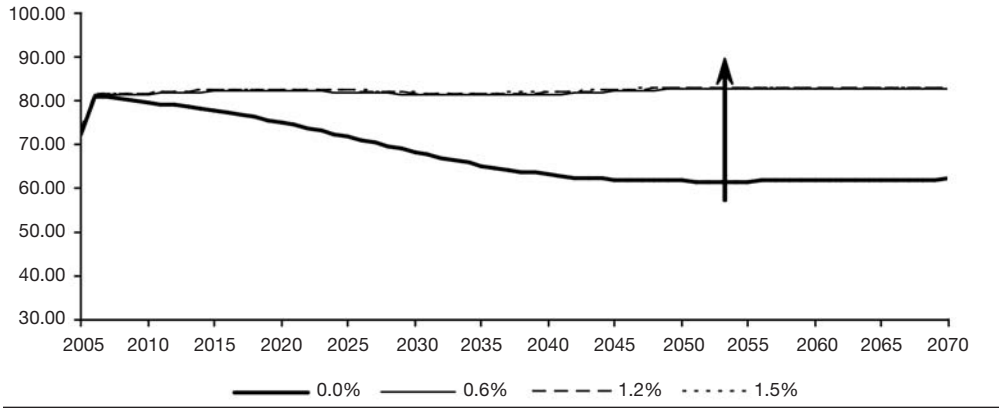
Wages (ROUS)



ROUS = Rest of the United States.

Exhibit 11

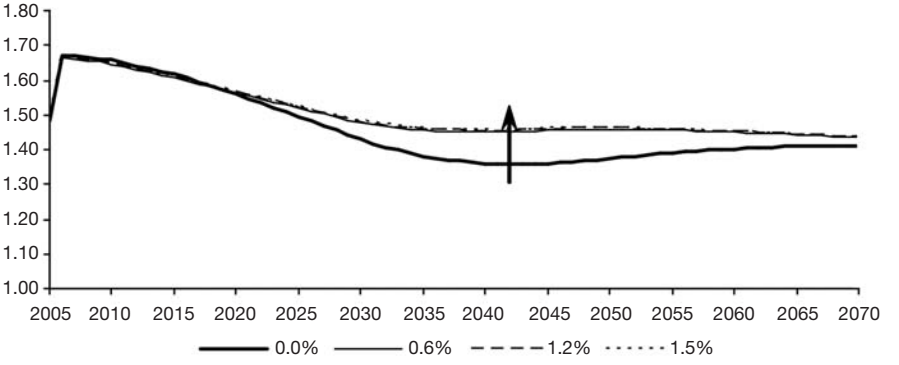
GRP (ROUS)



GRP = gross regional product. ROUS = Rest of the United States.

Exhibit 12

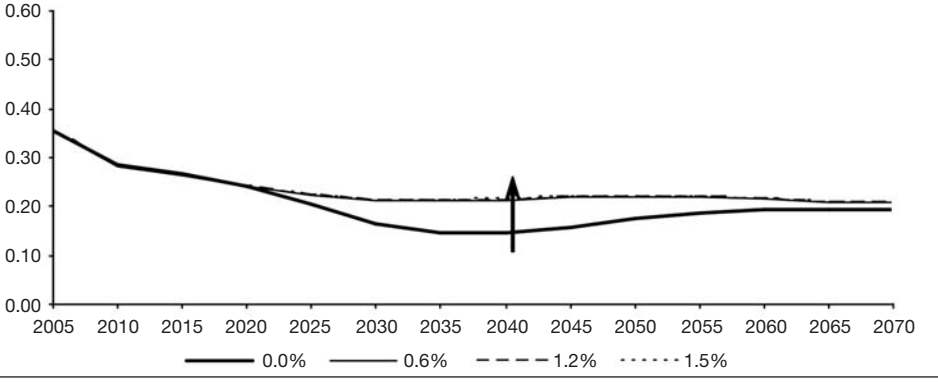
Per Capita GRP (ROUS)



GRP = gross regional product. ROUS = Rest of the United States.

Exhibit 13

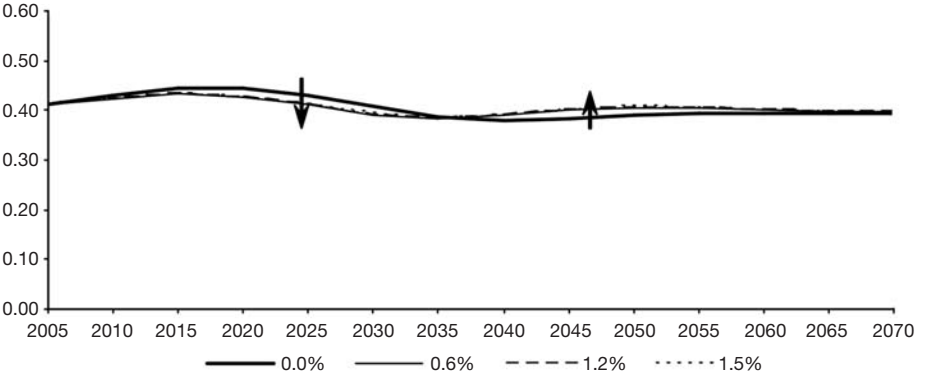
Income Gini Coefficient (ROUS)



ROUS = Rest of the United States.

Exhibit 14

Asset Gini Coefficient (ROUS)



ROUS = Rest of the United States.

Evaluation and Conclusions

As with any model, the interpretation of the results is rooted in the reasonableness of the assumptions. For an economy that is small relative to the nation (although still large in absolute terms), the outcomes in terms of enhanced flows of immigrants are variable. The results provide insights into the complexity of the immigration debate and why it is so difficult to navigate a policy outcome that is consistent in the sense that it provides either continuously positive or negative outcomes over time. Consider the effects on wages; initially, and, not surprisingly, wages fall as a result of increased immigration. This finding is consistent with an equilibrium view of a market receiving a supply shock and a fall in the capital/labor ratio; but after 2040, the effects appear to be reversed. One reason for this fall can be traced to the retirement of the first wave of immigrants, but, more importantly, increasing numbers of immigrants will provide contributions to taxes that will reduce the social security tax burden and thus increase the after-tax income of native workers. Over time, the model assumes that immigrants and their offspring begin to accumulate skills in such a way that they become undifferentiable from the native population. In terms of regional macroeconomic effects, immigration would appear to reverse a projected decline in gross regional product that would occur essentially as a result of an aging population with no stimulus provided by immigration. In per capita GRP terms, however, the positive effects occur only after the immigrants (cumulatively) acquire skills to elevate their productivity levels. The Chicago region, under an asymmetric immigration policy (Chicago gains more immigrants as a percentage of its base population than the United States as a whole), actually increases its share of gross domestic product.

One might expect that, given these findings, the effect on the social security tax rate would be "positive" in the sense of either muting increases or actually decreasing the rate. This positive effect is true until the immigrants start to retire in significant numbers after 2050; this result stems from the fact that, over time, the effects of immigration begin to diminish—a finding that is revealed in the results for the United States as a whole.

In this article, it is assumed that consumers are forward looking and have the capacity to adjust their consumption to anticipate needs in retirement; however, little has been said about the optimal policy strategy for a region such as Chicago. Does it make sense to adopt a proactive immigration policy? Given the findings, is there some imperative to increase the immigration rate over time or is there some longrun optimal level? This part of the analysis is incomplete; further, it would be unrealistic to explore the issue without consideration of the expected structural transformation of the economy. Beyond 2050, confidence in forecasts must be more heavily depreciated, but they cannot be ignored because there appears to be an important turning point in the welfare implications during the 2030–50 period. Clearly, this area is one in which more intensive analytical fine-tuning needs to be accomplished; what is not in dispute, however, is the importance of skill acquisition and the enhancement of productivity levels in the immigrant populations and their offspring.

Appendix: Model Specification and Data Calibration

The model is described in more detail in Park and Hewings (2007). This appendix summarizes the more important features of the structure.

Household Sector

Each individual makes lifetime decisions about consumption and savings at the beginning of his or her adult life, leaving no voluntary bequests and receiving no inheritances. Because each agent is represented as forward looking and having perfect foresight, the evolution of consumption and savings depends on all future interest rates and after-tax wages.

Representative agents of each age cohort maximize a time-separable expected lifetime utility function, U, that depends on streams of aggregate consumption goods, C. Mortality risk is represented by the conditional probability, s. $\prod_{k=1}^{j} s_k$ is then the unconditional probability of being alive at age k, as shown in equation (4):

$$U_i = \sum_{j=1}^{65} \left(\frac{1}{1+\rho}\right)^{j-1} \left[\prod_{k=1}^{j} s_k\right] \frac{(C_{i,j})^{1-\gamma}}{1-\gamma} \tag{4}$$

where $C_{i,j}$ is the aggregate consumption of an individual of age j in i_{th} generation, ρ is the subjective discount rate, and γ is the inverse of the intertemporal elasticity of substitution. Thus, the effective discount rate is expressed as $\left(\frac{1}{1+\rho}\right)^{j-1} \prod_{k=1}^{j} s_k \frac{1}{1-\gamma}$, meaning that with mortality risk, the utility of future consumption is more heavily discounted.

At every period, each individual faces the budget constraints described as follows:

$$(1+\tau_c)P^C C_{i,j} + a_{i,j} = (1-\tau_w-\tau_p)w\, e_j + (1+(1-\tau_r)r)a_{i,j-1} + pen_{i,j} + \Phi$$

where $a_{i,j}$ is the asset of generation i at age j; τ_w, τ_c, and τ_r are tax rates on labor income, consumption, and capital income, respectively; τ_p is the social security tax rate (that is, pension contribution rate); w is the wage; r is the interest rate; and P^C is the price of aggregate consumption good. $pen_{i,j}$ stands for the pension benefit of generation i at age j, and Φ is the transfer from accidental bequests. An individual's labor productivity is assumed to be an exogenous function of his or her age.

This productivity difference by age is captured by e_j, which changes with age j in a hump-shape way (Miles, 1999). For simplicity, productivity age profile, e_j, is constant in terms of time and region, as shown in equation (5):

$$e_j = \lambda_1 + \lambda_2 j - \lambda_3 j^2 \tag{5}$$

With the maximization procedure, the following standard first-order conditions can be derived, concerning consumption per period. Equation (6) implies that the marginal rate of substitution between consuming now and consuming later equals the relative price of consuming later instead of now:

$$\begin{aligned} C_{i,j} &= \left(\frac{1+r_t}{1+\rho}\right)^{\frac{1}{\gamma}} \left\{\frac{P^C_{t-1}(1+\tau_{c,t-1})}{P^C_t(1+\tau_{c,t})}\right\}^{\frac{1}{\gamma}} C_{i,j-1} \\ C^A_t &= \sum_{j=1}^{65} N_{65-j+1,t} C_{t-j+1,j} \end{aligned} \tag{6}$$

where C_t^A is the aggregate consumption at time t, and $N_{j,t}$ measures the number of people in age cohort j at time t.

The wealth accumulation equation—equation (7)—can be obtained with the maximization procedure, where A_t is the aggregate asset at time t:

$$\begin{aligned} a_{i,j} &= a_{i,j-1}\{1+(1-\tau_{r,t})r_t\}+(1-\tau_{w,t}-\tau_{p,t})w_t e_j + pen_{i,j}-(1+\tau_{c,t})P_t^C C_{i,j}+\Phi_t \\ A_t &= \sum_{j=1}^{65} N_{65-j+1,t}\, a_{t-j+1,j} \end{aligned} \tag{7}$$

After these optimal conditions governing the aggregate consumption levels at each period are established, the next step is to distribute the optimal consumption of its purchases in terms of regional geographic distribution. The representative agent of each age group minimizes total expenditure, with an aggregate level of consumption being a constant elasticity of substitution composite of two regional goods, as shown in equation (8):

$$\min P_s^C C_{i,j,s} = p_s^{HOME} c_{i,j,s}^{HOME} + p_s^{ROUS} c_{i,j,s}^{ROUS} \tag{8}$$

subject to:

$$C_{i,j,s} = \left[(\beta_s)^{(1-\varphi_s)} (c_{i,j,s}^{HOME})^{\varphi_s} + (1-\beta_s)^{(1-\varphi_s)} (c_{i,j,s}^{ROUS})^{\varphi_s} \right]^{1/\varphi_s}$$

where $c_{i,j,s}^{HOME(ROUS)}$ is the consumption of generation i at age group j for a Chicago (HOME) or rest of the United States (ROUS) produced goods at region s, β_s is the consumption share parameter for goods produced in region s, and ϕ_s is the parameter that controls taste for variety. Optimal consumption of the differentiated goods between imports and domestic goods takes the forms shown in equation (9):

$$\begin{aligned} c_{i,j,s}^{HOME} &= \beta_s \left[\frac{P_s^C}{p_s^{HOME}} \right]^{\sigma_s} C_{i,j,s} \\ c_{i,j,s}^{ROUS} &= (1-\beta_s) \left[\frac{P_s^C}{p_s^{ROUS}} \right]^{\sigma_s} C_{i,j,s} \end{aligned} \tag{9}$$

where σ_s is the Armington elasticity of substitution for consumption in regions s between homemade goods and imported goods[10]. Equation 9 implies that the demand by an individual of region s for a good produced in each region is the function of the price of that good relative to the price of aggregate goods and of the quantity of aggregate goods the individual wants to buy.

Equation (10) shows that combining equation (9) with equation (8) yields the aggregate price (P_s):

$$P_s = \left\{ \beta_s \left[p_s^{HOME} \right]^{1-\sigma_s} + (1-\beta_s) \left[p_s^{ROUS} \right]^{1-\sigma_s} \right\}^{1/(1-\sigma_s)} \tag{10}$$

[10] σ is equal to $1/(1-\varphi)$. Thus, as long as ϕ is sufficiently less than 1, which implies σ is finite, consumers regard each good produced by different origin as an imperfect substitute and prefer variety.

Production Sector

In each region, a single representative firm specializes in the production of a unique regional good. Production in every period takes place with a constant return to scale of a Cobb-Douglas production technology, using capital stock installed at the beginning of the period in the region and the full regional labor force, as shown in equation (11):

$$Y_t = AK_t^{\alpha} L_{e,t}^{1-\alpha} \tag{11}$$

where Y is the output; A and α stand for scale parameter and capital income share, respectively; and K and L_e represent the capital stock and effective labor force, respectively.

The current cash flow of the firm π_t is determined by equation (12):

$$\pi_t = P_t^C Y_t - w_t L_t - P_t^C I_t \tag{12}$$

where $I_t = K_t + (1-\delta)K_{t-1}$ is the investment, and δ stands for depreciation rate of capital. The firm maximizes its value, which is expressed as future cash flow discounted by gross interest rate R, as shown in equation (13):

$$\max \sum_{t=0}^{\infty} \left(\prod_{s=0}^{t} \frac{1}{R_t}\right) \pi_t \tag{13}$$

The first order conditions to this problem yield the factor demand conditions, as shown in equation (14), equation (15), and equation (16):

$$\frac{re_t}{P_t^C} = \alpha A K_t^{\alpha-1} L_{e,t}^{1-\alpha} \tag{14}$$

$$\frac{w_t}{P_t^C} = (1-\alpha) A K_t^{\alpha} L_{e,t}^{-\alpha} \tag{15}$$

$$R_{t+1} = (re_{t+1} + (1-\delta)) \frac{P_{t+1}^C}{P_t^C} \tag{16}$$

where re is rental return of capital. Equation (16) implies that the unique gross interest rate is increased by rental return of capital and capital gains.

Government Sector (Generic Government)

The role of the government in this economy is simply to levy the taxes and administer the social security programs. The government has three types of taxes: wage income tax, consumption tax, and capital income tax. Since this economy ignores the public debt, the government balances the budget constraint, spending tax revenues without issuing government bonds. The government decides tax rates according to budget constraints to balance for each period. The government budget constraint is defined as shown in equation (17):

$$\sum_{j=1}^{65} N_{j,t} (\tau_{w,t} w_t e_{j,t} + \tau_{c,t} P_t^C C_{j,t} + \tau_{r,t} r_t A_{j,t}) = P_t^C G_t \tag{17}$$

where G_t is the government expenditures at time t.

The government also manages the public pension system, which is initially modeled as a pay-as-you-go (PAYG) scheme for the benchmark economy. Under a PAYG system, the government grants a fixed pension benefit to the retired generations, while pension contributions are completely

financed by the current working generations. The pension benefits are determined as a fraction of the lifetime average wage earnings from age 21 through the previous age of retirement. The fraction is given by the replacement rate, ψ, which is assumed to be identical across the region. Aggregate pension benefit is represented by equation (18):

$$PB_t = \sum_{j=45}^{65} N_{j,t}[\psi(\frac{1}{44}(\sum_{k=1}^{44} w_{t-j+k}e_k))] \tag{18}$$

Aggregate pension contribution, shown in equation (19), is determined by the product of the population of working group N_j, social security tax rate τ_p, and labor income $w_t e_j$.

$$PC_t = \sum_{j=1}^{44} N_{j,t}\tau_{p,t}w_t e_j \tag{19}$$

Because the pension budget constraint is balanced every period, $PB_t = PC_t$, the model can calculate the path of social security tax from the current working generation, which is endogenously determined.

Migration

The working population in model age group from 1 to 44 is assumed to be partially mobile across domestic regions. The net out-migration of labor is determined by the wage elasticity of labor migration, shown in equation (20):

$$M_t^w = POP_t^w(1-\frac{w_t^{HOME}}{w_t^{ROUS}})^{\eta} \tag{20}$$

where M_t^w denotes the number of net out-migration of labor at time t, POP_t^w is the aggregate stock of labor given at the beginning of time t, w_t^{HOME} and w_t^{ROUS} are the wage rates in Chicago (HOME) and the rest of the United States (ROUS), and η refers to the wage elasticity of labor migration.

The stock of effective labor L_e is defined as the number of net workers, N_t^w, times their corresponding productivity level, e_j, as shown in equation (21):

$$\begin{aligned} L_{e,t} &= \sum_{j=1}^{44}(POP_{j,t}^w - M_{j,t}^w)e_j \\ &= \sum_{j=1}^{44} N_{j,t}^w \cdot e_j \end{aligned} \tag{21}$$

Retirees aged over 65 are assumed to migrate from one region to the other region with the exogenously given rate ε, where M_t^R and POP_t^R are the number of retiree migrants and total retirees population at time t, respectively, shown in equation (22):

$$M_t^R = \varepsilon \cdot POP_t^R \tag{22}$$

Market Clearing Conditions

Two equilibrium conditions close the model. First, the equilibrium conditions for the goods market must hold, which states that domestic output is equal to total demand from household, C_t; government, G_t; and firms, I_t, shown in equation (23):

$$\begin{aligned} D_t &= C_t + G_t + I_t \\ &= [\sum_{j=1}^{65}(N_{j,t}^{HOME} \cdot C_{j,t}^{HOME} + N_{j,t}^{ROUS} \cdot C_{j,t}^{ROUS})] + G_t + K_t - (1-\delta)K_{t-1} \end{aligned} \tag{23}$$

The second condition is equilibrium in the financial market. A financial market equilibrium condition ensures that the stock of assets accumulated by all individuals must be equal to the sum of the capital stock used in both regions, shown in equation (24):

$$A_t^{HOME} + A_t^{ROUS} = K_t^{HOME} + K_t^{ROUS} \tag{24}$$

Data and Calibration

One key issue in computable general equilibrium modeling is calibration, which is the process of selecting values of exogenous parameters to ensure that the solution is consistent with what is observed in the data. The calibration of the model is basically conducted to replicate the equilibrium conditions in the base year, which is 2005 in this model. Because national values are easily obtained from the accessible national data set like National Income and Product Accounts and previous studies (Brown et al., 1992; Kouparitsas, 1998), the following text mainly describes the choice of regional parameters.

Steady state conditions and the microconsistent data set for the Chicago region are obtained mostly from the Chicago Social Accounting Matrix (SAM) constructed by IMPLAN[11] and Illinois input-output multipliers and Chicago input-output tables prepared by the Regional Economics Applications Laboratory at the University of Illinois at Urbana-Champaign. Furthermore, a computable general equilibrium model for the Chicago region under a single representative household has been completed, and many of the parameters for this model are used in this two-region system.

Some regional parameters that appear in the utility and production functions are obtained from the corresponding national counterparts, because the model assumes the same type of household preferences and production function across regions. For example, the coefficient of relative risk aversion is chosen by γ =1.91, following the estimates established by Hurd (1989) and Imrohoroglu et al. (1999).[12] The subjective discount factor is chosen by $1/(1+\rho) = 1.011$, following the suggestion of Imrohoroglu et al. (1999) to reproduce a reasonable wealth-output ratio. Both preference parameters generate the wealth-output ratio of 2.89, which is slightly lower than the empirical measurement of 3.15 by Laitner (1992). The production parameters are calibrated along the line suggested by previous studies. The depreciation rate, δ, and the technology parameter, *A*, for both Chicago and the ROUS are set at 0.069 and 1.005, respectively. The labor share of output, α, for Chicago is calibrated using Chicago SAM, yielding a value of 0.66, instead 0.69 for the ROUS.

For the demographic data set, the population change by age cohorts until 2050 is obtained from the projections provided by the United Nations (U.N.) and the Illinois Department of Commerce and Economic Opportunity. The conditional survival probabilities, *s*, are taken from Faber (1982) These estimates imply a dependency ratio results in a dependency ratio of 17.7 percent in the base year, which is close to a ratio of 17.8 percent based on the U.S. census data for 2005. And, over the demographic transition periods, the dependency ratio calibrated in the model closely approximates to the one from the U.N. projection. The labor earning's profile is taken from Hansen (1991).

[11] IMPLAN (www.implan.com) provides annual data for U.S. counties and states as well as nonsurvey input-output and social accounts.

[12] Mehra and Prescott (1985) suggested that the coefficient of relative risk aversion is between 1 and 2.

Also, the price elasticities in interregional trade are assumed to be the same as those in international trade, following the suggestion by Jones and Whalley (1989). The labor migration elasticity is specified at 0.137, reflecting the past studies on interregional migration (Plaut, 1981; Seung and Kraybill, 2001). The replacement rate for the base year is taken to be 50 percent of the average wage income, which matches its empirical counterpart.[13]

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Exploring Recent Trends in Immigrant Suburbanization

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Abstract

Central cities historically have been viewed as "ports of entry" welcoming new immigrants to the United States. Beginning in the 1970s, new immigrants began to settle in areas outside traditional ports of entry as economic opportunities moved to the suburbs and new suburban immigrant enclaves emerged. By the end of the 20th century, foreign-born suburbanites outnumbered foreign-born central city residents.

This article relies on microdata from the U.S. Current Population Survey to identify the determinants of suburban location choice among foreign-born U.S. residents. The analysis includes a variety of controls for household-level socioeconomic characteristics, metropolitan area characteristics, and country of origin. Graphs displaying trends in suburbanization and location choice among U.S. immigrants, along with logit regression models of suburban destination, suggest that recent waves of foreign-born immigrants choose residential locations in conformance with spatial assimilation theory. The study also finds evidence that native and immigrant groups place a different value on the consumer amenities found in the central city and the transportation access and owner-occupied housing supply found in the suburbs. Trends in immigrant suburbanization follow trends in housing and gas prices. These trends have interacted with metropolitan-specific conditions to affect rates of suburbanization among foreign-born residents.

Introduction

Since the work of Park (1950), sociologists, economists, and geographers have been interested in explaining the assimilation of new immigrants into American society. Suburbanization is often taken as a sign of spatial assimilation and status attainment, given that suburbanization is often associated with homeownership in areas away from traditional immigrant enclaves. Whereas most European immigrants moving to the United States during the early portion of the past century tended to initially locate in the central city and move out of central cities following increases in

socioeconomic status and cultural assimilation, many newer Asian and Latino immigrants are choosing suburban residential locations immediately upon relocating to the United States (Waters and Jimenez, 2005). This change is due in part to the recent decentralization of immigrant locations, which creates opportunities for location in suburban immigrant enclaves (Frey, 2006). Rising housing costs during the past decade have also increased the appeal of suburban locations, which tend to offer more affordable housing opportunities. By the 1990s, 48 percent of immigrants recently arriving in the United States chose to locate in suburban areas (Alba and Nee, 2003).

Apart from aggregate U.S. Census statistics that report net annual international migration flow estimates by county, no studies have examined the rate and determinants of immigrant suburbanization since 2000. The few studies that examined suburbanization of foreign-born residents in the 1990s tended to focus on individual metropolitan areas. This study is the first to provide information about the determinants of suburbanization among recent waves of U.S. immigrants. The study also includes a more robust set of controls not found in previous studies, including household-level socioeconomic controls, country of origin fixed effects, year fixed effects, and characteristics of the surrounding metropolitan statistical area.

Descriptive statistics on trends in suburbanization and location choice among U.S. immigrants, along with logit regression models of suburban destination, suggest that recent waves of foreign-born immigrants choose residential locations in conformance with spatial assimilation theory. The study also finds evidence that native and immigrant groups place a different value on the consumer amenities found in the central city and the transportation access and owner-occupied housing supply found in the suburbs. Trends in immigrant suburbanization follow trends in housing and gas prices. These trends have interacted with metropolitan-specific conditions to affect rates of suburbanization among foreign-born residents, particularly since 2005.

The next section of this article describes the data and methodology used in the study and is followed by sections that discuss results of the analysis and summarize the findings. The final section discusses the implications of these findings for smart growth policies and federal fair housing policy.

Data and Methodology

The data used in this analysis come from the U.S. Current Population Survey (CPS). The CPS is a U.S. household survey administered by the U.S. Census Bureau for the Bureau of Labor Statistics. The survey asks a variety of questions on labor force characteristics, demographic characteristics, residential location, mobility, and migration. The survey is conducted monthly. In addition, each year in March, the survey includes a detailed set of supplemental questions on a variety of more detailed demographic variables. Total sample sizes range from around 64,000 to more than 97,000 U.S. households, depending on the year.

The study presented in this article relies on a pooled sample of March CPS surveys conducted from the years 1994 through 2008. Sample sizes for this study are smaller than those for the entire United States, because the study eliminated those respondents not reporting suburban residential location status, metropolitan area location status, or foreign-born status. For this study, we chose the year 1994 as the base year, because the CPS first identified foreign-born status in that year. The

CPS data are acquired from the Integrated Public Use Microdata Series project, administered by the Minnesota Population Center.

The primary analysis reported in this study is a logit regression model explaining the probability of locating in a suburban residential location versus a central city location. For the period under investigation, the CPS identifies each household's residential location by U.S. metropolitan statistical area (MSA) and within metropolitan statistical areas by central city and suburban residential location status. The central city/suburban status variable, provided by the U.S. Census Bureau, links survey respondent records to the residential location of the respondent.

The literature points to several factors that are important in shaping suburban location destinations among foreign-born and native residents. These factors include the following characteristics:

- **Household income.** In the monocentric model of urban residential location (Muth, 1969), households make tradeoffs between housing costs and transportation cost savings when choosing a location within any given metropolitan area. Assuming the income elasticity of demand for housing exceeds the income elasticity of demand for leisure time, increases in household income are associated with an increased propensity to move outward to consume larger homes at lower prices. Margo (1992) found that 43 percent of postwar suburbanization could be attributed to rising U.S. household incomes. Alba et al. (1999) found that the positive effect of income on suburbanization is larger for immigrants than for native non-Hispanic Whites.

- **Education.** Controlling for income, education status has been shown to be negatively correlated with a suburban location choice. Glaeser, Kolko, and Saiz (2000) and Sander (2005) attributed this finding to the importance of consumer amenities found in urban areas, which tend to be attractive to highly mobile workers with high levels of human capital. Consumer amenities are important as both a residential amenity and as a venue for knowledge sharing among high-human-capital workers. Alba et al. (1999) found that, among many immigrant households, education is positively associated with suburbanization, possibly due to occupational differences between natives and immigrants that differentially affect the importance of consumer amenities.

- **Race.** Non-White households have been shown to be less likely to choose suburban destinations due to lower relative household incomes and discriminatory barriers to housing choice found in the suburbs. For example, Gabriel and Rosenthal (1989) found that large simulated changes in household characteristics have little effect on patterns of African-American suburbanization, which suggests that such households face discriminatory barriers that impede their location choices.

- **Family characteristics.** Households requiring more space for large families will tend to choose housing in suburban areas, where spacious homes are more plentiful. Among immigrant households, cultural differences influencing tastes for multifamily versus single-family residential environments, along with differences in family sizes and the age of family members, contribute to differences in the observed spatial patterns of foreign-born households relative to native-born residents.

- **Occupation.** Controlling for income, occupation may exert an independent influence on a household's propensity to choose a suburban location if different occupations require different degrees of access to central business districts or if jobs in different occupations are spatially

distributed in different ways. Those working professional and service jobs requiring high degrees of repeated face-to-face interaction may choose to locate in centralized areas that are in close proximity to other similar workers. Similarly, the decentralization of low-skilled service and retail jobs may pull workers in those occupations to suburban locations to reduce commuting costs.

- **Metropolitan characteristics.** Suburban residential locations may be more or less desirable in different metropolitan areas, depending on the amenities offered by the city versus the suburbs. Suburban areas may be easier to access if road networks are sufficiently dense to facilitate travel to the central city. As Cutler, Glaeser, and Vigdor (2008) pointed out, immigrants may value proximity to roads differently if they rely on transit more heavily due to cultural affinities to this particular transportation mode or relatively lower incomes, which render public transit the only feasible transportation option. This study captures this effect by including a measure of the meters of major roads per hectare (100 acres) found outside the central city. Central cities also offer consumer amenities, such as those found in large retail and recreation conglomerations. To capture this effect, the study includes a measure of the number of bars and restaurants per 1,000 people in the metropolitan area. This measure is metrowide but, because such amenities are traditionally concentrated in the central city, the variable effectively captures intermetropolitan differences in the availability of central city consumer amenities. The availability of owner-occupied housing in the suburbs is also included as a control to capture intrametropolitan differences in housing stock characteristics. The percentage of intergovernmental transfers as a percentage of local revenue sources is included to capture the intrametropolitan fiscal capacity of local governments. The availability of increased revenue from nonlocal sources may alleviate the intrametropolitan fiscal disparities and increase the relative attractiveness of central cities, which tend to face fiscal pressures from their relatively lower tax base and higher public service needs. Because immigrant households have been shown to locate in areas where other immigrant households are more highly concentrated, the study also includes a measure of the relative size of the foreign-born population in the surrounding suburban area. Remaining metropolitan controls include the total metropolitan area population and the percentage of the population residing in suburban areas.

Spatial assimilation theory asserts that foreign-born residents will choose suburban residential locations after assimilating culturally and socioeconomically (Massey, 1985). As a result, additional factors likely influence suburban destination among U.S. immigrants, including citizenship status, year of immigration, and generation of immigration. All other things being equal, U.S. citizens with a longer history of residence in the United States are assumed to exhibit a higher likelihood of choosing a suburban residential location. Furthermore, first generation immigrants born abroad are assumed to be less likely to suburbanize than second generation immigrants whose parents were born abroad.

Country of origin is also likely to be an important determinant of suburbanization among foreign-born households. Country-specific heterogeneity may result from intercountry differences in the value placed on automobile transportation modes, intercountry differences in the value placed on suburban housing amenities, and intercountry differences in the average socioeconomic characteristics of in-migrating workers.

The source for all household-level variables is the 1994 through 2008 March CPS. Samples from all years are pooled to ensure sufficient sample sizes for estimation. This pooled model assumes that the influence of household and MSA characteristics on suburbanization is constant over time. To capture time-varying effects, such as rising housing costs, the recent credit crunch, and gas price fluctuations, the study includes year-specific dummy variables.

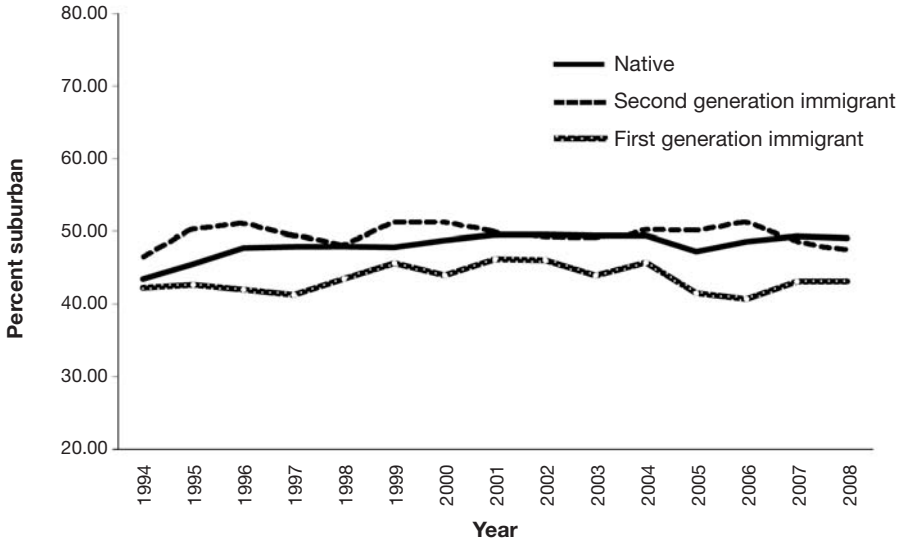
MSA variables are constructed from a variety of sources. Data on urban fringe road density, restaurants and bars per capita, and intergovernmental transfers were provided by Burchfield et al. (2006) available on line at http://diegopuga.org/data/sprawl. All other MSA-level data, provided by the American Communities Project (presented jointly by the Initiative in Spatial Structures in the Social Sciences, Brown University, and the Lewis Mumford Center, University at Albany), are available at http://mumford1.dyndns.org/cen2000/data.html. MSA boundaries are defined as of 1999. All variables are lagged to avoid endogeneity between MSA characteristics and suburbanization outcomes.

Results

This section begins with a discussion of trends in suburbanization for native-born U.S. residents, first generation immigrants, and second generation immigrants.[1] Exhibit 1 calculates the percentage of households residing in the suburbs by immigration status and year. The estimates rely on CPS household weights.

Exhibit 1

Suburbanization Trends, 1994–2008



Source: U.S. Current Population Survey

[1] For ease of exposition, second generation immigrants—native-born citizens with foreign-born parents—are distinguished from other native-born households.

As this exhibit suggests, suburbanization among native-born households has been slowly increasing over time, from 43.36 percent in 1994 to 49.07 percent in 2008. Second generation immigrants initially suburbanized at rates higher than natives until 2007, when their rate of suburbanization dipped slightly. First generation immigrants have been suburbanizing more slowly than natives and second generation immigrants. Among all groups, suburbanization dipped in 2005, a year in which gas prices had risen to historical highs, and housing price inflation was just beginning to level off. These two factors together likely increased the relative attractiveness of central city locations due to their closer proximity to employment.

Exhibit 2 provides a slightly different perspective on the differences in location choice among natives and immigrants. This exhibit displays, for recent movers, the stated reasons for choosing a residential location. Among natives, the most frequently cited reason for choosing a residential location is "wanted new or better housing." The second and third most frequently cited reasons also reference housing-related causes. Among second generation immigrants, housing-related reasons are likewise important. First generation foreign-born residents exhibit slightly different responses, however, with a relatively higher share of respondents citing "new job or job transfer" as a primary reason for moving. The 14 percent of respondents citing this reason is the highest among all household types. One possible explanation for this finding is that foreign-born moves are more likely to have occurred over longer distances. Evidence suggests that intermetropolitan area moves, particularly among different countries, are more likely to occur for employment-related reasons, whereas intrametropolitan area moves occur primarily for housing-related reasons. Apart from

Exhibit 2

Reasons for Moving Among Recent Movers, by Immigration Status

Reason for Moving	Natives		First Generation Immigrants		Second Generation Immigrants	
	Number	Percent	Number	Percent	Number	Percent
Change in marital status	2,728,212	6.3	281,140	4.6	172,358	5.8
To establish own household	4,568,337	10.6	446,444	7.3	254,559	8.6
Other family reason	3,930,151	9.1	563,226	9.2	264,067	8.9
New job or job transfer	4,422,697	10.2	855,843	14.0	294,152	9.9
To look for work or lost job	533,014	1.2	233,118	3.8	30,736	1.0
For easier commute	1,710,595	4.0	234,679	3.8	108,068	3.6
Retired	258,937	0.6	17,383	0.3	20,774	0.7
Other job-related reason	937,351	2.2	159,551	2.6	62,353	2.1
Wanted to own home, not rent	3,910,490	9.0	572,725	9.3	256,173	8.6
Wanted new or better housing	7,802,490	18.0	1,080,163	17.6	496,590	16.7
Wanted better neighborhood	1,837,680	4.3	215,570	3.5	151,608	5.1
For cheaper housing	2,745,676	6.4	476,580	7.8	216,380	7.3
Other housing reason	4,464,907	10.3	434,661	7.1	344,025	11.6
Attend or leave college	1,538,597	3.6	310,611	5.1	133,877	4.5
Change of climate	351,708	0.8	51,664	0.8	45,809	1.5
Health reasons	531,926	1.2	40,724	0.7	47,471	1.6
Other reasons	883,603	2.0	157,281	2.6	65,907	2.2
Natural disaster	78,416	0.2	1,055	0.0	0	0.0
Weighted total	43,234,787	100.0	6,132,418	100.0	2,964,905	100.0

Source: 1994 through 2008 Current Population Survey

differences in the relative importance of housing-related reasons and employment-related reasons, natives and immigrants choose new locations for similar reasons.

This section now turns to an examination of logit regression results predicting suburban location destination. Descriptive statistics for all variables used in the analysis are shown in exhibit 3.

Exhibit 3

Descriptive Statistics (1 of 2)

Variable	Natives		First Generation Immigrants		Second Generation Immigrants	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Dependent variable						
Suburban resident	0.46	0.50	0.43	0.50	0.47	0.50
Independent variables						
Year of CPS sample dummy variables						
1995	0.06	0.24	0.05	0.21	0.06	0.25
1996	0.06	0.24	0.06	0.23	0.08	0.26
1997	0.06	0.24	0.06	0.24	0.08	0.27
1998	0.06	0.24	0.06	0.24	0.08	0.26
1999	0.06	0.24	0.06	0.24	0.07	0.26
2000	0.06	0.24	0.07	0.25	0.07	0.25
2001	0.06	0.24	0.07	0.25	0.07	0.25
2002	0.10	0.29	0.11	0.31	0.09	0.28
2003	0.10	0.30	0.11	0.31	0.09	0.29
2004	0.09	0.29	0.11	0.32	0.08	0.28
2005	0.05	0.23	0.05	0.22	0.04	0.20
2006	0.05	0.23	0.05	0.22	0.05	0.21
2007	0.05	0.23	0.05	0.22	0.04	0.20
2008	0.05	0.22	0.05	0.23	0.04	0.20
Household characteristics						
HH head recent immigrant	0.00	0.00	0.13	0.34	0.00	0.00
HH head noncitizen	0.00	0.00	0.49	0.50	0.00	0.00
HH income	$54,986.70	$54,804.23	$46,882.95	$52,405.18	$47,632.70	$50,106.33
HH head non-White	0.15	0.36	0.25	0.43	0.07	0.25
Number of children in HH	0.86	1.13	1.24	1.37	0.65	1.03
Age of HH head	47.52	16.38	43.77	15.74	54.66	19.91
HH head male	0.56	0.50	0.60	0.49	0.55	0.50
HH head married	0.55	0.50	0.63	0.48	0.52	0.50
HH head college degree	0.26	0.44	0.24	0.43	0.23	0.42
Household head occupation						
Professional	0.08	0.27	0.07	0.26	0.06	0.24
Farmer	0.01	0.09	0.04	0.20	0.01	0.09
Manager	0.12	0.32	0.07	0.26	0.09	0.28
Technical/ engineering	0.06	0.25	0.05	0.22	0.05	0.21
Sales	0.09	0.28	0.06	0.24	0.06	0.25
Administrative	0.09	0.29	0.05	0.22	0.08	0.27
Service	0.08	0.27	0.14	0.34	0.07	0.25
Transport	0.03	0.17	0.02	0.15	0.02	0.14
Laborer	0.02	0.14	0.03	0.17	0.01	0.12

Exhibit 3

Descriptive Statistics (2 of 2)

Variable	Natives		First Generation Immigrants		Second Generation Immigrants	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Country/region of origin, HH head						
U.S. outlying areas	0.00	0.00	0.07	0.26	0.00	0.00
Central America	0.00	0.00	0.04	0.21	0.00	0.00
Mexico	0.00	0.00	0.35	0.48	0.00	0.00
South America	0.00	0.00	0.04	0.20	0.00	0.00
Northern Europe	0.00	0.00	0.00	0.06	0.00	0.00
United Kingdom	0.00	0.00	0.03	0.18	0.00	0.00
Western Europe	0.00	0.00	0.01	0.11	0.00	0.00
Southern Europe	0.00	0.00	0.03	0.16	0.00	0.00
Central/Eastern Europe	0.00	0.00	0.07	0.25	0.00	0.00
East Asia	0.00	0.00	0.06	0.23	0.00	0.00
Southeast Asia	0.00	0.00	0.08	0.27	0.00	0.00
Southwest Asia/India	0.00	0.00	0.04	0.19	0.00	0.00
Central Asia	0.00	0.00	0.00	0.02	0.00	0.00
Middle East	0.00	0.00	0.02	0.14	0.00	0.00
Other Asia	0.00	0.00	0.01	0.08	0.00	0.00
Russian Empire	0.00	0.00	0.01	0.11	0.00	0.00
Other Europe	0.00	0.00	0.00	0.04	0.00	0.00
Northern Africa	0.00	0.00	0.00	0.07	0.00	0.00
East Africa	0.00	0.00	0.01	0.09	0.00	0.00
Other Africa	0.00	0.00	0.01	0.08	0.00	0.00
Oceania	0.00	0.00	0.01	0.07	0.00	0.00
MSA characteristics						
Northeast region	0.12	0.32	0.09	0.29	0.20	0.40
Midwest region	0.28	0.45	0.15	0.36	0.19	0.39
West region	0.18	0.38	0.36	0.48	0.29	0.45
Restaurants, bars/ 1,000 population	1.47	0.32	1.61	0.36	1.57	0.34
Road density in urban fringe	0.88	0.33	0.76	0.41	0.83	0.41
Intergovernmental transfers	35.68	9.72	36.16	9.17	36.37	8.88
Suburb/CC percent owner occupied	1.38	0.16	1.35	0.18	1.37	0.17
Percent of MSA population in suburbs	58.00	18.53	57.43	19.18	58.64	19.92
Suburb/CC per capita income[a]	1.07	0.19	1.03	0.18	1.07	0.19
MSA population	891,051.00	752,158.00	968,944.90	776,822.10	941,320.40	772,513.30
Suburban foreign-born residents	19,152.81	28,546.87	34,662.95	40,550.96	28,400.43	34,755.86
N	224,963		25,397		18,670	

CC = central city. CPS = Current Population Survey. HH = household. MSA = metropolitan statistical area.

[a] Income in U.S. dollars.

Exhibit 4 reports results from three regression models for native-born households, first generation immigrants, and second generation immigrants. These models rely on controls for CPS sample year, household characteristics, occupational characteristics, and MSA characteristics.

As previous studies have found, higher income is associated with a higher likelihood of choosing a suburban location. As in the study by Alba et al. (1999), this study finds that the effect of income on suburban location choice is larger among immigrant groups than among native households. If immigrant groups have lower income levels initially, the proportionate effect of an increase in income may be larger relative to the same increase among those earning higher incomes. Non-Whites are less likely to choose suburban locations, particularly if those non-Whites are native-born households. Differences in the effect of race between native and foreign-born households possibly reflect differences in average racial characteristics, with a larger share of natives likely identifying themselves as African Americans, who have historically exhibited lower rates of suburbanization relative to other racial groups.

Household characteristics influence suburbanization among the different groups in similar ways, with the exception of age of household head, which is negative and statistically insignificant for first generation immigrants. If the coefficients from exhibit 4 are applied to the means of the variables shown in exhibit 3, marital status of the household head has the largest effect among all statistically significant household characteristics. The influence of college-education status conforms with previous findings, which point to a negative effect on suburbanization among native-born households and a positive effect among first generation immigrants. That this finding still holds with a robust set of occupational controls points to possible cultural or skill differences

Exhibit 4

Logit Regression Results by Immigration Status (1 of 2)

	Natives		First Generation Immigrants		Second Generation Immigrants	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Independent variables						
Constant	– 2.999	0.000	– 1.247	0.000	– 1.860	0.000
Year of CPS sample dummy variables						
1995	0.054	0.042	0.118	0.214	0.123	0.184
1996	0.193	0.000	0.167	0.069	0.238	0.008
1997	0.195	0.000	0.111	0.222	0.152	0.086
1998	0.199	0.000	0.240	0.008	0.135	0.130
1999	0.203	0.000	0.260	0.004	0.228	0.012
2000	0.248	0.000	0.211	0.017	0.231	0.012
2001	0.267	0.000	0.229	0.009	0.183	0.048
2002	0.302	0.000	0.274	0.001	0.287	0.001
2003	0.324	0.000	0.248	0.003	0.294	0.001
2004	0.329	0.000	0.270	0.001	0.357	0.000
2005	0.297	0.000	0.207	0.032	0.219	0.040
2006	0.400	0.000	0.267	0.005	0.321	0.002
2007	0.431	0.000	0.338	0.000	0.313	0.003
2008	0.443	0.000	0.335	0.000	0.363	0.001

Exhibit 4

Logit Regression Results by Immigration Status (2 of 2)

	Natives		First Generation Immigrants		Second Generation Immigrants	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Household characteristics						
HH income	1.46E-06	0.000	1.81E-06	0.000	2.07E-06	0.000
HH head non-White	– 0.968	0.000	– 0.281	0.000	– 0.270	0.000
Number of children in HH	0.079	0.000	0.023	0.042	0.070	0.000
Age of HH head	0.003	0.000	0.004	0.000	0.006	0.000
HH head male	0.036	0.001	– 0.029	0.342	0.039	0.295
HH head married	0.380	0.000	0.359	0.000	0.289	0.000
HH head college degree	– 0.142	0.000	0.095	0.020	– 0.008	0.855
Household head occupation						
Professional	– 0.036	0.083	0.211	0.001	0.017	0.829
Farmer	0.236	0.000	0.704	0.000	0.797	0.000
Manager	0.074	0.000	0.344	0.000	0.238	0.000
Technical/engineering	– 0.022	0.297	0.083	0.244	– 0.216	0.014
Sales	– 0.009	0.633	0.214	0.001	– 0.057	0.434
Administrative	0.006	0.746	0.211	0.001	0.039	0.566
Service	– 0.094	0.000	0.208	0.000	– 0.071	0.312
Transport	0.122	0.000	0.208	0.025	0.196	0.099
Laborer	– 0.041	0.253	0.019	0.821	– 0.171	0.228
MSA characteristics						
Northeast region	– 0.128	0.000	0.057	0.318	0.724	0.000
Midwest region	– 0.134	0.000	– 0.155	0.003	0.275	0.000
West region	0.493	0.000	0.236	0.000	0.339	0.000
Restaurants, bars/ 1,000 population	– 0.608	0.000	– 0.667	0.000	– 0.697	0.000
Road density in urban fringe	0.324	0.000	– 0.309	0.000	0.056	0.440
Intergovernmental transfers	– 0.022	0.000	– 0.048	0.000	– 0.037	0.000
Suburb/CC percent owner occupied	1.011	0.000	0.898	0.000	1.015	0.000
Percent of MSA population in suburbs	0.017	0.000	0.034	0.000	0.025	0.000
Suburb/CC per capita income[a]	0.400	0.000	– 0.538	0.000	– 0.474	0.000
MSA population	9.22E-07	0.000	3.95E-07	0.000	4.89E-07	0.000
Suburban foreign-born residents	9.49E-07	0.238	2.66E-06	0.000	6.97E-06	0.000
Pseudo R-square	0.153		0.140		0.167	
N	224,963		25,397		18,670	

CC = central city. CPS = Current Population Survey. HH = household. MSA = metropolitan statistical area.

[a] *Income in U.S. dollars.*

between native and foreign-born workers. Another explanation is that workers trained abroad may be less likely to seek or take advantage of the knowledge-sharing networks found in dense cities.

The influence of occupation on suburbanization varies substantially between native and foreign-born households. The omitted occupational category in this case is production worker. Relative to this occupational category, all occupational categories have a positive influence on first generation immigrant suburbanization, whereas professional and service worker status has a negative influence on suburbanization among natives. Because these job categories are among those most likely to value proximity to other employers for knowledge-sharing and proximity to intermediate labor inputs, the findings again point to native/foreign-born differences in the importance of central city consumer and urban amenities.

Natives and immigrants exhibit regional differences in migration propensities. The only region in which both native and foreign-born households are more likely to suburbanize is the West, which has seen historical rates of suburbanization in recent years (Lang and LeFurgy, 2007).

Regarding the influence of metropolitan characteristics, consumer amenities as measured by bars and restaurants are negatively associated with suburbanization. This finding is consistent with Glaeser, Kolko, and Saiz's (2000) "consumer city" hypothesis, which asserts that central cities have become relatively more attractive to mobile workers for their prevalence of consumer-based amenities and recreational opportunities.

Road density in the fringe is associated with a higher propensity to suburbanize among native workers but a lower propensity to suburbanize among foreign-born workers. This finding is consistent with Cutler, Glaeser, and Vigdor's (2008) assertion that recent trends in immigrant segregation reflect native/foreign-born differences in automobile usage, with foreign-born workers more likely to rely on transit for transportation purposes.

Both first and second generation foreign-born households are more likely to suburbanize in response to lower relative per capita incomes in the suburbs. This finding possibly reflects their sorting into lower income immigrant enclaves relative to native-born residents. This finding is corroborated by the positive influence of suburban foreign-born population on immigrant suburbanization. The coefficient on this variable is insignificant for native-born households.

Applying the means from exhibit 3 to the coefficients displayed in exhibit 4, the study finds that the magnitude of the effect associated with metropolitan characteristics tends to be larger than the effect of household characteristics. Among natives, the owner-occupied housing ratio has the largest effect, with a standardized increase equivalent to the mean of this variable, increasing the probability of suburbanization by 1.4. The magnitudes of the coefficients for immigrants differ somewhat, with MSA population in the suburbs exhibiting the largest effect. One noteworthy finding is the difference in the effect of intergovernmental transfers across immigrant categories. The effect of this variable on first generation immigrant suburbanization is more than twice as large as its effect on natives, and the effect on second generation immigrant suburbanization is 1.7 times as large. This finding possibly reflects cultural differences in the demand for particular public service/tax packages that suburban governments offer, a point the study returns to in the conclusion.

Exhibit 5 presents the results for foreign-born households only, introducing controls for country of origin, citizenship status, and whether the household immigrated recently (within the previous 5 years). Both noncitizens and recent immigrants are less likely to suburbanize, a finding that is consistent with the spatial assimilation perspective on suburbanization.

Examining the country/region-specific effects, the study finds that, in general, Europeans and those with European ancestry from Australia and New Zealand are more likely to suburbanize, whereas those from Southeast Asia and Africa are less likely to suburbanize. These findings are consistent with evidence that points to a recent increase in suburbanization among European countries. Few country-specific effects are significant, however, which suggests that other than these larger trends, suburbanization has more to do with household-level factors than country-specific cultural or economic conditions.

The pattern of year-specific effects suggests that, even after controlling for a variety of household and MSA characteristics, suburbanization still dropped in 2005 and 2006. Recall that the year-specific effects capture the average of all factors influencing suburbanization within each year, controlling for household and MSA characteristics. Such factors include the rise in housing costs, the subsequent decline in credit availability, political and economic events occurring over the time

Exhibit 5

Logit Regression Results, Foreign Born (1 of 2)

Variable	Coef.	Sig.
Constant	– 1.101	0.000
Year of CPS sample dummy variables		
1995	0.136	0.154
1996	0.194	0.036
1997	0.142	0.119
1998	0.272	0.003
1999	0.307	0.001
2000	0.252	0.005
2001	0.280	0.002
2002	0.315	0.000
2003	0.304	0.000
2004	0.317	0.000
2005	0.259	0.007
2006	0.298	0.002
2007	0.391	0.000
2008	0.393	0.000
Household characteristics		
HH head recent immigrant	– 0.214	0.000
HH head noncitizen	– 0.095	0.005
HH income	1.49E-06	0.000
HH head non-White	– 0.213	0.000
Number of children in HH	0.026	0.027
Age of HH head	0.001	0.404
HH head male	– 0.020	0.532
HH head married	0.358	0.000
HH head college degree	0.091	0.032

Exhibit 5

Logit Regression Results, Foreign Born (2 of 2)

Variable	Coef.	Sig.
Household head occupation		
Professional	0.151	0.022
Farmer	0.717	0.000
Manager	0.258	0.000
Technical/engineering	0.047	0.516
Sales	0.150	0.017
Administrative	0.171	0.011
Service	0.206	0.000
Transport	0.181	0.053
Laborer	0.052	0.537
Country/region of origin, HH head		
U.S. outlying areas	– 0.488	0.000
Central America	– 0.036	0.652
Mexico	– 0.057	0.328
South America	– 0.052	0.527
Northern Europe	0.028	0.905
United Kingdom	0.177	0.041
Western Europe	0.282	0.033
Southern Europe	0.253	0.009
Central/Eastern Europe	0.186	0.008
East Asia	0.036	0.648
Southeast Asia	– 0.261	0.001
Southwest Asia/India	0.025	0.780
Central Asia	– 0.728	0.227
Middle East	– 0.158	0.156
Other Asia	0.064	0.726
Russian Empire	– 0.073	0.575
Other Europe	– 0.806	0.039
Northern Africa	– 0.312	0.143
East Africa	– 0.158	0.343
Other Africa	– 0.902	0.000
Oceania	0.598	0.003
MSA characteristics		
Northeast region	0.062	0.290
Midwest region	– 0.170	0.001
West region	0.224	0.000
Restaurants, bars/1,000 population	– 0.665	0.000
Road density in urban fringe	– 0.289	0.000
Intergovernmental transfers	– 0.049	0.000
Suburb/CC percent owner occupied	0.947	0.000
Percent of MSA population in suburbs	0.034	0.000
Suburb/CC per capita income[a]	– 0.523	0.000
MSA population	3.88E-07	0.000
Suburban foreign-born residents	3.14E-06	0.000
Pseudo R-square	0.146	
N	25,397	

CC = central city. CPS = Current Population Survey. HH = household. MSA = metropolitan statistical area.

[a] Income in U.S. dollars.

period, and rising gas prices. In models without MSA controls (not reported for brevity), this drop is much more dramatic over the post-2005 period. Furthermore, year effects become statistically insignificant during the 2005-to-2008 period. Together, these findings suggest that factors varying across metropolitan areas, such as energy prices and housing price inflation, likely interacted to affect rates of foreign-born suburbanization during the most recent period.

Summary of Findings

This article examines the effect of various household and metropolitan characteristics on the suburbanization of foreign-born households. Several findings provide evidence regarding spatial assimilation theory as it pertains to suburbanization. First generation immigrants generally suburbanize at a slower rate than second generation immigrants and natives. Noncitizens and recent immigrants are less likely to suburbanize than other foreign-born households. Across all models, the influence of household and metropolitan characteristics on second generation immigrants is more comparable to the influence of native-born households. First generation immigrants, on the other hand, suburbanize in response to a different set of influences. The most significant household characteristics are those relating to education and occupation.

The study also finds evidence that native and immigrant groups place a different value on the consumer amenities found in the central city and the transportation access and owner-occupied housing supply found in the suburbs. This finding is consistent with the pattern of household-level effects, particularly those relating to education and occupation, along with the pattern of metropolitan-specific effects.

Finally, the suburbanization of all households has varied over time, with rising suburbanization levels seen until 2005, when suburbanization rates began to decline somewhat. These trends mimic recent trends in housing and gas prices. These trends have interacted with metropolitan-specific conditions to affect rates of suburbanization among foreign-born residents, particularly since 2005. Together, these findings suggest that factors varying across time and across metropolitan areas, such as energy prices and housing price inflation, likely interacted to affect rates of foreign-born suburbanization over the most recent period.

Policy Implications

These findings have important implications for the current suburbanization/urban sprawl debate. So-called "smart growth" advocates have argued that the high rate of suburbanization and urban sprawl seen in the United States is to blame for a variety of social problems, ranging from environmental degradation to social inequality (Squires, 2002). To combat these problems, advocates have argued for various policies designed to slow the rate of suburbanization and reorient new urban growth back toward central cities. Although this article does not seek to address the relative merits of these proposals, the findings from this article have important implications for the likely effects of increased immigration on urban sprawl. Groups such as the Federation for American Immigration Reform and the Center for Immigration Studies have argued for restrictions on immigration to combat urban sprawl. The study presented in this article finds that natives are still more likely

to suburbanize than are first generation immigrants. The study also finds that after controlling for a variety of socioeconomic and metropolitan characteristics, the immigrant groups most likely to suburbanize originate in countries that constitute only a small share of new immigrant inflows. According to the most recent picture of the foreign-born population provided by the Census Bureau, 53.3 percent of foreign-born residents were from Latin American countries. Latin American countries provide the largest share of new immigrant inflows but are no more likely to suburbanize, controlling for household socioeconomic characteristics. Those originating from Asian countries constitute about 25 percent of the foreign-born population but are less likely to suburbanize after arriving, according to our estimates. Those most likely to suburbanize originate from European countries, but immigrants from European countries constitute only 13.7 percent of the total foreign-born population (Larsen, 2004). These findings suggest that concerns about the effect of increased immigration on urban sprawl are unfounded.

Regardless of whether the immigrant suburbanization trend is a real or perceived phenomenon, many suburban local governments have begun to adopt policies that are designed either explicitly or implicitly to exclude immigrant households from their communities. The recent increase in local anti-immigrant policies reflects, in part, the devolution of immigration policing power from the federal government to local governments, something that Coleman (2007) described as "pushing the border inward." For example, in Farmers Branch, Texas, landlords are required to check the legal status of renters before signing a lease agreement. The city has also passed an ordinance declaring English the city's official language. Suffolk County, New York, places restrictions on the number of residents that can occupy a single-family home (Walker, 2008). Other common restrictions include English-only requirements for local businesses, restrictions on local public service provisions to illegal immigrants, and land use restrictions that limit occupancy and density and raise the cost of housing for low-income immigrant households.

In addition to applying overt restrictions on immigrant location choices, local governments may also exclude immigrants through decisions regarding the mix and quantity of local public goods. If particular groups demand low levels of a given service, local governments may choose to provide higher levels of that service to exclude those households from a jurisdiction (Becker and Murphy, 2000). The results of this study suggest that policies that influence urban amenities, transportation access, and intraurban labor market opportunities will likely play the most significant role in shaping immigrant location choices.

One alternative interpretation of our findings is that suburban anti-immigrant policies are working. The study finds that immigrant households headed by a U.S. citizen earning a higher income and with more years of education are more likely to suburbanize. It is possible that limitations on higher density affordable housing in suburban areas place limitations on housing choices for low-income immigrant households. Similarly, restrictions on public services to noncitizens may further limit access to the suburbs. Given that the federal Fair Housing Act prohibits housing discrimination on the basis of national origin, further research is needed to determine if suburban anti-immigrant policies play a role in limiting the housing choices of immigrant households. Further research is also needed to understand the effect of suburban residence on the quality of life for foreign-born residents.

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Immigrants' Housing Search and Neighborhood Conditions: A Comparative Analysis of Housing Choice Voucher Holders

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Abstract

Immigrants and their residential outcomes are of great interest to urban researchers and policymakers. The literature, however, provides little knowledge about the residential status of immigrants with publicly subsidized housing assistance. In this article, we draw on three streams of literature—assimilation, neighborhood effects, and housing policy—to investigate the residential choices and outcomes (neighborhood conditions) of immigrants who receive housing choice vouchers. We use primary survey data from a sample of voucher households from two local housing authorities in Orange County, California, to investigate housing search behavior, locational choice, and neighborhood conditions. The results of our regression analyses show that immigrants, compared with nonimmigrants, are more likely to receive assistance from friends or family in their housing search and that they tend to live in neighborhoods with relatively higher concentrations of immigrants overall. Immigrant status is not directly associated with worse neighborhood conditions; however, higher concentrations of immigrants are strongly associated with relatively worse neighborhood conditions. This finding indicates an indirect association between immigrant status and neighborhood conditions. We conclude with a discussion of the research and policy implications of these findings.

Introduction

Residential choice plays a critical role in the life trajectories of immigrants. It is both a predictor of potential opportunities and a measure of assimilation into a new society. Traditionally, immigrants have located in areas, usually urban, with populations similar to themselves. Language and cultural ties to the "old country" made the transition to a new society less difficult for immigrants and provided social support, including assistance with housing and job searches (Gordon, 1964; Wright, Ellis, and Parks, 2005). As immigrants assimilated, according to the traditional view, they moved away from their urban ethnic enclaves to suburban locales (Gordon, 1964; Massey, 1985). Scholars also identify the move to homeownership as a marker of assimilation for immigrants (Alba and Logan, 1992).

Sociological research suggests that socioeconomic status; residential location, such as suburbs versus central city; and housing tenure are important indicators of immigrants' assimilation. In fact, this research provides a rich understanding of immigrants' residential choices and the importance of housing and neighborhoods to their lives. This existing literature, however, examines the immigrant population as a whole or by ethnic group and does not often focus more narrowly on immigrants with lower incomes who receive housing assistance. For this reason, it does not directly inform housing policy and existing housing programs.

Federal housing policy serving lower income households is dominated by two approaches. The Low-Income Housing Tax Credit Program supplies capital to the producers of lower income housing and the Housing Choice Voucher Program (HCVP), or Section 8 tenant-based assistance, provides rental subsidies to individuals with low incomes. The HCVP offers a degree of residential choice to recipients of this assistance because voucher holders must find their own rental unit in the private market. The voucher program, however, has some programmatic limitations on a recipient's choice of a unit. First, the landlord must be willing to accept a renter with a voucher. Second, the unit must pass an inspection by the local housing authority (LHA) charged with administering the program. Third, the program essentially caps the rent allowed on the unit; the level of subsidy typically is the difference between 30 percent of the recipient's income and the Fair Market Rent (set annually by the U.S. Department of Housing and Urban Development) for the area.[1] Within these constraints, voucher holders can exercise their preferences in their residential location decisions.

Housing choice vouchers are available to immigrant households under certain conditions. Specifically, immigrants who are citizens or eligible noncitizens[2] may receive voucher assistance. Voucher holders, including immigrants, are allowed to move and retain their voucher assistance as long as they locate in an area with an LHA; however, research suggests that short moves intracity or

[1] Voucher holders may choose to live in a unit that exceeds Fair Market Rent, but they must pay the difference between the LHA's contribution and the rent for the unit and, at lease up, the voucher holder's share of the rent may not exceed 40 percent of his or her adjusted household income.

[2] A member of the household, not necessarily the head, must be an eligible noncitizen. Eligible noncitizens include permanent residents, refugees, and others. (See Aids Housing Corporation, Resource Library, Immigrants and Housing, available at http://www.ahc.org/resource_library/legal_cori.html, for the list of all eligible noncitizens.)

intracounty, rather than intercounty or interstate, are overwhelmingly the most common (Basolo and Nguyen, 2005; Varady and Walker, 2003). Federal housing policy has encouraged mobility from high-poverty neighborhoods to lower poverty neighborhoods through the Moving to Opportunity (MTO) program, HOPE VI, and the HCVP (Basolo and Nguyen, 2005; Briggs et al., 2008; Rubinowitz and Rosenbaum, 2000). Undergirding this policy is the proposition that lower poverty neighborhoods offer more opportunities for the poor, directly for jobs and schools or indirectly through transmission of knowledge about the dominant culture's expectations and behaviors (see Basolo and Nguyen, 2005; Briggs, 1997).

Housing policy researchers have extensively investigated the federal policy and related programs as well as the status of neighborhood conditions for recipients of housing assistance. This research, however, has not examined immigrants with voucher assistance and their neighborhood conditions. Our research begins to fill that gap in knowledge.

This article draws on three streams of literature—assimilation, neighborhood effects, and housing policy—to formulate research questions related to the residential choices and outcomes (as measured by neighborhood conditions) of immigrants with housing vouchers and compares them with nonimmigrants using these vouchers. We address the following three questions:

1. Are immigrants with vouchers more likely to have assistance from friends or family in their housing search than are nonimmigrants with vouchers?
2. Do immigrants with vouchers compared with nonimmigrants with vouchers tend to locate in neighborhoods with higher overall concentrations of immigrants?
3. Are immigrants with vouchers living in worse neighborhoods than are nonimmigrants with vouchers?

We investigate these questions for the whole sample and then explore them and related issues in one ethnic subgroup, Hispanics, in our sample.

The research examines voucher holders in two local housing authorities in Southern California, the Orange County Housing Authority and the Santa Ana Housing Authority. The analyses in this article use a unique data set that combines census information, key indicators from the LHAs' client files, and responses to a mail sample survey of voucher holders in the administrative jurisdictions of the two housing authorities.

The remainder of this article is organized into four major sections. First, we provide a brief overview of the relevant literature, including assimilation theories and related empirical results; neighborhood effects research; and housing policy studies examining poverty concentration, neighborhood conditions, and individual outcomes. In the next section, we restate the research questions in the context of existing literature and discuss the data collection methods. We then present the results of our data analyses for the sample as a whole and for a subset of the sample (Hispanics only). Finally, we discuss the findings from the analyses and their policy and research implications.

Immigrants, Assimilation, and Residential Choice

Extensive literature exists on immigrants and their living environments. Studies of ethnic, immigrant enclaves describe an active community life in the context of poor, urban neighborhoods (for example, see Gans, 1962). These studies and later studies of social networks suggest that immigrants benefit from their cultural ties and familiarity by living near each other. For example, the immigrant enclave can provide help in initial housing and job searches (Massey, 1986; Wright, Ellis, and Parks, 2005).

In the United States, the view that immigrants will eventually integrate into mainstream society is clearly captured in the conceptualization of the country as a melting pot. This integration involves the process of assimilation. Early work from Parks and Burgess of the Chicago School connected immigrants, their socioeconomic status, and residential location. Parks and Burgess observed a spatial sorting as new immigrants arrived in a city, occupying older neighborhoods, while the fortunes of earlier immigrants improved over time with resettlement to better neighborhoods. They also saw the assimilation process beginning with social interaction among groups at the borders of neighborhoods (Conzen, 1979).

As the study of assimilation developed theoretically, scholars focused on the movement of immigrants from the dominant culture of their native country to the dominant culture of their new nation (Gordon, 1964). From this perspective, acculturation was a necessary, but not sufficient, step in the assimilation process. Instead, Gordon (1964) argued that structural assimilation or the entry of the immigrant group into the institutions and clubs of the dominant society would lead to complete integration of the immigrant (or minority) group. Scholars elaborated on this theoretical formulation of the assimilation process with the recognition that this process occurs over generations (Alba and Nee, 1997; Waters and Jiménez, 2005).

The spatial assimilation model grew out of the earlier work on assimilation. In this model, as immigrants achieve improved socioeconomic status, they move away from their poor, urban (ethnic) enclaves to more affluent areas such as the suburbs (Alba et al., 1999; Friedman and Rosenbaum, 2007). Because the suburbs are associated with the dominant or majority group (typically White), immigrant mobility to suburban neighborhoods promises better residential environments and more opportunities for social integration (Friedman and Rosenbaum, 2007; Nguyen, 2004).

The concept of assimilation was further developed in the work of Alejandro Portes and his colleagues. They reconceptualized the ethnic enclave as "a concentration of ethnic firms in physical space" (Portes and Jensen, 1992: 418; see also Portes and Jensen, 1989), rather than as a residential concentration. This work was followed by the introduction of segmented assimilation (Portes and Zhou, 1993), which recognizes that not all immigrants follow the traditional assimilation trajectory of improved socioeconomic status and integration into the middle-class mainstream. Other paths lead to entrenched poverty and entrance into the underclass, while another involves accelerated economic status with "deliberate preservation of the immigrant community's values and tight soli-

darity" (Portes and Zhou, 1993: 82). More recently, Portes, Guarnizo, and Haller (2002) examined transnational[3] entrepreneurship in the context of immigrant economic adaptation.

Empirical studies of assimilation are abundant, offering a range of indicators to determine the assimilation level of a group. Socioeconomic progress measured by income, education, and occupation; English language use; intermarriage; political participation; familism (family-centered versus individual-dominant values); fertility; tenure (homeownership); and residential location and quality are all used as measures of immigrant assimilation (Clark, 2003; Massey, 1981; McConnell, Diaz, and Marcelli, 2007; Waters and Jiménez, 2005). The last of these measures, residential location and quality, is of particular interest to the spatial assimilation model. Empirical research generally supports the spatial assimilation model, finding that immigrant mobility to better, suburban neighborhoods follows improvement in household socioeconomic status (Adelman et al., 2001; Alba and Logan 1993; Rosenbaum and Friedman, 2007). Other research, however, shows that immigrants who are ethnic minorities may not take the typical path but rather choose to live in ethnic communities, even when their economic status has improved (Logan, Alba, and Zhang, 2002; Nguyen, 2004); they are increasingly building ethnic enclaves in suburban environments that may or may not be better neighborhoods (Alba et al., 1999; Friedman and Rosenbaum, 2007; Logan, Alba, and Zhang, 2002). Finally, some research suggests that the immigrant population is so diverse—racially and ethnically and in their location choices, central cities versus other neighborhoods—that generalizations about the so-called "typical immigrant neighborhood" are unwarranted (see Galster, Metzger, and Waite, 1999: 395).

Spatial assimilation assumes that mobility to the suburbs delivers improved residential conditions for immigrants. This corollary has a parallel in the housing policy literature. Specifically, federal policy supports moving households with housing assistance from poor, minority-concentrated, urban neighborhoods to lower poverty, more racially and ethnically diverse neighborhoods; the latter, in some cases, has involved suburban environments. In the next section, we briefly examine the literature related to this policy.

Neighborhoods, Poverty Concentration, and Housing Policy

Neighborhood effects are a long-standing interest in academic literature and policy literature. Researchers have studied the relationships between neighborhoods and various subject areas, such as economic opportunities (Kaplan, 1999), health behavior and outcomes (Acevedo-Garcia et al., 2004; Cohen et al., 2003), adolescent sexual behavior (Dupere et al., 2008), and crime (Hannon, 2005; Hipp, 2007a). Neighborhood concentration of poverty and related characteristics in many of these studies are considered the main correlates of negative outcomes for individuals, and much of the empirical evidence, usually correlational analyses, supports this assertion. Scholars have presented two general arguments. First, the relationship between neighborhoods and sustained, intergenerational poverty stems from the existence of a culture of poverty that perpetuates antisocial behaviors (Lewis, 1966; Murray, 1984). Second, the social structure maintains disparities between the poor, especially

[3] The term *transnationalism* has various definitions, but Portes, Guarnizo, and Haller wrote that it concerns "the continuing relations between immigrants and their places of origin and how this back-and-forth traffic builds complex social fields that straddle national borders" (Portes, Guarnizo, and Haller, 2002: 279).

those who are racial minorities, and others and denies them access to opportunities (Wilson, 1987). Theoretical development has posited more nuanced formulations of these relationships. Despite the multiple explanatory theories propounded in the literature (see Ellen and Turner, 1997; Joseph, Chaskin, and Webber, 2007), cause-and-effect relationships are not well understood (Briggs, 1997; Ellen and Turner, 1997). Notwithstanding this theoretical uncertainty, federal housing policy encourages poverty deconcentration with the goal of increasing opportunities for people with lower incomes.

A federal policy of poverty deconcentration has existed for decades. For example, the Housing and Community Development Act of 1974 supported deconcentration by income (Katz and Turner, 2001). Poverty deconcentration during this period, however, was inextricably tied to racial concentration and residential segregation (see Basolo and Nguyen, 2005; Bonastia, 2006). For example, the Gautreaux class action lawsuit pitted African-American public housing residents against the Chicago Housing Authority (CHA) and the U.S. Department of Housing and Urban Development (HUD) with a charge of discrimination against African Americans based on the siting of public housing developments in inner-city, African-American neighborhoods and the discouragement of African Americans from seeking location in so-called "White" public housing projects. The case was eventually resolved by the U.S. Supreme Court, which ordered the development of a plan to deconcentrate African Americans served by the CHA. The court-ordered plan moved thousands of poor, African-American households from the impoverished, primarily African-American neighborhoods of Chicago's inner city to the mostly White, and relatively more affluent, suburbs. (See Rubinowitz and Rosenbaum [2000] for a detailed discussion of the Gautreaux program.)

Researchers followed the Gautreaux program, anticipating differences in participants' outcomes from a change in their residential environment. Findings from this research indicate that households that moved to the suburbs had increased employment, higher efficacy levels, and better residential conditions, and children from these households had higher high school graduation rates (Rosenbaum 1995; Rosenbaum, Reynolds, and DeLuca, 2002; Rubinowitz and Rosenbaum, 2000).

The Gautreaux program spurred renewed interest in the potential for poverty deconcentration to open up opportunities for the poor. In 1994, the federal government implemented the MTO program in five metropolitan regions in the United States (Baltimore, Boston, Chicago, Los Angeles, and New York). The MTO program was designed as an experiment, with eligible participants (households with public housing or other housing assistance) randomly assigned into one of three groups: (1) an experimental group to be located in a low-poverty neighborhood, (2) a treatment group with housing vouchers without location constraints, and (3) a control group (existing public housing residents).[4]

Results from the MTO program have not been as dramatic as the findings from the Gautreaux program. Analyses, however, show a substantial proportion of households in the experimental group moved to lower poverty neighborhoods, had lower unemployment rates, had increased feelings of safety, and experienced improved mental health (adults and female youth only). Female youth had fewer undesirable behaviors, such as smoking marijuana, but male youth had an increase in undesirable behaviors (Goering and Feins, 2003; Kling, Liebman, and Katz, 2007; Kling, Ludwig, and Katz, 2005; Orr et al., 2003).

[4] See Comey, Briggs, and Weismann (2008) for a more detailed discussion of the experimental groups.

The existing findings from MTO have raised numerous questions and sparked debate in the literature (see Clampet-Lundquist and Massey, 2008; Comey, Briggs, and Weismann, 2008; Ludwig et al., 2008). Changes to worse neighborhood conditions after the initial move, either because of a subsequent move by the assisted household or neighborhood decline with the household staying in place, are important issues to understand in the context of this mobility program. Despite the mixed results from MTO, it is clear that the program did have positive outcomes along some dimensions and, therefore, poverty deconcentration continues to be a viable strategy for housing policy.

Another federal program seeking to deconcentrate poverty began in 1992. Hundreds of HOPE VI grants were awarded across the nation to LHAs seeking to revitalize public housing developments and deconcentrate poverty. This initiative called for the demolition of deteriorating public housing stock, the redesign of public housing development sites to foster mixed-income developments, and the provision of housing vouchers to many existing public housing residents to relocate to private-market rental units. Based on a sample of residents from five sites receiving a HOPE VI grant, findings from Buron, Levy, and Gallagher (2007) indicate that many residents (47 percent) leaving these public housing sites and using a voucher in the private market now live in lower poverty neighborhoods.[5]

The HCVP also includes policies favoring poverty deconcentration. LHAs are encouraged through the Section 8 Management Assessment Program to seek participation from rental housing owners in areas "located outside areas of poverty or minority concentration" (CFR §985.3(g)). Therefore, program policy implicitly recognizes potential positive outcomes by trying to open up opportunities to voucher recipients to live in more socially and economically diverse neighborhoods. The research on this aspect of the HCVP suggests that voucher recipients, especially minorities, continue to live in impoverished, low-opportunity neighborhoods (Basolo and Nguyen, 2005; Devine et al., 2003; Hartung and Hening, 1997; Newman and Schnare, 1997; Pendall, 2000; Wang, Varady, and Wang, 2008).

Policy research on the locational choices and residential conditions of people who receive housing assistance is relatively plentiful; however, we possess very little knowledge about immigrants who receive this assistance. Extant research shows that, although immigrants receive housing assistance at a slightly higher rate than do nonimmigrants[6] (Borjas and Hilton, 1996), only a small proportion of all immigrants, 6 to 7 percent, receive housing assistance (Khadduri and Martin, 1997). Research on immigrants in public housing suggests this housing assistance offers some improvement in neighborhood conditions for residents compared with nonassisted households; however, the results are mixed overall (Rosenbaum and Friedman, 2007). We could find no previous research that focused specifically on immigrants in the HCVP; however, Briggs (1998) provided some insights on the social networks of immigrants' children in the context of a housing mobility program in Yonkers, New York.

[5] See Buron, Levy, and Gallagher (2007) and Popkin et al. (2004) for a more detailed discussion of HOPE VI and its outcomes.

[6] Using the Survey of Income and Program Participation (1990 and 1991), Borjas and Hilton (1996) reported that the Average Monthly Probability that an immigrant household receives housing assistance is 5.6 percent (for a native-born household, it is 4.4 percent).

In this article, we begin to address the research gap by synthesizing knowledge from the three streams of literature—assimilation, neighborhood effects, and housing policy—to frame our research questions and by empirically investigating the residential choices and outcomes of immigrants who use housing voucher assistance.

Research Questions, Survey Methods, and Data Sources

This research offers an indepth examination of immigrants in the HCVP in suburban Orange County, California. Because data and research on immigrants with vouchers are relatively scarce, the unique data set used in this study offers a rare opportunity to gain a better understanding of this population.[7]

Research Questions

In framing our research questions, we benefited from social science theories and empirical work on assimilation of immigrants, neighborhood effects research, and existing studies of poverty and racial concentration, primarily from the housing policy literature. In general, our research questions relate to the residential choices and outcomes (as measured by neighborhood conditions) of immigrants who use housing vouchers compared with nonimmigrants who use these vouchers.

Our first research question investigates the premise that immigrants are unfamiliar with their new environments and, therefore, are more likely to rely heavily on their social ties when searching for housing. We operationalize social ties as friends or family and ask, "Are immigrants who use housing vouchers more likely to have assistance from friends or family in their housing search than are nonimmigrants who use vouchers?" Our second research question explores the propensity for immigrants, particularly first generation immigrants, to cluster in certain neighborhoods, which often are identified as ethnic, immigrant enclaves. We focus on immigrant neighborhoods in a general sense by asking, "Do immigrants who use housing vouchers vis-à-vis nonimmigrant voucher holders tend to locate in neighborhoods with higher concentrations of immigrants?" Finally, the third question examines the neighborhood quality of immigrants to determine if residential choice, as provided in the HCVP, results in better residential outcomes for this group compared with nonimmigrants who use vouchers. Specifically, we ask: "Are immigrants who use vouchers versus nonimmigrants who use vouchers living in worse neighborhoods?"

We also explore these questions and an additional question concerning location in ethnic neighborhoods for one subgroup in our sample. Specifically, we focus on Hispanic households for a within-group comparison of immigrant and nonimmigrant residential choices and neighborhood outcomes.

Survey Methods and Data Sources

The researchers and LHAs collaborated on developing and implementing a mail survey of voucher holders. Researchers created a draft questionnaire and staff members from both LHAs reviewed

[7] The authors collected the survey data used in this article as part of a larger, cross-sectional study examining residential location, residential satisfaction, and mobility of voucher holders in the administrative jurisdictions of two LHAs in Orange County, California: the Orange County and Santa Ana LHAs.

and commented on the instrument, resulting in minor revisions. The LHAs also recruited focus group participants to pretest the draft questionnaire. The researchers conducted two focus groups of voucher holders, one for each LHA. Members of the focus groups completed the draft questionnaire and offered their reactions to the instrument. Based on these participants' comments and observations, the questionnaire was revised to improve question clarity and flow.

The two LHAs helped the researchers select random samples of the LHAs' voucher holder populations. Orange County LHA randomly selected 2,010 names (with addresses) from its voucher client list (N≈8,100), or approximately 25 percent of its population of voucher holders (Orange County LHA oversampled family households at the request of the researchers). The Santa Ana LHA randomly chose 830 names (with addresses) from its client voucher list (N=2,558), or about 32 percent of the total (Santa Ana LHA oversampled households that had moved within the past 3 years at the request of the researchers).[8]

Nonresponse is always a concern in mail survey research. Our survey design followed Dillman's (2000) recommendations for optimizing response rates in mail surveys. In addition to the two LHAs' providing a complete sampling frame and our pretesting of the questionnaire with focus groups from the target population, we sent a well-crafted introduction letter that was signed by the lead researcher and a manager from the appropriate LHA. In addition, because Orange County's demographic profile includes a substantial number of Hispanics and Vietnamese, we included Spanish and Vietnamese translations of the letter. Finally, the survey was designed with multiple followup requests to nonrespondents.

We launched the survey in the spring of 2002 and concluded it in August of the same year. In total, 1,735 voucher holders responded to the survey; 1,268 (63 percent) of the Orange County LHA voucher holders and 467 (56.3 percent) of the Santa Ana voucher holders returned the questionnaire, for a total of 1,735 cases. Because of incomplete data for some records, the sample was reduced to 1,706 cases.[9] Although these response rates are good for a mail survey, nonresponse raises concerns about potential response bias. Considering the oversampling conditions on different subgroups of the two LHAs and the results of logistic regression analyses on the separate samples indicates some differences in respondents' sociodemographic profiles when compared with nonrespondents, we recommend caution in generalizing these results to the population of voucher holders.[10]

We combined the survey data from the two LHAs for the analyses discussed in this article. Our rationale for this decision is threefold. First, the two LHAs together manage about 57 percent

[8] The larger study investigated mobility in the voucher population. The Orange County LHA reported approximately 50 percent of its voucher clients were elderly, a group that tends to move less frequently; therefore, oversampling for the Orange County LHA was to ensure that family households (more mobile group) were adequately represented in the final response sample. The population of Santa Ana LHA voucher holders was relatively small (2,558); therefore, the sampling proportion was larger, and we requested oversampling of movers to ensure enough movers appeared in the final response sample.

[9] The dropped cases were missing substantial or key information. Retained cases did have occasional missing values on some items, which we filled with the mean or mode of the appropriate variable for the entire sample. For most variables and some analyses, we used all 1,706 cases, but for analyses using census tract data, we dropped 21 cases because the address information could not be geocoded with confidence.

[10] The logistic regressions used *response* versus *no response* as the dependent variable, with a set of sociodemographic variables extracted from the LHA client files as predictors. The full results of the response bias analyses are available from the authors on request.

of the total vouchers controlled by LHAs in the county[11]; therefore, combining the data allowed us to capture a significant proportion of the total countywide voucher population. Second, the relevance of selection into a particular LHA's administrative jurisdiction is uncertain because people who want voucher assistance often register for the waiting lists of multiple LHAs in a region and, thus, the receipt of the voucher could be from any of these LHAs. Also, voucher holders can move across LHA jurisdictions with their voucher, and Orange County LHAs cooperate to manage administrative issues associated with these moves, such as swapping of vouchers (see Basolo, 2003); therefore, a voucher holder who moves may or may not stay in the jurisdiction of the originating LHA. Third, as discussed earlier in this article, survey nonresponse leads us to take caution in generalizing to the population of voucher holders. Nevertheless, we present our study as an important, but initial, exploratory step toward gaining an understanding of immigrants in the voucher population.

The data used in this study come from several sources. Using a unique identifier, we merged the survey data to variables from the two LHAs' client data files.[12] We then geocoded and linked the client addresses from the LHA files to census tract identification numbers. We then downloaded and attached census tract data from the 2000 census to individual records using these identification numbers.[13] The census tract data are used in this study to represent neighborhoods[14]; therefore, the data set contains individual- and neighborhood-level variables.[15]

Context, Variables, and Preliminary Analyses

The preliminary analyses consider the context—Orange County, California—and the individual- and neighborhood-level variables.

Context

Orange County is a suburban area located between Los Angeles and San Diego Counties along the Pacific Coast. In 2000, Orange County's population was approximately 2.8 million, and it was considered relatively affluent; however, generalizations about the county mask the considerable variation between places and populations in the county. Some of the 34 cities in the county can be

[11] According to HUD, 17,911 vouchers were available in 2000; these vouchers were distributed among four LHAs in Orange County. See the "Picture of Subsidized Housing," available at http://www.huduser.org/picture2000/index.html.

[12] The survey responses provided the following variables: nativity status (a proxy for *immigrant*), *marital status, education, family/friends assisted* (whether friends or family assisted the voucher holder in his or her housing search), and *lives in central city* (whether the voucher holder lives in Santa Ana). Variables extracted from the LHAs' data files include *age, annual household income, gender, race, ethnicity,* presence of a dependent (a proxy for a child present in the home), and *monthly contract rent* for the voucher holder's housing unit.

[13] The census tract data include *percentage foreign born* (immigrants) within tracts, six indicators used to construct the *neighborhood conditions* index, and *percentage of Hispanics* within tracts.

[14] We are aware that the definition of a neighborhood, especially its boundaries, has been a longstanding issue within the literature and that research suggests that for some population characteristics the geographic designation of a neighborhood affects results of statistical analyses (see Hipp, 2007b). It is customary in neighborhood research, however, to use the census tract for data availability reasons.

[15] A correlation matrix of all variables used in the analyses of the full sample appears in the appendix.

described as "inner ring" suburbs, communities of older, lower quality housing that are showing decline similar to many central cities; but other cities, especially along the coast and newer inland development areas, are communities of higher quality and expensive housing. The county seat, the city of Santa Ana, is the central city of Orange County. It has the largest population in the county and is one of the county's oldest cities. The population in Santa Ana is largely Hispanic, 76.1 percent in 2000 (U.S. Census Bureau, 2002), and the city has the highest percentage of people living in poverty, 19.8 percent in 1999 (U.S. Census Bureau, 2002), of any city in the county.[16]

The population of Orange County is racially and ethnically diverse. Its composition, however, is different from that of California and the United States (see exhibit 1). The proportion of Asians in Orange County is higher, but the percentage of African Americans is smaller compared with California and the United States. Whites constitute a smaller segment of the population in Orange County compared with the United States, but they are a larger proportion of the population in the county compared with California as a whole. Slightly more than 30 percent of the population in Orange County is Hispanic, while in California the percentage is slightly higher (32.4 percent), and in the United States it is substantially lower (12.5 percent). Orange County also has a higher proportion of foreign-born people than either California or the United States, consistent with the designation of the Orange County-Riverside-San Bernardino Metropolitan Statistical Area as an "immigrant gateway"[17] (Singer, 2004).

Orange County has a relatively high annual household median income and a lower poverty rate compared with California or the United States; however, contract rent in the county is much higher than it is in the state or nation, and lower income households face the possibility of paying a significant

Exhibit 1

Population and Housing Characteristics, 2000

Characteristic	Orange County		California		United States	
	Number	Percent of Total Population	Number	Percent of Total Population	Number	Percent of Total Population
Race/Ethnicity						
African American	47,649	1.7	2,263,882	6.7	34,658,190	12.3
Asian	386,785	13.6	3,697,513	10.9	10,242,998	3.6
White	1,844,652	64.8	20,170,059	59.5	211,460,626	75.1
Other[a]	567,203	19.9	7,740,194	22.9	25,060,092	8.9
Hispanic	875,579	30.8	10,966,556	32.4	35,305,818	12.5
Foreign born	849,899	29.9	8,864,255	26.2	31,107,889	11.1
People in poverty (1999)	289,475	10.2	4,706,130	13.9	33,899,812	12.0
Annual median household income (1999)	$58,820	—	$47,493	—	$41,994	—
Monthly median contract rent	$861	—	$677	—	$519	—

[a] *Includes all other races and mixed race.*

*Source: U.S. Census Bureau, 2000 Census, Summary File 1 (*Race/Ethnicity*) and Summary File 3 (all other variables in exhibit)*

[16] Throughout this article, we use Census 2000 data rather than more recent data from the American Community Survey. Our decision is based on the assumption that 2000 census data is a better match to the survey data, which was collected in 2002.

[17] See Singer (2004) for definitions and categorizations of different types of immigrant gateways.

portion of their monthly income for housing costs. In fact, Orange County appears on the National Low Income Housing Coalition's (NLIHC's) list of most expensive jurisdictions for housing. NLIHC estimates that a worker making minimum wage ($8 an hour in California) would need to work 153 hours a week to afford a two-bedroom rental unit at Fair Market Rent (NLIHC, 2008).

Orange County's place and population diversity, its historically suburban character, socioeconomic disparities, high housing costs, and the relatively large representation of immigrants, taken together, are more characteristic of the western part of the United States (Ong, 1998) and present a context that is less frequently considered in the housing policy literature. The county's profile and gateway status, however, make it an intriguing case for the study of immigrants in the HCVP.

Variables and Preliminary Analyses

The data set contains both individual and neighborhood variables. Individual-level variables include *immigrant* (foreign born used as a proxy), sociodemographic characteristics (*age*, *gender*, *marital status*, *child present* in household, *White, not Hispanic*[18], *education*, and *annual household income*), and housing search information. Three neighborhood-level variables are in the data set: the *percentage foreign born in a census tract*, the *percentage of Hispanics in a census tract*, and a *neighborhood conditions* index created by combining six attributes that capture the economic and living conditions in a census tract. These attributes are one minus the poverty rate, median household income, one minus the percentage of households on public assistance, one minus the unemployment rate, one minus the overcrowding rate, and the reflection of population density. To build the measure, we summed the z-scores for the six attributes. This index ranged from -16.63 (worst conditions) to 12.23 (best conditions) and showed good internal consistency with an alpha of 0.870.[19]

The first question in the preliminary analyses concerns the size of the immigrant population in our sample. The data show that 68.5 percent of the voucher holders are immigrants (see exhibit 2). Although this result initially seemed surprising, considering the previously mentioned slight difference between the percentages of immigrants versus nonimmigrants receiving some form of housing

Exhibit 2

Voucher Holders in Sample by Immigrant Status

Group	Number	Percent
Immigrant	1,169	68.5
Nonimmigrant	537	31.5
Total	1,706	100.0

[18] We recoded race and ethnicity information into a dichotomous variable: *White, not Hispanic*, or not (that is, minority status). We chose this approach because of limited variation in important subgroups in our analysis. African Americans constitute less than 5 percent of the sample, and only a few cases were identified as "other race" (not African American, Asian, or White). Also, Asians were the largest racial group in the sample, but only 3.2 percent of these voucher holders were immigrants. In other words, we had limited variation for our central analyses without creating the more general minority status variable.

[19] We initially used a prima facie logic to identify attributes for the conditions index. We followed with an empirical analysis to construct an index with the highest Cronbach's alpha.

assistance, the large percentage of immigrants most likely is because of the region's status as a gateway for new arrivals to the United States.

We also examined a set of sociodemographic and other variables for immigrants and compared them with nonimmigrants in the sample. Exhibits 3a and 3b show that immigrants are noticeably different from nonimmigrants on all the variables. More than 56 percent of the nonimmigrants are White, not Hispanic, and nearly 90 percent of immigrants are racial or ethnic minorities. Furthermore, immigrants, on average, are older, less educated, male, and married, and they are more likely to live in the central city (Santa Ana), have a child in the household, have a higher annual household income, and pay more in monthly rent compared with nonimmigrants in the sample. Immigrants are more likely to have received assistance from friends or family in their search for

Exhibit 3

Characteristics of Voucher Holders by Immigrant Status

Exhibit 3a

Variable[a]	Immigrant	Nonimmigrant	X^2
	Mean[b]	Mean[b]	
White, not Hispanic	0.11	0.56	405.2***
Gender (male)	0.58	0.20	205.9***
Marital status (married)	0.70	0.17	412.9***
Child present (children)	0.69	0.56	30.8***
Education (high school graduate)	0.61	0.80	58.4***
Family/friends assisted	0.46	0.35	18.4***
Lives in central city	0.19	0.15	5.54*

[a] *Category shown by variable name or in parentheses coded 1; all others coded 0.*

[b] *The mean of a dichotomous variable is the percentage of cases coded 1.*

** p<.05. ** p<.01. *** p<.001.*

Exhibit 3b

Variable	Immigrant	Nonimmigrant	Mean Difference	t
	Mean (Standard Deviation)	Mean (Standard Deviation)		
Age	53.93 (13.11)	49.41 (15.97)	4.52	6.17***
Annual household income	$16,802.86 ($7,995.43)	$14,839.14 ($8,508.95)	$1,963.72	4.62***
Percentage foreign born in census tract[a]	0.43 (0.13)	0.34 (0.15)	0.09	12.55***
Neighborhood conditions[a]	– 0.51 (4.49)	1.11 (4.88)	– 1.61	– 6.67***
Monthly contract rent	$1,013.28 ($240.36)	$935.93 ($246.79)	$77.35	6.12***

[a] *Sample size of 1,706 drops to 1,685 for these variables due to insufficient address information for geocoding.*

** p<.05. ** p<.01. *** p<.001.*

housing and are more likely to live in neighborhoods with a larger proportion of immigrants. Finally, immigrants live in worse neighborhoods, on average, than do nonimmigrants.

The preliminary analyses give us an initial understanding of the immigrant group in the sample; however, these analyses are simple group comparisons. To fully investigate our research questions, we performed multivariate analyses that can account for potentially confounding associations among the variables. In the next section, we consider each research question by presenting results from the multivariate analyses.

Multivariate Analysis

The first research question examines the propensity for immigrants to use their social ties to facilitate their search for housing. Specifically, we consider if immigrants are more likely to have reported having assistance from friends or family in their housing search. The dependent variable, therefore, is dichotomous (*family/friends assisted* or not). Using logistic regression, we specified *immigrant* as the substantive independent variable and controlled for sociodemographic characteristics, including *age*, *gender*, *marital status*, *child present*, *White, not Hispanic* (minority status), *education* (high school graduation), and *annual household income*. The last of these variables, *income*, was positively skewed; therefore, it was transformed by its square root.

Exhibit 4 presents the results from the analysis. The coefficient for the immigrant variable is positive and significant at the p=0.01 level; that is, immigrants are more likely than are nonimmigrants to have assistance from friends or family when they search for housing. By exponentiating the coefficient for immigrant (exp[0.419]=1.520), the magnitude of the effect can be stated clearly. The odds of friends or family assisting in the housing search process of voucher holders in the sample is 52 percent higher for immigrants compared with nonimmigrants, net of other variables in the model. The only other statistically significant variable in the model is age. The effect is relatively small; that is, on average, the odds of receiving assistance from friends or family in the housing search process increases by 1.4 percent for every 1-year increase in the age of the voucher holder. The model chi square of 54.028 is statistically significant at the p=0.001 level.

Exhibit 4

Logistic Regression: Family/Friends Assisted in Housing Logistic

Variable	B	SE B	Exp(B)
Immigrant	0.419**	0.140	1.520
Age	0.014**	0.004	1.014
Gender	0.107	0.114	
Marital status	– 0.137	0.123	
Child present	– 0.241	0.140	
White, not Hispanic	– 0.155	0.138	
Education	0.037	0.109	
Annual household income[a]	0.000	0.002	
Model X^2 (with 8 degrees of freedom)	54.028***		

B = coefficient estimate. Exp(B) = exponential (B). SE B = standard error (B).

[a] Square root transformation.

** p<0.05. ** p<0.01. *** p<0.001.*

The second research question examines whether immigrants with vouchers, compared with nonimmigrants with vouchers, locate in neighborhoods with a higher proportion of immigrants in general. To answer this question, we specify an ordinary least squares (OLS) regression, using the *percentage foreign-born* (in census tract) as the dependent variable and, as in the previous analysis, identify *immigrant* as the primary independent variable, while controlling for the set of sociodemographic variables. As exhibit 5 shows, the coefficient for immigrant is positive and significant, indicating that immigrants tend to live in neighborhoods with a higher proportion of foreign-born people, holding the other variables in the model constant. Four of the seven coefficients for the sociodemographic control variables are also statistically significant. Males are more likely than women to live in neighborhoods with a higher percentage of foreign-born people, and married people are also positively associated with the dependent variable. Both being White, non-Hispanic (nonminority) and having at least a high school education are negatively associated with the percentage of foreign born in the neighborhood. For the model as a whole, the R^2 indicates 15.5 percent of the variation in the dependent variable is explained by the included variables.[20]

The last research question investigates the neighborhood conditions of voucher holders in the sample, again with a focus on immigrants. The dependent variable is the *neighborhood conditions* index and the independent variables are *immigrant*, the set of socioeconomic control variables, and three additional variables. First, we include the dichotomous variable, *lives in central city* or not, to capture the potential effect of living in Orange County's central city. Second, based on findings from our previous work (see Basolo and Nguyen, 2005), we include *monthly contract rent* in the specification.[21] Finally, considering the percentage of minorities (Not White and/or Hispanic) in

Exhibit 5

Ordinary Least Squares Regression: Percentage Foreign Born in Census Tract

Variable	B	SE B
Immigrant	0.031**	0.009
Age	0.000	0.000
Gender	0.022**	0.007
Marital status	0.023*	0.008
Child present	– 0.015	0.009
White, not Hispanic	– 0.078***	0.009
Education	– 0.025***	0.007
Annual household income[a]	0.000	0.000
Model R^2 = 0.155		

B = coefficient estimate. SE B = standard error (B).

[a] Square root transformation.

** p<.05. ** p<.01. *** p<.001.*

[20] We explored the possibility that receiving assistance from family and friends may be associated with location in census tracts with relatively higher percentages of foreign-born residents. We ran a model with the *family/friends assisted* variable and another model adding an interaction term, *family/friends assisted and immigrant*. The new variables were not statistically significant and only negligibly affected coefficients, standard errors, and the model R2; in other words, the substantive results from the original model are unchanged.

[21] It is possible that the inclusion of contract rent presents an endogeneity (simultaneity) problem, but excluding contract rent raises a misspecification issue (omitting a relevant variable). Our data set did not have strong candidates for instrumental variables and we determined results from a two-stage least square analysis would not improve our results.

the sample and the high number of immigrants from Asia and Latin America in Orange County, we add an interaction term to consider the effects of being a nonminority and an immigrant.

Exhibit 6 displays the results from two OLS regressions on neighborhood conditions. First, in model A, the coefficient for immigrant indicates that these households, on average, are less likely to live in better neighborhoods compared with nonimmigrants, controlling for the other variables in the model. Males, households with a child present, and voucher holders living in the central city also are associated with worse neighborhood conditions. Voucher holders who are White, not Hispanic (nonminority), have at least a high school education, and pay more in monthly rent tend to live in better neighborhoods. The interaction term is positive and significant; therefore, this finding suggests that the effect of being an immigrant in relation to neighborhood conditions depends on minority status. The R^2 for the overall model is 0.199.

In model B we add an independent variable, *percentage foreign born in census tract* (a proxy for percentage of immigrants in the neighborhood), to model A to explore the relationship between living in areas with relatively higher concentrations of immigrants and neighborhood conditions. The coefficient for this variable is highly statistically significant and boosts the explained variation to 58.1 percent. Clearly, a strong association exists between neighborhood conditions and the proportion of immigrants in neighborhoods. The inclusion of this variable also affects the results for other variables. Neither the main effects of immigrant and White, not Hispanic are statistically significant, nor is their interaction. Because the results shown in exhibit 4 indicate immigrant and the minority status variables are associated with the percentage of immigrants in neighborhoods, as a whole, our results suggest that immigrant and minority status are indirectly associated (through the percentage of immigrants in neighborhood) with neighborhood conditions. This type of relationship appears to be the case for the education variable as well. The coefficients and their standard errors for monthly contract rent and lives in central city change in model B, but the coefficients'

Exhibit 6

Ordinary Least Squares Regression: Neighborhood Conditions

Variable	Model A		Model B	
	B	SE B	B	SE B
Immigrant	– 0.801*	0.341	0.438	0.249
Age	0.014	0.009	0.150*	0.007
Gender	– 0.761**	0.236	– 0.085	0.171
Marital status	– 0.101	0.251	0.343	0.182
Child present	– 1.197***	0.308	– 0.745**	0.223
White, not Hispanic	1.163**	0.374	0.239	0.272
Education	0.559*	0.226	0.353*	0.164
Annual household income[a]	0.002	0.004	0.001	0.003
Monthly contract rent	0.004***	0.001	0.003***	0.000
Lives in central city	– 3.946***	0.277	– 0.796***	0.216
Immigrant*White, not Hispanic	1.118*	0.546	– 0.037	0.396
Percentage foreign born in census tract			– 23.482***	0.602
Model R^2 (adjusted)	0.199	0.581		

B = coefficient estimate. SE B = standard error (B).

[a] Square root transformation.

** p<.05. ** p<.01. *** p<.001.*

signs do not change direction and remain statistically significant at the p=0.001 level. The results for the control variables, age and gender, are less stable and appear affected by their correlations with the percentage of immigrants in neighborhoods.

The analysis of neighborhood conditions considered immigrants across all racial and ethnic groups. Next, we examine a subgroup with substantial representation in the immigrant population in Orange County and in our sample: Hispanics.

Hispanics

Hispanics constitute 20 percent (341 cases) of the voucher sample. Of these voucher holders, slightly more than 56 percent (191 cases) are immigrants. In exhibits 7a and 7b, it is clear that the differences in socioeconomic and other indicators for immigrants versus nonimmigrants in the Hispanic subsample are consistent with the sample as a whole; however, the measure of association for the comparisons of the groups for categorical variables and the t statistic for the analyses for the continuous variables are not all statistically significant ($p \leq .05$). Only the associations among immigrant and marital status, education, annual household income, lives in central city, percentage foreign born in census tract, and percentage of Hispanics in census tract are significant. For percentage of Hispanics in the census tract, the mean for all Hispanic voucher holders is 49 percent, which suggests that Hispanics in the sample tend to locate in ethnically concentrated neighborhoods.

We performed all three multivariate analyses and one additional analysis on this subset of the voucher sample. The logistic regression with *family/friends assisted* with the housing search as the dependent variable had no statistically significant coefficients, and the OLS regression on *percentage foreign born in census tract* had only one significant coefficient: high school graduates were less likely to live in neighborhoods with a larger proportion of immigrants. Neither of the two models had much explanatory power; we do not show the full model results here.

To better understand the residential choices of immigrant voucher holders in the Hispanic subsample, we explored the possibility that immigrants might be more likely to live in neighborhoods with their ethnicity more highly represented, net of socioeconomic effects. We ran an OLS regression with *percentage of Hispanics in the census tract* as the dependent variable and *immigrant* and the set of sociodemographic characteristics as the independent variables. Exhibit 8 shows the results. The coefficient for immigrant is not statistically significant, suggesting that immigrant is not associated with living in a more ethnically concentrated neighborhood when socioeconomic differences are taken into account. The only coefficient that is statistically significant is education, indicating that Hispanic voucher holders with a high school education are less likely to live in more ethnically homogenous neighborhoods compared with Hispanic voucher holders who did not graduate from high school. Overall, the model has very little explanatory power.

Finally, we investigate neighborhood conditions in the subsample. Exhibit 9 shows the results for the OLS regressions with the *neighborhood conditions* index (α=0.888 for this subset of the data) as the dependent variable. Model A reveals that the coefficient for *immigrant* is not statistically significant. The result for monthly contract rent indicates that paying more in rent is associated with having better neighborhood conditions. The coefficient for living in the central city is negative, as expected; that is, living in the central city is associated with worse neighborhood conditions.

The R^2 for this model is .172. In model B, using a method that is similar to our analysis for the whole sample, we add the *percentage foreign born in census tract* as an independent variable. This additional variable has the only significant coefficient, and the R^2 jumps to .691. This result clearly demonstrates a strong association between census tracts with a larger proportion of immigrants and poor neighborhood conditions.

Exhibit 7

Characteristics of Hispanic Voucher Holders by Immigrant Status

Exhibit 7a

Variable[a]	Immigrant[b]	Nonimmigrant[b]	X^2
	Mean[c]	Mean[c]	
Gender (male)	0.27	0.19	3.1
Marital status (married)	0.47	0.21	24.8***
Child present (children)	0.73	0.69	0.5
Education (high school graduate)	0.40	0.69	27.1***
Family/friends assisted	0.34	0.39	1.0
Lives in central city	0.36	0.21	8.25**

[a] *Category shown by variable name or in parentheses coded 1; all others coded 0.*

[b] *n=191 for immigrant; n=150 for nonimmigrant.*

[c] *The mean of a dichotomous variable is the percentage of cases coded 1.*

** p<.05. ** p<.01. *** p<.001.*

Exhibit 7b

Variable[a]	Immigrant	Nonimmigrant	Mean Difference	t
	Mean (Standard Deviation)	Mean (Standard Deviation)		
Age	48.48 (14.94)	45.72 (14.20)	2.76	1.73
Annual household income	$18,307.02 ($9,963.21)	$15,906.28 ($8,451.48)	$2,400.75	2.36*
Percentage foreign born in census tract[a]	0.42 (0.15)	0.37 (0.15)	0.05	2.77*
Percentage Hispanics in census tract	0.52 (0.28)	0.46 (0.24)	0.07	2.37*
Neighborhood conditions[a] (α=0.888)	– 1.01 (5.27)	0.01 (4.89)	– 1.02	– 1.83
Contract rent	$989.67 ($226.01)	$963.83 ($219.97)	$25.83	1.06

[a] *Total sample size of 341 drops to 337 for these variables due to insufficient address information for geocoding.*

** p<.05. ** p<.01. *** p<.001.*

Exhibit 8

Ordinary Least Squares Regression: Percentage Hispanics in Census Tract (Hispanic Subgroup)

Variable	B	SE B
Immigrant	0.006	0.026
Age	0.000	0.001
Gender	0.016	0.030
Marital status	– 0.008	0.028
Child present	0.033	0.039
Education	– 0.056*	0.026
Annual household income[a]	0.000	0.000
Model R^2 = 0.08		

B = coefficient estimate. SE B = standard error (B).

[a] Square root transformation.

** p<.05. ** p<.01. *** p<.001.*

Exhibit 9

Ordinary Least Squares Regression: Neighborhood Conditions (Hispanic Subgroup)

Variable	Model A		Model B	
	B	SE B	B	SE B
Immigrant	– 0.248	0.569	0.293	0.349
Age	0.017	0.026	0.012	0.016
Gender	– 0.684	0.667	0.260	0.410
Marital status	0.608	0.612	0.131	0.375
Child present	– 0.857	0.883	– 0.969	0.541
Education	1.057	0.567	0.171	0.349
Annual household income[a]	– 0.008	0.009	– 0.002	0.005
Monthly contract rent	0.003*	0.001	0.002	0.001
Lives in central city	– 4.154***	0.606	– 0.599	0.401
Percentage foreign born in census tract			– 27.930***	1.195
Model R^2	0.172		0.691	

B = coefficient estimate. SE B = standard error (B).

[a] Square root transformation.

** p<.05. ** p<.01. *** p<.001.*

Discussion

We need to emphasize several aspects of our study before we discuss our results. First, the voucher holders in the sample used in this study all reside in a county that is routinely characterized as suburban; however, a substantial variation exists across communities in the county. As a result, distinctions between urban and suburban are less clear. In fact, the county seat, Santa Ana, is the archetypical central city. Thus, examining immigrants in this suburban county did not constrain variation in neighborhood conditions; instead, it suggests the use of suburban location as a measure of assimilation may no longer be as relevant as it once was. Second, the immigrants in our sample do not represent typical foreign-born people. Because the voucher program is aimed at people with lower incomes, the immigrant voucher holders in our sample are relatively poor. Also, the immigrants in our sample had to navigate the housing assistance system, including gaining

knowledge of the HCVP, getting on a waiting list, and finding an acceptable housing unit. Third, our study had information on first generation immigrants only and is cross-sectional, at one point in time; thus, it is unsuitable for investigating intergenerational and intertemporal social and spatial mobility or making causal claims. Our study has several additional limitations. The data do not have the structure or characteristics necessary for more extensive analyses. For example, they are cross-sectional rather than longitudinal or panel data. In addition, the data do not have sufficient variation in immigrant status for the Asian subgroup and, as a result, we are unable to do a within-group or cross-group comparison (with Hispanics, for example). Also, this study examines immigrant voucher holders in one county in the United States and, therefore, may not apply more generally, although we suspect the results might be similar to studies of the voucher populations in other gateway regions. Despite these limitations, this study is valuable for its focus and findings on a subset of the voucher population that is generally neglected in the housing policy literature.

Several findings from this study are consistent with the assimilation literature. First, immigrants rely more on friends or family in their housing search; that is, they use social ties more than native-born voucher holders do for this activity. Second, immigrant voucher holders tend to live in neighborhoods with higher concentrations of immigrants in general. This finding suggests that immigrant enclaves are present in Orange County and that immigrant voucher holders tend to cluster in these enclaves. Additional analyses (not shown in this article; see footnote 19), however, did not reveal a relationship between location in immigrant enclaves and having help during the housing search from friends or family; neither the main effect of assistance nor the interaction (housing assistance and immigrant status) were statistically significant. Therefore, immigrants do not appear to have been influenced to locate in an immigrant enclave as a result of housing search assistance from friends or family, at least no more than nonimmigrants have been influenced; however, immigrants, on average, tend to live in neighborhoods with relatively high concentrations of other immigrants. This choice may occur because immigrants in the HCVP may be familiar with people who live in these neighborhoods and feel a level of comfort in these areas as they search for a rental unit or become aware of the neighborhoods through routine social interaction (rather than through explicit assistance from close social ties). Other explanations would explain why voucher holders in general might locate in these neighborhoods but not why immigrants are more likely to live there. Some explanations might be institutional—the LHA's list of possible rentals in the area may include neighborhoods with higher concentrations of immigrants. Another explanation may be more market-oriented—either the supply in these neighborhoods is higher (more landlords willing to rent to voucher holders) or these neighborhoods simply have more affordable rents.

The emphasis of the housing policy literature on neighborhood effects prompted us to examine the neighborhood conditions of the immigrant voucher holders in our sample. We find that immigrants do live in worse neighborhoods than do nonimmigrants. Because many of the immigrants in the region are racial/ethnic minorities, we included an interaction item in the model (immigrant and White, not Hispanic) and found the main and interaction effects statistically significant. In other words, the effect of being an immigrant in relation to neighborhood conditions is moderated by minority status. We interpret our results to find that immigrants who are racial/ethnic minorities are particularly vulnerable to negative outcomes in the form of worse neighborhoods; however, our analysis of neighborhood conditions was extended by adding the percentage foreign born in

census tract (proxy for percentage immigrants in neighborhood) as an independent variable in the model. The inclusion of this variable results in a highly significant and strong association between living in an immigrant enclave and relatively worse neighborhood conditions. The main effects of immigrant and minority status and the interaction effect of these two variables are no longer significant with inclusion of percentage of minorities in neighborhood in the model. We find, therefore, that residing in neighborhoods with a relatively larger immigrant population mediates the relationship between immigrant, as well as minority status, and neighborhood conditions. It appears that immigrant and minority status are only indirectly associated with neighborhood conditions, and it is the direct effect of location in an immigrant enclave that results in worse neighborhood conditions for immigrants and racial/ethnic minorities.

Our findings for the Hispanic subgroup show that immigrant status has little to do with residential choices and outcomes. Although in the simple comparison of Hispanic immigrants with Hispanic nonimmigrants, immigrants in this subgroup tend to live in more ethnically concentrated and immigrant-concentrated neighborhoods; these differences are no longer evident after controlling for sociodemographic characteristics. It is clear from this analysis, however, that living in the central city and in a neighborhood with a higher percentage of immigrants is associated with worse neighborhood conditions, regardless of immigrant status.

The findings in this article have a number of policy and research implications. For policymakers, the premise that neighborhoods matter to the access of opportunities for the poor must include a concern for immigrant households. If Orange County's voucher population reflects other immigrant gateway regions in the country, then this subset of the population is substantial, and policies to recognize their circumstances and provide strategies for upward mobility are critical to a long-term goal of moving voucher holders out of poverty. Portes and Zhou (1993) have raised doubt about the assumption that immigrant households will assimilate into the mainstream and argued that distinctly different trajectories exist for immigrants, with the least desirable being intergenerational poverty and integration into the underclass. Considering the immigrants in our sample tended to live in immigrant enclaves and these enclaves are associated with poor neighborhood conditions, the immigrants in our sample appear to be vulnerable to the negative effects of these neighborhoods; however, the underlying motivation for current policy to deconcentrate poverty may or may not correspond to immigrant voucher holders. Whether the rationale for moving out of high-poverty neighborhoods to lower poverty areas is because a move will (1) reduce any negative influence from neighborhoods of social disorder or (2) provide new opportunities for social contact and mobility, it may not apply to immigrants or, at least not uniformly across immigrants from different racial/ethnic groups. It may be that immigrant enclaves offer unique opportunities for first generation immigrants that will serve to improve their socioeconomic status in the future, or perhaps these enclaves are places of isolation that limit social mobility. Policy must be flexible enough to respond to the needs of immigrants with housing vouchers living in immigrant enclaves. Thus, flexible policy must take into account whether these enclaves are relatively better or worse neighborhoods, and whether they are coethnic or ethnically diverse neighborhoods. Currently, however, we simply do not know enough about the experiences and trajectories of immigrants in the HCVP to design a flexible policy to foster their social mobility.

The research implications from our study and discussion of policy needs are clear. The scarcity of studies on immigrants with voucher assistance indicates a wide-open research agenda. We agree, for housing policy purposes, that attempting to generalize to the population of immigrants is not a fruitful exercise. That is, a national, aggregate study of immigrants and their neighborhoods will not produce the type of knowledge necessary to craft flexible policy for the HCVP. Instead, researchers need to investigate immigrant voucher use, neighborhood location, and social outcomes for gateway and nongateway regions and for different racial/ethnic subgroups; it may be that generalization must be at a smaller scale. Finally, the ideal study would be longitudinal to strengthen and expand on our work, including determining if immigrants served by the HCVP achieve social mobility in the first generation or whether the benefits might accrue to the second generation. Longitudinal research of this kind would require a long-term research commitment to gather appropriate data through existing national surveys or support for more localized work by independent researchers.

Appendix

Exhibit A-1

Zero Order Correlations for Variables Used in the Analysis

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12
x1 Immigrant	1.000											
x2 Age	0.148**											
x3 Gender	0.347**	0.211**										
x4 Marital status	0.492**	0.065**	0.411**									
x5 Child present	0.134*	– 0.560**	0.022	0.199**								
x6 White, not Hispanic	– 0.487**	– 0.030	– 0.244**	– 0.326**	– 0.236**							
x7 Education	– 0.185**	– 0.042	0.007	– 0.029	0.030	0.170**						
x8 Annual household income	0.111**	– 0.195**	0.096**	0.148**	0.351**	– 0.114**	0.043					
x9 Monthly contract rent	0.147**	– 0.387**	0.073**	0.183**	0.533**	– 0.168**	0.012	0.380**				
x10 Lives in central city	0.057*	0.102**	– 0.016	0.029	– 0.153	– 0.117**	– 0.168**	0.037	– 0.027			
x11 Family/friends assisted	0.104**	0.143**	0.069**	0.027	– 0.097**	– 0.059*	– 0.019	– 0.037	– 0.046	– 0.011	0.032	
x12 Percentage foreign born in census tract	0.293**	0.105**	0.205**	0.299**	0.019	– 0.331**	– 0.146**	0.038	– 0.024	0.385**	– 0.084**	
x13 Neighborhood conditions	– 0.160**	– 0.041	– 0.115**	– 0.110	– 0.025	0.239**	0.145**	– 0.003	0.102**	– 0.339**	0.089**	– 0.747**

** p<0.05. ** p<0.01. *** p<0.001.*

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Immigrants in the Polycentric Metropolis: Centers, Housing, and Dispersion

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Abstract

The burgeoning literature on the settlement patterns of immigrants has not yet examined recent residential patterns of foreign-born populations in the context of local government geography. Yet local (municipal) government is an important arena for consideration of immigrant integration, political incorporation, and service delivery. This article explores the extent to which immigrants disperse across jurisdictions in three politically polycentric regions: the San Francisco Bay Area in the United States, the Randstad in The Netherlands, and Emilia-Romagna in Italy. Finding that dispersal is not consistently linked with city size in these regions, the article then explores the role of multifamily and rental housing, which consistently accompanies immigrant concentrations. To the extent that their entry into a larger number of jurisdictions offers a pathway toward political incorporation and integration, this finding suggests a role for inclusive housing policy across a wider range of city sizes.

Introduction

Immigration has increased in the past 25 to 30 years in the European Union (EU) and the United States, bringing with it both a growing backlash against immigrants (foreign-born residents) and increased efforts to improve the integration of immigrants into receiving communities. At the national level, policies and public discourse on both sides of the ocean are increasingly hostile

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toward immigrants with stricter admittance policies (CECODHAS, 2007) and increased difficulties gaining citizenship. This shift in policy goals is accompanied by a broader political shift to the right across many Member States of the EU and in the United States.

Regardless of the tenor of the debate at the national level, however, immigration continues, and subnational and local governments have often been left to respond in an ad hoc fashion to the needs of immigrants. In the United States, some local governments and states have reacted with punitive measures focused at illegal immigrants, but others—even outside central cities—have been much more accommodating (Jones-Correa, 2008). Although these local policy responses to immigration have begun to draw scholarly attention, less is known thus far about the characteristics of the settlement pattern and built environment that associate with higher or lower degrees of diffusion by immigrants across local governments within metropolitan areas.

To begin addressing this gap, this article examines whether and how polycentric urban regions (PURs)—which this article defines as metropolitan conurbations with multiple medium-size to large local governments—foster the dispersion of immigrants across a metropolitan area's jurisdictions and explores policy and housing-market explanations for that dispersal. By considering regions in northern Europe, southern Europe, and the United States, the article seeks to find similarities and differences in regions with different immigrant and ethnic compositions, histories of social welfare policy, and housing market structures as a first step toward the generation of hypotheses that can be tested more broadly. The article approaches the issue by mapping and presenting quantitative data to begin to understand where immigrants live in these metropolitan regions and how their locations coincide with rental and multifamily housing.

The structure of the article proceeds as follows. The first section, which introduces the relationship among immigrant locations, the built environment, and polycentricity, is followed by a description in the second section of our three case-study regions. The third section describes immigrants' concentration in those regions at the scale of municipalities, and the fourth section relates the level of concentration to housing type, tenure, and affordability. The final section brings together the findings and discusses policy implications. The article concludes that cities that (1) are large, (2) have high shares of rental housing, and (3) have high shares of multifamily housing all tend to accommodate higher than average shares of immigrants in the three regions, but the effect of these three factors varies substantially among the three regions. More research is needed to identify the role of individual and neighborhood factors, but, in particular, planners need to know more about the way in which housing and land use policies can build an urban pattern that enables immigrants to advance in whatever way they deem desirable.

Immigrant Locations, the Built Environment, and the Polycentric Region

When considering why immigrants live where they do within cities and neighborhoods, the article identifies four main sets of explanatory variables: (1) characteristics of the immigrant household, (2) established activity and settlement patterns, (3) characteristics of the built environment, and the (4) urban policy environment.

Characteristics of the immigrant household are probably the most important and best studied of the four variable sets. Studies of immigrants' residential mobility and location decisions are embedded within a larger demographic literature. Such studies use microlevel data sets and provide keen understanding of the role of age, ethnicity/race, household structure, language acquisition, country of origin, education level, occupation, and gender in immigrants' decisionmaking. This well-studied variable set may be considered the "agency" or "demand" side of the location equation; the remaining variable sets constitute the "structure" within which household and individual agents exercise their choices.

Second, immigrants and other ethnic groups base their decisions in part on an established geographic distribution of households across a housing market area according to class, race, ethnicity, household type, national origin, and sometimes religion. In cities with established enclaves of immigrants, new immigrants often gravitate toward these areas; they also often face discrimination when searching for housing elsewhere A tight-knit community can offer a social network that can aid in the transition by offering connections to jobs, housing opportunities, and information. The location of employment opportunities also contributes to the spatial settlement patterns of immigrants. The jobs most often available to immigrants with low levels of education and/or limited language skills include low-wage jobs in what may remain in the industrial sector or in the service sector. The distributions of residences and employment do not usually change within the period in which a particular immigrant makes his or her location decision, although they might change within a few months in a very dynamic metropolitan area. In some situations, immigrants are isolated by deliberate policy.

Third, all households make decisions about location based in part on characteristics of the built environment. These decisions include the options they face in housing structures and tenure, which are in turn embedded within neighborhood environments. The availability of affordable and appropriate housing clearly shapes immigrants' location decisions (Leerkes, Engbersen, and Van San, 2007). This set of built-environment characteristics generally changes more slowly than the distribution of households according to class, race, and so on across the metropolitan area. Immigrant households are particularly drawn to certain kinds of housing and neighborhoods. In particular, immigrants usually need to rent dwellings upon arrival and more often choose to live in multifamily or attached housing. Those who plan to return and maintain connections with family in their countries of origin may choose to rent as little as a room or even a bed for a few hours a day; even those who plan to settle permanently will often rent because they lack the income, wealth, employment stability, and credit history necessary to buy a house. In most urban areas, rental housing disproportionately concentrates in the multifamily housing stock. Attached housing further attracts immigrants because, in general, it is less expensive than detached housing and because it usually is established in neighborhoods where households do not need cars. Immigrants also sometimes seek neighborhoods where they can easily travel to a rich array of employment, social, religious, and cultural activities; such neighborhoods tend to have high land rents, which in turn contribute to market forces encouraging the development of high-density (multistory) housing.

Fourth, immigrant households (like all households) make decisions about where to live based in part on the urban policy environment in place at the time of their housing search. Some cities and nations welcome immigrants and accommodate them in short-term housing, for example. Legal

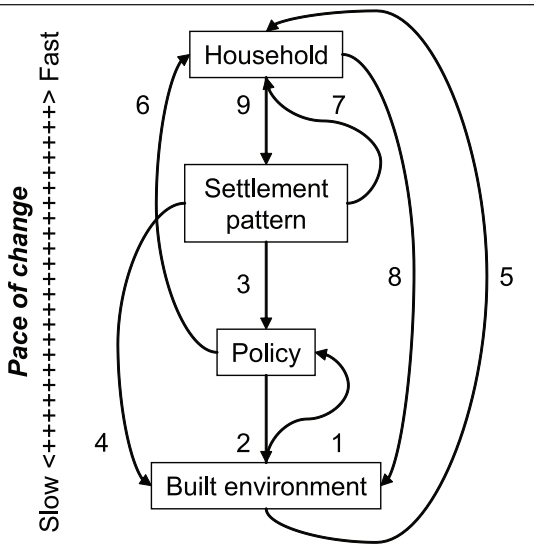
immigrants who plan to remain for the long term may or may not have access to social housing; if allowed to live in social housing, certain immigrant groups (especially asylees) may be granted priority access to housing. As legal immigrants establish themselves in social housing, they may also provide access to undocumented coethnics. Social housing often isolates its residents, rather than integrating them, a problem that has led to a shift toward housing policies that disperse assisted tenants. Policies can also exclude immigrants, as when local governments in the United States require property owners to verify their tenants' immigration status or establish law-enforcement relationships with U.S. Immigration and Customs Enforcement.

The housing policy environment extends far beyond assisted housing, of course, and into the realm of land use policy. Land use policy establishes the conditions under which new housing can be built and existing housing can be modified. To the extent that immigrants rely on attached housing, rigid housing regulation and enforcement that limit densification in established enclaves and flexibility in other locations may contribute to the creation of new enclaves. Plans and zoning ordinances, as well as infrastructure investment strategies, can facilitate or hinder the development of new high-density, mixed-use neighborhoods, which some observers have identified as important settlement sites for some immigrant households.

The third and fourth sets of explanatory variables—the built environment and urban policy—have longer periods of change than established activity and settlement patterns, and all three structural variable sets change more slowly than would be noticeable to a household over the course of its typical residential location search (usually considerably less than a year). The four sets of explanatory variables, illustrated in exhibit 1, influence one another at different time scales, arrayed top to bottom from fast to slow change.

Exhibit 1

Conceptual Model: Built Environment, Land and Housing Policy, Settlement Patterns, and Immigrant Location Choice



When decisionmakers and planners consider their choices for land use and housing policy, they consider—and often take as practically immutable—a range of built-environment characteristics. For example, cities often adopt zoning ordinances with maximum densities that match those of the existing built environment (arrow 1: built environment influences policy). Such regulations protect established neighborhoods, shielding them from the rapid or unconsidered change that might ensue in a deregulated environment (arrow 2: policy influences built environment), including the establishment of new immigrant neighborhoods.

Existing or prospective concentrations of low-income people, immigrants among them, can also influence both policy and the built environment. Decisionmakers might loosen zoning to allow immigrant clusters to intensify or conversely lock in certain policies to reduce the choices of immigrant households (arrow 3: concentrations of land occupants influence policy choice). Concentrations of immigrants can also lead to changes in the built environment—although mediated or moderated by land use policy—in, for example, the creation of more businesses in residential neighborhoods and the subdivision of existing housing structures and through the development of new structures in response to high demand (arrow 4: settlement pattern influences the built environment).

Individual immigrant households' decisions are sometimes considered as a function of multifamily and rental housing stock (arrow 5: built environment influences household decisions), subsidized housing policies (arrow 6: policy influences household decisions), and residential patterns of coethnics as well as of "out groups" (arrow 7: settlement patterns influence household decisions). But households' decisions can have feedback effects on the built environment (arrow 8), as when, for example, households partition housing structures. The same household would also influence settlement patterns (arrow 9), although perhaps only modestly, if it uses its new rooms to establish an informal business. Over the course of a few years, the sum total of individual household and worker decisions may have a marked effect on the settlement pattern and overall built environment, thereby occasioning shifts in the policy environment that reverse, dampen, or accelerate change in immigrant settlement patterns and the built environment.

Although many studies of immigration tend to treat the built and policy environments as exogenous variables and a few treat immigrant enclaves as dependent variables, a full understanding of why enclaves, built environment, and policies evolve is also fundamental to our understanding of immigrants' location decisions. Although this article does not undertake at this point the explanation of the structural factors that are usually treated as exogenous to immigrants' location decisions, it does outline some description of these location decisions and discuss directions for further research on "the structuring of structure," concentrating in particular on the location of multifamily and rental housing in polycentric regions.

PURs offer a little-explored setting for the study of immigrant locations. Polycentrism is a multidimensional planning concept that has gained much ground recently in Europe and, to a lesser extent, the United States. Its exact definition is still under debate, but it generally encompasses a model based on multiple nodes of concentrated activities and population that are separated in space but functionally connected. The concept is used as both a normative ideal and a model for the observed reality of metropolitan areas. As a spatial planning strategy, polycentrism has its roots in Dutch spatial planning and has now spread to all levels of the EU thanks to the introduction in

1999 of the European Spatial Development Perspective (CSD, 1999). Supporters of polycentrism contend that it will integrate the diverse regions of the Member States of the EU, both spatially and conceptually. Its European critics point out that its definitions are fuzzy, that it may operate in different ways at different scales, and that it should not be embraced as a normative ideal in the absence of sufficient empirical evidence about its effects (Davoudi, 2003). In the United States, polycentrism has also emerged—in the guise of "the Regional City"—as a normative model for postwar planning (Stein, 1954) and now as a metropolitan variant on the New Urbanism (Calthorpe and Fulton, 2001). Most American studies about polycentrism have concentrated on its relevance for economic geography—that is, the existence and evolution of new nodes of employment (Anas et al., 1998; Giuliano et al., 2007)—rather than on its promise and threats for governance.

Observers have made many arguments both supporting and opposing the deconcentration of low-income households at the neighborhood scale (Goetz, 2003; Turner, 1998); these arguments are also sometimes applied to immigrants. The dispersal of housing may relieve some of the demand pressures that the concentration of jobs in services in the city center can create. It may also deconcentrate poverty, creating more opportunities for immigrants in mixed communities. For low-income immigrants, clusters are often viewed as impediments to the integration process because they often have less access to economic resources and tend to be more linguistically isolated. In addition, these areas often are characterized by poor-quality housing and overcrowding (Pamuk, 2004). Immigrant clustering is especially an issue for younger generations, because they often lack access to schools where they can encounter native-born children; they also feel the stigmatization more than do the older generations, who are more comfortable living within concentrated ethnic communities. Some research suggests that living in ethnic neighborhoods limits upward mobility of the next generations, especially where ethnic minority children concentrate in schools where they receive too little instruction in mastering the native language (Kruythoff, 2003). Other research, however, is much more optimistic about the fate of the second generation in big cities, at least as experienced in New York City (Kasinitz et al., 2008).

Whether and how to promote the deconcentration of immigrants or low-income residents among jurisdictions within metropolitan areas, however, can and should be considered independent of the debate over neighborhood-level concentration or dispersal. Immigrant incorporation is a dominant goal in current American and EU policy. How will metropolitan deconcentration (regardless of concentration at the neighborhood scale) help reach or threaten this goal and how, in turn, will polycentrism affect metropolitan deconcentration?

This article explores PURs in which a group of between 4 and 15 medium-size to large jurisdictions accounts for more than one-half the metropolitan population. Metropolitan areas in which fewer than 4 jurisdictions account for more than one-half the regional population are mono-, bi-, or tri-centric; those in which the top 15 jurisdictions account for less than one-half the metropolitan population are better characterized as weakly centered. In such regions, significant numbers of local jurisdictions have enough inhabitants to create internal demand for employment, variety in housing and neighborhood type, and government service (bureaucratic) complexity (that is, beyond "caretaker" functions, into the realm of housing, economic development, and welfare policy). With multiple such jurisdictions, immigrants arguably can choose among a larger number of packages of local public goods (Tiebout, 1956) than would be available to them in nonpolycentric regions.

PURs might assist in immigrant incorporation through the following process. With multiple municipal destinations for immigrants, multiple policy responses will emerge—both backlash and accommodating—and immigrant incorporation will become a metropolitan issue, not just a state issue. In early rounds, battle lines may be drawn not just on central city-suburbs lines but also among suburbs. Immigrant incorporation will depend on the balance and resolution of these responses, but a proimmigrant resolution is probably more likely when the average jurisdiction is more complex and diverse (that is, when the region is more polycentric). As immigrants disperse across such a polycentric region, immigrant representatives are likely to gain election or appointment to local decisionmaking bodies. Their participation in large numbers in local politics will familiarize them to native-born decisionmakers from other jurisdictions to the extent that regional institutions and intergovernmental exchanges are common.

In addition, PURs may also foster the development of a broad and dispersed array of civil society institutions that work both to change policy and to respond to immigrants' needs. Community development corporations (CDCs) in the United States, for example, exist in sometimes uneasy tension with local government, carrying out policy by delivering housing, job training, and social services, but they also are dependent on local government for funding. CDCs also, however, respond to and organize neighborhood-based constituencies (including immigrant enclaves).

In all, then, the argument that PURs facilitate resilient responses to rapid immigration presupposes that PURs offer a larger number of governmental and civil-society arenas for experiments and experiences of immigrant settlement. Compared with a region with one large central city and many very small jurisdictions, a PUR can conceptually begin in early rounds by accommodating immigrants in several medium-size jurisdictions, each of which has a significant number of neighboring jurisdictions which, though smaller, may more closely resemble their larger neighbor than the small suburbs of a monocentric urban center. Emulation of the built environment and policies of such a medium-size neighbor is more likely than emulation of the built environment and policies of the largest city in the region.

The main goal of this article is to demonstrate in three examples of PURs that immigrants are dispersed among municipalities and that this dispersal relates, at least in part, to characteristics of the housing stock: multifamily and rental housing. At least in the United States, such housing is often excluded from small suburbs by deliberate local policy choices (Danielson, 1976; Pendall, 2000). Therefore, a large proportion of immigrants cannot live in substantial numbers of jurisdictions constituting a large share of metropolitan space. In addition, these medium-size and large jurisdictions—more than smaller centers—may tend to be generators and targets of housing policy initiatives that encourage the development of new immigrant neighborhoods.

The next section of the article introduces the three case-study regions by briefly summarizing the characteristics of immigrants in each region before turning to a discussion of their urban structures and immigrant settlement patterns. The following section outlines important policy initiatives that are poised to reinforce the "dispersed concentration" of immigrants in these metropolitan areas.

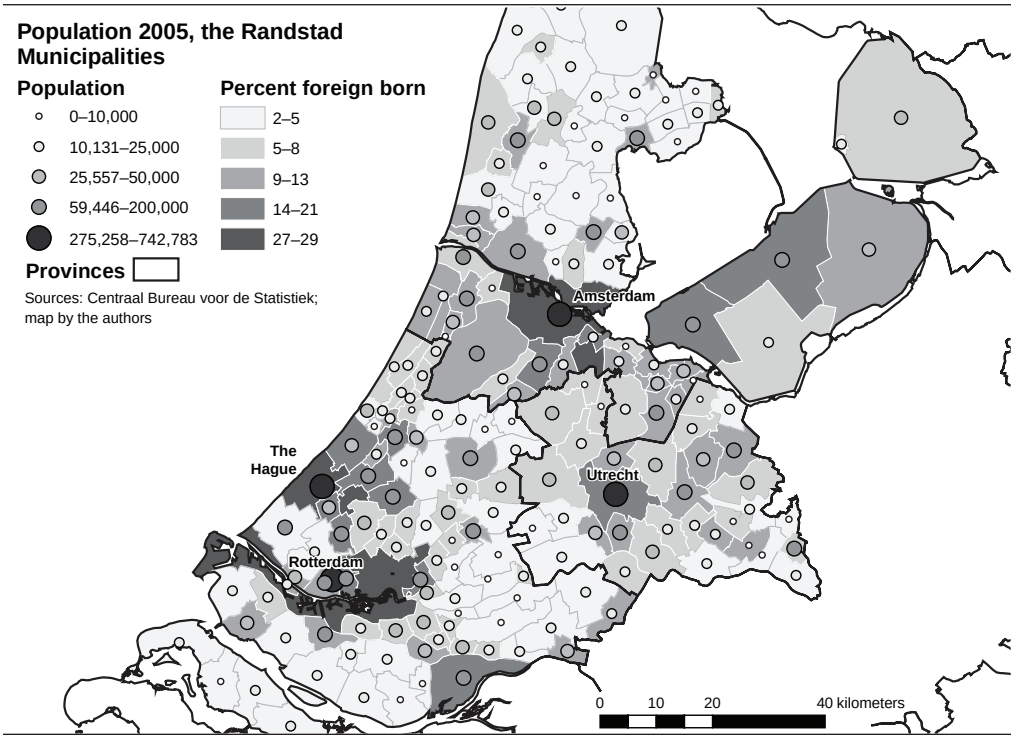
Population Concentrations in Three Polycentric Regions

The three polycentric regions compared in this article include the Randstad in The Netherlands, the San Francisco Bay Area in California, and the region of Emilia-Romagna in Italy. The Randstad (translated as "rim city"), probably the archetypal PUR, is a horseshoe-shaped region of The Netherlands containing the nation's four largest cities: Amsterdam, The Hague, Rotterdam, and Utrecht (exhibit 2).[2] The Randstad's total population in 2005 of 7.5 million constitutes 46 percent of The Netherland's total population (exhibit 3). The region also accounts for about one-half of the country's jobs. The area's center, the Green Heart, has been protected from development for more than 50 years; as a result, the predominant land use in the Randstad is rural, and only 26 percent of its total area is considered urban (Regio Randstad, 2001).

The establishment of The Netherlands' national capital at The Hague in the 17th century and the convergence of the national railway network in Utrecht (OECD, 2007) underscore the fact that The Netherlands has long discouraged the development of a single, strong population center. The Randstad is both a consequence and a manifestation of this embrace of small centers. As a planning concept, the Randstad has existed for nearly 40 years, but despite sometimes-enthusiastic rhetoric,

Exhibit 2

Population Centers and Immigrants, the Randstad, 2005



[2] Opinions differ on what makes up the Randstad. For this article, we use the four provinces of Flevoland, North Holland, South Holland, and Utrecht.

Exhibit 3

Foreign-Born Populations in Three Regions, 2006–07

	San Francisco Bay Area (2006)	Emilia-Romagna (2007)	Bologna Province (2007)	The Randstad* (2007)
Total population	6,789,879	4,223,264	954,682	7,633,195
Foreign-born population	2,027,374	317,888	65,785	1,095,351
Percent foreign born	29.9	7.5	6.9	14.3
Percent foreign born nationally	12.5	5.0	5.0	10.6

**Includes all 196 municipalities in the four provinces of the Western Region.*

Sources: United States: U.S. Census Bureau, 2006 American Community Survey (ACS), tables B01003 and B05007 (Bay Area estimate of total population and immigrants excludes Napa and Santa Cruz Counties, which are too small for ACS estimates; with Napa and Santa Cruz Counties, the metropolitan population totals about 7.2 million); Emilia-Romagna and Bologna: ISTAT GeoDemo (istat.it), downloads from http://demo.istat.it/pop2007/index3.html and http://demo.istat.it/strasa2007/index03.html, pertaining only to legally resident foreign-born noncitizen population; The Netherlands: Centraal Bureau voor de Statistiek, Bevolking op 1 januari; geslacht, geboorteland, leeftijd en regio, downloaded by authors from statline.cbs.nl

it continues to function primarily as three separate subregional urban systems (OECD, 2007) organized around (1) Amsterdam (2007 population, 755,605), (2) The Hague (2007 population, 475,681) and Rotterdam (2007 population, 582,951), and (3) Utrecht (2007 population, 294,737) (Statistics Netherlands 2009). In recent years, local and national decisionmakers have staked the international competitiveness of The Netherlands on its ability to create at least the perception and, better, the reality of a metropolitan region with sufficient population and economic activity to claim "global city" status (Regio Randstad, 2001).

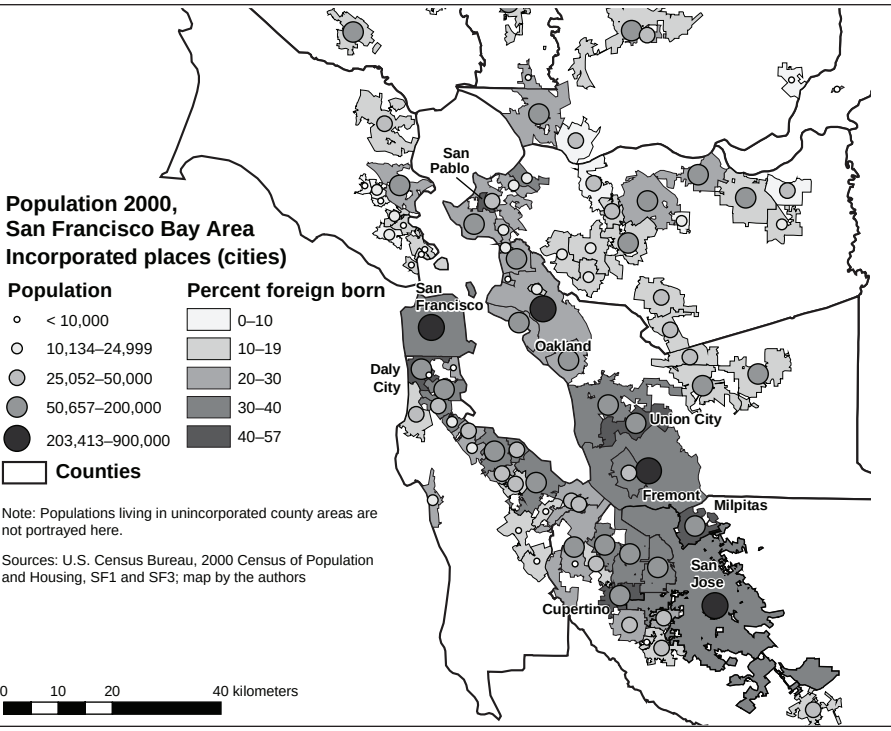
The Bay Area is also a clearly polycentric region (exhibit 4; see also Cervero and Wu, 1997; Lee, 2007), with three major cities—San Francisco (2006 population, 744,041), San Jose (2006 population, 929,936), and Oakland (2006 population, 397,067)—that account for less than one-third of the region's total population of 7.2 million (ABAG, 2007; U.S. Census Bureau, 2006). Indeed, only when one adds the populations of the 14 largest cities and urban counties[3] out of the region's total of 110 jurisdictions (101 municipalities and 9 urban counties) does one account for more than one-half the metropolitan population as of 2000.

The Bay Area's polycentricity reflects both geographic and economic transformations. The San Francisco Bay separates the historic central core city, San Francisco, from the rest of the region and, indeed, from the rest of the continent; Oakland, across the bay in Alameda County, first grew after becoming the terminus of the Central Pacific Railroad; and Berkeley, just to the north, was designated the first University of California campus. The great 1906 earthquake sent a wave of San Francisco residents to Berkeley and Oakland, where they moved into streetcar-oriented housing developments that grew rapidly between 1910 and 1930. World War II established new sites of defense production in areas outside San Francisco, and nearby cities (for example, Richmond, Oakland, Vallejo, and San Rafael) became magnets for immigration, including the region's first large influx of African Americans. The third center of population concentration is in Santa Clara County, which grew up starting in the 1960s around the civilian and defense-related industries of Silicon Valley.

[3] County governments in California are responsible for planning and development policy for areas outside municipal boundaries. These population figures are based on residents outside city limits.

Exhibit 4

Population Centers and Immigrants, San Francisco Bay Area, 2000

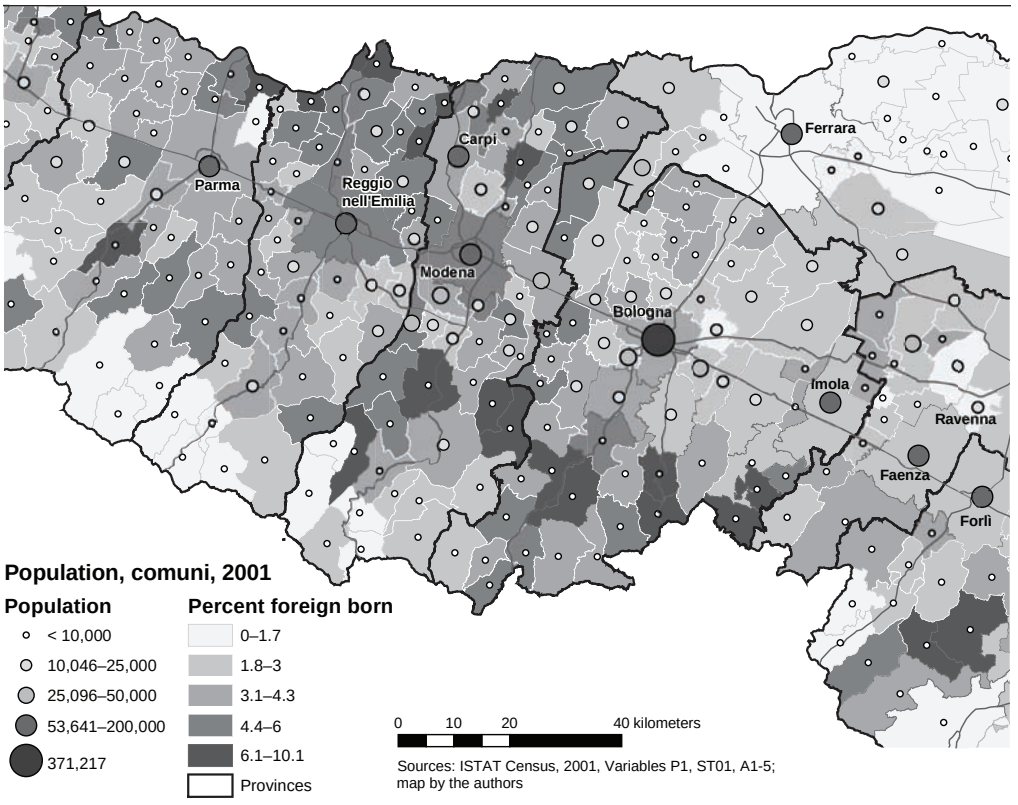


Emilia-Romagna, situated in the northern half of Italy, covers an area totaling 22,124 square kilometers (exhibit 5). It is the fifth largest of the 20 regions in Italy, with a population of 4.2 million (Istat, 2008). Many of the most populous cities of Emilia-Romagna were first established more than 2,000 years ago as way stations along the Roman Via Aemilia (completed in 187 BCE). These cities include the regional capital, Bologna (2006 population, 373,026), and the cities of Parma (2006 population, 177,069), Reggio nell'Emilia (2006 population, 159,809), Modena (2006 population, 180,080), and Ravenna (2006 population, 151,055). Emilia-Romagna has one of the highest gross regional products in Italy and is well known as part of the "Third Italy," with a thriving network of small and medium-size businesses (Becattini and Coltorti, 2006; Rinaldi, 2005) as well as prestigious automobile manufacturers Ferrari S.p.A. and Automobili Lamborghini Holding S.p.A.

The region's polycentric development appears to be a result of several factors, beginning with the original Roman settlement. After World War II, Emilia-Romagna was one of the most devastated regions in Italy. To spur economic growth, the left-wing government implemented a strategy of promoting small business by encouraging employee ownership and consumer and agriculture cooperatives and encouraging the development of an institutional structure to support small businesses (Logue, 2006). More recent civic traditions within the region contributed to strong communities and likely helped facilitate the formation of strong economic networks. In past decades, strong planning visions and innovative dispersed local governments have helped to maintain the polycentric regional form.

Exhibit 5

Population Centers and Immigrants, Emilia-Romagna (Central Section), 2001



Immigrant Characteristics and Dispersal Patterns in the Regions

Among the three regions, the Bay Area—with 30 percent of its population consisting of foreign-born residents—has the highest share of immigrants (exhibit 3). The Randstad also has a significant percentage of foreign-born residents, at 14 percent. Italy, historically a country of emigration, has only relatively recently started to receive immigrants in large numbers. In Emilia-Romagna, 7.5 percent of the population consists of foreign-born noncitizens, but this number is expected to grow in the near future.[4] In these each of these three regions, immigrants make up a larger proportion of the population than they do in each country's national average.

The origin of immigrant populations often acts as a significant factor in immigrants' settlement patterns within the region and ultimately the integration process. The table in exhibit 6 shows the

[4] These numbers, especially for the Italian case, do not reflect the rapid influxes of immigrants in the past 5 years. Italy, as a whole, has experienced unprecedented spikes in immigration from the newly admitted Member States in the EU from Eastern Europe and from around the Mediterranean.

significant variation in the origin of the regions' foreign-born populations. The Randstad has the greatest continental diversity. One-third of its foreign-born residents are from Europe; of these residents, about one-half are from EU countries and one-half are from non-EU countries. One-fifth of the remainder of the Randstad's foreign-born residents are from Africa, one-fifth are from Asia, and one-fourth are from the Americas. In Emilia-Romagna, most foreign-born residents are from Europe (42 percent) and Africa (35 percent), with most of the remainder coming from the Americas. In the Bay Area, most foreign-born residents come from Asia and Oceania (54 percent); the remaining foreign-born residents come from the Americas (35 percent) and Europe (10 percent). National policies, location on the globe, and existing ethnic communities all influence the origins from which immigrants arrive.

Naturalization rates also differ among the three regions. According to Census Bureau estimates, a little more than one-half of foreign-born residents living in the Bay Area in 2006 were citizens. Of the 1.1 million foreign-born residents living in the Randstad in 2005, 62 percent were citizens. In contrast, foreign-born residents living in Emilia-Romagna have not obtained citizenship in large numbers. In 2001, only about 270,000 of the region's 1.45 million foreign-born residents had become citizens. Naturalizations are much less common in Italy than in The Netherlands; only about 8,000 foreign-born residents were naturalized annually in Italy in the 1990s, compared with as many as 86,000 foreign-born residents naturalized in The Netherlands in 1996. None of these statistics account entirely for the often-large numbers of undocumented (illegal) immigrants living in these regions, although most censuses do attempt to count illegal residents.

All three regions have been the focus of recent studies of immigrant clustering and dispersal. In her analysis of immigrant clusters in San Francisco, Pamuk (2004: 289) contended that "new and different forms of spatial clustering" are emerging; ethnic enclaves and communities have persisted in San Francisco, even among affluent and more acculturated immigrant groups (especially among Chinese residents). Buzar, Hall, and Ogden (2007), in their investigations of the social-spatial transformations occurring in Bologna, mirrored this sentiment by arguing that complex demographic

Exhibit 6

Origin of the Foreign-Born Population in the Three Regions: San Francisco Bay Area, the Randstad, and Emilia-Romagna, 2005–07

	San Francisco Bay Area (2006)		The Randstad (2005)		Emilia-Romagna (2007)	
	Total	Percent	Total	Percent	Total	Percent
Total	2,027,277	29.9	1,093,909	14.4	317,841	7.6
Europe	194,759	9.6	354,998	32.5	134,857	42.4
EU nations			187,518	17.1	19,250	6.1
Non-EU nations			167,480	15.3	115,607	36.4
Africa	37,087	1.8	215,229	19.7	109,818	34.6
Americas	709,503	35.0	283,940	26.0	57,124	18.0
Asia	1,061,736	52.4	230,966	21.1	15,962	5.0
Oceania	24,192	1.2	8,776	0.8	80	0.0

EU = European Union.

**Foreign born is percent of total population; continental distribution is percent of foreign born.*

Sources: U.S. Census Bureau, 2000 Census of Population and Housing, SF1: Table P1, SF3: Table P21; ISTAT Census, 2001, Variables P1, ST01-07; Centraal Bureau voor de Statistiek, Population: age, sex, and nationality, January 1, 2007

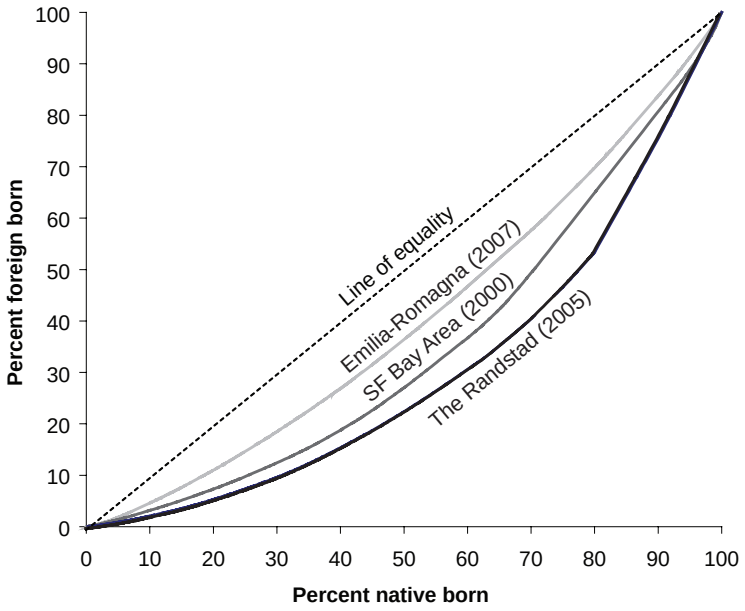
trends "are leading to the social diversification, residentialisation and fragmentation of the urban fabric" (Buzar, Hall, and Ogden, 2007: 64). Several kinds of residential clusters have also emerged in The Netherlands, including both low-income enclaves of immigrants from non-Western countries (predominantly from Morocco and Turkey) and affluent communities of foreign-born residents from Western countries (Musterd and Deurloo, 2002; Zorlu and Mulder, 2008).

The spatial concentrations of foreign-born residents vary widely across the regions despite some common threads. Emilia-Romagna has the lowest levels of immigrant concentration at the municipal scale; the Bay Area has levels just slightly higher (exhibit 7). The most significant clustering patterns are found in the Randstad. There, 30 percent of the population lives in municipalities that do not contain any immigrants at all; at the other end of the distribution scale, more than 75 percent of the foreign-born population lives in jurisdictions, accounting for only 30 percent of the jurisdictions' total population. Meanwhile, in the Bay Area and Emilia-Romagna, distribution patterns are far more even. In these regions, about three-fourths of foreign-born residents live in municipalities, accounting for 60 percent of the cities' population.

National variations in the spatial concentration of foreign-born residents are partly a consequence of immigrants' socioeconomic status, years since arrival, employment niche, age, gender, and reason for immigration (including, for example, employment, refuge, and family reunification). Various kinds of immigrants are arriving in the United States, The Netherlands, and Italy, ranging from temporary, unskilled workers to people employed in high-tech industries. Immigrants to the

Exhibit 7

Cumulative Foreign-Born Population as a Function of Cumulative Native-Born Population, Municipalities, 2000 and 2001



Sources: U.S. Census, 2000 Census of Population and Housing, SF1: Table P1, SF3: Table P21; ISTAT Census, 2001, Variables P1, ST07; Centraal Bureau voor de Statistiek

Bay Area and the Randstad are very diverse in socioeconomic status, employment, and reason for immigration. Immigrants to Emilia-Romagna, in contrast, tend to concentrate in service-sector jobs—especially in positions that involve caring for the elderly—and in the region's manufacturing and agroindustrial operations.

Immigrants' concentration also partially relates to concentrations of the native-born population (Leerkes, Engbersen, and Van San, 2007). Europe, in general, has less economic and racial segregation than the United States does; although the San Francisco region has less African-American–White and Latino-White segregation than many Midwest and Northeast metropolitan areas in the country have, racial segregation is still quite pronounced, as is the separation between high- and low-income households.

Exhibit 2 shows that the concentration of immigrants in the Randstad's largest cities extends to their immediate suburbs, making Amsterdam, Rotterdam, and The Hague not only concentrations but nuclei of immigrant settlement. Most of the municipalities with few or no immigrants are small ones at some distance from the urban centers. The legacy of segregation in the cities of the Randstad was established during the late 1970s, when large influxes of immigrants from former Dutch colonies concentrated in massive housing blocks on the periphery of the urban center. Concentrations of immigrants also appear in other locations in the region; the nature of those concentrations requires further research.

Exhibit 4 shows a pattern of spatial concentration in the Bay Area that differs from the high centralization around the Randstad's three largest cities; a strong concentration occurs in San Francisco and its two immediate suburbs of Daly City and South San Francisco. With 53 percent of the population consisting of immigrants, Daly City has the highest share of foreign-born residents of any of the three PURs. A more widespread swath of immigrants than that found in the other PURs lives in cities extending around the southern margin of San Francisco Bay. In many cities, foreign-born residents exceed one-third of the population. Asian immigrants tend to concentrate in Santa Clara County (Silicon Valley) and San Francisco and in its two immediate southern suburbs, Daly City and South San Francisco. Latino immigrants, in contrast, tend to live in the East Bay counties of Alameda and Contra Costa, with heavy concentrations in Oakland, Hayward, Richmond, Concord, and Pittsburg. Large numbers of foreign-born Latinos also live in the city of San Jose, however, which has historically served as the "bedroom city" of Silicon Valley and is the metropolitan area's largest city.

Emilia-Romagna has a very low level of immigrant clustering (exhibit 5), with the highest shares of immigrants living in the region's smallest *comuni* (municipalities). The larger population centers, in contrast, have comparatively low concentrations of immigrants. The tight housing market in several major cities, especially Bologna, has led immigrants to seek housing in comuni where they can find low-cost rentals, often within the housing stock that would otherwise sit vacant. In the Province of Bologna, such comuni are located in the Apennine Mountains at a distance of 30 to 40 kilometers from the city of Bologna. Buzar, Hall, and Ogden (2007) identified a tendency for immigrants in the city of Bologna to cluster in the historic center and in the former industrial districts in the northern part of the city. Despite these tendencies, they also argued that no strong segregation patterns exist anywhere in the city, and, where they do exist, the patterns are diffuse and at a scale below the neighborhood level.

A first hypothetical pathway from polycentricity to immigrant concentration occurs through the mechanism of city size. That is, immigrant concentrations are hypothetically a direct function of city size, and polycentric regions will have more dispersed populations because they have more medium-size and large cities than either monocentric or noncentered regions. The three PURs studied in this article provide limited support for such a supposition, with the strongest link in The Netherlands and practically no connection in Emilia-Romagna (exhibits 8, 9, and 10). Other factors must clearly be at work in the municipal dispersion of immigrants.

Exhibit 8

City Size and Percent Immigrant, the Randstad, 2005

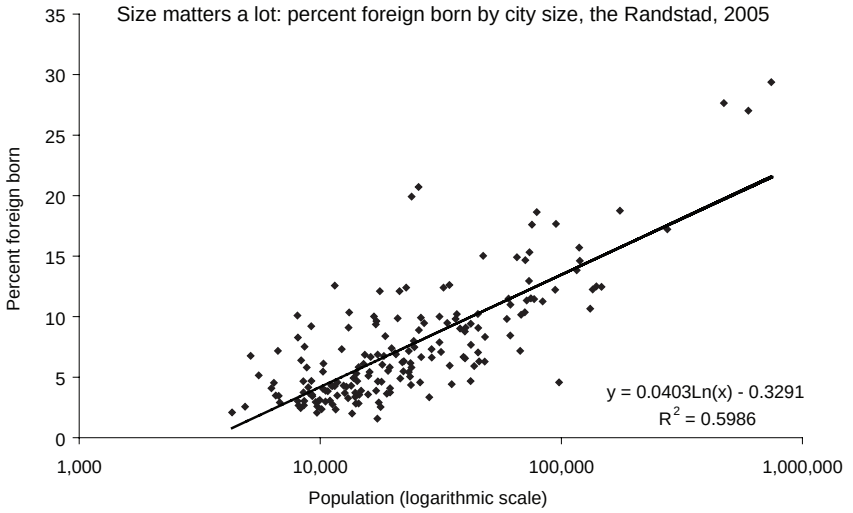


Exhibit 9

City Size and Percent Immigrant, San Francisco Bay Area, 2000

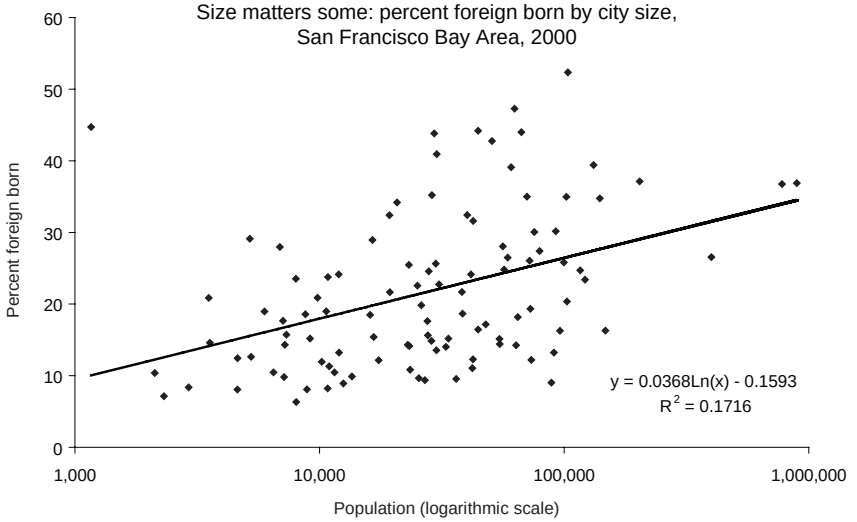
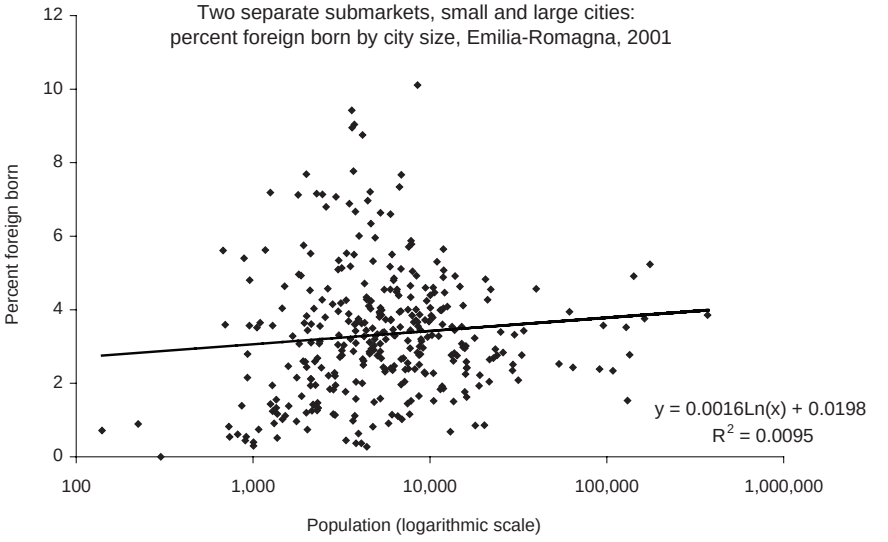


Exhibit 10

City Size and Percent Immigrant, Emilia-Romagna, 2001



Housing and Immigrants' Residential Clustering

A first factor that correlates with immigrant settlement patterns is the type of housing units available. Immigrants tend to move into multiunit structures, while relatively low numbers of immigrants settle in areas with predominantly single-family housing. Multiunit structures tend to be built in higher density areas, where people can get around without their own cars and where a richer mix of economic activities can occur. This phenomenon is also likely closely tied to the issue of housing affordability and tenure, because single-family homes are usually more costly to purchase or rent than are condominiums or apartments and units in multiunit structures are more often rented than are single-family homes.

Exhibits 11, 12, and 13 show the negative correlation between the percentage of the population that is foreign born and the percentage of the housing units that are single-family detached homes. As shown previously, high concentrations of immigrants tend to cluster in the larger urban centers of the San Francisco Bay Area, especially San Francisco and San Jose, but immigrant concentration is not solely a function of jurisdictional population (exhibit 12). Daly City, which has the highest concentration of immigrants (just more than 50 percent), has only about 100,000 residents, but 45 percent of its housing stock consists largely of single-family attached homes and apartment structures. Indeed, none of the jurisdictions in which more than three-fourths of the housing stock consists of single-family detached homes has a concentration of immigrants as high as that of the regional average.

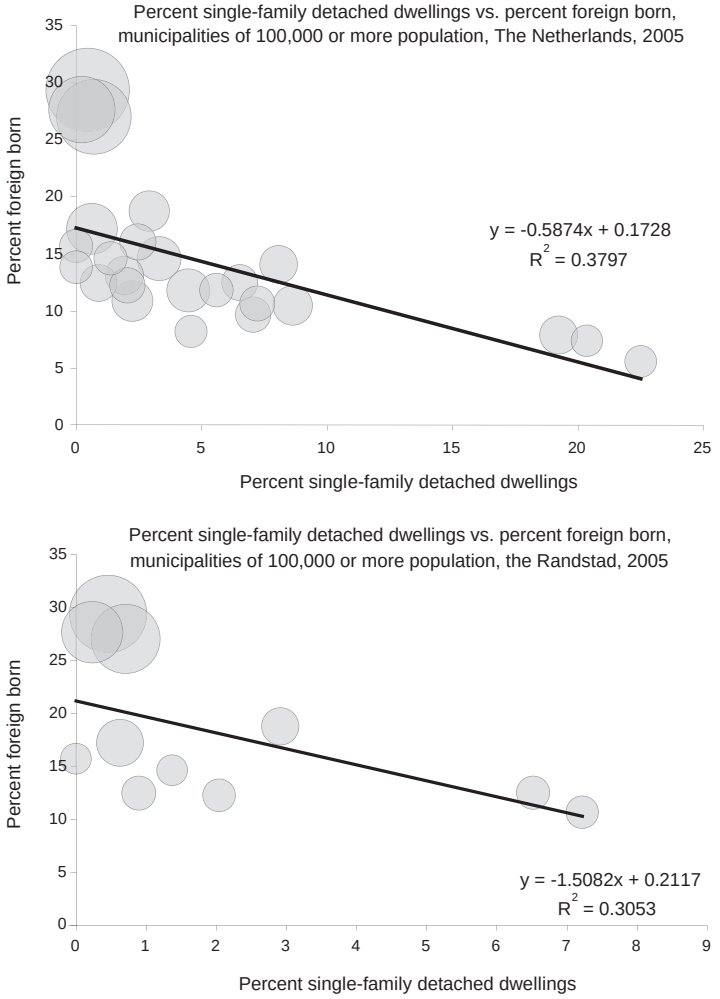
This inverse relationship also holds true for both the Randstad and Emilia-Romagna. In The Netherlands, the largest cities (Amsterdam, Rotterdam, and The Hague) appear more attractive

to immigrant families than their share of single-family homes alone would predict. Here, social housing policy and the timing of immigrant influxes explain part of the difference, while economic (employment) and social factors probably explain the remainder. In Emilia-Romagna, in contrast, the city of Bologna's share of immigrants is lower than one might expect, given its large population and high share of multifamily dwellings. The presence of university students and the strong demand for inner-city housing by high-status Italians have crowded many immigrants out of that city (Bernadotti and Mottura, 1999).

A second factor that has been identified as having an effect on the distribution patterns of immigrants is the availability of rental housing. Immigrants, especially recent arrivals, do not always

Exhibit 11

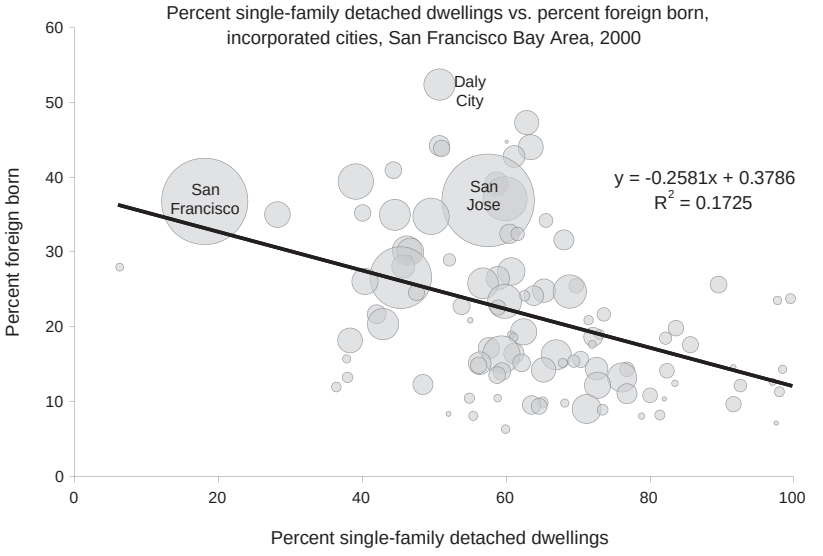
Percent Single-Family Detached Housing and Percent Immigrant, The Netherlands and the Randstad (Largest Cities Only), 2005



Note: Dot size indicates municipality population.

Exhibit 12

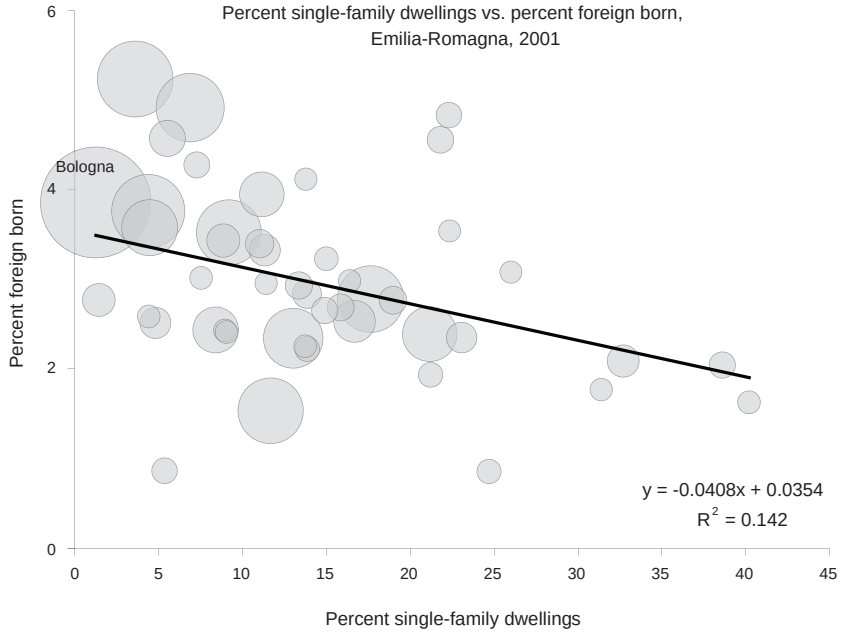
Percent Single-Family Detached Housing and Percent Immigrant, San Francisco Bay Area, 2000



Note: Dot size represents city size.

Exhibit 13

Percent Single-Family Detached Housing and Percent Immigrant, Emilia-Romagna, 2001



Note: Dot size represents city size; represents only cities with 15,000 or more residents.

plan to settle in the country to which they immigrate. Those who do plan to stay often cannot obtain jobs that pay enough to afford mortgage payments and rarely have access to the necessary credit to buy a home. The table in exhibit 14 compares the housing mix across the regions, with owner-occupancy rates ranging from 70 percent in Emilia-Romagna to 57 percent in the Bay Area and 50 percent in the Randstad.

Exhibits 15, 16, and 17 show the positive correlation between the percentage of foreign-born residents and percentage of households renting their housing. The relationship is strongest in the Randstad, but rental housing and city size are also very strongly correlated, suggesting an interlocking relationship there between city size, city centrality, multifamily housing, and rental housing. In the Bay Area and Emilia-Romagna, in contrast, the relationship among city size,

Exhibit 14

Housing Characteristics in the Three Regions: San Francisco Bay Area, Emilia-Romagna, and the Randstad, 2000–06

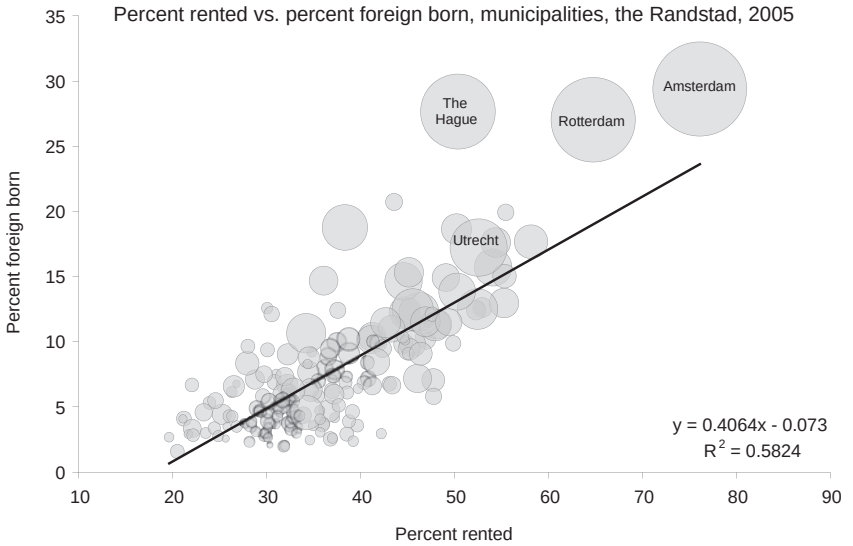
	San Francisco Bay Area (2000)	Emilia-Romagna (2001)	The Randstad (2006)
Total housing units	2,520,940	1,970,977	3,288,159
Occupied housing units	96.8%	84.6%	96.3%
Vacant housing units	3.2%	15.4%	3.7%
Owner-occupied housing units	57%	70%	50%
Renter-occupied housing units	43%	19%	50%
Other occupied housing units	0%	10%	0%

Note: Tenure percentages are as a share of occupied housing units and do not total to 100 percent because of rounding.

Sources: U.S. Census Bureau, 2000 Census of Population and Housing, SF1: Table P1, H1, H3; ISTAT Census, 2001, Variables P1, ST01, A1-5; Centraal Bureau voor de Statistiek, Housing Stock 2006

Exhibit 15

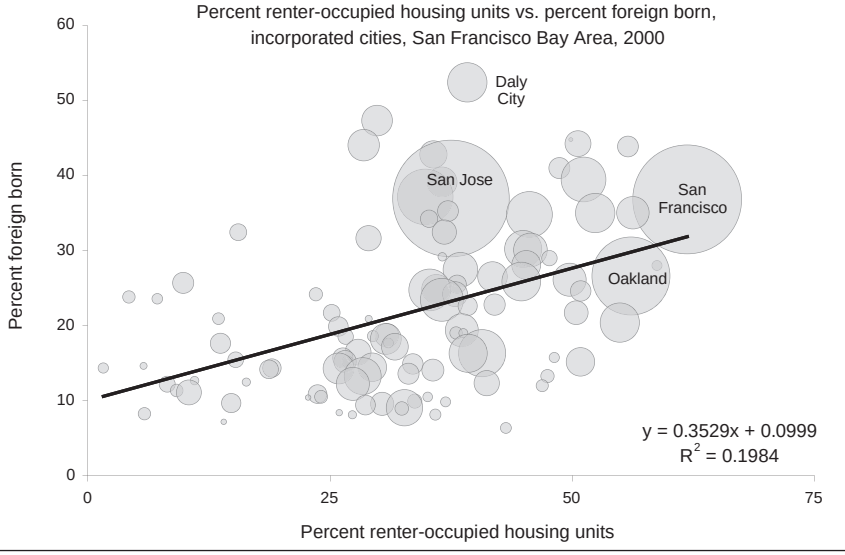
Percent Rental Housing and Percent Immigrant, the Randstad, 2005



Note: Dot size indicates municipality population.

Exhibit 16

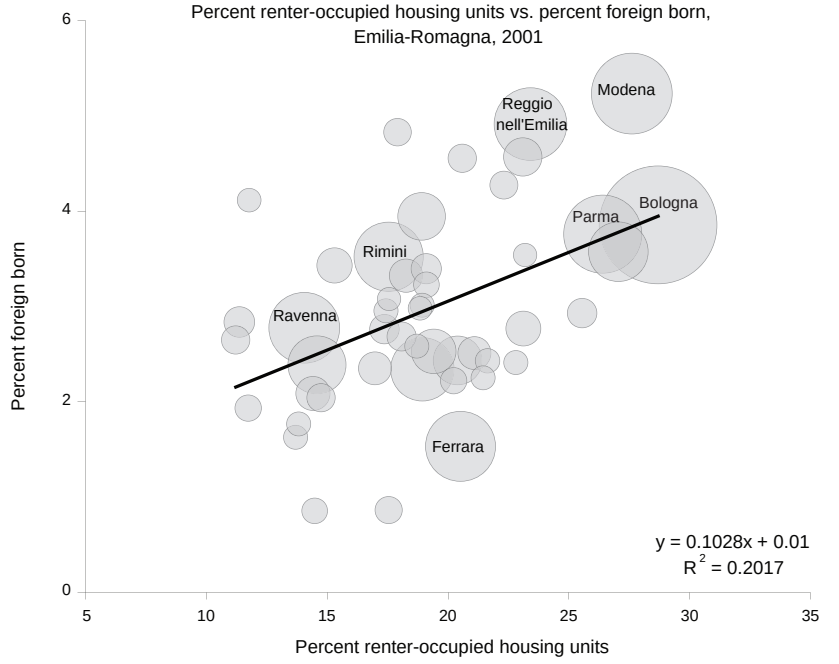
Percent Rental Housing and Percent Immigrant, San Francisco Bay Area, 2000



Note: Dot size represents city size.

Exhibit 17

Percent Rental Housing and Percent Immigrant, Emilia-Romagna, 2001



Note: Dot size represents city size; represents only cities with 15,000 or more residents.

Sources: U.S. Census, 2000 Census of Population and Housing, SF1: Tables P1, H1, H3, and SF3: Table P21; ISTAT Census, 2001, Variables P1, ST01, and A1-5; Centraal Bureau voor de Statistiek, Housing Stock 2006

location, structure types, and tenure do not interlock as strongly. In those two regions, rental housing also correlates with the percentage of foreign-born residents. The Randstad's percentage of total households renting their housing is the highest of the three regions, at 43 percent. In Amsterdam and Rotterdam, homeownership hovers at around 20 percent, while social housing[5] accounts for more than 50 percent of the housing stock (OECD, 2007). Italy has long been characterized by high rates of homeownership (71 percent in 2001 [Istat, n.d.]), and policies in that country have been largely aimed at further strengthening homeownership (Longo, 2006). Italy also has a large number of vacant housing units, partly a consequence of its now-abandoned rent control policy (van Hees, 1991). Recently, demographic shifts have resulted in a higher demand for rental housing by students, young professionals, and immigrants (Longo, 2006). This increased demand has occurred during a time when the available supply of low-cost rental housing is decreasing.

Perhaps the largest factor affecting immigrant dispersion across a region is the availability of affordable housing. Immigrants often occupy the lower price levels of housing markets because many lack language skills or education to find high-paying employment. Immigrant clusters can often be attributed to the location of affordable housing within the region. Data on housing costs (rents and home sale prices), available in nationally published sources for the Bay Area, are not available for The Netherlands or Italy. This topic remains an area requiring further research, but we can make tentative remarks about it now.

Housing affordability is the largest challenge that residents of the Bay Area face. The region ranks among the most expensive places to live in the United States, and prices continue to climb. Many people consequently cannot afford to live near where they work and must travel long distances from the job centers to the far reaches of the region to find affordable housing (ABAG, 2002). Despite concentrated efforts to plan and construct new housing in the region, supplies still fall short of the ever-increasing demand (ABAG, 2007).

Social policy and housing policy have played important roles in the dispersion of Emilia-Romagna's immigrant population. In Emilia-Romagna, policymakers at the regional level began devoting resources to temporary housing centers as early as 1991, working with the comuni to identify locations for these group-housing structures. Between 1992 and 1995, 48 of these "first housing" centers were built in municipalities spread across the region; another 14 projects, with 350 dwellings, were built for medium-term occupancy in 7 of the region's 9 provinces (Giardini, 2003). Deliberate policy, therefore, has played some role in the dispersal of certain migrant populations among multiple medium-size and large population centers, especially among single men who wish to maximize their savings and perhaps return to their countries of origin (Bernadotti and Mottura, 1999).

Private housing market characteristics have strongly influenced immigrant families' dispersal in Emilia-Romagna. These families require affordable rental housing but often cannot find it in the larger and medium-size cities, partly because of competition with university students (in the comuni of Bologna and Modena). Furthermore, longstanding efforts to renew historic city centers have reduced the number of low-value central neighborhoods that might form nuclei for new

[5] Dutch social housing consists of both municipally owned and nonprofit-owned housing usually available for rent at below-market rates.

immigrant enclaves, as has occurred in Turin and Milan (Giardini, 2003). Consequently, immigrant families often seek housing farther away from the city center. In the Province of Bologna, their destinations have often been comuni in the Apennines, where the housing stock has stood unused and without modern services for many years (Bernadotti and Mottura, 1999).

In The Netherlands, because so much of the rental housing is government regulated, the small proportion of units available on the open market is extremely expensive. Many middle-income households live in social housing; although some observers see this situation as inequitable, others contend that it is an intentional and desirable effect of policies aimed at maintaining economically integrated neighborhoods (Boelhouwer, 2002). The lowest level of housing turnover has occurred in some of the more desirable parts of Amsterdam, especially, and immigrants have had fewer opportunities to choose housing in good neighborhoods.

Integrating the Findings and Policy Implications

Together, these findings suggest that sometimes, but not always, direct relationships occur between city size and the share of foreign-born residents and that generally independent relationships occur between rental housing and multifamily housing on one hand and the share of immigrants in a city on the other. Larger cities tend to have higher shares of multifamily housing than do medium-size and small cities, and multifamily housing tends to be rented more often than detached homes are. Therefore, based on these cases, we support the hypothesis that a part of the pathway from polycentricity to immigrant dispersion is a tautology. Polycentric regions, by definition, have more medium-size and large cities; such cities tend to accommodate more than their share of immigrants, simply because of their size. As a result, polycentric regions tend to have more dispersed immigrant settlement than monocentric or noncentric regions do.

The relationship is obviously more complex than that, however. In particular, we find a consistent moderate-to-strong relationship between housing type (multifamily) and tenure (rental) on one hand and the percentage of foreign-born residents on the other. In the Randstad, where immigrants are more highly concentrated than in the other two regions, city size, structure type, and tenure all correlate fairly strongly. The largest Dutch cities have the highest shares of multifamily and rental housing, and, along with their immediately adjacent municipalities, they have the highest concentrations of immigrants. Rental and attached housing also correlate with the concentration of foreign-born residents in the Bay Area, but cities' populations have a weaker relationship with their share of rental and attached housing in the Bay Area than they do in the Randstad.

Further research on the dispersion of immigrants will require more comprehensive data than we have had available for this study. In particular, in the case of the Randstad, detailed information on the composition of the housing stock (structure type) for smaller municipalities would be helpful. In all the cases, the most satisfying model explaining immigrants' location patterns would integrate data about individuals within their household context (for example, age, income, education, language proficiency, gender, marital status), neighborhoods (for example, share of immigrants, affordability), cities (for example, city-level policies on immigrants and housing), and labor market areas.

It is especially important to maintain the focus above that of individuals, households, and neighborhoods, because planners can use many important and accepted policymaking tools at these higher levels. In all these regions (and beyond), we find three main sets of policies that can contribute to the housing component of immigrant location decisions: (1) land use planning and policy, (2) assisted (subsidized) housing policy, and (3) area redevelopment (urban renewal) (Delladetsima, 2003).

Land use planning—along with its regulatory and implementation arms—sets the rules for developing higher density housing; it also can promote, discourage, or ignore the rich mix of commercial and residential uses that often occur in immigrant neighborhoods. In all three regions, land use planning is quite strong. All municipalities in the Bay Area, in addition, must abide by strong housing plan rules that link land use planning to the need for housing for those of all income ranges (Lewis, 2003). This mandate has led many cities to accommodate at least some high-density (and, thus, "immigrant-friendly") housing even when their residents would prefer to exclude it. We know of no similar mandates in either the Randstad or Emilia-Romagna.

Assisted housing policy also plays an important but underresearched role in the location of immigrants. Anecdotally, all three regions have strong histories of providing social housing. The legacy of these programs in the Randstad is arguably much stronger in the big cities than in medium-size and small ones, with such notable exceptions as the new town of Almere. Immigrants gained access to public housing in The Netherlands in the late 1970s, just as Almere's construction was beginning; Dutch families found this housing less appealing than did new immigrants from former Dutch colonies, and, consequently, large concentrations of immigrants occurred in the new social housing projects. Although public housing in the Bay Area was at first provided mainly in the biggest cities, there were enough large cities to spread public housing to nuclei around the region, and defense housing in Richmond, Oakland, Vallejo, and Marin City reinforced this decentralized centrality. More important, however, are the recent housing plan requirement and the mandate that cities using tax increment financing to promote redevelopment dedicate at least 20 percent of the tax increment to affordable housing. Almost all cities use redevelopment; furthermore, most cities in the region have adopted inclusionary zoning that requires market-rate developers to provide affordable units before they can receive approval for development. Complementing the potentially decentralizing effects of the region's affordable housing policies, federal government housing policy also encourages decentralization, especially as a result of the shift from public housing toward tenant-based assistance. The demolition of some of the region's most troubled affordable housing projects and their replacement with mixed-income, lower density developments under the HOPE VI program have also played some role in the deconcentration of assisted households. In the Bologna PUR, affordable housing has been provided historically by cooperatives that are widely dispersed throughout the region. More recently, in direct response to the emergence of new immigrant populations—especially single men—Emilia-Romagna's government has funded a series of short- and medium-term accommodations that have been constructed in many different cities (Bernadotti and Mottura, 1999). National policies in Italy have been much less helpful for renters or immigrants, however; the broader lack of investment and incentives for rental housing construction has led to problems not only for immigrants but for all households that cannot afford or do not wish to buy houses.

Area redevelopment policy also affects immigrants' ability to live in some central and older neighborhoods. The countries of all three regions have recently experienced the redevelopment and upgrading of central-city neighborhoods. It is unclear, however, whether these programs have had the massive displacement effects that urban renewal had on immigrants in the United States; one of the most infamous U.S. cases was the destruction of Boston's diverse, immigrant-rich West End neighborhood and its replacement with highrise public housing (Gans, 1962). Recent U.S. redevelopment projects have had more modest budgets, greater upfront private-sector involvement, and a stronger emphasis on upgrading existing housing and neighborhoods when compared with the publicly funded wholesale demolition of earlier urban renewal. Renewal of central Bologna, too, has been a project not of removal and replacement but of upgrading existing housing and neighborhoods. The effects on immigrants, therefore, may be less direct than in the past, as housing prices rise in the wake of upgrading. Recent upgrading programs in The Netherlands, in contrast, may involve more displacement of immigrants from low-rent areas (Kruythoff, 2003). This issue, too, deserves more general study and hypothesis formation within the context of research on gentrification.

Conclusions and Directions for Further Research

Polycentrism is emerging as an influential spatial planning model on both sides of the Atlantic Ocean. The comparative framework of this article intends to give some preliminary indications of future directions for research in the areas of housing strategies in polycentric urban regions and the particular situations of immigrants. This discussion of three case studies of PURs in the United States and Europe—the San Francisco Bay Area (United States), the Randstad (The Netherlands), and Emilia-Romagna (Italy)—shows how this spatial strategy has manifested in diverse settings.

PURs face unique challenges and opportunities when tackling such issues as housing for immigrants. Polycentricism may facilitate the "concentrated deconcentration" of immigrants away from only one or two central cities while still promoting minor clusters of immigrants in many small, medium-size, and large cities throughout a region. This scenario could enable traditional ethnic enclaves' informal support systems to exist to a certain extent without isolation and stigmatization. On the other hand, polycentrism might pose special challenges for immigrant settlement and incorporation in metropolitan regions. Immigrants have historically become gradually more politically powerful in the United States, thanks to their concentration in major "gateway cities" such as New York, Chicago, Miami, San Francisco, and Los Angeles. To the extent that immigrants disperse to smaller centers within metropolitan areas, their needs, voices, and problems may be obscured in general.

This article serves as a foundation for asking critical questions about policy strategies that aim to promote the mixing of immigrant populations. The mixed success of these controversial programs leaves significant room for further research. One important area for further research could include a deeper qualitative study of various immigrant groups' housing preferences and needs. Current immigrant groups are quite heterogeneous. Understanding the actual needs of immigrants would make policies for immigrants more effective than the status quo.

Another area for further research could include a more indepth examination of the effectiveness of current housing strategies aimed at addressing integration issues to identify best practice examples.

Especially in polycentric regions, it would be beneficial to understand at what level of government these issues are best dealt with and how local authorities are finding innovative ways to collaborate laterally and vertically.

Finally, some of the current strategies demand a more a critical review to assess their effectiveness. For example, place- or area-based programs have been criticized for not addressing the root causes of social and economic marginalization. These strategies can lead to gentrification and the displacement of immigrant populations. Case studies that critically examine specific policies and track the possible resulting displacement of vulnerable populations (such as immigrants) would help determine if these strategies are actually helping disadvantaged populations.

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Immigrants and Transportation: An Analysis of Immigrant Workers' Work Trips

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Abstract

A significant increase in immigrant populations in the United States poses various social and economic issues. Transportation mobility is one of the most crucial components for facilitating economic activities of new immigrants. Using the 2006 Integrated Public Use Microdata Series, this study analyzed the work-trip mode of new immigrants in comparison with nonimmigrants. This study found that workers' immigration history is associated with their work-trip modes and immigrants are still more likely to use nondrive-alone trip modes after controlling for various personal, household, and other characteristics. Female immigrants, however, are less likely to use public transit after adjusting various covariates, including household income and vehicle availability. Also, a lower propensity toward carpooling among highly educated immigrants is noteworthy. The notable increase in immigrant populations requires special efforts to support carpooling or community-based transit service and requires more attention in both research and practice.

Introduction

The United States has experienced a significant increase in immigrant populations in recent decades. One of the biggest challenges immigrants face in their process to assimilate into society is finding a job. Labor market conditions and job accessibility are important determinants of new immigrants' location choices (Jaeger, 2007); however, transportation is a critical element in job accessibility. A positive relationship between transportation access and economic welfare is evident for immigrants as well as nonimmigrants across all racial and ethnic groups. Blumenberg (2008) reported that one of the most significant determinants of employment for both immigrants and nonimmigrants who are on welfare assistance is unlimited automobile access (Blumenberg, 2008).

It is often believed that many immigrants reside in urban areas (Valenzuela, Schweitzer, and Robles, 2005), and they are increasingly segregated in residential location over the decades in general (Cutler, Glaeser, and Vigdor, 2008). A study in Los Angeles, California, however, reported substantial differences among ethnic groups in residential location patterns during their assimilation (Yu and Myers, 2007). A national study based on census data reported different residential location choices by national origin of immigrants, choices that are associated with the creation and growth of ethnic enclaves in major metropolitan areas in the United States (Borjas, 2002). Hanlon, Vicino, and Short (2006) reported that U.S. metropolitan areas are becoming less urban-suburban dichotomous and suburban communities are becoming increasingly diverse with the emergence of poor, African-American, and immigrant enclaves. Immigrants are not homogenous. Friedman and Rosenbaum (2007) reported that many foreign-born members of households reside in significantly better suburban neighborhoods than do their native-born counterparts, based on the 2001 panel of the American Housing Survey. They also reported that race/ethnicity is a more consistent predictor than nativity status for households' neighborhood conditions in general.

Existing studies on residential location or settlement of immigrants indicate that the immigrants are not necessarily urban residents, and, therefore, they may face the same transportation problems as nonimmigrants when they do not drive. Blumenberg (2008) reported that one of the greatest difficulties low-income immigrants face in travel for work is age-related unreliability of their vehicles. Existing studies on immigrants' transportation indicate that immigrants, new immigrants in particular, often heavily patronize public transit. One study reported that urbanized areas with more recent immigrants tend to have higher transit ridership (Taylor et al., 2009). Myers (1997) reported that new immigrants, regardless of their ethnic backgrounds, rely heavily on public transit based on cross-sectional 1980 and 1990 Census data. Myers (1997), however, also found that new immigrants' transit use declines dramatically after they gain an additional 10 years of residence in the United States. This change is especially substantial among women, who increase their rate of driving alone noticeably. This finding indicates that immigrants adopt their travel behaviors during assimilation as their economic conditions improve.

Several studies have reported that vehicle availability, income level, and limited accessibility or inadequacy of public transportation (particularly in suburban communities) are related to personal automobile use (for example, de Palma and Rochat, 2000). Travel behavior is related to the household's residential location (Srinivasan and Ferreira, 2002). In general, service frequency and fare levels are significant factors associated with transit use (Taylor et al., 2009). For bicyclists, hindrances in road use (that is, the number of stops bicyclists must make on their routes) and safety are important factors associated with bicycle use (Rietveld and Daniel, 2004). Other studies (for example, Ye, Pendyala, and Gottardi, 2007) have scrutinized the complex relationship between mode choice and trip chain. Work-trip mode is significantly associated with trip chain for other intermediate activities (Krygsman, Arentze, and Timmermans, 2007).

A number of studies examined factors associated with work-trip mode choice and its effect on congestion. Vehicle availability is often considered one of the most significant factors in work-trip mode choice (Titheridge and Hall, 2006). Instant availability, convenience, flexibility, and high speed that automobiles offer are not comparable to other alternative transportation modes (Anable and Gatersleben, 2005; Kim and Ulfarsson, 2008). In addition, the automobile is an ideal mode

of transportation for trip chains. One study reported that people do not necessarily minimize their travel time or always choose the most cost-efficient mode or route, even when they are making work trips (Anable and Gatersleben, 2005). That study found that instrumental factors such as flexibility, convenience, cost, and predictability are important factors in work-trip mode choice, but affective factors such as a sense of control and freedom also are significantly relevant factors. Therefore, Anable and Gatersleben (2005) argued that nonautomobile modes need to increase their competitiveness to satisfy people who are considering the affective factors.

One study reported that sticks, such as congestion pricing and parking regulation, have greater influence than carrots, such as improving public transit service and other alternatives, on decreasing automobile use for work trips (O'Fallon, Sullivan, and Hensher, 2004). For nonmotorized transportation alternatives in work trips, one study reported that a completely segregated bicycle path, other en-route and trip-end facilities, and direct financial incentives (for example, daily payment to cycle to work) can significantly increase bicycle use for work trips (Wardman, Tight, and Page, 2007), and work trips on foot are significantly associated with the level of local job opportunities (Titheridge and Hall, 2006).

Urban form and land use characteristics have been reported as important factors in work-trip mode choice and in nonwork-trip mode choice. Schwanen and Mokhtarian (2005) reported that neighborhood physical structure or design, personality, and lifestyle are also associated with commuting mode choice. For example, consonant neighborhood type, proenvironment attitude, lower levels of adventure seeking, frustration, and status-seeking attitudes are associated with nonprivate automobile use.

Although the number and proportion of immigrants in U.S. society have been growing significantly, and the importance of transportation access is clear to immigrants, limited studies have examined immigrants' work trips, partly because of limited transportation survey data with detailed information on survey participants' immigration history. Immigrants are not homogenous. Better understanding of immigrants' travel behavior (work travel in particular) is important in the development of transportation systems and policy that accommodate transportation needs of this growing segment of population. By analyzing immigrants' commuting trip mode choice by their immigration tenure in comparison with nonimmigrants as a function of various personal, household, and residential environment factors, this study contributes to a deeper understanding of work-trip behavior in the increasing immigrant population.

Data and Methods

This study analyzed the 2006 Integrated Public Use Microdata Series (IPUMS) data that contain representative individual samples of U.S. populations along with various personal, household, employment, and housing characteristics information (Ruggles et al., 2008). The data also contain immigration history of individuals, including year of entry and citizenship status. The study classified individuals into four groups based on their immigration history: immigrants who entered the United States 1 year ago or less (new immigrants), more than 1 year ago and less than 5 years ago (intermediate-term immigrants), 5 years ago or more (long-term immigrants), and nonimmigrants. The data include 2,441 individual working-age individuals aged 18 to 64 among new immigrants.

Because these new immigrants are substantially fewer than other immigrants and nonimmigrants, a stratified random sampling method was used to select 2,441 samples from each group in the IPUMS data.

This study analyzes individuals' commuting mode choices using a robust statistical method. The analysis of mode choice for commuting trips uses a discrete choice modeling approach, the multinomial logit (MNL) model. The MNL model assumes each individual n associates a utility with each alternative mode i and that this utility is separable into an observable part $\boldsymbol{\beta}_i \mathbf{x}_{ni}$ and unobservable part ε_{ni}, where $\boldsymbol{\beta}_i$ are estimable mode-specific coefficients; $\mathbf{x}_{ni}$ are observable characteristics of the modes, tripmakers, and environment; and the error terms ε_{ni} are on independently and identically distributed type 1 extreme value (the Gumbel distribution). The analysis also assumes that each individual tripmaker selects the mode with the highest utility. The probability of individual n selecting mode i out of I modes is:

$$P_{ni} = \frac{e^{\boldsymbol{\beta}_i \mathbf{x}_{ni}}}{\sum_{i'=1}^{I} e^{\boldsymbol{\beta}_{i'} \mathbf{x}_{ni'}}}. \tag{1}$$

Because the data include no mode-specific information concerning utility, it is allowed to drop the index i on the observed data $\mathbf{x}_n$. In this case, the MNL model is unidentified up to a scale because it is sensitive only to differences in utility; therefore, one utility must be arbitrarily, and without loss of generality, fixed and is most conveniently set to zero. In this study, *Drive Alone* is chosen as the base case and other modes (*Carpool*, *Walk/Bike*, *Other*) are compared. The coefficients of the model can, therefore, be interpreted through their effect on the log-odds ratio of each alternative to the base case *Drive Alone*.

$$\ln \frac{P_{ni|i \neq 1}}{P_{n1}} = \ln \frac{e^{\boldsymbol{\beta}_i \mathbf{x}_n}}{e^{\boldsymbol{\beta}_i \mathbf{x}_n = 0}} = \boldsymbol{\beta}_i \mathbf{x}_n. \tag{2}$$

The coefficients in this model are estimated using the method of maximum likelihood, which also provides standard errors of the estimates. To focus on the most statistically significant factors, we restrict coefficients that are not significantly different from zero at the 95-percent level of significance (p-value > 0.05).

The MNL model assumes that probabilities of the alternative choices are independent of each other. This property is called the independence of irrelevant alternatives (IIA). MNL models are valid when the outcome categories are plausibly distinct (McFadden, 1973). Hausman and McFadden (1984) proposed a Hausman-type test of the IIA property. The Hausman test for the MNL model was tested to see whether the IIA assumption holds. Also, various tree structures were tested in the nested logit (NL) model framework; however, in each tested NL model, a statistical test for the Inclusive Value (IV) parameter resulted in the legitimacy of the MNL model.

Descriptive Analysis

As seen in exhibit 1, which shows personal and household characteristics of the samples by their immigration history, the immigrant population in the United States is younger than the nonimmigrant population, and immigrant gender is predominantly male. Although the gap between male and female distribution narrows based on number of years in the country, nonimmigrants have the most equal gender distribution. Compared with nonimmigrants, the immigrant population has more people with Asian and other/mixed racial backgrounds. The largest population for both immigrants and nonimmigrants is White. The nonimmigrant population is predominantly non-Hispanic. These distributions are more equal in the immigrant population, in which Hispanics account for approximately one-half.

When compared with nonimmigrants, immigrants have a larger number of people with either very little education (*less than high school*) or the highest education (*college degree, graduate degree*), while nonimmigrants have higher distributions of people with *high school* or *some/tech college*. The largest immigrant population has *less than high school* education, while the largest nonimmigrant population has *high school* or *some/tech college*. When compared with nonimmigrants and other immigrant groups, new immigrants have the highest population with the highest education (*college degree, graduate degree*). Nonimmigrants have a larger population with *physical disability* than do

Exhibit 1

Characteristics of Workers by Immigration History (1 of 2)

		Immigrants ≤ 1 Year	Immigrants 1 < Years < 5	Immigrants ≥ 5 Years	Non-immigrants
Age	18–24	28.1%	28.2%	7.4%	12.6%
	25–49	66.2%	64.9%	67.6%	58.0%
	50–64	5.7%	6.9%	25.1%	29.4%
	Mean	31.3 yrs.	31.6 yrs.	41.0 yrs.	41.1 yrs.
	(std. dev.)	(9.5) yrs.	(9.9) yrs.	(11.1) yrs.	(12.3) yrs.
Gender	Female	30.3%	33.9%	43.0%	49.1%
	Male	69.7%	66.1%	57.0%	50.9%
Race	White	49.2%	46.0%	41.9%	85.2%
	African	6.5%	6.9%	8.8%	9.5%
	Asian	26.8%	22.7%	27.0%	1.1%
	Other or mixed	17.5%	24.5%	22.2%	4.2%
Ethnicity	Hispanic	42.8%	54.5%	43.5%	5.2%
	Non–Hispanic	57.2%	45.5%	56.5%	94.8%
Education level	Less than high school	26.3%	31.7%	24.9%	6.3%
	High school	19.2%	23.9%	22.2%	28.2%
	Some/tech college	11.0%	14.1%	20.5%	32.8%
	College degree	24.1%	16.6%	18.4%	20.0%
	Graduate degree	19.4%	13.7%	14.0%	12.7%
Physical disability	Yes	1.9%	3.0%	3.7%	6.0%
	No	98.1%	97.0%	96.3%	94.0%

Exhibit 1

Characteristics of Workers by Immigration History (2 of 2)

		Immigrants ≤ 1 Year	Immigrants 1 < Years < 5	Immigrants ≥ 5 Years	Non-immigrants
Ability to speak English	English as first language	11.7%	9.3%	17.0%	93.8%
	Very well	25.1%	20.4%	37.6%	5.3%
	Well	19.8%	18.2%	22.5%	0.5%
	Not well	17.0%	26.2%	16.6%	0.3%
	Not at all	26.5%	25.9%	6.4%	0.0%
Family size (number of people)	One	33.8%	24.1%	11.7%	19.9%
	Two	19.0%	21.3%	19.6%	28.5%
	Three	14.6%	17.6%	19.3%	21.8%
	Four or more	32.7%	37.0%	49.4%	29.8%
Household income	Less than $30,000	32.1%	22.7%	16.3%	12.0%
	$30,000–$49,999	23.0%	23.5%	20.9%	17.9%
	$50,000–$74,999	17.7%	22.6%	21.2%	23.7%
	$75,000–$99,999	10.7%	14.7%	13.9%	17.7%
	$100,000 or more	16.5%	16.6%	27.8%	28.7%
	Mean (std. dev.)	$59,475 ($57,837)	$65,113 ($50,976)	$83,175 ($76,286)	$86,965 ($73,559)
Home-ownership	Own	17.6%	24.6%	65.5%	79.1%
	Rent	82.4%	75.4%	34.5%	20.9%
Residential building: year built	2000 or later	13.2%	11.6%	11.9%	11.6%
	1980–1999	31.6%	28.8%	28.5%	31.4%
	1960–1979	31.1%	31.2%	26.4%	25.5%
	1940–1959	12.2%	14.8%	20.1%	16.3%
	Before 1940	11.9%	13.6%	13.2%	15.2%
Employment sector	Private	88.2%	88.2%	78.0%	72.6%
	Public	7.1%	6.6%	10.9%	19.2%
	Self-employed	4.4%	5.0%	11.0%	8.1%
	Work without pay	0.3%	0.2%	0.2%	0.1%
Employment industry	Administration	1.4%	1.1%	2.6%	6.1%
	Agriculture	4.2%	3.5%	2.0%	1.0%
	Construction	14.0%	16.9%	9.3%	7.2%
	Education	8.3%	5.8%	6.0%	11.2%
	Entertainment	13.0%	14.5%	10.2%	6.3%
	Extraction (oil/mine)	0.7%	0.4%	0.3%	0.3%
	Finance	3.2%	3.7%	6.3%	7.4%
	Media/information	1.8%	1.2%	1.8%	3.1%
	Medical	6.1%	6.4%	11.3%	10.8%
	Manufacturing	13.3%	12.3%	14.7%	11.1%
	Professional	16.1%	14.0%	9.7%	9.3%
	Retail	7.8%	7.9%	8.7%	11.3%
	Service	4.5%	5.6%	6.9%	3.4%
	Transportation	1.7%	2.6%	4.1%	4.5%
	Wholesale	3.0%	2.9%	3.8%	3.9%
	Other (military, utility, etc.)	1.0%	1.2%	2.2%	3.1%

immigrants. Most nonimmigrants and only a small percentage of immigrants speak English as a first language. About one-fourth of new and intermediate-term immigrants speak no English.

Immigrants tend to have larger families than do nonimmigrants. More new and intermediate-term immigrants have families of one person than do nonimmigrants, but long-term immigrants are least likely to have families of one. Average household income increases based on the number of years in the country for immigrants and is highest for nonimmigrants. The largest population of new immigrants earns less than $30,000 a year, while the largest population of nonimmigrants earns $100,000 or more. Nonimmigrants and long-term immigrants have a comparable percentage earning $100,000.

Homeownership also increases the longer an immigrant is in the country; homeownership is highest for nonimmigrants. Both immigrants and nonimmigrants tend to live in residential buildings built between 1980 and 1999, with the exception of intermediate-term immigrants, who tend to live in buildings built between 1960 and 1979. Higher percentages of immigrants live in buildings dating from 2000 or later and those built between 1960 and 1979 than do nonimmigrants.

Both immigrants and nonimmigrants are more likely to work in the private sector, although percentages decrease the longer an immigrant has lived in the country; nonimmigrants have the lowest percentage. Nonimmigrants are more likely to work in the public sector than are immigrants. Compared with all other groups, long-term immigrants are more likely to be self-employed. Immigrants also have relatively high employment distributions in entertainment and manufacturing. New and intermediate-term immigrants tend to have relatively high employment in construction and professional industries, while nonimmigrants are employed in the education, medical, manufacturing, and retail industries. Long-term immigrants have a higher percentage of employment in the medical industry than do nonimmigrants.

Exhibit 2 shows a descriptive analysis of commuting travel characteristics of individuals by their immigration history. In transportation, immigrants are increasingly likely to have two or more vehicles in their households the longer they have been in the country, and nonimmigrants have the highest percentage of two or more vehicles. Nonimmigrants also have shorter average commuting times than do immigrants.

For both immigrants and nonimmigrants, those who drive alone spend about 23 to 25 minutes on their commute. Average carpooling commute time increases for immigrants according to length of time in the country and is greatest for nonimmigrants. Long-term immigrants spend more time commuting on public transit than do nonimmigrants and the other immigrant populations. New and intermediate-term immigrants spend more time commuting by bicycling or walking than do long-term immigrants and nonimmigrants.

Immigrants and nonimmigrants work about the same number of hours per week, close to the standard 40 hours per week. A slightly higher percentage of the immigrant population works the 40-hour week than does the percentage of the nonimmigrant population. Both immigrants and nonimmigrants tend to arrive at work between 6:00 and 8:59 a.m.

Exhibit 2

Work Trip Characteristics by Immigration History

		Immigrants 1 Year	Immigrants 1 < Years < 5	Immigrants 5 Years	Non-immigrants
Number of vehicles in household	None	26.7%	16.1%	6.7%	2.8%
	One	37.2%	33.3%	21.1%	17.7%
	Two or more	36.1%	50.5%	72.2%	79.5%
Commuting mode	Drive alone	30.5%	45.0%	69.3%	82.5%
	Carpool	31.4%	28.7%	15.4%	10.5%
	Public transit	17.2%	14.0%	10.1%	3.2%
	Walk/bike	16.5%	8.4%	3.9%	2.7%
	Other	4.3%	3.9%	1.4%	1.1%
Commuting time	1–15 min.	41.7%	38.0%	35.3%	43.8%
	16–30 min.	36.5%	37.0%	36.7%	32.6%
	31–60 min.	10.2%	13.2%	14.3%	13.4%
	More than 60 min.	11.7%	11.8%	13.7%	10.2%
	Mean (std. dev.)	25.9 (21.0) min.	27.1 (21.3) min.	29.1 (23.5) min.	25.6 (23.5) min.
Commuting time by mode: mean (std. dev.)	Drive alone	23.5 (17.4) min.	23.0 (16.2) min.	25.3 (18.3) min.	24.3 (20.8) min.
	Carpool	25.7 (19.3) min.	29.3 (23.8) min.	29.9 (22.5) min.	31.2 (25.1) min.
	Public transit	41.3 (27.2) min.	42.2 (24.8) min.	49.9 (27.2) min.	47.2 (30.3) min.
	Walk/bike	14.4 (10.8) min.	14.8 (10.2) min.	12.8 (9.3) min.	11.1 (8.7) min.
	Other	26.3 (21.6) min.	34.5 (36.3) min.	29.7 (30.8) min.	42.9 (51.8) min.
Work hours per week	Less than 30	10.6%	11.9%	9.2%	11.3%
	30–39	11.1%	11.1%	11.1%	12.9%
	40	52.3%	53.5%	53.2%	46.0%
	41–50	16.4%	14.7%	16.4%	19.6%
	51 or more	9.7%	8.7%	10.1%	10.2%
	Mean (std. dev.)	40.5 (11.7) hrs.	39.8 (11.6) hrs.	40.9 (11.5) hrs.	40.4 (11.6) hrs.
Arrival time at work	3:00 a.m.–5:59 a.m.	8.0%	8.0%	9.3%	8.6%
	6:00 a.m.–8:59 a.m.	63.2%	60.8%	61.2%	68.2%
	9:00 a.m.–2:59 p.m.	20.1%	19.5%	21.1%	15.2%
	3:00 p.m.–5:59 p.m.	4.2%	6.8%	4.5%	4.0%
	6:00 p.m.–8:59 p.m.	2.4%	2.0%	1.5%	1.8%
	9:00 p.m.–2:59 a.m.	2.1%	3.0%	2.3%	2.3%

Model Results

Exhibit 3 shows the results of the MNL model on work-trip mode choice of the samples by workers' immigration history. Various covariates, shown in exhibits 1 and 2, and a series of interaction variables with immigration history were tested in the model to identify the effects of immigration background on work-trip mode choice. *Drive alone* is the base case in the model. All the coef-

Exhibit 3

Multinomial Logit Analysis of Workers' Commuting Mode Choice (1 of 2)

		Carpool		Public Transit		Walk/Bike		Other	
		Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Constant		– 1.073	0.150 ‡	– 2.955	0.239 ‡	– 2.005	0.253 ‡	– 5.603	0.464 ‡
Immigration	Immigrants (≤ 1 year)	1.394	0.146 ‡	2.395	0.230 ‡	2.266	0.205 ‡	2.810	0.268 ‡
	Immigrants (1 < years < 5)	0.626	0.133 ‡	1.476	0.215 ‡	1.177	0.211 ‡	1.859	0.256 ‡
	Immigrants (≥ 5 years)			0.499	0.235				
Age		– 0.021	0.003 ‡	– 0.021	0.004 ‡	– 0.025	0.004 ‡	– 0.015	0.007
Household income ($1,000)		0.002	0.000 †						
	*Immigrants (≥ 5 years)					– 0.005	0.002	0.004	0.001 †
	*Nonimmigrants	– 0.005	0.001 ‡			– 0.007	0.002 †		
Race	African			0.405	0.124 †	– 0.956	0.203 ‡		
	Asian	0.359	0.087 ‡	0.334	0.090 ‡				
Ethnicity	Hispanic							0.866	0.156 ‡
	*Immigrants (≤ 1 year)	0.497	0.124 ‡						
	*Immigrants (1 < years < 5)	0.442	0.122 ‡						
	*Immigrants (≥ 5 years)	0.385	0.115 ‡						
Gender	Female	– 0.317	0.061 ‡						
	*Immigrants (≤ 1 year)			– 0.391	0.123 †				
	*Immigrants (≥ 5 years)			– 0.423	0.154 †				
Vehicle availability (number of vehicles in household/ number of adults)	*Immigrants (≤ 1 year)	– 0.238	0.042 ‡	– 0.549	0.053 ‡	– 0.386	0.052 ‡	– 0.371	0.075 ‡
	*Immigrants (1 < years < 5)	– 0.277	0.039 ‡	– 0.588	0.049 ‡	– 0.423	0.056 ‡	– 0.386	0.075 ‡
	*Immigrants (≥ 5 years)	– 0.258	0.043 ‡	– 0.532	0.055 ‡	– 0.396	0.079 ‡	– 0.618	0.091 ‡
	*Nonimmigrants	– 0.171	0.072	– 0.804	0.099 ‡	– 0.598	0.109 ‡		
College or graduate degree	*Immigrants (≤ 1 year)	– 0.451	0.119 ‡					– 1.044	0.268 ‡
	*Immigrants (1 < years < 5)	– 0.472	0.130 ‡						
	*Immigrants (≥ 5 years)	– 0.586	0.154 ‡						
	*Nonimmigrants			0.699	0.238 †				

Exhibit 3

Multinomial Logit Analysis of Workers' Commuting Mode Choice (2 of 2)

		Carpool		Public Transit		Walk/Bike		Other	
		Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Physical disability	*Immigrants (≥ 5 years)	0.660	0.230 †						
	*Nonimmigrants	0.973	0.222 ‡						
Residential building: year built	Before 1960								
	*Immigrants (≥ 5 years)			0.786	0.156 ‡	0.452	0.224		
	*Nonimmigrants					0.698	0.236 †		
	1980 and after					– 0.473	0.093 ‡		
	*Immigrants (≤ 1 year)	– 0.357	0.103 ‡	– 0.628	0.132 ‡				
	*Immigrants (1 < years < 5)			– 0.648	0.143 ‡				
	*NonImmigrants			– 0.832	0.272 †				
Ability to speak English	Not well or not at all	0.376	0.076 ‡	0.339	0.089 ‡				
	*Immigrants (≥ 5 years)					0.566	0.233		
Arrival time at work	9:00 a.m.–2:59 p.m.	– 0.357	0.077 ‡						
	*Nonimmigrants					0.575	0.272		
Work hours	Full-time (40+ hrs.)	0.147	0.070			– 0.511	0.089 ‡		
Employment industry	Agriculture	0.687	0.141 ‡	– 1.739	0.468 ‡				
	Construction	0.697	0.082 ‡	– 0.608	0.149 ‡	– 0.656	0.169 ‡		
	Manufacturing			– 0.760	0.126 ‡	– 0.497	0.140 ‡		
	Retail	– 0.243	0.103						
	Service and entertainment					0.260	0.097 †		
Region	Northeast			1.584	0.091 ‡	0.947	0.106 ‡	1.087	0.367 †
	West			0.474	0.094 ‡	0.441	0.095 ‡	0.964	0.341 †
	South							1.043	0.336 †

SE = Standard error.

** Interaction terms.*

† for p-value <0.01. ‡ for p-value <0.001.

Obs = 9764, ^{2}(82) = 4344.18. LL w/ constants only = – 11595.85. LL at convergence = – 9423.75. Adjusted pseudo-^{2} = .1855.

Notes: Drive alone *is the base case. All coefficients are statistically significant at the 0.05 level.*

ficients are statistically significant at the 0.05 level; insignificant covariates at the significance level were dropped from the model.

Exhibit 3 shows that immigrants have higher propensities toward the use of carpool, public transit, walk/bike, and other modes (for example, moped, motorcycle) for work trips compared with nonimmigrants. The propensities become weaker, however, as the years of residency increase. The propensities toward the use of carpool, walk/bike, and other modes disappear among long-term immigrants. These results indicate that the adoption of drive-alone travel behavior among immigrants occurs gradually; however, the results also indicate that immigrants are more likely to patronize public transit as a means of work-trip mode compared with nonimmigrants.

The age variable indicates that older workers are more likely to drive alone (base case). The analysis also tests interaction terms with immigration history; however, none of the interaction terms are significant. This result suggests that age in general is associated with greater odds of driving alone, regardless of immigration history.

Household income is positively associated with carpool use; however, the interaction terms with immigration history indicate that nonimmigrants are less likely to carpool. Walk/bike use is negatively associated with household income among long-term immigrants and nonimmigrants. Other modes are positively associated with household income among the long-term immigrants. These results show that household income plays a different role in work-trip mode choice throughout workers' immigration history.

People with African heritage are more likely to use public transit and less likely to walk/bike. This finding is consistent with existing studies. People with Asian heritage are more likely to carpool and use public transit. Interaction terms with immigration history are not statistically significant at the 0.05 level. People with a Hispanic background are more likely to use other modes; however, the interaction terms with immigration history have a higher propensity toward carpooling among Hispanic immigrants, even though the propensity becomes weaker as years of residency increase.

Gender is a statistically significant factor associated with work-trip mode choice. Overall, females are less likely to carpool; however, female immigrants tend to have lower propensities toward public transit. This finding is consistent with the finding of Myers (1997).

Vehicle availability has long been considered a significant factor in mode choice. In this study, the coefficients of vehicle availability (in number of vehicles in household minus number of adults in household) indicate that workers are more likely to drive alone when vehicles are available, regardless of their immigration history. The effects, however, are somewhat different between immigrants and nonimmigrants. For example, for carpools, the magnitude of the vehicle availability variable coefficient among nonimmigrants is smaller than that of immigrants for carpooling and larger for public transit and walk/bike. This finding indicates that immigrants are less likely to carpool and more likely to use public transit or walk/bike when vehicles are available, compared with nonimmigrants. Overall, these results show that immigrants are more likely to use nonautomobile modes compared with nonimmigrants with the same level of vehicle availability.

Immigration history interaction terms with educational background are significant. Nonimmigrants with a college or graduate degree are more likely to use public transit, compared with immigrants; however, immigrants with a college or graduate degree are less likely to carpool, compared with

nonimmigrants. This propensity gets stronger as the number of years of residency in the United States increases.

The model also tested for the effect of workers' physical disabilities. As shown in exhibit 1, immigrants are less likely to have a physical disability. The model results indicate that long-term immigrants and nonimmigrants are more likely to carpool than are new and intermediate-term immigrants. People who have a limited ability to speak English are also more likely in general to carpool or use public transit. Long-term immigrants with limited English skills, however, are more likely to walk/bike to work.

The effect of the built environment or land use on work-trip mode choice was assessed in this study. The year the residential building was built as a proxy of the built environment was tested, as in previous studies (Berrigan and Troiano, 2002; Kim and Ulfarsson, 2008). A more recent year built indicates more new neighborhoods or low-density suburban neighborhoods, while an earlier year built indicates more old neighborhoods or high-density urban neighborhoods. The results indicate that, among those who live in old neighborhoods (built in 1960 or before), both long-term immigrants and nonimmigrants are more likely to walk/bike. The long-term immigrants in the old neighborhoods are also more likely to use public transit for their work trip. Overall, people who live in new neighborhoods (built in 1980 or later) are less likely to walk/bike. The interaction terms with immigration history reveal more findings. First-year immigrants are less likely to carpool compared with other immigrants and nonimmigrants. Also, nonimmigrants and first-year immigrants are less likely to use public transit in the neighborhoods compared with long-term immigrants. This finding may indicate that long-term immigrants in new suburban neighborhoods have somewhat different travel behavior than others.

People who arrive at work during nonpeak times (9:00 a.m. to 2:59 p.m.) are less likely to carpool. This result is intuitive because carpooling can have significant advantages for commuting during peak time. Nonimmigrants who arrive during nonpeak times, however, are more likely to walk/bike. Regarding work hours, full-time employees are more likely to carpool and less likely to walk/bike than are part-time employees. The interaction terms with immigration history are not significant.

The model in this analysis also tested employment industry to examine its effect on work-trip mode. In general, workers in the agricultural and construction industries are more likely to carpool and less likely to use public transit. Also, people who are in the construction and manufacturing industries are less likely to walk/bike to work. These findings are likely associated with location of their work place and commute distance. Workers in the retail industry are less likely to carpool, and people in the service and entertainment industry are more likely to walk/bike to work. The interaction terms with immigration history are all insignificant at the 0.05 level. By region, workers in more densely developed regions are more likely to use a nonautomobile mode of transit.

Discussion and Conclusions

This study found that immigrants, newer immigrants in particular, have significantly different characteristics for transportation modes, as well as in personal and household backgrounds, com-

pared with nonimmigrants, as shown in exhibits 1 and 2; however, immigrants themselves are not homogenous. New immigrant workers are younger and more racially diversified. They also have either very low or very high educational levels. Their household income, ability to speak English, residential neighborhoods, vehicle ownership, and commuting mode also vary. These differences also change throughout their immigration history. The MNL model results shown in exhibit 3 indicate that workers' immigration history is associated with their work-trip modes. It is challenging to develop any policy to accommodate the needs of these diverse groups of the population to facilitate their assimilation to the society.

This study found that the availability of nondrive-alone work-trip modes is important for new immigrants. Immigrants are still more likely to use public transit after controlling for various personal, household, and other characteristics. As Myers reported, sustained high immigration can bolster the ridership base of public transit (Myers, 1997). Habits are important elements in work-trip mode choice (Klöckner and Matthies, 2004). Immigrants may not have the negative perception of public transit, bus transit in particular, that is deeply rooted in U.S. culture and society. How to develop public transit to be competitive enough to retain immigrants should be an important issue to address. Resolving this issue may require more than simple physical infrastructure upgrades of transit systems. It is imperative to understand what immigrants need and expect from public transit.

The results of this study also indicate that special efforts to support carpooling or community-based transit service are needed among new immigrants. Often, new immigrants tend to have strong ties with their ethnic communities. As Valenzuela, Schweitzer, and Robles (2005) argued, however, community-based transportation service needs to be given more attention for new immigrants because they often face mobility problems resulting from various barriers, such as limited public transit service, language, culture, and even immigration status. Strategies to target and improve carpooling services for Hispanic immigrants are warranted.

This study also found that female immigrants are still less likely to use public transit after adjusting various covariates, including household income and vehicle availability. Also, a lower propensity toward carpooling for work trips among highly educated immigrants is noteworthy. The reasons for these results need further research. This study found that workers who cannot speak English adequately are more likely to carpool and use public transit. This finding may reflect the fact that the language barrier may discourage people who are mostly immigrants from getting a driver's license. Public transit policy may need to consider ways to alleviate language barriers for new immigrants so that they may use the system comfortably.

Finally, studies on how different modes affect new immigrants' job accessibility and nonwork-related travel need are necessary. One way to handle this need is by including a more detailed immigration history of survey participants in traditional national and regional travel surveys. Because of a significant increase in immigrant populations, issues of immigrant transportation require more attention and effort in both research and practice, which is challenging. This challenge, however, also can be an opportunity to develop a better nonautomobile transportation system and structure in society.

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Loan Modifications and Redefault Risk: An Examination of Short-Term Impacts

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Abstract

One promising strategy to stem the flood of home foreclosures is to modify mortgage loans so that borrowers can remain in their homes. A primary concern of loan modification efforts, however, is the seemingly high rate of recidivism. In this article, we examine the relationship between redefault rates and different types of loan modifications based on a large sample of recently modified loans. Our findings show that the key component to making modified loans more sustainable, at least in the short run, is that mortgage payments are reduced enough to be truly affordable to the borrowers. The findings also show an even lower likelihood of redefault when the payment reduction is the result of a principal reduction. Unfortunately, our findings also show that to reduce redefault for modified loans that are currently under water (those with significant negative equity), more significant loan restructuring or refinancing may be needed.

Introduction

The foreclosure crisis shows no sign of abating. More than 2.3 million homeowners faced foreclosure in 2008, an 81-percent increase from 2007 (Aversa and Zibel, 2009). The foreclosure crisis and the resulting credit and financial turmoil became a full-fledged national and global recession in late 2008. Payroll employment has declined by 3.6 million since December 2007 and more than one-half of this decline occurred between November 2008 and February 2009 (Bureau of Labor Statistics, 2009). Job losses lead to more foreclosures, which, when added to the already oversupplied real estate market, further reduce home values, leading to even more foreclosures. The $2.8 trillion

financial loss in household real estate wealth from 2006 to the third quarter of 2008 further weakens the overall economy, leading to more income loss (Board of Governors of the Federal Reserve System, 2008).

Borrowers' inability to meet mortgage payments is the core of the foreclosure problem, and a modification of the terms of mortgages has been regarded as a means to reduce the payment burden. By providing troubled homeowners with relief, modifications can be regarded as a tool for foreclosure avoidance. For instance, under the Federal Deposit Insurance Corporation's (FDIC's) streamlined loan modification program, mortgages that meet certain criteria can be modified to help borrowers achieve sustainable payments by lowering their housing payments to 38 percent of their gross income (FDIC, 2008). The Homeowner Affordability and Stability Plan creates a $75 billion program to subsidize loan modifications that would reduce the monthly mortgage payment of a troubled homeowner to as low as 31 percent of monthly household income (U.S. Department of the Treasury, 2009). In practice, the Office of the Comptroller of the Currency (OCC) and Office of Thrift Supervision (OTS) (OCC and OTS, 2008) documented that an estimated 133,000 loans were modified in the third quarter of 2008, a 16-percent increase from the second quarter of 2008, but the number of modifications continued to fall further behind the number of new delinquencies.[1]

A primary concern with loan modification efforts is the seemingly high rate of recidivism. Within 6 months, more than one-half of all modified loans were 30 days or more delinquent and more than one-third were 60 days or more delinquent (OCC and OTS, 2008). Do these high rates of redefault imply that loan modifications are failing?

Unfortunately, the complexity of the many factors involved in loan modifications makes this question less straightforward than it appears. Modifications do not necessarily reduce mortgage payments, only some do. Loan modifications can lower monthly payments by extending the loan term, or by reducing the interest rate or the mortgage's outstanding balance, or by a combination of practices. Traditional modifications, however, only add the delinquent payment to the unpaid principal, thus increasing the amount of debt and often resulting in higher monthly payments (White, 2008).

Also, an important temporal aspect to loan modifications exists during an extended period of economic downturn. A loan modification may be successful in addressing the initial problem, for instance, by reducing the monthly payment to address a lack of affordability after an interest rate reset. As a result of the deepening financial and economic crisis, however, borrowers can easily face new problems shortly after a loan modification, such as loss of a job, which can lead to another mortgage delinquency and redefault. Thus, it is important to examine the short- and long-term implications of loan modifications.

Using data from a large sample of recently modified nonprime loans, we examine why some loan modifications are more likely to redefault than others. More narrowly, we examine the types of modifications that are more likely to redefault in the short term. As expected, we find that a significant reduction in mortgage payment makes modified loans more sustainable in the short

[1] During the same period, the number of mortgages delinquent by 60 days or more increased by 17 percent.

term. The findings also show an even lower likelihood of redefault when the payment reduction is accompanied by a principal reduction. Of course, not all loan modifications that avoid redefault are better for the lender. Further studies are still needed to compare the relative effectiveness of different types of loan modifications based on a net present value analysis.

This article proceeds as follows. The next section reviews the current practices of loan modifications and the literature. The third section discusses the data and outlines the logistic models of the redefault behavior of borrowers with modified loans. The fourth section presents and discusses the results, and the final section concludes.

Literature Review

Loan modification has been regarded by the Obama Administration as one promising strategy to stem the flood of home foreclosure, but not much solid research exists on this topic. In this section, we review some of the recent practices of loan modifications and the literature on the effect of loss mitigation efforts.

Implementing Loan Modifications

As of early 2007, most modifications involved a capitalization of arrears for seriously delinquent loans and/or a principal forbearance, according to Inside B&C Lending (2008). In 2007, however, interest rate resets on the massive 2005 and 2006 vintages were starting to cause defaults, because the rate indexes were high and monthly mortgage payments were rising by large amounts. The decline of housing prices started in late 2006 in many markets, making it difficult for borrowers to refinance. In late 2007 and early 2008, the prereset modifications (interest rate freeze or reduction) on subprime adjustable-rate mortgages (ARMs) increased significantly. More recently, modification activity has focused on interest rate reductions and less seriously delinquent borrowers. The category of principal reduction is still largely theoretical, however, and has not been used to any significant degree (White, 2008).

The federal government has relied primarily on encouraging lenders to voluntarily modify the terms of existing mortgages. In October 2007, a coalition of mortgage servicers and housing counseling agencies formed the HOPE NOW Alliance to stimulate a voluntary effort to restructure mortgages. In June 2008, the HOPE NOW Alliance members issued guidelines for a streamlined foreclosure prevention process for committed servicers. In August 2008, the FDIC, which took over the former IndyMac Bank, launched the first streamlined loan modification program for struggling mortgage borrowers meeting certain criteria. This program is designed to help troubled borrowers achieve a sustainable 38-percent housing expense-to-income (HTI) ratio in the mortgage and decrease the borrower's payment by 10 percent or more.[2] To reach affordable levels, mortgage modifications can combine interest rate reduction, extended amortization, and partial principal

[2] If the initial modification at 38 percent of HTI does not decrease the borrower's payment by 10 percent or more, the HTI ratio can be lowered to 35 percent and then to 31 percent to achieve the 10-percent savings. For cases in which a 10-percent reduction cannot be achieved, the 31-percent HTI ratio is used for affordability. FDIC (2008) provides the technical details about the loan modification program.

forbearance. In December 2008, government-sponsored enterprises (GSEs) started a streamlined modification program, applying many features of the FDIC loan modification program.[3] The recently announced Home Affordable Modification Program encourages lenders and servicers to bring the mortgage payments to as low as 31 percent of monthly income by providing incentives to lenders, servicers, and borrowers. Under this plan, a mortgage lender would reduce a borrower's payments to 38 percent of monthly income and the federal government would provide additional incentives, such as a $1,000 upfront payment per modification and more payments if the borrower keeps current (U.S. Department of the Treasury, 2009). The government will also match additional reductions to bring the payment to as low as 31 percent of monthly income.

The current government loan modification programs aim to standardize the modification process, allowing troubled borrowers to get timely and consistent help. Servicers are encouraged to examine readily available loan criteria, such as loan-to-value (LTV) ratios, loan amount, credit scores and payment history, and debt ratios, to make a quick determination of qualifications. Although the number of completed loan modifications steadily increased in 2008, a number of barriers and concerns have impeded the wider adoption of loan modifications.

Barriers of Loan Modification

Eggert (2007) summarized several barriers to loan modifications and indicated that servicers' costs and self-interests are the primary hurdles. Loan modifications have been labor intensive and usually very expensive for servicers, with costs estimated at between $500 and $600 per modification (Eggert, 2007). Because of the high cost of the loan modification, servicers may want to save money by doing nothing, in the hope that the loan can cure itself without any action (Mayer and Gan, 2006). Furthermore, because subprime servicers can derive substantial income from late fees that can be reimbursed for the costs of foreclosure, many servicers once had more incentive to allow a loan to proceed to foreclosure than to resolve the delinquency, especially in a booming housing market in which the liquidation of foreclosed properties was not a big problem. In the current market, however, servicers are not nearly as interested as they once were in keeping borrowers in long-term delinquency; they fear their outlays may never be reimbursed. For example, servicers must advance monthly payments on loans that are not paying; that requirement is a negative to them.

For securitized loans, the Pooling and Servicing Agreement (PSA), a legal document that outlines the responsibilities of the servicer, restricts the extent of loan modifications allowed. Bound by the PSAs, servicers find that it is not easy to work with investors of securitized mortgages to achieve loan modifications and, usually, it is not clear what is legally permissible (Eggert, 2007). The differences in the type and scope of modifications that are explicitly permitted among different trustees raise operational compliance costs and litigation risks. These negative aspects of securitization seem to affect servicers' incentives and slow or reduce their propensity to modify loans—even

[3] The underwriting criteria include missing at least three mortgage payments, proof of financial hardship, not in active bankruptcy, and payment on first-lien mortgage not exceeding 38 percent of a borrower's gross monthly household income (Inside Mortgage Finance, 2008). Servicers are expected to begin actively soliciting eligible borrowers with owner-occupied mortgages and loan-to-value ratios of 90 percent or more. Servicers will be compensated $800 for each successful loan modification under the program.

when such action would be in the collective interests of investors and borrowers.[4] One recent study suggests that frictions due to the securitization preclude efficient loan modifications and increase the foreclosure rate. Conditional on a loan becoming seriously delinquent (60 days or more), the likelihood of a portfolio loan default is lower in absolute terms than that of a securitized loan default (19 to 33 percent, respectively, relative to the mean foreclosure rate) (Piskorski, Seru, and Vig, 2008).

By introducing foreclosure alternatives such as a loan modification that likely will have a lower cost for the borrower, the lender/servicer encounters an implicit moral hazard issue: the willingness to negotiate a less costly solution for borrowers can itself lead to more defaults (Ambrose and Capone, 1996). In other words, providing a less costly option by modifying the terms of a mortgage may signal to other borrowers that the costs associated with default have declined sufficiently, which would result in more defaults than otherwise would have occurred. To limit the moral hazard problems associated with lowering borrower default costs, Ambrose and Capone (1996) suggested that lenders or servicers should restrict foreclosure alternatives to liquidity-constrained borrowers. In practice, the requirement for the defaulted borrower to provide full financial disclosure has addressed the moral hazard problem; only true hardship cases will receive assistance (Inside Mortgage Finance, 2008).

Finally, redefault risk may be higher if modifications are not significant enough. About 53 percent of mortgages modified in the first quarter of 2008 had become delinquent again in 6 months (OCC and OTS, 2008). It seems many of the current modifications do not effectively help troubled borrowers, most likely because the modifications do not bring mortgage debt in line with declining home values or reduce the mortgage payment to a sustainable level. Other factors—such as the high-debt burden, increased unemployment rate, and continuing decline in property values—also may contribute to high redefault rates. As the subprime market worsens and housing prices continue to decline, more innovative solutions that can effectively help troubled borrowers will need to be considered.

The Effect of Loss Mitigation Efforts

Why would some borrowers with modified mortgages redefault? In broad terms, two complementary theories may explain why borrowers stop making their mortgage payments: the "option" theory and the "trigger-event" theory. According to the option theory, the borrower exercises the put option and default when he has a negative equity in the property (Foster and Van Order, 1984; Kau, Keenan, and Kim, 1993; Vandell and Thibodeau, 1985). When the property value has fallen below the amount owed on the loan, the borrower has the incentive to default and to let the lender take the property. The trigger-event theory focuses on life-changing events that affect the homeowner's ability to make mortgage payments, because of either a sudden drop in or loss of income or an unforeseen increase in expenses (Vandell, 1995). Income disruptions typically are associated with a loss of employment or adverse change in family circumstances, such as an illness, death, or

[4] In June 2007, the American Securitization Forum (ASF) issued guidelines for the modification of securitized subprime residential mortgage loans (ASF, 2007). The ASF (2007) indicated that modifications were allowable to the extent they improved the net present value for the "aggregate investor"; however, investors and servicers have been sending mixed signals.

divorce. In addition, some environmental factors, such as local economic conditions and changes in underwriting standards, also influence a borrower's decision to default (Cutts and Merrill, 2008). Because most borrowers with modified loans were delinquent to some degree before the loan modifications, most, if not all, of them should have had disruptions in income or unforeseen expenses. As a result, payment relief through a loan modification should help them keep current with required mortgage payments. Of course, the level of equity in the property is also important, because, if a borrower has sufficient equity in the home, the borrower can simply sell the property or refinance it when he or she cannot make the mortgage payment. In these cases, income disruptions are usually insufficient to cause severe default. More simply put, loan to value has always been the most important determinant of default. The conventional wisdom is that the trigger-event theory explains delinquency and the option theory explains default; in this way, they are not really competing, but complementary, explanations.

One group of studies examined whether loss mitigation efforts, including loan modifications, prove helpful to borrowers. For FHA loans, Capone and Metz (2003) found that loss mitigation programs successfully lowered the foreclosure rate; the probability of a loan reaching foreclosure is dramatically reduced when the loans goes through a forbearance agreement (from 77.6 percent in 1998 to 14.5 percent in 2002). Cutts and Green (2005) provided an excellent review of servicing literature and Freddie Mac's innovations in loan servicing and loss mitigation. Using Cox's hazard model to investigate the effect of repayment plans on foreclosure incidence, they found that borrowers who enter a repayment plan have a much lower probability of losing their home (80 percent lower for borrowers overall and 68 percent lower for low- to middle-income borrowers). They also found that borrowers who previously had a loan modification but were again in default were significantly less likely to fail than those who had not previously been through a loan modification, perhaps because of the borrower's willingness to work with the servicers to reach a positive resolution. Cutts and Merrill (2008) also documented that the success rate of modified loans varies by the amount of arrearage capitalized into the loan modification; they found a direct relationship between a lower arrearage and a lower failure rate.

Data on recent modifications are available from a number of sources;[5] however, scant evidence exists concerning the effectiveness of different types of loan modifications. Dubitsky et al. (2008) documented that rate-freeze modifications and principal-reduction modifications have lower redefault rates than do traditional modifications, but the analysis does not control for borrowers' risk characteristics. For example, the data found that reset modifications (primarily rate freeze) exhibited only a 15-percent delinquency rate 8 months postmodification, thus outperforming the other categories. About 10 percent of the loans that received a reset modification, however, were delinquent before modification compared with the much higher delinquency rates (usually 80 to 85 percent) for loans modified by other means. This example illustrates the need for a more precise analysis of the performance of modifications, taking into account borrower, loan, and market factors. The effect

[5] Sources include at least the *OCC and OTS Mortgage Metrics Report*, the *Foreclosure Prevention Report* from the Federal Housing Finance Agency, the HOPE NOW Alliance of mortgage servicers and counselors, the Mortgage Bankers Association, and the *Mortgage Servicing Report* by the State Foreclosure Prevention Working Group. Few of these sources, however, specify the kinds of modifications implemented or attempt to understand the effect of the modifications beyond summary statistics.

of loan modification and the effectiveness of different modification types are still very new fields of research, and very little data have been available for academic study. In this analysis, we examine the short-term effect of different loan modifications by identifying which kinds of modifications are more sustainable than others and under which circumstances. In the following section, we describe the data and methods used to examine these issues.

Data and Methodology

This section describes a national sample of private-label mortgages that were modified in the second quarter of 2008. It also outlines the logistic models of the redefault behavior of borrowers with modified loans.

Data

Loan-level data on individual mortgages are available for a national sample of private-label securitizations, known as the Columbia collateral file (White, 2008). The data are available through remittance reports produced by the trustee on several mortgage pools, altogether representing more than 4 million outstanding mortgages. During the 2007–08 reporting period, many of the leading mortgage servicing companies serviced the pools.[6] The monthly performance reports provide loan-level details on loan characteristics, defaults, foreclosures, bankruptcy, and losses on foreclosed homes. The reports also have information about the loan balance, mortgage payment, and interest rate, both before and after modification, which enables us to identify whether total mortgage debt, interest rate, or mortgage payments are reduced for individual homeowners. Unfortunately, the information about mortgage debt-to-income ratio, overall debt-to-income ratio, and household disposable income are not available in the data set.

This analysis focuses on a sample of mortgage loans derived from remittance reports for 2006 securitizations, which covers about 1.3 million loans, mostly originated in 2005 and 2006. We chose to examine the 2006 deals because recent nonprime securitizations, especially subprime ARMs, have performed worse than earlier ones as a result of relaxed underwriting criteria, higher combined LTV ratios, and the popularity of risky loan terms (Immergluck, 2008). Although our sample is national in scope, about one-half of the mortgages are concentrated in California, Florida, and a few other high-growth states. As of April 2008, the top five servicers of the 2006 deals—Wells Fargo Bank, Countrywide Home Loans Servicing LP, Aurora Loan Servicing LLC, Ocwen Loan Servicing LLC, and Bank of America—accounted for about 47 percent of all the loans.

In general, the data do not allow us to explicitly identify the loan types for all the loans (59 percent have missing values for the loan type variable). As exhibit 1 shows, the credit quality of the loan types, as measured by the average FICO scores, differs, ranging from 629 for subprime mortgages, to 698 for conventional mortgages, to 702 for Alt-A mortgages. We are confident, however, that a vast majority of the loans in this sample are nonprime loans, because most of them have at least

[6] As documented by White (2008), a subset of this data set includes 7 of the top 10 subprime originators in 2006 and 6 of the top 15 subprime servicers in 2007.

one risk characteristic that is more common in the subprime sector.[7] Restricting the analysis to modified loans further alleviates this concern to some degree. As exhibit 1 shows, the average FICO score, average LTV ratio, and average interest rate of modified loans do not differ much across loan types.

Of course, this sample of loans does not represent a statistically random sample of all mortgage loans or all nonprime mortgage loans. The loans are securitized loans, and servicers of securitized loans may have different incentives than lenders who retain ownership of mortgage loans. Therefore, this sample of voluntary loan modifications may not be representative of loan modifications by portfolio lenders. Nevertheless, given that nonprime mortgages account for more than one-half of all foreclosures[8] and that the vast majority of nonprime loans that led to the crisis were securitized, this sample provides important insights regarding what voluntary loan modification programs have yielded to date in the nonprime market.

Characteristics of Modified Loans

The number of loan modifications among this sample increased sharply in 2008, from about 4,800 in March 2008, to about 6,200 in May 2008, and then to nearly 9,000 in November 2008. This pattern is consistent with the national trend, which showed a significant increase in loan modifications in 2008 (Evers, 2009). We restricted the analysis to modifications in one quarter only to alleviate concerns that policy environment and macroeconomic conditions might have changed substantially during the study period. During the second quarter of 2008, 17,592 loan modifications were in the sample—a large number considering that, in the same quarter, OCC and OTS (2008) reported 114,439 modifications based on a sample representing more than 60 percent of all outstanding mortgages, and FHFA (2008) reported 15,372 modifications by the GSEs.

After excluding second liens, originations before 2005, loans with missing data, nonowner-occupied loans, and those loans in which the final outcomes could not be identified, we had 9,693 loan modifications reported. The data also provided rich details on individual mortgage delinquency and foreclosure, enabling us to track the performance of the modified loans through December 2008. Although most of the modified loans had experienced some delinquency, 37 percent had never experienced any delinquency during the 12 months before the modification. Therefore, we divided the borrowers holding modified loans into two basic groups: those with loans that were already past due under the current terms and those that remained current but were considered to be in "imminent default" (for example, as a result of pending interest rate resets). More than 90 percent

[7] As suggested in the literature, it is reasonable to assume the following characteristics significantly increase mortgage credit risk: (1) a borrower's FICO score of less than 620, (2) an interest-only loan, (3) negative amortization, (4) limited or no documentation, and (5) original LTV ratio higher than 90 percent (Foote et al., 2008; Immergluck, 2008). A vast majority of conventional loans in this sample and those with missing values (86 and 90 percent, respectively) have at least one of these risky loan features. In this sense, most of these private-label securitizations should be considered subprime or Alt-A mortgages, although they were coded as conventional, conforming, or with missing values.

[8] Without including Alt-A mortgages, subprime mortgages alone accounted for 48 percent of all foreclosure starts in the second quarter of 2008 (MBA, 2008).

Exhibit 1

Characteristics of Different Loan Types

	Loan Type	Mean FICO Score	Mean OLTV	Mean Interest Rate	ARM	PPP	Interest Only	Low/No Doc*	At Least One Risky Factor**	Number of Loans
				(%)	(%)	(%)	(%)	(%)	(%)	
All loans***	Missing	671	73.25	8.12	61.45	53.11	27.90	55.19	88.11	757,035
	Conventional	698	72.72	7.17	58.74	35.69	42.51	52.61	85.57	205,018
	Conventional w/private mortgage insurance	715	90.62	6.82	13.78	3.9	6.37	55.26	81.12	1,822
	Jumbo	740	71.00	6.64	0	0	15.61	45.73	55.46	1,839
	Conforming	674	72.12	8.24	63.24	50.39	28.78	68.59	79.52	90,244
	Nonconforming	695	76.01	7.66	70.53	48.29	37.66	66.51	94.78	35,586
	Subprime	629	71.73	9.07	57.57	62.24	19.18	37.33	91.54	171,743
	Other	694	74.45	7.25	0	11.83	29.28	85.63	91.33	2,206
	Alt-A	702	76.11	8.15	60.41	55.4	22.02	76.15	92.25	20,675
	Total									1,286,168
Modified loans sample	Missing	617	81.53	8.84	91.42	78.77	24.49	36.77	89.70	6,273
	Conventional	604	82.33	9.04	76.92	58.65	19.71	43.75	96.47	624
	Conforming	614	81.91	8.85	93.89	70.90	17.36	46.69	96.09	409
	Nonconforming	635	81.31	8.40	97.45	79.62	28.03	63.69	94.90	157
	Subprime	604	82.59	8.80	90.18	76.26	26.35	34.78	93.92	2,220
	Other	663	80.00	7.38	0.00	0.00	100.00	100.00	100.00	2
	Alt-A	675	75.03	10.06	75.00	62.50	37.50	75.00	87.50	8
	Total									9,693

ARM represents adjustable-rate mortgage. OLTV represents origination loan-to-value ratio. PPP represents existence of a prepayment penalty.

** Low/No Doc represents low- or no-documentation mortgages.*

***Features that are considered risky include a borrower's FICO score of less than 620, interest-only mortgages, negative amortization mortgages, limited or no documentation, and original loan-to-value ratios higher than 90 percent.*

**** A few loans coded as "FHA" (Federal Housing Administration) or "VA" (Department of Veterans Affairs) (less than 0.4 percent of the total) that are likely miscoded were dropped from the sample.*

of loans in this sample were ARMs and about 61 percent of those with teaser rates were modified before the interest rate reset dates.[9]

Descriptive statistics of the modified loans are listed in exhibit 2. Borrowers holding modified loans generally had quite low origination FICO scores, with an average of about 614. More than one-half of the loans were refinance mortgages (54 percent), about 24 percent were interest-only mortgages, and a small percentage (4 percent) were negative amortization loans. More than one-third of the loans had limited or no documentation at origination. About two-thirds originated in 2006; the remainder originated in 2005.

Exhibit 2

Descriptive Statistics for Modified Loans

Characteristic	Mean Value
Original FICO score	614
Interest rate	8.84
Appraisal value	$260,194
Loan amount	$238,726
OLTV	81.83%
CLTV	84.95%
Home purchase	46.04%
ARM	90.37%
Interest only	24.39%
Negative amortization	4.30%
Full-doc/alt-doc*	62.34%
Origination year	
2005	33.57%
2006	66.43%
Property location	
California	24.95%
Florida	11.72%
Texas	4.56%
Arizona	4.32%
Michigan	4.22%
Maryland	3.43%
Other states	46.80%
Servicer	
Servicer 1	30.42%
Servicer 2	23.32%
Servicer 3	13.30%
Servicer 4	7.49%
Others	25.47%
Redefault as of December 2008 (30+ days)	44.75%
N	9,693

ARM represents adjustable-rate mortgage. CLTV represents combined loan-to-value ratio. OLTV represents origination loan-to-value ratio.

**Full-doc/alt-doc represents full- or alternative-documentation mortgages.*

[9] A smaller share of the mortgages (about 11 percent of all the ARMs) kept payment unchanged and may be considered as "streamlined" reset modifications. These modifications are usually designed for borrowers who were current before reset.

Slightly more than one-half of the modifications (53 percent) led to reduced monthly principal and interest (P&I) payments (with at least a 1-percent reduction in mortgage payment; see exhibit 3); however, 23 percent of reported modifications resulted in payment increases, likely a product of recasting arrears. The remaining 23 percent of modifications had roughly the same P&I payment (less than a 1-percent change). On average, the monthly payment was reduced by $173 for all modified loans. But the reports do not disclose whether the payment changes and rate reduction are permanent or temporary for this sample. The most common modifications were either interest reduction only (53 percent), in which the interest rate was cut but the principal remained the same or increased slightly, or a traditional modification (39 percent), in which the interest stayed the same but the principal balance and mortgage payment increased slightly (exhibit 3). These increases likely resulted from capitalization of unpaid interest or other charges.

Overall, loan modifications increased the aggregate outstanding mortgage debt, but most experienced an interest rate reduction. The amount owed on the modified loans increased from $2.31 billion before modification to $2.33 billion after modification. A small share of modified loans (8.4 percent) had the principal balance reduced, but only 299 loans (3 percent) reduced principal by more than 20 percent. Because principal reductions have not yet been used to a large extent, we are unable to make a clear determination of their success. More than one-half (about 59 percent) of loan modifications experienced an interest rate reduction. Because of the rate reduction, the average interest rate of modified loans dropped from 8.84 to 7.16 percent after modification, still much higher than the prevailing 30-year fixed rate on prime mortgages, which, during this period, was a little higher than 6 percent.

The modification strategy of different servicers seems to vary significantly. Exhibit 4 shows the share of different types of modifications by major servicers in this sample. Servicer 1 was the only one that had actively used principal-reduction modifications. In comparison, Servicer 2 had been more likely to use traditional modifications and Servicer 3 was more likely to use rate reduction.

Exhibit 3

Types of Loan Modifications by Payment Reduction

Loan Modification Type		Percent
By rate/principal reduction	Rate reduction and principal reduction	6.19
	Rate reduction only	52.92
	Principal reduction only (rare)	2.26
	No rate reduction and no principal reduction (traditional)*	38.63
By payment relief	>40% reduction	5.84
	30.1–40% reduction	8.71
	20.1–30% reduction	13.12
	10.1–20% reduction	15.26
	5.1–10% reduction	6.15
	1–5% reduction	4.17
	No reduction	23.44
	Increase in payment*	23.32
Total number of loans		9,693

** Reference group in the model.*

Notes: Based on the 2006 deals in the Wells Fargo remittance reports. All second-liens, nonowner-occupied loans, and loans with missing information have been excluded.

Exhibit 4

Loan Modifications by Servicers

Servicer	Number of loans	Loan Modification Type	Percent
Servicer 1	2,949	Rate reduction and principal reduction	19.46
		Rate reduction only	49.34
		Principal reduction only	7.12
		Traditional	24.08
Servicer 2	2,260	Rate reduction and principal reduction	0.04
		Rate reduction only	30.97
		Principal reduction only	0.13
		Traditional	68.85
Servicer 3	1,289	Rate reduction and principal reduction	0.23
		Rate reduction only	77.04
		Principal reduction only	0.00
		Traditional	22.73
Servicer 4	726	Rate reduction and principal reduction	0.00
		Rate reduction only	58.13
		Principal reduction only	0.00
		Traditional	41.87
Other servicers*	2,469	Rate reduction and principal reduction	0.89
		Rate reduction only	63.18
		Principal reduction only	0.24
		Traditional	35.68

** Reference group in the model.*

Notes: Based on the 2006 deals in the Wells Fargo remittance reports. All second-liens, nonowner-occupied loans, and loans with missing information have been excluded.

Servicer 4 made no principal-reduction modifications. We used data from only one quarter, so some servicers may have changed their strategy over time.

Servicers report, however, that loan modification is not always a successful strategy. For loans modified in the second quarter of 2008, about 44.7 percent were foreclosed or delinquent by 30 or more days as of December 2008, slightly lower than the 55-percent, 6-month redefault rate reported by OCC and OTS (2008). More than 25 percent were delinquent by 90 or more days or were in the foreclosure process. Redefault rates varied, however, by type of loan modification. Modifications with a reduced mortgage payment have a lower redefault rate than those with the same or a larger mortgage payment (38, 46, and 60 percent, respectively). A similar pattern can also be found for the interest rate reduction modifications, in which a loan modification with a rate reduction has a lower redefault rate than loan modifications without (39 versus 52 percent).

Modeling

In our empirical analysis, we wanted to identify the kinds of loan modifications that are more successful than others. That is, we examined why some loan modifications are more sustainable than others and why some loans redefault quickly. The simplest approach for this analysis is in the use of the following specifications:

$$\Pr(Y_i = 1 | Modify) = f(\alpha + \beta * Modify_i + \gamma * X_i + \eta * S_i + \kappa * \delta_i + \varepsilon_i) \quad (1)$$

where *Modify* is the type of modification, X_i contains a set of loan and borrower characteristics, S_i is a servicer dummy, and δ_i is a control for state, all further described in the following paragraphs. The dependent variable (Y_i) is an indicator variable for a modified loan *i* that takes a value of 1 if the loan redefaults. A loan is considered to be a redefault if it was in delinquent status as of December 2008 (including foreclosures before December 2008). In this analysis, we tried the 30+day delinquency as a measure of delinquency and the 90+day delinquency as a proxy of default.[10]

X_i is a vector of factors that may influence the outcome of a modified loan. Specifically, we controlled the following loan and borrower characteristics: FICO score at origination, documentation type, adjustable interest rate, interest-only loan type, loan amount (in log), loan purpose, and estimated current LTV ratio[11] when modified. We estimated the current LTV ratio by dividing the unpaid balance when the loan was modified by the estimated house price in the second quarter of 2008, using the original house price and the House Price Index (HPI) at the metropolitan statistical area (MSA) level provided by the Federal Housing Finance Agency (FHFA). If the property was located outside an MSA, we used the state HPI. We used the county unemployment rate as of October 2008 to represent local economic conditions.

It is possible that, after conditioning on a host of observables, the assumption of a random assignment into different modifications at the time of modification may be violated, making the estimate biased. As exhibit 4 shows, different servicers may adopt different loan modification strategies, and they may also decide the types of modification based on unobservable private information about the borrower's quality at the time of modification. As a result, the differences in redefault rates among modified loans might simply reflect the unobservable information of the practices of servicers and conditions of modified loans. Consequently, our results could be driven by selection on unobservables at the time of modification and the estimated value of β may be biased.

We mitigate this concern by controlling for the delinquency status and prior delinquency history of the borrower *at the time* of modification. We expect the delinquency severity represented by the delinquency status at the time of modification and the number of months in delinquency during the preceding 12 months to capture some of the information regarding the quality of the borrower that is revealed between origination and modification. We hypothesize these variables to be important factors when servicers decide the type of modifications and to be predictors for redefault. We further controlled the dummies (S_i) of major servicers to capture unobservable information of different servicers. We also included dummies for two major states (δ_i, California and Florida) to

[10] OCC and OTS report 30+day, 60+day, and 90+day delinquency as measures of postmodification default. The industry has focused on the 90+day event because investors are more concerned with foreclosures rather than with delinquencies. In fact, because the 60+day delinquent borrower behavior is similar to the 90+day delinquency from the modeling perspective, we focus on 30+day and 90+day delinquencies in this article.

[11] Consumers usually do not observe home equity in static terms, and recent movement (trends and volatility) matters as much as absolute changes. The trend (house price appreciation rate) and volatility variables, however, are highly correlated with the estimated LTV variables. In fact, the estimated current LTV ratio is determined by the original LTV ratio and recent house price changes, which are highly correlated with house price change postmodification. Because the observation period is quite short, we decided not to include the house price movement variables in this analysis.

account for variation of socioeconomic conditions across regions and inserted a time dummy for all originations in 2006. These controls should reduce the bias in the estimation.[12]

Modify is a set of indicators of different types of loan modifications. Specifically, we tried two sets of loan modification variables. The first set of variables focuses on the level of payment relief induced by the loan modification. We were interested in testing how the mortgage payment reduction affects the redefault probability of modified mortgages. By using a set of variables capturing the level of payment relief after the modification, we could determine the sensitivity of the redefault risk to the change in mortgage payment. The second set of variables focuses on the different changes in loan terms. By considering two features of loan modifications—interest rate change and principal change—we constructed four mutually exclusive dummy variables for the combinations of these two characteristics. These dummy variables are *r0p0* for "*rate reduction and principal reduction,*" *r1p0* for "*principal reduction only,*" and *r0p1* for "*rate reduction only*." The variable *r1p1,* "*no rate reduction and no principal reduction,*" which can be roughly regarded as the traditional loan modification, is set as the reference group.

To illustrate the effect of loan modifications on a borrower's monthly mortgage payment obligation, we assume we have a fixed-rate mortgage originated in January 2006 with an original principal of $238,726, the average of our study sample. The interest rate is 8.84 percent annually (0.74 percent monthly), the average of all modified loans in this sample. Therefore, the monthly mortgage payment is $1,893. As of May 2008, the borrower was 90 days delinquent on this mortgage, which means his last payment was in February 2008 and the outstanding balance on his mortgage was $234,878. Under the traditional loan modification structure, the arrearages and the amount to bring the escrow account current will be added to the principal and reamortized over the remaining 331 months. The borrower's new mortgage balance will be $241,827 and his mortgage payment will be $1,953, a 4-percent increase.[13] To lower the borrower's payment (for example, by 10 percent), servicers can either lower the interest rate to 7.33 percent from 8.84 percent, reduce the principal to $210,949, or use a combination of the two. For example, reducing the principal to $223,134 and the rate to 8.20 percent lowers the mortgage payment by 10 percent. A rate reduction to 8.12 percent and a term extension to 40 years can also reduce the payment by 10 percent.

Empirical Results

This section describes the results from the logit regression models. The dependent variable is whether the loan was 30 or more days delinquent or 90 or more days delinquent (and includes those loans that had been foreclosed) as of December 2008, as shown in exhibits 5 and 6, conditional on the loan being modified during the second quarter of 2008. In Model 1, we used

[12] We acknowledge that the current model cannot completely address the endogeneity issue, and that the model can only address the issue with data on borrower updated credit scores, employment status, debt ratios, household income, and other information that servicers collected when underwriting the modification.

[13] The three missed interest payments total $5,187. If we assume that property taxes and insurance together total 3 percent of the original principal annually, then we add another $1,762 to bring the escrow account current, making the total amount due $241,827.

the measures of the change in mortgage payment, and, in Model 2, we tried different types of loan modifications. In exhibit 7, we summarized the predicted redefault rate for different types of loan modifications based on the regression results. In exhibit 8, we further tested the relationship between redefault risk and the level of equity in the property for those modified loans with significant payment relief. We report the estimated coefficients, *p*-values, and marginal effects of different models in the exhibits.

Exhibit 5

Logit Regression of Redefault (30 or More Days)

Parameter	Model 1			Model 2		
	Estimate	P-Value	Marginal Effect	Estimate	P-Value	Marginal Effect
Intercept	– 4.769	0.000		– 5.111	0.000	
FICO score	– 0.003	0.000	– 0.001	– 0.003	0.000	– 0.001
30 or 60 days delinquent when modified	0.488	0.000	0.121	0.489	0.000	0.121
90 or more days delinquent when modified	0.572	0.000	0.141	0.574	0.000	0.141
Times in delinquency in prior 12 months	0.118	0.000	0.029	0.127	0.000	0.031
Loan balance (in log)	0.397	0.000	0.098	0.406	0.000	0.100
Estimated CLTV	0.314	0.054	0.077	0.421	0.011	0.104
ARM	0.184	0.020	0.045	0.203	0.010	0.049
Interest only	0.070	0.203	0.017	0.119	0.030	0.029
Full documentation	– 0.106	0.032	– 0.026	– 0.096	0.052	– 0.024
Home purchase	0.343	0.000	0.084	0.334	0.000	0.082
Unemployment rate	0.058	0.000	0.014	0.052	0.000	0.013
Year 2006	0.123	0.015	0.030	0.156	0.002	0.038
California	0.075	0.334	0.018	0.064	0.407	0.016
Florida	0.330	0.000	0.082	0.318	0.000	0.079
Servicer 1	0.131	0.043	0.032	0.155	0.021	0.038
Servicer 2	0.202	0.002	0.050	0.231	0.000	0.057
Servicer 3	0.030	0.711	0.007	– 0.046	0.555	– 0.011
Servicer 4	– 0.025	0.796	– 0.006	0.087	0.359	0.022
Payment reduced >40%	– 1.052	0.000	– 0.229			
Payment reduced 30.1–40%	– 0.802	0.000	– 0.183			
Payment reduced 20.1–30%	– 0.577	0.000	– 0.136			
Payment reduced 10.1–20%	– 0.470	0.000	– 0.112			
Payment reduced 5.1–10%	– 0.432	0.000	– 0.103			
Payment reduced 1.1–5%	– 0.215	0.064	– 0.052			
Payment same (99%–101%)	0.043	0.557	0.011			
r0p0: Rate and principal reduced				– 0.840	0.000	– 0.189
r0p1: Rate reduced only				– 0.543	0.000	– 0.133
r1p0: Principal reduced only				– 0.420	0.007	– 0.100
Pseudo R-square		0.1520			0.1477	

ARM represents adjustable-rate mortgage. CLTV represents combined loan-to-value ratio.

Note: n=9,693.

Exhibit 6

Logit Regression of Redefault (90 or More Days)

Parameter	Model 1			Model 2		
	Estimate	P-Value	Marginal Effect	Estimate	P-Value	Marginal Effect
Intercept	– 6.344	0.000		– 6.428	0.000	
FICO score	– 0.001	0.026	0.000	– 0.001	0.026	0.000
30 or 60 days delinquent when modified	0.513	0.000	0.098	0.459	0.000	0.088
90 or more days delinquent when modified	0.707	0.000	0.130	0.620	0.000	0.114
Times in delinquency in prior 12 months	0.089	0.000	0.016	0.094	0.000	0.017
Loan balance (in log)	0.329	0.000	0.058	0.340	0.000	0.060
Estimated CLTV	0.490	0.006	0.086	0.585	0.001	0.104
ARM	0.247	0.005	0.041	0.294	0.001	0.049
Interest only	– 0.011	0.862	– 0.002	0.027	0.654	0.005
Full documentation	– 0.168	0.002	– 0.030	– 0.160	0.003	– 0.029
Home purchase	0.410	0.000	0.073	0.407	0.000	0.073
Unemployment rate	0.052	0.000	0.009	0.047	0.001	0.008
Year 2006	0.142	0.013	0.025	0.176	0.002	0.031
California	0.204	0.016	0.037	0.215	0.011	0.039
Florida	0.380	0.000	0.072	0.375	0.000	0.071
Servicer 1	– 0.023	0.755	– 0.004	– 0.049	0.514	– 0.009
Servicer 2	0.161	0.024	0.029	0.226	0.001	0.041
Servicer 3	– 0.078	0.396	– 0.014	– 0.184	0.042	– 0.031
Servicer 4	– 0.204	0.054	– 0.034	– 0.144	0.166	– 0.025
Payment reduced >40%	– 0.884	0.000	– 0.123			
Payment reduced 30.1–40%	– 0.651	0.000	– 0.098			
Payment reduced 20.1–30%	– 0.523	0.000	– 0.082			
Payment reduced 10.1–20%	– 0.362	0.000	– 0.059			
Payment reduced 5.1–10%	– 0.300	0.007	– 0.049			
Payment reduced 1.1–5%	– 0.151	0.222	– 0.026			
Payment same (99%–101%)	0.347	0.000	0.064			
r0p0: Rate and principal reduced				– 0.776	0.000	– 0.113
r0p1: Rate reduced only				– 0.517	0.000	– 0.092
r1p0: Principal reduced only				– 0.179	0.291	– 0.030
Pseudo R-square		0.103			0.0971	

ARM represents adjustable-rate mortgage. CLTV represents combined loan-to-value ratio.

Note: n=9,693.

Exhibit 7

Predicted Redefault (90 or More Days) Rate and Type of Modifications

	No Payment Reduction (%)	5.1–10% Payment Reduction (%)	10.1–20% Payment Reduction (%)	20.1–30% Payment Reduction (%)
Rate reduction only	39.44	32.59	31.25	27.88
Rate reduction and principal reduction	39.44	31.98	30.32	26.60
Principal reduction only	39.44	31.62	29.64	25.58

Notes: Estimation is based on the results of Model 1 in exhibit 6. Estimation is for an average borrower holding a 30-year home purchase mortgage originated in January 2006 with an adjustable interest rate of 8.84 percent in the second quarter of 2008. The original loan amount is $238,726. The property is not in California or Florida and not served by the major four servicers. The loan has an average value for other regressors.

Exhibit 8

Logit Regression of Redefault for Modifications With Significant Payment Reduction

Parameter	30 or More Days			90 or More Days		
	Estimate	P-Value	Marginal Effect	Estimate	P-Value	Marginal Effect
Intercept	– 4.669	0.000		– 5.796	0.000	
FICO score	– 0.002	0.002	– 0.001	– 0.001	0.320	0.000
30 or 60 days delinquent when modified	0.437	0.000	0.103	0.309	0.013	0.046
90 or more days delinquent when modified	0.762	0.000	0.177	0.652	0.000	0.097
Times in delinquency in prior 12 months	0.105	0.000	0.024	0.097	0.000	0.014
Loan balance (in log)	0.309	0.000	0.070	0.274	0.000	0.038
ARM	0.142	0.272	0.032	0.079	0.611	0.011
Interest only	0.073	0.362	0.017	0.083	0.387	0.012
Full documentation	– 0.037	0.606	– 0.008	– 0.049	0.559	– 0.007
Home purchase	0.254	0.000	0.058	0.305	0.000	0.043
Unemployment rate	0.054	0.000	0.012	0.068	0.000	0.010
Year 2006	– 0.027	0.696	– 0.006	– 0.088	0.281	– 0.012
Servicer 1	0.163	0.058	0.037	– 0.087	0.393	– 0.012
Servicer 2	– 0.181	0.127	– 0.040	– 0.210	0.125	– 0.028
Servicer 3	– 0.106	0.298	– 0.024	– 0.326	0.010	– 0.043
Servicer 4	– 0.030	0.862	– 0.007	– 0.059	0.773	– 0.008
Estimated CLTV 70–79.9%	0.167	0.189	0.038	0.083	0.595	0.012
Estimated CLTV 80–89.9%	0.319	0.010	0.074	0.175	0.244	0.025
Estimated CLTV 90–94.9%	0.344	0.020	0.081	0.356	0.144	0.055
Estimated CLTV 95–99.9%	0.406	0.006	0.096	0.275	0.129	0.041
Estimated CLTV ≥100%	0.304	0.024	0.070	0.300	0.063	0.044
Pseudo R-square		0.1255			0.0708	

ARM represents adjustable-rate mortgage. CLTV represents combined loan-to-value ratio.

Note: n=4,757.

Redefault Risk and Payment Relief

Relative to a modification with an increased mortgage payment, a loan modification that lowers the mortgage payment by at least 5 percent can significantly lower the redefault risk. Based on Model 1 in exhibit 5, the estimated 6-month redefault rate for an average borrower will be about 55.6 percent if the mortgage payment is increased. As exhibit 5 shows, a modification reducing the borrower's payment by just 5.1 to 10 percent lowers the probability of redefault (30 or more days) by 10.3 percent compared with a modification with an increased mortgage payment. If the payment is lowered by 30.1 to 40 percent, the probability of redefault is more than 18 percent lower. As expected, when redefault is measured by 90+day delinquency, the results are consistent but the magnitude of the effect is less. Overall, the results indicate that modifications that reduce the borrower's monthly payment reduce the redefault rate. This finding suggests that the key component of a successful loan modification is whether the modification is able to reduce the mortgage payments enough to be truly affordable to the borrowers.[14]

To illustrate the effect of payment relief on redefault rate, we estimated the 6-month, 90+day delinquency probability for an average nonprime borrower who was 90 or more days delinquent as of May 2008. As exhibit 7 shows, when the mortgage payment is reduced by 5.1 to 10 percent by lowering the interest rate, the probability of a 90+day delinquency drops from more than 39 percent to 33 percent. And if the payment is cut by 20.1 to 30 percent, the 90+day redefault rate drops further to about 28 percent.

Because a loan modification with a principal reduction can also reduce the LTV ratio, such a modification has an even lower redefault rate, even when it results in the same level of mortgage payment. Among all approaches that can lower the payment by 5.1 to 10 percent, the redefault rate for a modification based on a principal reduction is 0.9 percent lower than for one based on an interest rate cut. When the payment is reduced by 20.1 to 30 percent, the redefault rate of a principal-reduction modification is 2.2 percent lower than that of a rate-reduction modification. The difference in the redefault rate seems modest, likely because we used a continuous LTV variable; in reality, however, the effect of loan to value on default may be nonlinear. We revisit this issue later in this section.

Redefault Risk and Different Types of Modifications

Conditional on being modified, a loan with a reduced interest rate, a reduced principal, or both is less likely to redefault, relative to a loan modification in which neither the principal nor the interest rate is reduced. In the latter, a loan is modified either by extending the loan term or by adding the unpaid interest and escrow payment to the total loan balance, which usually results in an increased mortgage payment. As exhibit 5 shows, the coefficients of three loan modification dummies (*r0p0*, *r0p1,* and *r1p0*) are consistently negative and significant. The effects are large: after controlling for other variables, a combination of principal reduction and rate reduction lowers the

[14] One caveat is that the findings are based on the assumption that borrowers have similar income level. Because borrowers' income information is missing in the data set, it is difficult to precisely identify the level of payment relief that is truly affordable for different borrowers.

probability of redefault by 19 percent. When the modification involves a rate reduction only, the probability of redefault is lowered by 13 percent. The principal reduction itself has a similar effect but the magnitude is slightly smaller (10 percent). The results are generally robust enough when we use the 90+day delinquency as the outcome variable, except that the principal-reduction group (*r1p0*) becomes insignificant.

Although it seems the combination of principal reduction and rate reduction is more effective in reducing the redefault rate, we cannot conclude on the relative effectiveness of different loan modifications here, because these variables do not account for the magnitude of the rate reduction or principal reduction. For example, if the level of principal reduction has been marginal, as in this case, it is reasonable to expect that the effect of the principal-reduction modification would be quite small. The evidence supports the view, however, that the type of loan modification has substantial effect on the performance of modified loans and that modifications need to be tailored to the particular borrower based on household and product characteristics.

Redefault Risk and Home Equity

In the short run, the principal reduction may influence the performance of modified loans by lowering both the mortgage payment and the total debt. Because the results suggest that redefault risk will be significantly lower if the mortgage payment is reduced by at least 5 percent, we examined the effect of home equity on redefault risk for those loans with significant payment relief (exhibit 7). Instead of using a continuous variable, we ran a separate regression in which the LTV ratio was coded into buckets for all modified loans with a 5-percent or more reduction in the mortgage payments. When we used 30+day delinquency as the measure of default, the results suggest the equity in the home does matter. Relative to borrowers with substantial equity in the property (with estimated LTV ratios of less than 70 percent), borrowers with less equity or negative equity in the property are more likely to default (most coefficients are significant at the 0.05 level, except the coefficient with estimated LTV ratios of 70 to 80 percent).

When we used serious delinquency (90 or more days) as the measure of default, only borrowers with negative equity remain significantly more likely to default (significant at the 0.1 level). This finding suggests households with less or negative equity in the property are more likely to redefault even when the modifications lower their mortgage payments. They usually would not default (foreclosure or serious delinquency), however, unless they had negative equity. In fact, according to the option-based theory of default, as long as the equity in the home is negative, the option to default remains in the money (see, for example, Foster and Van Order, 1984), and borrowers will be more likely to default when confronting a crisis. Further studies are needed to identify the effect of home equity on the long-term performance of the modified loans.

Results of Other Controls

Across all models in exhibits 5, 6, and 8, the sign and significance of the coefficients of other variables are generally as we expected. Loans originated with less than full documentation, ARMs, and home-purchase mortgages are more likely to redefault. Nonprime purchase mortgages originated during the peak of the subprime bubble seem to have a very high risk of redefaulting.

As expected, early intervention seems to result in lower redefault risks. Relative to borrowers who are current on their mortgage payment, those whose loans were modified after only one or two missed payments are 12 percent more likely to default compared with 14 percent for those whose modifications occurred after three or more missed payments (Model 1 in exhibit 5). The results suggest that loans should be modified as early as possible after a missed payment; ideally, serious consideration should be given to modifying loans preemptively.

Local economic conditions are a crucial factor affecting the ability of borrowers to meet their debt obligations, even after a loan modification. The local unemployment rate is a significant predictor of redefault in all models, with redefault rates higher in places with a high unemployment rate: a 1-percent increase in the area unemployment rate increases the probability of redefault by about 1.4 percent.

Consistent with findings elsewhere, market and servicing seem to matter. Loans in Florida, those serviced by Servicer 2, and those originated in 2006 are more likely to redefault after being modified, even after controlling for important determinants.

Conclusions

Confronted with the worst financial and economic crisis in decades, government and industry are considering strategies to deal with the flood of home foreclosures. One promising strategy is to modify mortgage loans so that borrowers can remain in their homes. Unfortunately, scant evidence exists regarding the effectiveness of loan modifications, and the evidence that does exist suggests a high rate of recidivism. In this article, we examine the relationship between postmodification redefault rates and different types of loan modifications. We attempt to identify those modifications that work and those that are more likely to lead to redefault. Findings show that, in general, the greater the reduction in the mortgage payment, the lower the redefault risk. Unfortunately, this finding is contrary to many practices in the industry. According to White (2008), most loan modifications do not lead to lower payments; in fact, many result in higher payments and higher balances because traditional modifications add the payments owed plus any penalties and fees to the outstanding balance without changing other terms of the loan. In contrast, to successfully enable troubled homeowners to meet their obligations, loan modifications need to reduce a mortgage payment enough to make it truly sustainable.

Moreover, the findings show an even lower level of redefault when payment reduction is accompanied by principal reduction. Among the different types of modifications, the principal forgiveness modification has the lowest redefault rate, most likely because it addresses both the short-term issue of mortgage payment affordability and the longer term problem of negative equity. The results indicate that households with negative home equity are more likely to redefault over time, even when a modification has initially lowered the mortgage payment. More significant loan restructuring or refinancing may be needed to minimize redefault risks for these loans. This finding is consistent with current efforts to include principal reduction when modifying loans.

One caveat is that the redefault rate is only one measure for the success of loan modifications. The optimal loss mitigation solution should be in the collective interests of borrowers, investors, and other stakeholders. Although loan modifications that can lower the redefault risk more than other

modifications are ideal for borrowers, servicers have fiduciary responsibilities to the bondholders who own the mortgages to maximize their net present value. If the costs related to the loan modifications outweigh the benefits from the reduced foreclosures, foreclosure may be the better option for the lender. Considering the huge social and economic costs of foreclosures on the borrower, neighborhood, community, and the entire economy, however, a study focusing on how to minimize the redefault risk has its own merit.

Overall, the findings in this study illustrate that not all modifications are created equal. The industry clearly needs standards and directives for making more modifications and for making those modifications more sustainable than they are in the current practice. To the extent practicable, modifications need to be tailored to the particular conditions of the borrower, loan product, and market. Because this study relies on data from one particular quarter and because the study observed the short-term performance of modified loans only, further research is needed to verify these findings to see whether the conclusions hold for modifications in different time periods, for modifications of different types of mortgages, and after controlling for borrowers' income levels. Further studies are also needed to answer questions such as these: What is the level that makes a modified loan "truly affordable"? What is the ideal combination of principal reduction and rate reduction for achieving this affordable level? How can we develop guidelines to better tailor modifications to the particulars of individual borrowers in specific housing markets?

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Closing Gaps in Local Housing Recovery Planning for Disadvantaged Displaced Households

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Abstract

Severe hurricane disaster events can leave the most vulnerable and disadvantaged households of a community displaced and in limbo for several years following the storm. Long-term recovery coalitions and committees with roots in voluntary nonprofit and faith-based organizations are springing up nationwide to fill unmet needs of displaced households after local, state, and federal agencies have completed their initial recovery missions. In South Florida, Broward County's recovery experience following Category 1 Hurricane Wilma in 2005 demonstrated the valuable role that these coalitions play in reintegrating displaced households into strong, recovering communities. Scaling this success to deal with severe and damaging storms that displace far more disadvantaged households requires a coordinated predisaster recovery planning framework. Long-term recovery coalitions, as currently structured, cannot design such planning frameworks. In this article, the authors make the case for a more formal independent planning agency dedicated to integrating coordinated housing recovery scenarios and priorities into municipal comprehensive plans as they evolve.

Introduction

In 2005, the same year that Category 1 Hurricane Wilma displaced more than 2,000 households in Broward County, Florida, Category 3 Hurricane Katrina struck the U.S. Gulf Coast, leading to a sustained drop in the New Orleans population of more than 50 percent—from 450,000 to

less than 200,000 (Brown, 2006; Weeks, 2006). More than 1 year later, while Broward County struggled to help the 200 or so remaining displaced households, approximately 37,700 Federal Emergency Management Agency (FEMA) trailers still housed more than 100,000 New Orleans residents (FEMA, 2006). An estimated 250,000 Gulf Coast residents had dispersed to permanent homes throughout the United States away from the coast (Brown, 2006). Three years later, in 2008, interviews conducted with a diverse set of housing professionals indicated that almost all Broward County residents displaced by Hurricane Wilma had new homes, while 9,500 New Orleans families were still working to facilitate a transition out of their temporary housing (FEMA, 2008). Despite the severity difference, juxtaposing these two disaster events suggests common gaps in housing recovery planning that leave a community's most vulnerable and disadvantaged households displaced from their prestorm homes and in limbo for several years after the event.

This article characterizes predisaster and postdisaster gaps in local housing recovery planning. The findings are developed primarily from some of the successes and challenges experienced by Broward County's long-term recovery coalition and from planning research reported for Hurricane Katrina. From this information, the article then offers specific recommendations that regions at risk from hurricanes might employ to avoid postdisaster recovery planning delays and procurement shortfalls.

The authors gathered information for this article during interviews with professionals from federal, county, municipal, and nonprofit agencies. All these entities were directly involved with helping Broward County's disadvantaged displaced households find permanent housing following Hurricane Wilma in 2005. The authors also reviewed existing disaster recovery plans for Broward County and several Broward municipalities.

Gaps in Predisaster and Postdisaster Local Housing Recovery Planning

The research described in this article suggests that these planning-related gaps fall into three basic categories. First, coordinated predisaster recovery plans and frameworks at the municipal and county levels remain essentially undeveloped. Without such frameworks, pledges for recovery funding will remain out of sync with approved recovery plans and allocation of funds. Consequently, displaced households that have the most difficulty independently reestablishing homes in the community after the storm run the risk of losing all housing options as time limits run out on public housing disaster funds.

Second, the interviews conducted during the research suggest a fundamental misunderstanding within the municipal professional planning community of the potential number, socioeconomic profile, and specific locations of disadvantaged households that will remain locally in housing limbo after a severe storm. Deriving this type of household information for municipal and county planners within high-risk impact areas may generate "the prerequisite awareness needed for group mobilization" (Paterson, 1998). Without an understanding of the potential size of this displacement problem, local planning agencies run the risk of not addressing large-scale migrations of disadvantaged households from, or even into, their community following a severe hurricane. There

is also a missed opportunity to integrate preferred regional housing recovery options into local comprehensive plans.

Third, the role of long-term, postdisaster housing recovery planning has defaulted to newly emerging recovery entities that are not designed to plan. Long-term recovery coalitions and committees with roots in voluntary nonprofit and faith-based organizations have sprung up to fill unmet needs of displaced households after local, state, and federal agencies have completed their initial recovery missions. These long-term community recovery coalitions and committees, recommended by FEMA, integrate resources from private business, nongovernmental organizations (NGOs), and government agencies to organize and manage a recovery process only after a disaster has struck (FEMA, 2005). In South Florida, Broward County's recovery experience with Category 1 Hurricane Wilma in 2005 demonstrated the valuable role these coalitions can play in reintegrating disadvantaged households into strong, recovering communities. Scaling this success, however, to deal with more locally severe and damaging storms that displace far more disadvantaged households requires predisaster coordinated recovery planning frameworks that these coalitions, as currently structured, cannot be expected to design.

The following section of the article describes the study area and its broader relevance to other metropolitan coastal areas at risk from hurricanes. This section is followed by an explication of the Disadvantaged Displaced Household (DDH) terminology used throughout the article. Three subsequent sections provide specific details about three gaps in predisaster and postdisaster local housing recovery planning: (1) obtaining the "prerequisite awareness" of the DDH problem from estimates and counts, (2) identifying the characteristics of a coordinated predisaster planning framework, and (3) extending the local recovery coalition model. The final section then offers recommendations for closing these gaps with an independent planning agency dedicated to integrating coordinated recovery scenarios and priorities into municipal comprehensive plans as they evolve.

The Study Area and Its Broader Relevance

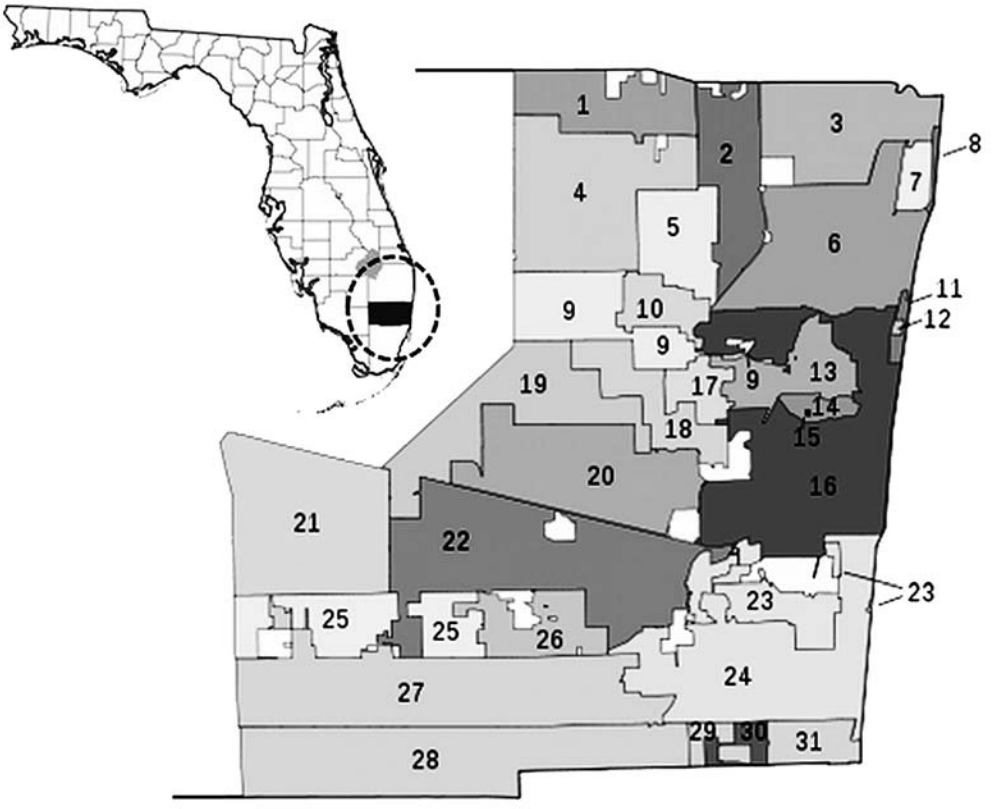
The southeast coast of Florida has one of the highest probabilities (~1 in 4 probability) of experiencing at least a Category 1 hurricane strike in any given year (Jagger, Elsner, and Niu, 2001). According to the National Oceanic and Atmospheric Administration "Hurricane Strikes" website,[1] the Southeast Florida region was impacted by 26 of the 158 total hurricanes that made landfall along the U.S. Atlantic and Gulf coasts from 1900 through 1996. Of these storms, 11 were Category 3 or greater strength on the Saffir-Simpson Hurricane Scale. Since 2004, 5 additional significant storms have hit Southeast Florida: Charley, Frances, Jeanne, Katrina (before the Gulf Coast hit), and Wilma.

Broward County is located on the southeast coast of Florida approximately 30 miles north of Miami. The county includes 31 separate incorporated municipalities located primarily in the eastern section adjacent to the coast (exhibit 1). According to 2006 Census Bureau estimates, the total population and number of households are 1.77 million people and 706,000 households, respectively.

[1] See http://www.publicaffairs.noaa.gov/strikesstates.html.

Exhibit 1

Broward County and Its Municipalities, Located in Southeast Florida



1. City of Parkland
2. City of Coconut Creek
3. City of Deerfield Beach
4. City of Coral Springs
5. City of Margate
6. City of Pompano Beach
7. City of Lighthouse Point
8. Town of Hillsboro Beach
9. City of Tamarac
10. City of North Lauderdale
11. Town of Lauderdale-by-the-Sea
12. Village of Sea Ranch Lakes
13. City of Oakland Park
14. City of Wilton Manors
15. Village of Lazy Lake
16. City of Fort Lauderdale
17. City of Lauderdale Lakes
18. City of Lauderhill
19. City of Sunrise
20. City of Plantation
21. City of Weston
22. Town of Davie
23. City of Dania Beach
24. City of Hollywood
25. Town of Southwest Ranches
26. City of Cooper City
27. City of Pembroke Pines
28. City of Miramar
29. City of West Park
30. Town of Pembroke Park
31. City of Hallandale Beach

In addition to the hurricanes that have directly affected Broward County, some nearby severe hurricane strikes have indirectly affected the county. In 1992, Hurricane Andrew struck adjacent southern Miami-Dade County, destroying more than 40,000 homes (Peacock, Morrow, and Gladwin, 1997) and leaving more than 80,000 people unemployed (Hartwig, 2002). The devastation from the 145-mile-per-hour storm instigated an unanticipated housing rush as displaced

households migrated north to reestablish their lives. Just as southern Miami-Dade communities were unprepared to assist residents with the significant challenges delivered with the storm and, therefore, lost residents to Broward County (Benedick, 2002), Broward County was similarly unprepared with urban growth plans to receive these displaced households. The 30-percent increase in Broward County's population over the next 10 years, driven in part by the migrations from Miami-Dade County, rapidly transformed sparsely developed, rural western Broward County into a sprawling suburb with little remaining vacant land. Major spikes in home prices, driven by high demand and a shrinking supply of homes, accompanied the migration. A post-Hurricane Andrew study of one Miami-Dade working class community immediately following the 1992 hurricane and then again a decade later (in 2003) highlighted the lingering "deep-seated impacts on many households" that lacked the resources to rebuild locally after the storm (Dash et al., 2007; Peacock, Morrow, and Gladwin, 1997).

Broward County has had a unique experience with storm-related housing issues: historically, as a receiving area in 1992 with Hurricane Andrew and, more recently, as an area of direct impact from Hurricane Wilma in 2005. The county's experience, therefore, makes it an ideal candidate for evaluating the state of local disaster housing recovery planning. Furthermore, Broward's use of the Long-Term Recovery Committee (LTRC) model, based on FEMA's Long-Term Community Recovery Planning Process (FEMA, 2005) after Hurricane Wilma came ashore, can offer valuable insights into the utility of this model in other communities. Such recovery committees have formed in local communities throughout the country[2] in the past 4 years in response to hurricanes, floods, and wildfires.

Disadvantaged Displaced Households Defined

The severity of a hurricane is certainly relevant to predicting overall counts of displaced households. Severe physical damage potential, however, does not necessarily translate into a large number of *disadvantaged* displaced households. Beyond the physical damage to a household, vulnerability to displacement risk is largely informed by measures related to "social inequalities" (Cutter and Emrich, 2006: 103). Key variables that appear consistently in the literature include low-income/poverty levels, density of the built environment, age (median age greater than 65 years or any children less than 5 years), number of mobile homes, percentage of immigrant and/or nonnative speakers, race, and single-sector economic dependence (such as farming or tourism) (Chakraborty, Tobin, and Montz, 2005; Cutter, Boruff, and Shirley, 2003).

For the purposes of this article, DDH is the subset of displaced households expected to need additional coordinated assistance to reestablish a permanent household in their community after storm-related public assistance program options (via FEMA housing, FEMA grants, and/or Small Business Administration [SBA] loans) expire or are exhausted. In contrast, most non-DDHs are expected to have sufficient independent means (via insurance, savings, family assistance, etc.) to make this transition.

[2] Long-term recovery committees (also referred to as long-term recovery organizations and long-term recovery coalitions) are in Pasadena, California; Puerto Rico; Texas; and counties throughout Florida.

Quantifying DDHs—Closing the Local Awareness Gap

The Florida Catastrophic Planning (FLCP) Initiative (http://www.floridadisaster.org/CatastrophicPlanning/) uses similar socioeconomic characteristics to define vulnerable population segments for a Category 5 hurricane scenario ("Hurricane Ono"). Included in the project's "Consequences" document (Florida Division of Emergency Management, 2008) are estimates of expected counts of damaged homes (derived from the FEMA HAZUS model) and statistics on "vulnerable and special needs" households. Although statistics at a county level are discussed, specific municipal locations for these populations have not been explicitly noted in project publications. The worst-case Category 5 Ono storm scenario predicts that, of the 706,000 households in Broward County, more than 90 percent will experience major damage or complete destruction, and the storm will potentially displace more than 1.3 million people. The huge scope of the Hurricane Ono project, although important, does not address less catastrophic storms that still have a severe localized impact.

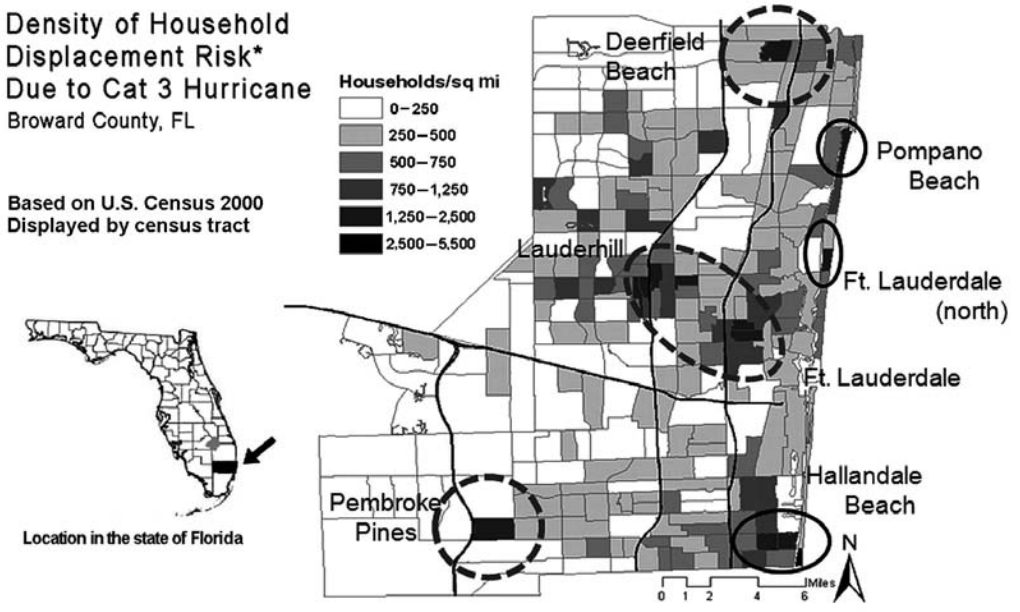
The lack of coordinated municipal planning to address DDHs expected from severe storms may, in part, derive from a lack of awareness (Paterson, 1998) related to the size of the potential problem at the local level (Levine, Esnard, and Sapat, 2007). In an effort to close the local awareness gap, Welsh (2008) developed a simplified model to estimate the density and locations of socially vulnerable households at risk to displacement (that is, DDHs) for the 279 census tracts within Broward County. The model accounted for (1) location, hurricane surge, and wind strength (assuming a uniform Category 3 storm) and (2) a set of socioeconomic census variables similar to those used by the FLCP initiative and in Cutter and Emrich's (2006) coastal risk analysis. To obtain the disadvantaged subset, the model heavily weighted households with an annual income of less than $15,000 and then added an adjusted aggregate of households with residents who are younger than 18 years or older than 65 years, racial minorities, renters, and workers in service or agricultural occupations.

The model results highlighted that many of the areas with high densities of potential DDHs are well inland from the coast (exhibit 2). Locations have high displacement risk potential for a combination of reasons. Three high-risk areas along the coast—Hallandale, Fort Lauderdale, and Pompano—have risk factors that include densely built areas, high concentrations of low-income households (incomes less than $15,000 annually), and significant numbers of households with service industry occupations. By contrast, the Pembroke Pines region also has a high-density factor, but with a high concentration of households with residents older than 65 years of age.

Exhibit 3 provides a summary of actual DDH count estimates for a subset of Broward municipalities (defined by groups of census tracts) and emphasizes the potentially large scale of the DDH problem that can occur from a storm the size of a Category 3 hurricane. Using only the inland Pembroke Pines municipality as an example, the model estimates 7,341 (13.3 percent) DDHs from a Category 3 storm (exhibit 3). When comparing the displacements from a Category 3 storm with the more-than-200 displacements across the entire county from Category 1 Hurricane Wilma, the authors could easily surmise that the local impact from a Category 3 storm will require *dramatically* more resources, planning, and coordination to facilitate the transition of such a large number of households to permanent homes. To address the planning framework expected to support these high numbers and percentages, this article examines lessons learned in New Orleans from Hurricane Katrina.

Exhibit 2

Distribution and Density of Disadvantaged Displaced Households in Broward County, Florida



** Based on a combination of physical and social vulnerability factors.*

Sources: Welsh (2008); www.2.census.gov/census_2000/datasets/Summary_File_3/Florida

Exhibit 3

Ratio of Potential Displaced Households to Total Households for Sample Municipalities in Broward County, Florida

Broward County Municipality	Census Tracts in City	Area (sq mi)	Total Households	Density of Displaced Households per sq mi (mapped)	Number of Households With High Displacement Potential	Ratio of Displaced Households per Total Households (%)
Fort Lauderdale	32	28.3	69,412	533	15,063	21.7
Pembroke Pines	18	47.3	55,199	155	7,341	13.3
Pompano Beach	14	20.5	36,953	350	7,165	19.4
Deerfield Beach	12	15.1	32,844	457	6,914	21.1
Hallandale Beach	7	5.0	19,180	1,212	6,101	31.8
Davie	12	36.8	28,657	126	4,655	16.2
Lauderhill	10	6.9	22,951	651	4,513	19.7
North Lauderdale	4	3.7	11,527	556	2,075	18.0

Source: Modified from Welsh (2008)

Lessons From Hurricane Katrina: Closing the Predisaster Planning Gap

In the months—and then years—following the landfall of Hurricane Katrina in 2005, New Orleans officials found themselves working through recovery delays driven in large part by three separate time-consuming, politically charged, postdisaster planning iterations. According to Olshansky et al. (2008: 275), the first "politically poisonous" recovery plan, created by the Urban Land Institute, failed to incorporate community input from many socially vulnerable areas of the city. The second, more community-driven plans, orchestrated by the Lambert Advisory LLC, eluded success by not coordinating with the City Planning Commission and the Board of Directors of the Governor's Louisiana Recovery Authority (LRA), which managed recovery funding (Olshansky, 2006). The final "Unified New Orleans Plan" added substantial input from widely dispersed community residents, included recovery scenario preferences, and offered a prioritized list of recovery projects specific to city districts. In late May/early June 2007, almost 2 years following the storm, that final plan obtained approval from the local planning commission and LRA, which began the flow of recovery funds.

Research by Olshansky et al. (2008) underscores a key ingredient that New Orleans was missing: an agreed-upon planning recovery framework established *before* the storm that would enable the city to quickly procure federal funds for reconstruction. More specifically, the lack of a plan focused on vulnerable household recovery left thousands of New Orleans DDHs in long-term limbo. In essence, the community was missing a "plan to plan" (Nelson, Ehrenfeucht, and Laska, 2007) that could offset the intense time pressure to rebuild something *now*, regardless of its future resiliency or community support. The New Orleans experience highlighted a need for a planning framework that included preferred recovery scenarios and project prioritizations derived with coordinated community consensus (Olshansky, 2006; Olshansky et al., 2008). The results also demonstrated that such planning frameworks require the kind of time and coordination available only before any disaster, when controversial decisions, especially those related to socially vulnerable populations, can be made without postdisaster pressure to act (Nelson, Ehrenfeucht, and Laska, 2007; Olshansky et al., 2008).

Furthermore, a predisaster planning framework offers opportunities to develop mitigation strategies that can leverage community assets in ways that counterbalance social inequities and accelerate a local area's disaster recovery time (Berke et al., 1993; Burby, 1998; Schwab et al., 1998; Simpson, 2006). In general, the same variables that contribute to the day-to-day sustainable nature of a community also contribute to its disaster resiliency (Heinz Center, 2002). Simpson (2006) and the Heinz Center (2002) suggest that risk factors (including displacement risk factors) can be affected by such things as community disaster-awareness training programs, economic incentives for private and business mitigation (for example, hurricane shutters, business continuity plans), and funded community disaster simulation exercises. And, finally, predisaster plans can focus public attention and debate on the mitigation and recovery issues related to existing housing developments in high-risk areas. Predisaster planning gives communities the chance, before a storm occurs, to participate in decisions that prioritize the reconfiguration of these existing high-risk developments (Schwab et al., 1998) while simultaneously identifying potential "sending zone" options that would be used to permanently relocate these homes (Berke and Campanella, 2006).

The Hurricane Katrina experience demonstrated that the National Response Plan (NRP) in place at the time missed this important "sending zone" concept specifically related to household displacement. The NRP lacked any methodology, preparation, or baseline metrics for managing displaced populations and also lacked a relocation plan for the displacement of a large urban population center. No scenario played out within the NRP that considered the possibility of an entire region losing its infrastructure and grid connectivity. As Mohr et al. (2008) pointed out, the NRP assumed that another city or large population center nearby could temporarily absorb a displaced population. Hurricane Katrina exposed the flaws within this assumption. Ongoing research points to the example of the large number of socially disadvantaged households that still have not returned home following Hurricane Katrina as the basis for the need to identify and prepare for similar long-term displacements in other hurricane-prone regions (Levine, Esnard, and Sapat, 2007).

Fortunately, Hurricane Katrina's lessons may be providing a new model, albeit imperfect, for postdisaster planning solutions. Olshansky et al. (2008), in their analysis of post-Hurricane Katrina recovery planning, identified how federal-level funding hurdles had to be (and are still being) locally overcome and highlighted the important role that the LRA is now playing. The governor-mandated LRA board derives its success from (1) serving as a central conduit for the multitude of federal funding sources, (2) including members with diverse expertise from areas throughout the geographic region, and (3) acting as a policy body to form procedural frameworks for disaster recovery (Olshansky et al., 2008).

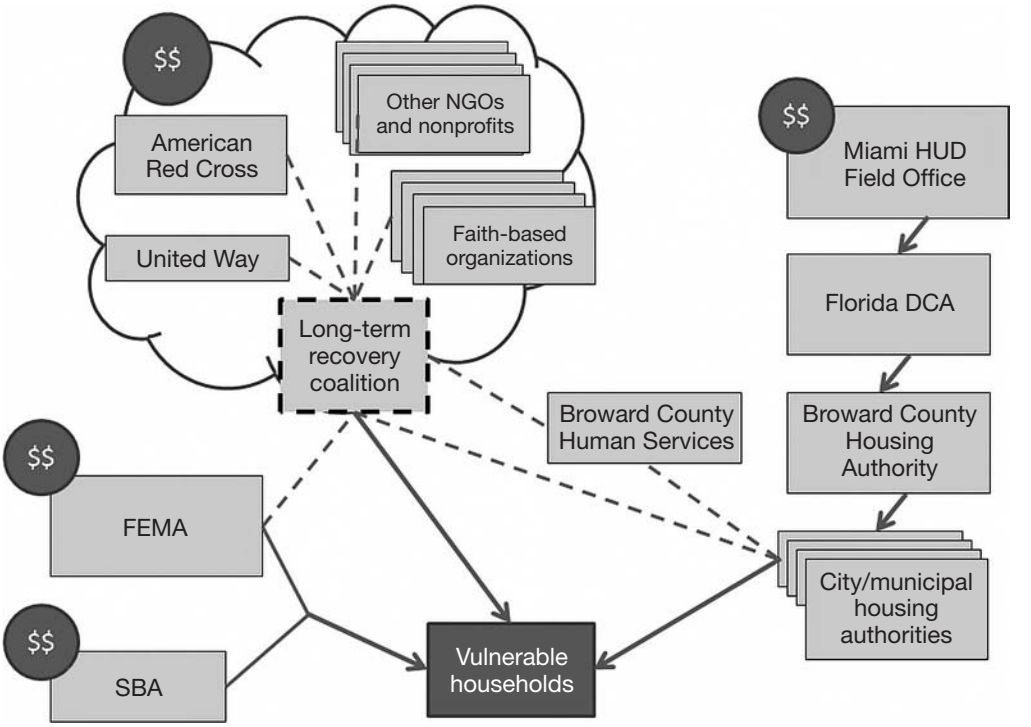
Lessons From Hurricane Wilma: Closing the Planning Agency Gap

Two successful elements from the Louisiana postdisaster planning experiences, and from the LRA model in particular, are reflected in the recovery approaches that Broward County used to reestablish its more-than-200 DDHs after Hurricane Wilma's destruction. The Broward County LTRC, like the LRA, brought diverse members from the public and private NGO community together, and the committee acted as a coordinator for funds associated with helping DDHs make the transition to permanent homes. The LTRC, operating with private grant funds under the umbrella of the United Way 501(c)(3), coordinated with FEMA, multiple private and faith-based NGOs, the Broward County Human Services office, and a municipal housing agency to complete the transitions. It is important to note that FEMA has begun to promote similar LTRCs for any community at risk from a significant disaster event through its Long-Term Community Recovery Program.

Exhibit 4 offers a conceptual framework for the complex array of agencies that were actually involved with the LTRC efforts to help the more-than-200 DDHs make the transition to permanent homes. Note that vulnerable households have direct access to at least three sources for disaster-related assistance: FEMA grants or SBA loans (depending on household income qualifications), disaster-related U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant (CDBG) funds available through municipal housing authorities, and private grant funding from private NGOs.

Exhibit 4

The Complex Web of Postdisaster Housing Funds



DCA = Department of Community Affairs. FEMA = Federal Emergency Management Agency. HUD = U.S. Department of Housing and Urban Development. NGOs = nongovernmental organizations. SBA = Small Business Administration.

The interviews conducted during the research highlighted that one of the most significant challenges for DDHs was obtaining the funds to reestablish their homes. Without coordinated assistance from the LTRC, a DDH would have needed to independently navigate the FEMA/SBA decision tree and/or apply for CDBG assistance through its local municipality. FEMA grant requests may result in a potentially confusing denial response that redirects applicants to a separate SBA application process based on their household income. In addition, CDBG applications to the city can require procurement approval from three additional layers of government: county, state, and local HUD offices. Although additional services and NGO funds were available through case management with the American Red Cross, it is not difficult to understand how the independent case management system organized by FEMA[3] resulted in more than 200 households still looking for a permanent housing solution 15 months after the storm.

The LTRC solution, encouraged by FEMA, solved two problems. As an umbrella organization under the private 501(c)(3) of the United Way, the LTRC brought together diverse case manage-

[3] FEMA is restricted by national Stafford Act privacy issues from sharing some pertinent personal DDH information with county Human Services case managers.

ment information from the multiple NGOs, the county, and especially FEMA, which is permitted to share private "routine use" information with NGOs. As an agency that coordinated with federal, county, municipal, NGO, and faith-based organizations, the LTRC was empowered with information to act as a fair coordinator for the diverse sources of public and private funds available to help the remaining DDHs make the transition into permanent, affordable homes.

Like the LRA, the Broward LTRC acted as both a coordinating entity that brings together diverse players and a coordinator for the diverse funding options available after a storm. None of the LTRC participant organizations, however, is directly associated with private, municipal, or county planning offices. By design, the LTRC maintains only loose coordination among the participants, who meet voluntarily and infrequently in the nonhurricane season, primarily for the purpose of maintaining open channels of communication. Unlike the LRA, however, the crucial third role of a coordinated planning and policy body dedicated to preparing for disaster housing recovery remains elusive.

Without such a body, Broward County's next severe storm could easily lead to year-long planning delays similar to those seen in New Orleans following Hurricane Katrina. The authors believe that the relatively small scope of the Category 1 Hurricane Wilma in Broward County unfortunately allowed most municipalities to completely rely on the coordinated services of the LTRC, the county Human Services department, and isolated local housing authorities to deal with their small number of DDHs. This result almost certainly masked any need to establish municipal growth plans that continuously integrate coordinated preferred poststorm recovery scenarios and housing recovery priorities. Thus, the complex coordinated municipal growth plans that will be needed to accommodate the many thousands of DDHs expected from a severe storm still appear undefined. This planning shortfall, which even an effective LTRC is not designed to resolve, cannot be understated. As Hurricane Katrina demonstrated, politicians and sympathetic news reports can generate huge sums of generically pledged funds. But allocation of those funds to actual recovery projects can occur only when the agreed-upon planning is firmly in place.

If this issue exists in a Florida county such as Broward, where severe storms are routinely expected, the same planning shortfall almost certainly exists in many less-experienced regions along the entire U.S. Altlantic and Gulf coasts. To address this issue, the authors developed a set of recommendations for closing the local recovery planning gap.

Recommendations for Closing Local Recovery Planning Gaps

The recommendations in this article focus on one overriding need for an independent planning agency that would continuously coordinate with municipal planners to integrate preferred recovery scenarios and recovery priorities into county and municipal comprehensive plans as they evolve year after year. This agency would fill the need for developing the "plan to plan." To ensure a more permanent network structure, the agency should operate as a standalone 501(c)(3) organization with a dedicated source of public (federal or state) grant funding. In this way, ongoing coordination among FEMA, HUD, diverse NGOs, county agencies (disaster planning, growth management, Human Services), municipal agencies, and private business can be maintained even if private funding interest dissipates as several years pass without a severe storm. Grant funding could be

potentially obtained through FEMA's Hazard Mitigation Assistance programs, including the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, or Severe Repetitive Loss program (FEMA, 2009).

Specific planning agency tasks would include the following:

1. **Ensure all municipal postdisaster plans reflect best practices of the county and other municipalities.**

   The review of several county municipal comprehensive plans indicates that planning for postdisaster housing recovery has either only just begun or remains completely outside the perceived scope of municipal responsibility. A few municipalities have begun to develop detailed postdisaster policy that specifically addresses how to prioritize funds and streamline code approvals to repair homes and businesses. Most, however, have no dedicated planning staff to address recovery. The Broward County disaster housing plan, for example, addresses short-term accommodations after a storm (hotels, rentals, cruise ships, etc.), but specific planning to address helping DDHs make the transition from temporary to permanent housing after a disaster remains essentially unaddressed at all levels. The new, dedicated 501(c)(3), acting as an independent planning agency, would have an opportunity to accomplish the following:

   a. Ensure that best practices are distributed to all municipalities.

   b. Begin establishing a housing recovery framework within all comprehensive plans.

   c. Potentially foster grant-funding–related collaborations between NGOs and/or between smaller adjacent municipalities that share similar growth visions and recovery hurdles.

   d. Act as a member of a broader coordinating body, possibly grouped within the local HUD office regions, to establish cross-regional recovery frameworks for a wide range of storms—that is, from storms that are only locally severe to storms that affect multiple counties or even the entire state.

   e. Establish memorandums of understanding between county and municipal planning agencies that acknowledge support for established recovery priorities.

2. **Encourage comprehensive plan integration that reflects DDH profiles for a range of storm scenarios.**

   To prevent postdisaster temporary housing from becoming de facto permanent housing solutions, the agency should work across municipalities to encourage comprehensive planning that leverages existing growth management objectives to identify where DDHs could possibly relocate within the county (or adjacent counties). The planning options would also depend on the severity of the storm. Plans should reflect information on the locations and characteristics for a wide range of potential DDH counts to determine how to intelligently relocate certain household profiles. For example, single mothers near schools and elderly households near public transportation and appropriate social/medical support services. Most importantly, priorities for redevelopment and relocation should include ongoing public input from members of the communities affected by the plans.

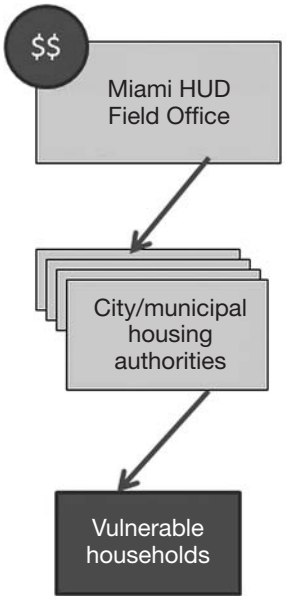
3. Establish clear, streamlined, flexible procurement procedures for disaster-related HUD, private, and NGO grant funds.

Beyond establishing the vision for recovery, plans should serve as the required framework for the spending of recovery funds. In terms of recovery housing for DDHs, gaining access to the largest funding source, HUD disaster-related grants, depends heavily on the ability to meet procurement guidelines. Standard HUD funding procedures **not** related to disasters allow local "HUD-entitled" municipalities (that is, those with identified areas in need of development/redevelopment assistance) to apply directly to the regional HUD office to obtain CDBG funds (exhibit 5). Postdisaster-related CDBG funds from HUD, however, currently require a much more complex fund procurement process that must pass through separate requirements from both the county housing office and the Florida Department of Community Affairs (DCA) (right path on exhibit 4). The interviews revealed that even the 15 HUD-entitled municipalities in Broward County familiar with the application process experienced frustrating delays with the additional bureaucracy imposed by the added county and state procurement layers following Hurricane Wilma. Without some shared education, the other county municipalities lacking any HUD procurement experience will almost certainly experience longer funding delays as they attempt to navigate the procurement learning curve.

By working with municipalities, the county, the DCA, and HUD to streamline procurement processes before the next storm occurs, a dedicated 501(c)(3) planning agency has the opportunity to accelerate disaster fund distribution while simultaneously educating municipal stakeholders to ensure funds can be acquired as quickly as possible. Finally, as part of the streamlining process,

Exhibit 5

HUD's Standard CDBG Procurement Process



CDBG = Community Development Block Grant (program). HUD = U.S. Department of Housing and Urban Development.

the dedicated planning agency should work with HUD to ensure that procured funds are applied as effectively as possible. This effort means ensuring municipal agencies can have flexibility using these funds to respond to specific local circumstances (Olshansky, 2006). Following the devastation brought by Hurricane Wilma, for example, disaster grant funds dedicated exclusively to "hardening of existing structures" restricted the ability of a municipality with a high concentration of mobile homes to fund programs related to moving residents into more resilient, affordable homes.

As an independent 501(c)(3), the dedicated agency would retain the added advantages currently demonstrated by the LTRC: the ability to coordinate funds from a multitude of public, private, and NGO sources and the ability to coordinate loosely with a diverse cross-section of experts from throughout the region to develop innovative solutions to unexpected housing challenges after a severe storm.

Conclusion

Households displaced by Hurricane Andrew contributed to the transformation of rural Broward County into a sprawling suburb after 1992. Yet 16 years later, coordinated housing recovery plans that address the household displacement consequences from severe storms remain elusive. The extensive procurement delays associated with the lack of a preestablished recovery-planning framework in New Orleans after Hurricane Katrina have offered a strong incentive for planners in other high-risk regions to avoid the same mistake. Post-Hurricane Katrina research also suggests that organizations of diverse skilled professionals, which can both "plan to plan" before a storm and then act to coordinate funds after a storm, offer an excellent opportunity to streamline housing recovery.

Interested parties need to look back no further than the Category 3 Hurricane Ike strike on the Texas coast in September 2008 to reiterate the importance of planning before the storm. More than 2 months after the strike, the governor appointed a Commission for Disaster Recovery and Renewal to "create a plan to speed recovery and accelerate economic development." Their initial task: mitigate the housing shortages for the thousands still having difficulty finding alternatives (*Government Technology Magazine,* 2008). The commission's report to the governor was scheduled for June 2009, 9 months after the storm.

In Broward County, the more-than-200 DDHs following Category 1 Hurricane Wilma in 2005 successfully made the transition to permanent homes by 2007 despite the lack of a clear predisaster planning framework. The analysis and research presented in this article indicate *much* larger DDH counts will likely occur throughout the county from a more severe storm. The county, however, suffers from gaps in local recovery planning similar to the problems experienced in New Orleans after Hurricane Katrina washed away entire neighborhoods—and similar to what has recently occurred in Texas. Currently, local planners have essentially abdicated responsibility for facilitating the transition of DDHs from evacuation shelters or interim accommodations to permanent homes. Innovative, ad hoc solutions developed by a coalition composed of FEMA, county human service agencies, and private nonprofit agencies managed to fill this gap for hundreds of DDHs following Hurricane Wilma. But the inherent informal and reactive nature of this ad hoc network highlights missing planning elements that will be necessary to scale this solution to accommodate the thousands of DDHs expected with a more severe storm.

Planners, with core competencies in areas such as land use, housing, transportation, and economic development, have the skills to prepare for the complex recovery challenges posed by these large counts of DDHs. By extending the success of the LTRC network model into a dedicated, formal 501(c)(3) planning agency, planners can begin the ongoing process of defining and integrating best practices, preferred recovery scenarios, and recovery priorities into municipal comprehensive plans. This process should recognize their community's potential to either suddenly lose or receive large numbers of DDHs after a severe hurricane. With a charter to convene with FEMA, HUD, and a complete set of community stakeholders on a regular basis, such an agency can begin building community consensus for a recovery planning framework that addresses the challenges of effectively and efficiently navigating the grant-funding procurement processes needed to reestablish DDHs before the chaos of the next storm.

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Homeownership and Local Voting in Disadvantaged Urban Neighborhoods

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Abstract

Homeownership has long been considered the cornerstone of the American dream, and considerable research has pointed to the social benefits of homeownership for both families and communities. Yet research concerning this link between homeownership and social participation has recently undergone critique for failing to consider neighborhood context. Do homeowners in disadvantaged urban neighborhoods become active participants in neighborhood improvement, or do they feel stuck in undesirable neighborhoods where they perceive little potential for change? The research addresses endogeneity concerns and shows that, when compared with renters, homeowners are more likely to have voted in recent local elections. Neighborhood context does moderate this relationship, with homeowners in disadvantaged neighborhoods being more likely to vote than owners in other areas. These findings suggest that, despite potential household-level costs associated with owning a home in a disadvantaged urban area, responsible homeownership in such areas promotes local political involvement among lower income residents.

Introduction

Recent research has linked homeownership with a variety of beneficial social outcomes, including increased community involvement, more diverse social capital resources, and greater civic engagement (Dietz and Haurin, 2003; Rossi, 1996). Two significant critiques of such studies have emerged, however: one theoretical and one analytical. Because the empirical association between homeownership and positive social outcomes has been undertheorized, few studies have considered whether the benefits of homeownership extend equally to all owners or whether they

are moderated by neighborhood characteristics. It is possible that the strain associated with living in disadvantaged urban neighborhoods could be compounded for homeowners in those areas, who are generally less mobile than renters (Rohe, Van Zandt, and McCarthy, 2000). Homeowners in poor neighborhoods, particularly lower income owners, risk losing their largest source of wealth if their home value declines because they have fewer options to transfer their wealth to a less risky investment by moving to a better neighborhood. Low-income residents are also more dependent on social ties and informal exchange and support networks within their local communities (Stack, 1997), so moving to a different neighborhood extracts both economic and social costs for homeowners, which can take time to recoup. In this study, we evaluate whether homeowners in lower income neighborhoods are more likely to participate in local elections to address these challenges and whether "neighborhood effects" moderate the relationship between homeownership and local voting.

A second, analytical critique of studies on homeownership and social outcomes is that many researchers have failed to account for the self-selectivity of homeowners, leading to bias in analyses comparing social outcomes of homeowners and renters (Aaronson, 2000; Dietz and Haurin, 2003; Rohe, Van Zandt, and McCarthy, 2000). People self-select into homeownership, and the predictors of homeownership are often similar to the predictors associated with local political participation and civic involvement (DiPasquale and Glaeser, 1999). Because this endogeneity exists within the models, attempts to model the effect of homeownership on outcomes such as voting may produce biased results. In past research, it has often been impossible to determine whether homeownership is associated with increased political participation, independent of the predictors common to both outcomes.

In this study, we address both theoretical and analytical concerns by exploring whether homeowners are more likely than renters to vote in local elections and, if so, whether this outcome is realized equally for homeowners in all neighborhoods or whether the association found in previous studies is context dependent. We use a modification of statistical techniques proposed by Dietz and Haurin (2003), discussed in detail later in this article, to account for endogeneity, thus ensuring that our analysis treats the actual effects of homeownership.

Contributions

This study offers three key contributions. First, it addresses unanswered questions about the role of homeownership in promoting local voting among lower income citizens. Urban low-income residents have historically been seen as less politically active or engaged in civic life than other groups due to the relative lack of opportunities for activism in disadvantaged areas (Wilson, 1990). This relative lack of political engagement means that some of the most disadvantaged citizens may be cut off from the local political structures that could afford them increased opportunities. Recent research has indicated, however, that economic disadvantage can spur political activity when people have a sense of collective efficacy and positive past experiences with government (Lawless and Fox, 2001). This study tests whether homeownership increases political engagement—specifically local voting—among lower income citizens. If indeed homeownership does increase voting, our research will provide support for the claim that homeownership can potentially foster democratic participation in disadvantaged urban neighborhoods.

Second, our findings speak to an ongoing debate about the value of encouraging homeownership in disadvantaged areas. Although policymakers have focused on promoting homeownership among lower income families as a means of wealth building, some scholars have recently questioned this position (Shlay, 2006). Rohe, Van Zandt, and McCarthy (2000) argued that neighborhood revitalization efforts aimed at increasing homeownership in disadvantaged neighborhoods can result in homeowners' feeling trapped in depreciating neighborhoods that offer them few opportunities for civic or community involvement. These scholars argued that, although there are clear social benefits to homeownership, insufficient research has been done on the social costs associated with ownership. They wrote, "Future research needs to better identify the circumstances under which ownership leads to both positive and negative outcomes" (Rohe, Van Zandt, and McCarthy 2000: 402). Our research offers empirical evidence as to whether neighborhood disadvantage affects the degree to which homeowners participate in local political activities.

Finally, this analysis uses a method that takes into account the fact that homeownership and political participation share an overlapping set of predictors. We use a bivariate probit model that allows homeownership and political participation to vary jointly with an overlapping set of covariates. We first model homeownership and then use predicted probabilities of homeownership in a second-stage model predicting local voting. This model provides an explicit test of the relationship between homeownership and voting and improves on previous models that have failed to account for endogeneity in this relationship.

Background

A key benefit of a democratic society is the ability of its citizens to participate in their own government. Both social and financial factors explain why lower income homeowners may be more likely to vote than similar renters. First, homeowners have a financial motive to maintain desirable neighborhood and property conditions, because the values of their homes are partially tied to the larger community (Rohe and Stewart, 1996). For this reason, local political participation yields not only quality-of-life benefits but also long-term economic benefits for homeowners. Renters experience the same quality-of-life benefits of political participation but not the economic ones. In fact, one study suggests that as neighborhoods improve as a result of active local political and civic groups, market-rate rents are likely to increase because the neighborhoods become more desirable (DiPasquale and Glaeser, 1999). Improved local amenities and better neighborhood conditions translate to a gain for homeowners as their home values increase but a financial loss for renters as their rents increase.

Second, renters have more flexibility than homeowners to relocate if community conditions become unfavorable. Orbell and Uno (1972) described how people make choices about responding to unfavorable neighborhood conditions. They argued that people have three options: leave the neighborhood, attempt to change the neighborhood, or do nothing. Setting aside the "do nothing" option, the options amount to an "exit or voice" decision (Hirschman, 1970); how do people decide whether to move away or work for change? We argue that homeownership (versus renting) can play an important role in this decision. Homeowners living in declining communities often face substantial barriers to relocating, including difficulty selling their home and reduced purchasing

power if home prices have fallen. They may therefore be more likely to try to improve or maintain their neighborhoods through political and civic participation, not only as a wealth-building activity but as a lower cost alternative to moving (Cox, 1982). Renters, however, incur fewer expenses when they move; therefore, the benefits associated with moving out of an undesirable area may outweigh the costs. For homeowners, especially those with lower incomes and fewer resources, the costs associated with moving are often greater than the potential benefits.

Third, homeowners may be more politically active at the local level than renters are because they have a greater attachment to their communities simply by virtue of being homeowners. Although selection issues affect earlier research in this area, findings suggest that, among lower income families living in comparable areas, homeowners have increased informal interaction with their neighbors the longer they live in their homes (Rohe and Stegman, 1994; Rohe and Basolo, 1997). Homeowners also tend to be more satisfied with their communities in general (Rossi, 1996). Putting aside the economic incentive for political participation, we argue that homeowners will be more politically involved in their communities because they feel more "a part of" their neighborhoods by virtue of owning a part of the community.

The link between homeownership and local political participation has been partially substantiated through previous empirical research. Many studies have found that homeowners are more likely than renters to participate in voluntary associations, local political groups, and nonprofessional organizations (Cox, 1982; DiPasquale and Glaeser, 1999; Guest and Oropesa, 1986; Rossi, 1996). Herbert and Belsky (2006) recently reviewed the research on voting behaviors and found that most studies conclude that homeowners are more likely to vote than are renters (DiPasquale and Glaeser, 1999; Squire, Wolfinger, and Glass, 1987). Rossi and Weber (1996: 23) analyzed a variety of nationally representative data sets and found that owners were "almost consistently more engaged in local politics" than renters and were more likely to vote in national elections. Although suggestive, these studies cannot be taken as conclusive evidence because they have generally failed to address selection bias. Rohe, Van Zandt, and McCarthy (2000) suggested that the relationship between ownership and political participation may be spurious and the possibility that people who are politically active are more likely to become homeowners cannot be ruled out. They wrote, "Although unlikely, there may be a more fundamental orientation toward social involvement that predisposes people both to participate in voluntary and political activity and to purchase homes" (Rohe, Van Zandt, and McCarthy, 2000: 397).

Even if the relationship between homeownership and voting remains after adjusting for selection, research needs to expand beyond general outcomes to consider context-specific effects. Previous research has largely overlooked the possibility that the relationship between homeownership and local voting may be moderated by other factors. Gilderbloom and Markham (1995) compared the political participation of owners and renters by income. They found that wealthier owners are more politically active than wealthier renters are, but they found no difference between owners and renters with incomes below the median income for their communities.

This article proposes that a key component omitted from these analyses is neighborhood context. In addition to addressing selection concerns while testing individual-level predictors related to the homeownership-political participation relationship, the article examines neighborhood conditions that may fundamentally alter this relationship. Neighborhood context is an important variable to

include both as a potential moderating variable and as an independent variable affecting voting, because neighborhood conditions are likely to influence political participation, particularly at the local level.

Neighborhood Conditions

Researchers have traditionally suggested that people who live in neighborhoods with higher crime rates or more public disorder experience lower levels of collective efficacy, civic engagement, and neighborhood satisfaction (Sampson and Raudenbush, 1999). If residents lack access to social and cultural resources, they may view political participation as futile and resign themselves to living in an undesirable area (Brady, Verba, and Schlozman, 1995). Rohe, Van Zandt, and McCarthy (2000) cautioned that neighborhood revitalization efforts that focus on increasing homeownership in disadvantaged neighborhoods could result in homeowners feeling trapped in depreciating neighborhoods that offer them few opportunities for civic or community involvement. It is therefore possible that homeowners in less desirable neighborhoods may experience greater dissatisfaction than comparable renters do because they lack mobility. Furthermore, even homeowners who do feel they have the option to move may be reluctant to do so because they feel a stronger sense of attachment and commitment to their local communities than renters do.

On the other hand, homeowners in disadvantaged areas could actually become more politically active to protect their investment in their neighborhood. Although they may be skeptical about whether local voting yields tangible neighborhood improvements, many lower income homeowners simply may not have the option to move without taking a damaging financial loss on their homes. In addition to assuming the economic costs associated with moving—costs that many lower income families may not be able to afford—low-income homeowners assume social costs as well. Low-income families are more dependent on social ties than wealthier families are, and they derive greater well-being from their community-based support networks (Gladow and Ray, 1986). Therefore, even if neighborhood conditions decline, relocating may not be a viable or desirable option for low-income homeowners. As evidence of this observation, studies have found that lower income families are less likely than middle-class families to translate neighborhood dissatisfaction into a move (South and Deane, 1993). Combined, these findings suggest that neighborhood context should be an important consideration when examining any association between homeownership and local political participation, but any model of that relationship needs to also account for endogeneity and selection effects.

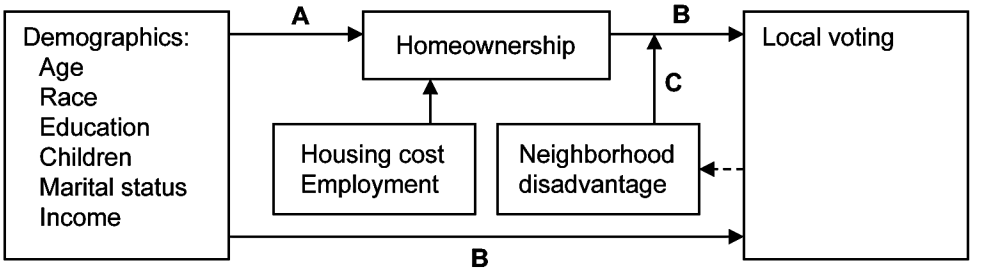
Conceptual Model

Based on the framework outlined previously, the conceptual model proposed in this article is designed to explore the relationship between homeownership and voting in local elections and to consider whether neighborhood conditions moderate that relationship. This model is depicted in exhibit 1.

The model first tests the relationship predicting homeownership, link A in exhibit 1. Although this link has been established in past studies, it provides the base model for subsequent analyses. The second-stage model tests the relationship between homeownership and local voting, link B. This

Exhibit 1

Theoretical Model



model incorporates both homeownership and the direct effects of the demographic variables. The study first models only the direct effect of homeownership, net the influence of the variables from the first-stage model. An added interaction term then evaluates the moderating effect of neighborhood disadvantage on the homeownership-political participation relationship, link C.

As shown in the conceptual model, this study recognizes the likelihood of a reciprocal relationship between voting and neighborhood disadvantage (shown in the dashed line). Neighborhoods where people are politically active and engaged are likely to improve. Although the model acknowledges this relationship, this study does not test it empirically because it uses cross-sectional data.

Data

The study tested the theoretical model described previously using data collected for the Community Advantage Program (CAP) study. CAP is a secondary mortgage market program developed out of a partnership between the Ford Foundation, Fannie Mae, and Self-Help, a leading community development financial institution located in Durham, North Carolina. To qualify for the program, participants had to meet one of the following criteria: (1) have an annual income of no more than 80 percent of the Area Median Income (AMI), (2) be a minority with an income not in excess of 115 percent of AMI, or (3) purchase a home in a high-minority (>30 percent minority residents) or low-income (<80 percent of AMI) census tract *and* have an income not in excess of 115 percent of AMI. By the end of 2004, 38,573 families had purchased homes through CAP.

This study's data originated from a survey designed to evaluate the effects of homeownership on families who purchased homes through CAP. To facilitate this analysis, a random sample of CAP borrowers participated in a survey covering social and financial outcomes related to homeownership. After we selected the sample of homeowners, we matched a comparison group of renters to the homeowners based on neighborhood proximity and income. This matching was limited to the 30 metropolitan areas in the United States with the highest numbers of CAP owners. The renter sample was obtained by randomly selecting households that lived within the same census blocks[1] as homeowners already enrolled in CAP, based on public telephone directory lists. Similar

[1] When eligible renters could not be found within the census block, we expanded the radius up to 4 miles.

to the CAP homeowners, the renters had to meet income or racial criteria. Respondents had to be between 18 and 65 years old, pay rent to the owner of their residence, and have an annual income of less than 80 percent of AMI or 115 percent of AMI in a predominantly minority neighborhood. (Center for Community Capital, 2005). The final matched sample of participants was composed of 1,671 homeowners and 1,530 renters for a total of 3,201 participants.

Because the CAP homeowners sample is not a random sample, the study managers compared CAP with the sample of low-income homeowners who participated in the 2004 Current Population Survey (CPS) in order to assess how CAP compares with a random national sample (Riley and Ru, 2009). The sociodemographic composition of CAP is very similar to the CPS sample. CAP includes a greater percentage of men because the primary respondent was designated based on the first name to appear on the mortgage deed. The CAP sample also includes a greater percentage of minority respondents because one of the goals of the original program was to increase minority homeownership. The only other notable difference between CAP and CPS is that more than 90 percent of CAP homeowners are employed, compared with only 70 percent of CPS low-income homeowners. The authors presume this difference is because all CAP owners purchased their homes fairly recently and therefore had to have a steady source of income at that time, while the CPS owners likely include more retirees who purchased their homes much earlier.

In this study, the authors reduced the analytic sample to exclude nonurban participants who lived outside a metropolitan statistical area (MSA), because neighborhood effects are less meaningful in rural communities. The study also excluded participants who were not registered to vote, because they would be ineligible to manifest the outcome of interest (voting). Therefore, the findings apply only to registered voters in urban neighborhoods. The final analytic sample includes 1,836 respondents, 60 percent of whom were homeowners. Because the study excluded respondents who were not registered to vote in 2004, the sample of participants includes very few Hispanic respondents (8 percent), who are more likely than Whites or African Americans to be undocumented residents.

Methods

Dietz and Haurin (2003) pointed out that endogeneity issues are especially problematic in this line of research because it is plausible that people who are predisposed toward civic engagement may be more likely to want to buy homes and establish themselves within a community. Many variables that are known to influence or predict homeownership are also associated with social outcomes such as voting (Gilderbloom and Markham, 1995; Haurin, Parcel, and Haurin, 2002; Rossi, 1996). The best way to examine such a possibility would be through longitudinal studies that can compare civic participation attitudes and activities before and after homeownership. Such studies are rare, however, and are often limited in terms of generalizability.[2]

The authors address the issue of endogeneity by using a bivariate probit model, which is suitable when an overlapping set of covariates appears in each of two equations (Greene, 1999; McLanahan and Sandefur, 1994). In this case, a common set of variables predicts both homeownership and

[2] One such study of low-income Baltimore homeowners by Rohe and Stegman (1994), for example, found that homeowners' level of participation in neighborhood associations increased after they became owners compared with the level of participation of continuing renters; however, Rohe and Stegman did not find increases in other forms of civic engagement.

political participation. Greene (1999) shows that a seemingly unrelated bivariate probit model is appropriate when the dependent variable from the first equation appears as an independent variable in the second equation. The authors therefore use the predicted probability of homeownership (dependent variable) from the first model as an independent variable in the second equation that predicts voting and estimate this model using the */biprobit/* routine in Stata®.

Measures

Descriptive statistics for all variables are presented in exhibit 2. The dependent variable for the first-stage model is an indicator for homeownership. Owners are coded 1 and renters are coded 0. This measure is then instrumented and becomes the key independent variable in the second equation predicting voting.

The dependent variable of interest is local voting. First, we asked respondents, "Are you registered to vote where you live now?" We then excluded respondents who were not registered to vote. We then asked respondents who said they were registered to vote, "Did you vote in the last local election?" We coded responses as an indicator variable with yes answers coded as 1 and others as 0.

It is important to note that some overreporting of voting for social desirability reasons is likely. Estimates based on National Election Survey data indicate that between 25 and 30 percent of respondents incorrectly report whether they voted in the previous election. Most of these respondents are people who report having voted when they did not (Tanur, 1992). Although overreporting happens across the sociodemographic spectrum, a few trends are worth noting. First, several previous studies have found that residents of southern states have higher rates of overreporting than residents of other states (Jones, 2008). Because the owners and renters in this study are matched by neighborhood, the geographic distribution of overreporting does not bias the results regarding homeownership and voting. The only other pattern in overreporting that has been substantiated by multiple studies is that African Americans have higher rates of overreporting than Whites do. This finding, however, has been based on examining the population as a whole. When Silver, Anderson, and Abramson (1986) examined only overreporting among eligible registered voters who claimed that they had voted, the race factor was not statistically significant. We do recognize that overreporting of voting likely contributes to the frequency of voting reported among the CAP respondents, and we acknowledge this issue as a limitation of the present study. Such overreporting, however, is not thought to significantly bias the findings of this research.

Neighborhood disadvantage is measured using an index measure based on research by Sampson et al. (2002) to develop a reliable measure of "concentrated disadvantage" at the tract level. Sampson and colleagues used measures of the percentage of single parents, non-White residents, unemployed persons, families on public assistance, and households below the poverty line. These measures are specifically selected to represent the latent concept of localized community wealth and economic advantage, particularly the geographic isolation and multiple layers of disadvantage experienced in some poor, predominantly minority, urban areas. Each element of the index is transformed to a z-score, and the z-scores are summed together and divided by 5 (Benson et al., 2003). Previous research has found that neighborhoods with higher concentrated disadvantage also have higher rates of adolescent delinquency, infant and adult health problems, violent crime, and high school attrition (Brooks-Gunn, Duncan, and Aber, 1997).

Exhibit 2

Descriptive Statistics

	Renters					Owners				
Variable	Mean	SD	Frequency	Minimum	Maximum	Mean	SD	Frequency	Minimum	Maximum
Local voting			0.22	0	1		0.48	0.65	0	1
Age	41.89	7.35		20	65	33.86	8.60		19	81
White			0.26	0	1		0.50	0.47	0	1
African American			0.53	0	1		0.49	0.42	0	1
Hispanic			0.04	0	1		0.31	0.11	0	1
Other race			0.17	0	1		0.10	0.01	0	1
High school diploma			0.37	0	1			0.10	0	1
Some college			0.39	0	1			0.59	0	1
College degree			0.18	0	1			0.17	0	1
Advanced degree			0.06	0	1			0.14	0	1
Child in home			0.61	0	1			0.50	0	1
Married/partnered			0.25	0	1			0.53	0	1
Single			0.65	0	1			0.36	0	1
Divorced			0.09	0	1			0.10	0	1
Relative income	0.45	0.29		0	2.35	0.67	0.31		0	2.20
Months in neighborhood	34.42	56.73		0	552	38.39	66.86		4	540
Neighborhood disadvantage	0.36	0.66		– 1.08	2.47	0.13	0.83		– 1.16	2.86
Employed			0.32	0	1			0.95	0	1
Unemployed			0.33	0	1			0.02	0	1
Retired			0.01	0	1			0.01	0	1
Homemaker			0.34	0	1			0.02	0	1
Relative homeownership cost	2.10	0.14		1.70	2.79	2.10	0.22		1.70	2.79

SD = standard deviation.

Note: (n=1,836).

Instrumental Variables

The first-stage model predicting homeownership contains two instrumental variables, variables that predict homeownership but not voting. Following Green and White (1997), the first variable is MSA relative homeownership cost. This variable is a ratio of the median monthly housing cost for owners holding a mortgage to the median rent paid by renters. The variable is calculated at the MSA level using census data. The relative homeownership cost is an ideal measure for instrumenting homeownership, because it is strongly correlated with homeownership rate (Green and White, 1997). The second instrumental variable is employment status. Employment status is measured using a series of indicator variables for employed, unemployed, retired, and not in the paid labor force (homemaker). The reference category is employed. Employment status is significantly correlated with homeownership but is not correlated with local voting in the CAP data set.[3]

Control Variables

Most of the control variables in the bivariate probit model significantly predict both homeownership and voting and thus appear in both equations. The control variables include age, race/ethnicity, education, family composition, marital status, relative income, and length of time in the neighborhood. Age is measured as a continuous variable and is top-coded at 80. Race/ethnicity is measured using indicator variables for African American, White, Hispanic, and other race. The reference category is White. Education is also measured using indicator variables. The categories are high school diploma or less, some college, college graduate, and advanced degree. The reference group in all models is high school diploma or less. Family composition is measured by an indicator variable for whether a family has children living at home. Those with children are coded 1 and those without children are coded 0. Marital status is measured using indicator variables for married/partnered, single, and divorced. The reference is married/partnered. Relative income is measured as the ratio of total household income to mean household income at the MSA level. This measurement accounts for geographic differences in the cost of living. Finally, we measure the length of time a respondent has lived in the neighborhood in months using a continuous variable.

Findings

Exhibit 3 presents the results from the first equation in the bivariate probit model. This equation predicts homeownership and does not change across all the models. We therefore present it only once, in exhibit 3, but readers should note that this equation generates the instrumented homeownership variable that is used in all the remaining analyses. The parameter estimates in the bivariate probit model are not directly interpretable, so we limit our discussion to the direction of significant effects (Gensler and Walls, 1997; Stolzenberg, 2001).

Unlike Green and White (1997), we find that the likelihood of homeownership increases as the relative cost of owning a home versus renting increases. One possible reason for this increase is that people may be more inclined to purchase homes when house values overall are appreciating rapidly, because they see housing as a good investment with the potential for strong returns.

[3] Models supporting the selection of MSA median housing cost and employment status as instrumental variables are available from the authors on request.

Exhibit 3

Coefficients From Bivariate Probit Model Instrumenting Homeownership

Variable	Coefficient	Standard Error
MSA relative homeownership cost	1.74 ***	0.27
Unemployed[a]	– 1.85 ***	0.17
Retired[a]	0.46	0.32
Homemaker[a]	– 1.81 ***	0.17
Age	– 0.04 ***	0.01
African American[b]	0.56 ***	0.12
Hispanic[b]	– 0.41 *	0.18
Other race[b]	– 1.06 ***	0.24
Some college[c]	0.75 ***	0.12
College degree[c]	0.54 ***	0.17
Advanced degree[c]	1.07 ***	0.20
Child(ren) in home	– 0.17	0.11
Single[d]	– 1.23 ***	0.13
Divorced[d]	– 0.39 *	0.13
Relative income	1.25 ***	0.16
Constant	– 2.05 ***	0.64
athrho	– 0.44 ***	0.11
rho	– 0.41	0.09

MSA = metropolitan statistical area.

[a] Reference group is employed.

[b] Reference group is White.

[c] Reference group is high school diploma or less.

[d] Reference group is married.

** p < 0.05. ** p < 0.01. *** p < 0.001.*

Note: (n=1,836).

Another explanation could be that average rents in some inner-city neighborhoods are so low that, even when owning a home costs significantly more than renting, owning is still an affordable option. Regardless of the reason, the relative homeownership cost variable is statistically significant and therefore functions as an appropriate instrumental variable. The direction of the relationship is not relevant to the model.

People who are unemployed or homemakers are less likely to be homeowners. Older respondents are slightly less likely to own a home. The model indicates that, compared with Whites, African Americans are more likely to be homeowners. This finding contradicts past studies but is likely due to our focus on urban residents in low-income and high-minority neighborhoods and is, therefore, an artifact of the CAP sample. People who have any education beyond high school are more likely to be homeowners. As expected, single and divorced people are less likely to be homeowners than are married couples. Finally, people with higher incomes are more likely to be homeowners.

Exhibit 4 presents the second half of the bivariate probit model. This equation uses the instrumented homeownership variable and the independent variable for neighborhood disadvantage to predict a respondent's likelihood of having voted in his or her community's most recent local election. Model 1 finds that homeowners are more likely than renters to have voted in the most recent local election. When looking at the control variables, we find that Hispanic and "other race"

Exhibit 4

Local Voting Regressed on Homeownership and Neighborhood Disadvantage: Bivariate Probit Model

Variable	Model 1		Model 2		Model 3	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Homeowner (instrumented)	1.38 ***	0.17	1.44 ***	0.17	1.37 ***	0.17
Neighborhood disadvantage			0.17 **	0.06	0.01	0.10
Homeownership*nei. disadvantage					0.22 *	0.11
African American[a]	0.09	0.10	– 0.01	0.10	– 0.02	0.11
Hispanic[a]	– 1.66 ***	0.19	– 1.80 ***	0.19	– 1.84 ***	0.20
Other race[a]	– 1.41 ***	0.27	– 1.40 ***	0.27	– 1.51 ***	0.27
Age	0.03 ***	0.00	0.03 ***	0.00	0.03 ***	0.00
Single[b]	0.41 ***	0.12	0.40 ***	0.12	0.37 **	0.12
Divorced[b]	– 0.08	0.13	– 0.04	0.13	– 0.07	0.13
Some college[c]	1.44 ***	0.12	1.45 ***	0.12	1.45 ***	0.12
College degree[c]	1.78 ***	0.16	1.72 ***	0.16	1.68 ***	0.16
Advanced degree[c]	1.52 ***	0.17	1.43 ***	0.18	1.38 ***	0.18
Child(ren) in home	– 0.38 ***	0.08	– 0.35 ***	0.09	– 0.38 ***	0.09
Relative income	– 0.30 *	0.13	– 0.31 *	0.13	– 0.31 *	0.13
Months in neighborhood	0.00	0.00	0.00	0.00	0.00	0.00
Constant	– 2.70 ***	0.25	– 2.63 ***	0.25	– 2.53 ***	0.26
N	1,836		1,836		1,836	
Wald chi2	1,512.78		1,507.05		1,505.63	
Log likelihood	– 1,209.53		– 1,205.08		– 1,203.23	

[a] Reference group is White.

[b] Reference group is married.

[c] Reference group is high school diploma or less.

** p < 0.05. ** p < 0.01. *** p < 0.001.*

Note: (n=1,836).

respondents are much less likely to have voted compared with Whites. Older respondents are slightly more likely to have voted, as expected, as are single respondents. Respondents at all other education levels are significantly more likely to vote compared with those who have only a high school diploma or less. The presence of children in the home is associated with a decline in voting likelihood. Relative income and length of time in the neighborhood have no effect on local voting.

Model 2 tests the significance of neighborhood disadvantage in the model. We find a small yet significant relationship. People who live in more disadvantaged neighborhoods are slightly more likely to have voted in their most recent local election. In addition to finding a direct effect, we also found that neighborhood disadvantage moderates the relationship between homeownership and local voting, as shown in model 3. The interaction term for neighborhood disadvantage and homeownership is significant, indicating that homeowners in disadvantaged neighborhoods are even more likely to vote than either owners in less disadvantaged areas or renters in comparable neighborhoods.

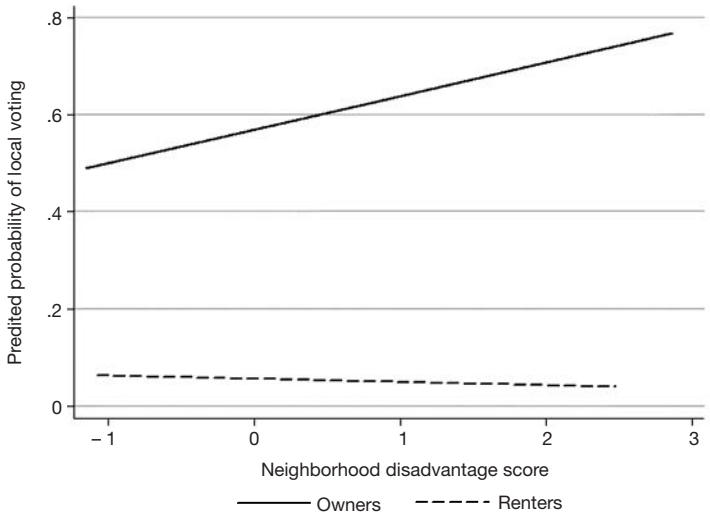
Predicted Probability of Voting

As discussed previously, it is difficult to interpret the coefficients in a bivariate probit model. To evaluate how great an effect homeownership and neighborhood disadvantage have on voting, we calculated the predicted probabilities of local voting for homeowners and renters varying by neighborhood disadvantage score, holding all other variables constant at the mean.

Exhibit 5 presents a graph of the predicted probability of a respondent having voted in the most recent local election based on model 3 in exhibit 4. A significant gap exists between owners and renters, with homeowners predicted to vote at much higher levels than renters. Recall that these lines show the predicted probability of voting, not whether any given respondent actually voted. Exhibit 5 shows that, as neighborhood disadvantage increases, homeowners are more likely to vote in local elections. From the least to the most disadvantaged neighborhood, homeowners' predicted probability of voting increases by approximately 30 percent. Voting by renters, however, remains nearly constant and significantly lower than voting by owners. In summary, as neighborhood disadvantage increases, homeowners are more likely to become politically active at the local level, where their actions have the most potential to improve their neighborhoods and local communities.

Exhibit 5

Local Voting Predicted Probability by Neighborhood Disadvantage and Tenure Status



Discussion

The objective of this study was threefold: (1) address selection bias concerns in the research on the relationship between homeownership and local voting, (2) test the relationship between homeownership and voting, and (3) test whether neighborhood disadvantage moderates that relationship. We used a seemingly unrelated bivariate probit model to model homeownership and political participation as a two-stage model. We first predicted homeownership using two

instrumental variables, MSA median housing cost and employment status, which are correlated with homeownership but not with local voting. The model also includes a set of sociodemographic variables likely predictive of both homeownership and political participation: age, race, relative income, education, marital status, and family composition. The model then uses predicted probabilities of homeownership from the first-stage model as the independent variable for homeownership in the second-stage model. By using this technique, we were able to measure the direct effect of homeownership on local voting, independent of the common sociodemographic predictors that both outcomes share. This technique is a substantial improvement over previous studies that have failed to account for the fact that homeownership itself is an endogenous variable within any model predicting social outcomes.

Our findings further clarify the selection issue. Recall that selection bias poses a problem, because people who self-select to become homeowners may do so for unobserved reasons, such as being very civic minded, which may also predict voting. We found that homeowners in the most disadvantaged neighborhoods are the most likely to vote. It is highly unlikely that the most civic-minded people would intentionally select to move into the most disadvantaged communities, so we have little reason to suspect that these results are biased.

Regarding the relationship between homeownership and voting, we found that homeownership does have an independent effect on local political participation. Owners are more likely than renters to have voted in their most recent local elections. This finding confirms results from previous studies on political participation and homeownership and indicates that, contrary to Rohe, Van Zandt, and McCarthy's (2000) suggestion, the relationship is not spurious.

We found that neighborhood disadvantage also has an independent effect on political participation. People in disadvantaged neighborhoods are more likely to have voted in their most recent local election. Lastly, we found that there is an interaction effect between homeownership and neighborhood disadvantage regarding political participation. Homeowners who live in disadvantaged neighborhoods are more likely to vote in local elections than both homeowners in less disadvantaged areas and renters. As neighborhood distress increases, homeowners show significant increases in voting, while renters' voting behavior remains constant.

Taken together, these findings support the claim that homeownership can potentially spur political participation regardless of neighborhood conditions. In fact, homeownership is most beneficial as a catalyst for political participation and potential community improvement in neighborhoods that are facing higher levels of concentrated disadvantage. We found that homeownership can provide a pathway to positive social change in two ways. First, homeownership leads to increased local political participation, even for lower income owners living in disadvantaged neighborhoods. Political engagement is a crucial element of democracy and one of the most accessible avenues through which ordinary citizens can participate in civic life. By increasing political involvement within disadvantaged neighborhoods, homeownership contributes to the empowerment of those urban communities. Homeownership also benefits communities as a whole, because involved, engaged citizens are more likely to create positive neighborhood-level changes. As residents become more involved in local politics, they are more likely to actualize the positive changes they seek for their communities.

At the same time, individual-level costs associated with homeownership in disadvantaged neighborhoods need to be acknowledged. Although homeownership brings collective benefit to these areas, individual owners who live there likely invest a disproportionate amount of time in creating improvements, relative to owners in more desirable areas. Any policies intended to promote homeownership in disadvantaged areas must consider whether potential homeowners would have access to housing in a more desirable neighborhood if they elected to defer homeownership.

It is also important to note, especially in light of the recent housing downturn in the United States, that all homeowners who participated in CAP received prime, fixed-rate, 30-year mortgages with a 38-percent debt-to-income limit. Research suggests that risky mortgage products—subprime (high-interest) mortgages and adjustable-rate mortgages—are bad for both homeowners and neighborhoods. Not only do risky mortgage products increase a borrower's risk of default, but even people with prime-rate mortgages who live in neighborhoods with a high rate of subprime lending have a significantly higher default risk (Ding et al., 2008). We therefore stipulate that our conclusions on the individual and community benefits of homeownership are predicated on homebuyers obtaining responsible mortgage products that do not create financial strain.

These findings suggest several directions for future research in this area. Although we have demonstrated a link between voting in local elections and homeownership, other forms of community involvement have not been explored. Are homeowners in disadvantaged communities more likely to participate in neighborhood groups or volunteer in community events? Future research can test whether homeownership also promotes forms of neighborhood involvement that require more time and effort than voting does. We also plan to build on these findings by testing whether the relationship between homeownership and voting changes over time. One strength of the CAP data set is that it provides longitudinal measures of most outcomes. We can therefore examine whether homeowners continue to vote in greater numbers over time, or whether there is a dropoff in voting after people have been homeowners for several years.

Based on our findings, our conclusion is that policies promoting and facilitating homeownership in disadvantaged neighborhoods should be encouraged, because homeownership in such neighborhoods leads to greater local political participation and community involvement. Whether homeowners stay in disadvantaged areas out of necessity or by choice, they demonstrate a commitment to improving their neighborhoods through local political involvement. Rather than resigning themselves to being "trapped" in an undesirable area, lower income homeowners capitalize on the community participation opportunities that are available. This participation benefits individual homeowners by protecting their wealth and long-term equity and also benefits struggling neighborhoods by promoting active citizenship and fostering a sense of collective efficacy and civic engagement.

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Policy Briefs

The Policy Briefs department summarizes a change or trend in national policy that may have escaped the attention of researchers. The purpose is to stimulate the analysis of policy in the field while the policy is being implemented and thereafter.

Fannie Mae and Freddie Mac: Past, Present, and Future

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Abstract

This policy brief examines the past, present, and future of Fannie Mae and Freddie Mac. Beginning with the present, this brief discusses the recent economic and regulatory changes that have affected the government-sponsored enterprises' (GSEs') operations and businesses. Next, the article looks back at the regulations and major events over the years that shaped the enterprises and their role in the housing finance market. The final part of this article highlights issues to consider. These issues present research opportunities on topics that will shape and inform the policy debate on the future of the GSEs.

Recent Economic and Regulatory Changes

In the past 2 years, Fannie Mae and Freddie Mac have faced dramatically changing economic and regulatory environments. Large declines in house prices began in December 2006 and led to the deepest recession since the 1930s.[1] Mortgage delinquencies began to skyrocket in nearly all states and uncovered lax underwriting standards, unsustainable payment terms in exotic mortgage products, and faulty securities ratings. The widespread undervaluation of mortgage default risk and loss severity had dire effects on the performance of mortgage portfolios and mortgage-related securities.

The regulatory structure that had governed the government-sponsored enterprises (GSEs) since the Federal Housing Enterprises Financial Safety and Soundness Act (FHEFSSA) of 1992 began to change on July 30, 2009, when the U.S. Congress passed the Housing and Economic Recovery Act (HERA) of 2008. This reform legislation created the Federal Housing Finance Agency (FHFA),

[1] Based on the S&P/Case-Shiller® U.S. National Home Price Index, the decline in national house prices began in December 2006.

a new independent regulator. FHFA replaced the Office of Federal Housing Enterprise Oversight (OFHEO), Fannie Mae and Freddie Mac's safety and soundness regulator, and assumed additional responsibilities that had previously been carried out by the U.S. Department of Housing and Urban Development (HUD).[2] These responsibilities included setting affordable housing goals, monitoring the GSEs' compliance with the housing goals, and conducting new program reviews. HERA provided FHFA with broad authority to regulate the size and composition of the Fannie Mae and Freddie Mac investment portfolios, set capital requirements, place the enterprises into conservatorship, and reorganize them to prevent their insolvency. HERA also provided temporary authority for the U.S. Department of the Treasury (Treasury Department) to provide financial support to Fannie Mae and Freddie Mac by purchasing securities or other obligations of the GSEs through December 31, 2009.

The troubles in the mortgage finance market exposed large risks the GSEs had undertaken and increased concerns related to their safety and soundness. In 2007, both GSEs reported net income losses, the first ever for Freddie Mac. Losses continued to mount for the GSEs in the first half of 2008. Their core capital eroded and FHFA moved to place Fannie Mae and Freddie Mac in conservatorship on September 7, 2008. The Treasury Department began to exercise its GSE assistance authorities to restore the GSEs' solvency. Initially, the Treasury Department purchased $1 billion in senior preferred stock in Freddie Mac and Fannie Mae and warrants for the purchase of common stock representing 79.9 percent of outstanding common stock. To further ensure the GSEs' stability and strength, the Treasury Department and Federal Reserve created the Troubled Asset Relief Program and Term Asset-Backed Securities Loan Facility to purchase GSE mortgage-backed securities (MBS) and GSE debt.

As of April 30, 2009, the Treasury Department had spent $59.8 billion on capital injections through the purchase of preferred stock in the two enterprises. As of May 20, 2009, the Federal Reserve, using its separate authorities, had purchased nearly $77 billion in GSE debt issuances. In addition, both the Treasury Department and the Federal Reserve directly purchased more than $567 billion worth of GSE MBS.

Federal conservatorship has allowed the GSEs to maintain, and even expand, their presence in the secondary mortgage market. Their combined share of single-family mortgage purchases peaked at 81 percent in the second quarter of 2008 and stood at 73 percent for 2008 as a whole.

The Treasury Department also contracted with Fannie Mae and Freddie Mac to act as financial agents for the federal government to implement the Making Home Affordable (MHA) program.[3] MHA is a major initiative that was designed to combat loan delinquencies on two fronts: through loan modifications (the Home Affordable Modification Program [HAMP]) and refinancing (Home Affordable Refinance Program [HARP]). In most cases, borrowers who participate in the program receive a new loan with mortgage payments that should be more affordable over the long term.

[2] HERA amended FHEFSSA and transferred GSE oversight to FHFA, with the exception of the responsibility for administering FHEFSSA's fair lending provisions, which HUD retained. HERA also transferred the regulatory authority of the Federal Home Loan Banks to FHFA.

[3] The MHA program, which was announced on March 4, 2009, is a major initiative of the Homeowner Affordability and Stability Plan, which was announced on February 18, 2009.

The GSEs' roles in the program vary. Fannie Mae is working with mortgage servicers to implement HAMP, an aggressive restructuring approach for curing troubled loans.[4] It is estimated that up to 4 million at-risk homeowners could reduce mortgage payments primarily through interest-rate reductions. The program also provides loan servicers and investors with the option of reducing a loan's outstanding principal balance. Freddie Mac's role is overseeing the servicers' compliance with HAMP's terms and conditions.

Both Fannie Mae and Freddie Mac offer HARP. Under this program, the GSEs will purchase any refinanced mortgage that they owned or guaranteed when the property is owner-occupied, the borrower has sufficient income to support the new mortgage debt, and the first mortgage does not exceed 125 percent of the current market value of the property. This program provides access to mortgage credit for up to 5 million homeowners who are current on their mortgage payments but have negative equity due to declining house prices and lack of private mortgage insurance.[5] In many cases, this program enables borrowers to refinance into lower interest-rate mortgages.

Thus, the support from the Treasury Department and the Federal Reserve has allowed the GSEs to play a key role in providing liquidity to the second-mortgage market and stabilizing the primary-mortgage market through loan modifications and refinances; however, conservatorship is not a permanent state. Determining where the GSEs go from here is one of the key policy objectives of the Obama Administration's white paper entitled *Financial Regulatory Reform—A New Foundation: Rebuilding Financial Supervision and Regulation*, which was released on June 23, 2009. The administration empowered the Treasury Department and HUD to work with other government agencies to explore options regarding the future of the GSEs.[6] The process will be comprehensive and include an interagency task force that will study and assess the various options for reforming the GSEs. Recommendations are expected when the President's 2011 budget is released.

A Brief History of the GSEs

In 1948, the Federal National Mortgage Association (now known just as Fannie Mae) was established as a portfolio holder of mortgage loans under the Federal Housing Administration (FHA). Initially, Fannie Mae bought and held loans guaranteed by FHA and later by the Veterans Administration (now known as the Department of Veterans Affairs). The Housing Act of 1954 expanded Fannie Mae's charter. In addition to managing and liquidating its existing mortgage portfolio, Fannie Mae was directed to provide liquidity in the mortgage market. The 1954 Act reorganized Fannie Mae as a mixed ownership corporation; the eligible shareholders were the federal government and lenders who sold mortgages to Fannie Mae.

[4] To be eligible for HAMP, a borrower must be an owner-occupant in a one- to four-unit property; have an unpaid principal balance that is equal to or less than $729,750; have a loan that was originated before January 1, 2009; have a mortgage payment (including taxes, insurance, and homeowners association dues) that is more than 31 percent of the borrower's gross monthly income; and have experienced a significant change in income or expenses to the point that the current mortgage payment is no longer affordable.

[5] See the Road to Stability on the Financial Stability website at http://www.financialstability.gov/roadtostability/homeowner.html.

[6] Under the Obama Administration's Financial Regulatory Reform Plan, the Treasury Department and HUD will also explore options and report on recommendations about the future of the Federal Home Loan Bank System.

In 1968, Congress chartered Fannie Mae as a private, shareholder-owned company with government sponsorship. The Housing and Urban Development Act of 1968 gave the Secretary of HUD general regulatory authority over Fannie Mae. The federal government's shares were sold publicly. Fannie Mae issued its first MBS in 1981.

Congress established Freddie Mac in 1970 to develop a secondary market for conventional mortgage loans under the Federal Home Loan Bank Board. Freddie Mac introduced its first conventional mortgage security in 1971, the Mortgage Participation Certificate. In 1982, Freddie Mac became a publicly traded shareholder-owned corporation. The Financial Institutions Reform, Recovery, and Enforcement Act of 1989 dissolved the Federal Home Loan Bank Board and established a shareholder-elected board of directors for Freddie Mac. Freddie Mac mainly securitized mortgages until the early 1990s, when it began accumulating a substantial portfolio of mortgages.

FHEFSSA fundamentally revised Fannie Mae and Freddie Mac's regulatory structure and better defined their mission. Under FHEFSSA, Congress created OFHEO as an independent agency within HUD to monitor the safety and soundness of Fannie Mae and Freddie Mac. OFHEO was responsible for ensuring that the GSEs were adequately capitalized and operating safely. The Director of OFHEO assessed the GSEs for the costs of their financial safety and soundness regulation.

FHEFSSA mandated specific responsibilities for the Secretary of HUD, acting independently of OFHEO, that included setting affordable housing goals, monitoring and enforcing the GSEs' performance in meeting the housing goals, reviewing requests for new program approval submitted by the GSEs, prohibiting discrimination in the GSEs' mortgage purchase activities and reviewing and commenting on their underwriting guidelines, and establishing a public use database on the GSEs' mortgage purchases. Before 1992, the GSEs' charters required that 30 percent of GSE conventional mortgage purchases be devoted to mortgages for (1) low- and moderate-income housing or (2) housing located in central cities. FHEFSSA provided HUD with the power to collect data to monitor the GSEs' compliance with the housing goals, a critical authority it had lacked.

In 1995, HUD began issuing affordable housing goals requiring the GSEs to purchase (1) mortgages made to low- and moderate income families, (2) mortgages on properties located in underserved areas, and (3) mortgages made to very low-income families and low-income families in low-income areas. The levels of the affordable housing goals and home purchase subgoals are summarized in exhibit 1. With the issuance of subsequent rules in 2001 and 2004, the levels of the affordable housing goals increased. In 2004, home purchase subgoals were introduced.

The recent housing crisis has brought the effectiveness of the housing goals into question. Some critics argue that the goals and subgoals contributed to the crisis. Critics also suggest that the GSEs used the goals as an excuse to expand their business into a higher yield segment of the housing market instead of providing prudent underwriting for borrowers on the margin, as advocated in their respective charters.

Exhibit 1 shows that, in recent years, one or both GSEs failed to meet one or more of the affordable housing goals or home purchase subgoals. In 2005, Fannie Mae's performance fell short of the low- and moderate-income subgoal, which, in that year, was 45 percent. Of total eligible units, 44.6 percent qualified for the home purchase low- and moderate-income subgoal. In 2007,

Exhibit 1

Levels of the Affordable Housing Goals and Home Purchase Subgoals for Fannie Mae and Freddie Mac Since 1996

	Year													
	1996	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Housing goals														
Low- and moderate-income	40%	42%	42%	42%	42%	50%	50%	50%	50%	52%	53%	55%	56%	43%
Geographically targeted (underserved area)	21%	24%	24%	24%	24%	31%	31%	31%	31%	37%	38%	38%	39%	32%
Special affordable	12%	14%	14%	14%	14%	20%	20%	20%	20%	22%	23%	25%	27%	18%
Special affordable multifamily														
Fannie Mae ($ billions)	$1.29	$1.29	$1.29	$1.29	$1.29	$2.85	$2.85	$2.85	$2.85	$5.49	$5.49	$5.49	$5.49	$6.56
Freddie Mac ($ billions)	$0.99	$0.99	$0.99	$0.99	$0.99	$2.11	$2.11	$2.11	$2.11	$3.92	$3.92	$3.92	$3.92	$4.60
Home purchase subgoals														
Low- and moderate-income										45%	46%	47%	47%	40%
Geographically targeted (underserved area)										32%	33%	33%	34%	30%
Special affordable										17%	17%	18%	18%	14%

Sources: "HUD's Housing Goals for the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mae) for the Years 2005-2008 and Amendments to HUD's Regulation of Fannie Mae and Freddie Mac; Final Rule," 24 CFR Part 81. Federal Register *69 (211) November 2, 2004; "2009 Enterprise Transition Affordable Housing Goals; Final Rule," 12 CFR 1282.* Federal Register *74 (83) August 10, 2009*

the GSEs met the affordable housing goals but failed to meet two of the subgoals. In letters sent to the GSEs on April 24, 2008, HUD notified the GSEs that the low- and moderate-income home purchase subgoal of 47 percent and the special affordable home purchase subgoal of 18 percent were suspended as infeasible.[7] For 2008, although FHFA determined that the low- and moderate-income and special affordable goals and all the home purchase subgoals were infeasible, the underserved areas goal was feasible. Fannie Mae exceeded this goal and Freddie Mac failed it with 37.7 percent of its total eligible units qualifying. Both GSEs exceeded their respective special affordable multifamily subgoal.

Since FHEFSSA was enacted in 1992, the GSEs' combined book of business grew substantially until 2008. At the end of 1992, Fannie Mae's retained portfolio was $156.3 billion and the total of its MBS outstanding was $424.4 billion. Freddie Mac had a portfolio of $33.6 billion and a total of $407.5 billion MBS outstanding. By 2008, Fannie Mae's portfolio grew to $768 billion and its MBS outstanding increased to $2,289 billion. Freddie Mac's portfolio grew to nearly match Fannie Mae's, at $749 billion, while its MBS outstanding rose to $1,403 billion. To put the size of the GSEs' obligations into perspective, at the end of 2008, the GSEs held about 43.7 percent of the total outstanding mortgage debt in the United States and their combined obligations were $5.2 trillion. Their combined obligations rivaled the U.S. public debt, which was $6.3 trillion in October 2008.[8]

Other Events

Beginning in the 1990s, lenders' use of automated underwriting systems (AUSs) transformed the mortgage industry. These systems applied underwriting criteria and statistical algorithms to predict the default probability of loan applications. The GSEs were industry leaders in the development and implementation of these systems to evaluate their loan purchases. Fannie Mae's system, Desktop Underwriter, and Freddie Mac's system, Loan Prospector, considerably reduced the cost and time associated with loan approvals.[9] Another important benefit was that these systems evaluated loan applications without human preferences and biases that might occur with manual underwriting.

In 2000, Fannie Mae and Freddie Mac expanded their purchases to include "Alt-A," A-minus, and subprime mortgages, in addition to private-label mortgage securities.[10] To accommodate their mortgage purchases, Fannie Mae implemented the Expanded Approval system and Freddie Mac expanded its Loan Prospector system to accommodate risk-based pricing.

[7] Fannie Mae's and Freddie Mac's purchases that qualified for the low- and moderate-income home purchase subgoal were 42.1 and 43.5 percent of total eligible units, respectively, while their qualifying purchases for the special affordable home purchase subgoal were 15.5 and 15.9 percent of total eligible units, respectively.

[8] FHFA (2009).

[9] Before automated loan systems, it was not uncommon for loan approvals to take a month or more. With the advent of these systems, some lenders can approve a mortgage within 24 hours.

[10] Alt-A mortgages have little or no borrower income and asset documentation. A-minus mortgages are loans made to borrowers who cannot qualify for prime mortgages because of blemished credit; however, their credit is higher than that typically found for a subprime loan. Subprime mortgages are loans made to borrowers with credit blemishes that result in low credit scores. Private-label mortgage securities do not have the backing of a government entity.

Subprime and Alt-A mortgages provided the GSEs with an opportunity to grow their businesses. In 2000, the GSEs had very little exposure to the subprime market. Fannie Mae purchased $600 million of subprime mortgages. Freddie Mac purchased $18.6 billion worth of mostly Alt-A and A-minus mortgages. The GSEs guaranteed another $7.7 billion worth of subprime mortgages in structured transactions.[11] These totals were small compared to the total size (about $160 billion) of the Alt-A and subprime market segments.[12]

During the next 6 years, Alt-A and subprime lending exploded. In 2003, the dollar volume of originations doubled to more than $215 billion. In 2004, Alt-A and subprime loans accounted for more than 35 percent of the conventional mortgage market. In 2006, the dollar volume of originations peaked at more than $1 trillion and accounted for nearly 50 percent of the conventional market.

The GSEs increased their presence in the subprime and Alt-A markets and invested heavily in private-label MBS. Beginning in 2003, Fannie Mae and Freddie Mac began to rapidly increase their ownership of assets backed by private-label mortgage-related securities. In 2006, Fannie Mae's and Freddie Mac's holdings peaked at $80.3 billion and $157.5 billion, respectively. By the end of 2008, their holdings remained high, with $52.4 billion at Fannie Mae and $99.9 billion at Freddie Mac. The private-label securities contributed significantly to the GSEs' losses in 2008; in many cases, the value of the securities fell as much as 90 percent from the time of purchase. The Government Accountability Office (GAO) (GAO, 2009) concluded that the enterprises' substantial investments in assets collateralized by subprime and Alt-A mortgages had probably precipitated their conservatorships.

In 2003, Freddie Mac disclosed that it used improper accounting. OFHEO, its regulator at the time, later found that it had misstated earnings by $5 billion between 2000 and 2003. The interesting twist in Freddie Mac's restatement is that, in most cases, the earnings were underreported. In response to the revelation of fraud at Freddie Mac, OFHEO launched an investigation of Fannie Mae and, in 2004, found it had overstated earnings between 2000 and 2003 by $6.3 billion. OFHEO reported serious accounting, disclosure, and management issues that led to the GSEs' misstatements. Freddie Mac paid a $125 million penalty in 2003 and a $50 million fine in 2007. Fannie Mae paid a $400 million civil penalty, one of the largest penalties in an accounting fraud case.

The misapplication of accounting rules had two intended effects. First, the improper accounting served to smooth out variations in the GSEs' earnings over time, masking their volatility and giving the enterprises the appearance of low-risk companies. Second, in the case of Fannie Mae, senior management manipulated earnings to maximize their annual bonuses. Among the accounting-rule violations was the failure of both GSEs to properly book complex financial instruments known as derivatives, which the companies used to hedge against movements in interest rates in their investment portfolio of mortgages.

These improper accounting practices deceived investors about the GSEs' true performance, profitability, and growth trends. These practices also disclosed a failure of senior management to establish and maintain adequate internal control systems.

[11] Inside Mortgage Finance Publications (2001).

[12] Temkin, Johnson, and Levy (2001).

In May 2006, OFHEO reported that, in addition to violating accounting and corporate governance standards, the GSEs engaged in excessive risk-taking and poor risk management. These actions included their increased holdings of subprime and Alt-A private-label MBS and their use of derivatives to manage the interest-rate risk of their investment portfolios. In hindsight, these findings were a clear warning of the systemic risk that the GSEs posed to the greater financial system.

The accounting scandals at the GSEs also reignited the 1995 debate about whether the GSEs' organizational structure was optimal for meeting the goals laid out in their charters. Continual efforts were made to pass reform legislation but all failed under the GSEs' heavy lobbying efforts.

After the enactment of FHEFSSA in 1992, the GSEs enjoyed large profits until 2007. Between 1992 and 2003, the GSEs' reported annual return on equity (ROE) was generally higher than 20 percent and rose as high as 47.2 percent for Freddie Mac in 2002. After the accounting scandals, the GSEs reported more modest profitability ranging between 8.1 and 19.5 percent ROE.

In 2007 and 2008, as house prices plummeted and serious delinquencies soared, the GSEs experienced huge credit losses on their guarantee and portfolio business and saw a rapid deterioration of the value of their private-label MBS holdings, which had composed 19 percent of their investments. In 2007, both GSEs had negative net income. Fannie Mae reported -8.3 percent ROE and Freddie Mac reported -21.0 percent ROE. By the fourth quarter of 2008, both GSEs had negative core capital positions, triggering insolvency concerns. On September 6, 2008, both Fannie Mae and Freddie Mac voluntarily entered conservatorship under FHFA.

Issues To Consider

This section highlights issues to consider in the policy debate about the future of the GSEs and how researchers can help make better public policy.

The GSEs' charters define their public purpose in terms of four organizational goals:

1. Provide stability in the secondary market for residential mortgages.
2. Respond appropriately to the needs of the private capital market.
3. Provide ongoing assistance to the secondary market for residential mortgages (including activities related to mortgages on housing for low- and moderate-income families involving a reasonable economic return that may be less than the return earned on other activities) by increasing the liquidity of mortgage investments and improving the distribution of investment capital available for home mortgage finance.
4. Promote access to mortgage credit throughout the nation (including central cities, rural areas, and underserved areas) by increasing the liquidity of mortgage investments and improving the distribution of investment capital available for home mortgage finance.

In the 17 years since FHEFSSA was passed, the secondary mortgage market and housing finance have evolved. A first step in the process of determining the future of the GSEs is determining whether their public purpose objectives need to be amended.

The Obama Administration's white paper on financial regulatory reform tasked the Treasury Department and HUD with conducting extensive research and outreach and providing recommendations for restructuring Fannie Mae and Freddie Mac. The potential policy options for the GSEs range widely. Six possible models include (1) returning the companies to their previous status as GSEs with the paired interests of maximizing returns for private shareholders and pursuing public policy homeownership goals; (2) incorporating the GSEs' functions into a federal agency; (3) creating a public utility model in which the government regulates the GSEs' profit margin, sets guarantee fees, and provides explicit backing for GSE commitments; (4) converting the GSEs' corporate purpose to being providers of insurance for covered bonds; (5) dissolving Fannie Mae and Freddie Mac into many smaller companies; and (6) gradually winding down the GSEs' operations and liquidating their assets.[13] Within the context of each of these models, the public purpose objectives of the GSEs need to be examined and evaluated.

If the GSEs were to be fully privatized shareholder-owned companies, they would no longer have their public purpose objectives. It is unlikely that fully privatized companies would provide the desired social benefits. During stressful economic periods, such companies generally withdraw from mortgage markets or fail, providing little or no support to mortgage markets. Earlier discussions supporting fully privatizing Fannie Mae and Freddie Mac were predicated on the conditions that the GSEs were stable, well managed, and economically viable institutions. It is unclear at what point in the future these conditions will again apply.

In its *Report to Congress 2008,* FHFA identified key operational issues that the GSEs must overcome before they can emerge from conservatorship. These issues present short- and long-term challenges. The short-term challenges include (1) addressing the operational, financial, and risk-management weaknesses that led to conservatorship; (2) building and retaining staff and infrastructure; (3) mitigating credit losses, including through loan modifications; and (4) pricing mortgage products given current market uncertainties, modeling difficulties, and the political risk of operating while in conservatorship.

The long-term issues fit into a larger debate on financial regulatory reform. More specifically, policy recommendations on the future of the GSEs are contingent on the federal government determining their role in the housing finance market and the relationship between the GSEs, or their successors, with other institutions involved in the financing of home mortgages. These long-term challenges include (1) providing for mission and public policy objectives of housing market stability, mortgage availability, and mortgage affordability; and (2) buying and/or guaranteeing mortgages when constraints exist on the availability of private mortgage insurance.

In addition to the operational challenges that the GSEs face, Fannie Mae and Freddie Mac face one new financial challenge associated with their conservatorships: the obligation on their senior preferred stock. The Treasury Department has purchased $44.6 billion in preferred stock in Freddie Mac and $15.2 billion in Fannie Mae. The dividends of senior preferred stock accrue at 10 percent based on the Treasury Department's outstanding preferred share investments. In the case of Freddie Mac, this accrual currently translates into annual dividends of $4.6 billion. Before

[13] These options were identified in U.S. Department of the Treasury (2009).

conservatorship, Freddie Mac's annual net income exceeded $5 billion in only 2 years. The GSEs are in the process of reducing their mortgage portfolios and have stopped purchasing private-label securities. These two lines of business were very profitable in the good times and very costly in the recent downturn. It is unclear how the GSEs' current lines of business will produce enough returns to honor this obligation to the Treasury Department.

In practice, the GSEs' public purpose objectives (discussed previously) can be categorized into four activities: (1) providing liquidity and stability to the residential mortgage markets, (2) managing mortgage credit risks, (3) providing targeted lending (affordable, neighborhood renewal, green, etc.), and (4) financing the construction of multifamily and other types of housing. Additional areas of concern within activities, summarized in the following bullet points, will shape the debate and outcomes of the Treasury Department's and HUD's research and recommendations on restructuring options for the GSEs.

Liquidity and Stability

- How will the broader capital markets be accessed?
- Will capital access be available for both single-family and multifamily properties?
- What alternative models to mortgage securitization exist?
- How are institutions providing liquidity being adequately regulated and capitalized?
- How are regulations being monitored for consistency across institutions?
- How will down cycles affect liquidity?
- What are the countercyclical roles and capacities of FHA and Ginnie Mae compared with those of alternative institutions?

Credit Risk

- Who will bear mortgage credit risks?
- How will incentives support good underwriting?
- How will underwriting quality controls be enforced?
- How does the federal government bear catastrophic risk—explicitly or implicitly?
- How might credit risk-sharing options apply?
- How well do these options provide liquidity and targeted lending, particularly during down cycles?

Targeted Lending

- What are the goals of targeted lending?
- How well are they achieved?
- How best should subsidies or incentives be provided?
- What enforcement mechanisms exist?
- What are possible fair lending concerns?

Financing the Production of Other Housing

- What mechanisms exist for financing multifamily housing production?
- How can a market for such production be created?
- How can investments from a secondary market institution be an efficient means for financing housing production compared with alternative approaches?
- How can a private-market solution meet public-sector production goals?

Concluding Remarks

The GSEs have a dominant position in housing finance. Even in conservatorship, they have played a critical role in providing liquidity to mortgage markets. Going forward, careful attention must be paid to avoiding the past missteps of Fannie Mae and Freddie Mac. The GSEs' transition and future place in the housing finance system remain key components of the broader financial regulatory reform taking shape.

Acknowledgments

The author thanks Mark Shroder and Ed Szymanoski for their valuable comments and suggestions.

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Graphic Detail

Geographic Information Systems organize and clarify the patterns of human activities on the earth's surface and their interaction with each other. GIS data, in the form of maps, can quickly and powerfully convey relationships to policymakers and the public. This department of Cityscape *includes maps that convey important housing or community development policy issues or solutions. If you have made such a map and are willing to share it in a future issue of* Cityscape*, please contact david.e.chase@hud.gov.*

High Business and Residential Vacancy Rates

Todd W. McNeil
KBM Group, Inc.

The recent upheaval in the housing and mortgage markets and the downturn in commercial activity have increased concerns about the viability of many communities. Long-term vacancies, whether residential or commercial, can affect the value of property in surrounding neighborhoods, the quality of life within communities, and the overall local economy. In response to these concerns, the U.S. Department of Housing and Urban Development (HUD) has developed maps of the distribution of high vacancy rates in various metropolitan areas. Two such maps, exhibit 1 and exhibit 2, represent the urban centers of the Denver, Colorado and Atlanta, Georgia metropolitan areas. The maps depict a relatively new vacancy data set HUD has obtained from the U.S. Postal Service (USPS).[1]

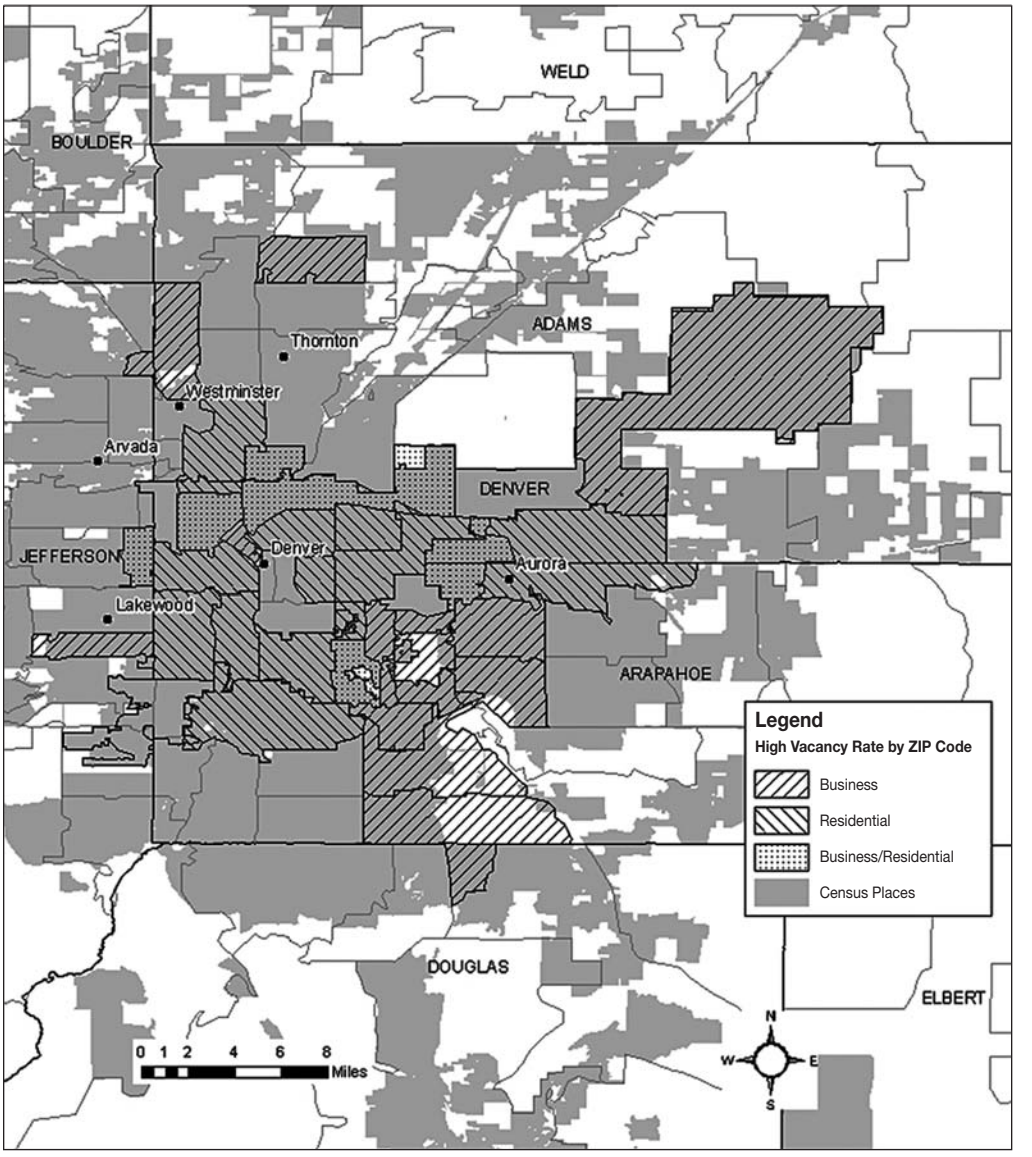
Exhibits 1 and 2 illustrate areas of high business and high residential vacancy rates by ZIP Code for December 2008. The ZIP Code areas of high business (left to right upward hatch), high residential (left to right downward hatch), and combined high business/high residential (stippled) are indicated in grayscale on the map. The 2000 Census Places have been added to show the urban centers of each metropolitan area. The text includes additional details on the construction of the maps.

One general observation can be made for both maps: high residential and high business vacancy rates occur in different ZIP Codes; relatively few ZIP Codes have a combination of both types of vacancies.

[1] HUD has entered into an agreement with the USPS to receive quarterly ZIP+4 extracts of addresses identified by the USPS as residential, commercial, or other. Under an agreement with the USPS, HUD aggregates this data to the census tract level for release to the public on HUD's Office of Policy Development and Research (PD&R) HUD USER website. The potential power of these data is that they represent the universe of all addresses in the United States and are updated every 3 months. HUD is making these data available for researchers and practitioners to explore their potential benefit for tracking neighborhood change. The USPS data and its documentation can be obtained from HUD at http://www.huduser.org/datasets/usps.html.

Exhibit 1

High Business and Residential Vacancy Rates by ZIP Code for the Denver, Colorado Metropolitan Area



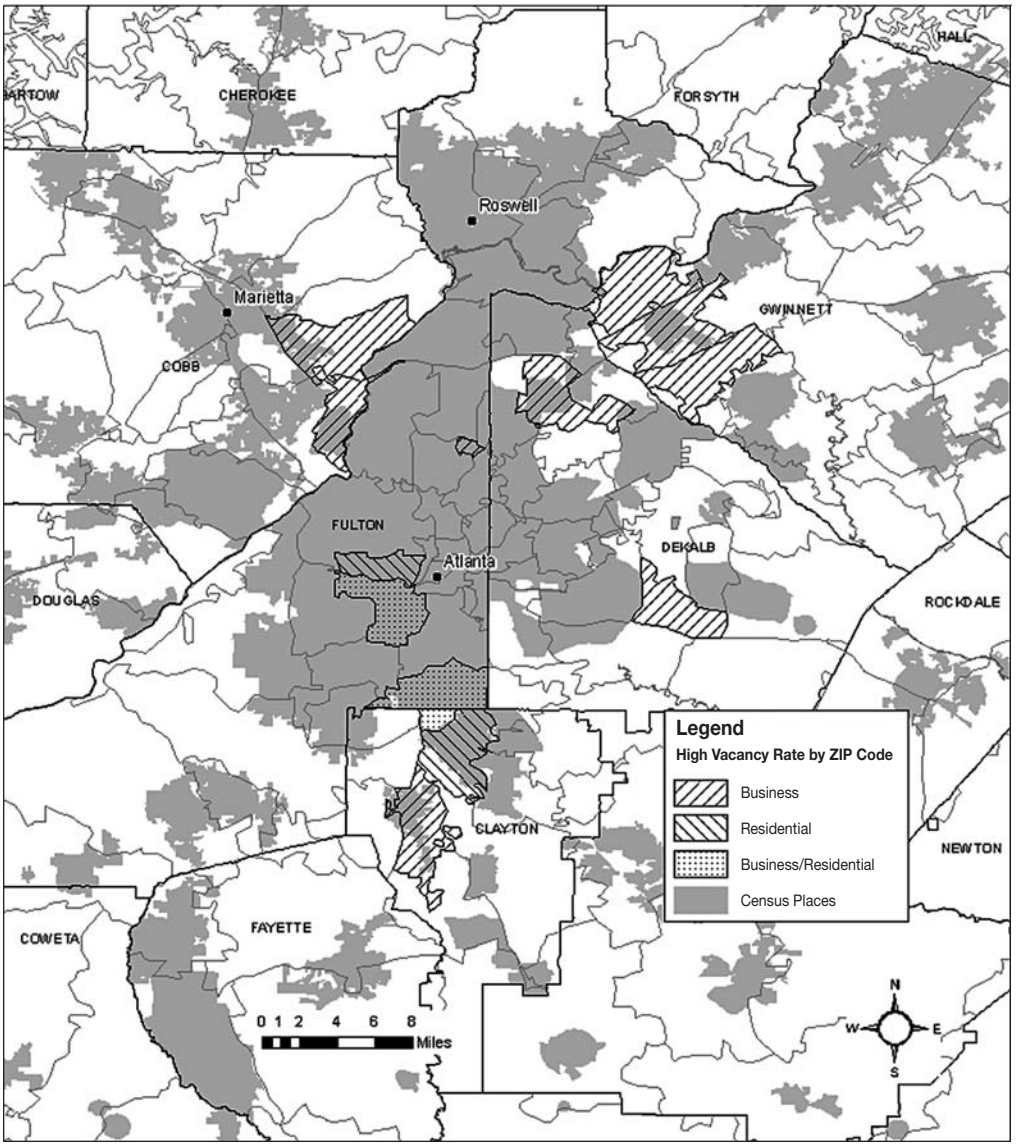
Author: KBM Group, Inc.,
U.S. Department of Housing and Urban Development,
Office of Policy Development and Research,
Office of Program Monitoring and Research.
July 2009.

Notes: ZIP Codes with residential vacancy rates above 4.77 percent and residential addresses above 515 (mean – 1 standard deviation) are shown. ZIP Codes with business vacancy rates above 17.02 percent and business addresses above 682 (mean) are shown.

Source: United States Postal Service address service data for December 2008

Exhibit 2

High Business and Residential Vacancy Rates by ZIP Code for the Atlanta, Georgia Metropolitan Area



Author: KBM Group, Inc.,
U.S. Department of Housing and Urban Development,
Office of Policy Development and Research,
Office of Program Monitoring and Research.
July 2009.

Notes: ZIP Codes with residential vacancy rates above 9.77 percent and residential addresses above 2554 (mean – 1 standard deviation) are shown. ZIP Codes with business vacancy rates above 16.71 percent and business addresses above 682 (mean) are shown.

Source: United States Postal Service address service data for December 2008

Exhibit 1 shows that many, if not most, ZIP Code areas in the central core of Denver County have high residential, high business, or a combination of both vacancy rates. Some of the ZIP Code areas in Arapahoe County, adjacent to Denver County, have high business vacancy rates, and two ZIP Codes have high residential vacancy rates. The southwestern portion of Adams County, adjacent to Denver County, has areas of high residential vacancy rates with one smaller area of high business and high residential vacancy rates. The areas with the highest vacancy rates, as described previously, occurred in the cities of Aurora and Denver, which constitute most of Denver County and part of Arapahoe County and are the urban center of the Denver, Colorado metropolitan area.

Conversely, exhibit 2 shows that most ZIP Code areas with high business and high residential vacancy rates are in the adjacent areas surrounding the urban center of the Atlanta, Georgia metropolitan area. Clayton, Cobb, DeKalb, Fulton, and Gwinnett Counties each have two or more ZIP Code areas with high business or high residential vacancy rates. Fulton County has the only areas with a combination of both high business and high residential vacancy rates that are located in the urban center. Unlike Denver, Atlanta appears to be more affected outside the central core.

These maps are not intended to explain thoroughly the patterns of residential and business vacancy in these two cities. They do, however, suggest that similarities and differences exist in those patterns across metropolitan areas and that further analysis of those patterns could yield a better understanding of the interrelationships between housing markets and the business cycle. Researchers and planners concerned about vacancies should consider exploring the USPS data to see whether these divergent vacancy patterns are consistent with facts on the ground and whether they hold true across other metropolitan areas. HUD is very interested in finding out how researchers use the USPS data. If you create any maps using the USPS data that you would like to share, or if you have any questions or comments, please send them to david.e.chase@hud.gov.

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Data Shop

Data Shop, a department of Cityscape, *presents short articles or notes on the uses of data in housing and urban research. Through this department, PD&R introduces readers to new and overlooked data sources and to improved techniques in using well-known data. The emphasis is on sources and methods that analysts can use in their own work. Researchers often run into knotty data problems involving data interpretation or manipulation that must be solved before a project can proceed, but they seldom get to focus in detail on the solutions to such problems. If you have an idea for an applied, data-centric note of no more than 3,000 words, please send a one-paragraph abstract to david.a.vandenbroucke@hud.gov for consideration.*

The Community Advantage Program Database: Overview and Comparison With the Current Population Survey

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Abstract

The Community Advantage Program Database (CAPD) is a unique data source that researchers can use to study the housing experiences of low-to-moderate-income and minority households in the United States. The CAPD includes data from a longitudinal panel survey of mortgage borrowers linked to monthly loan-level information and contemporaneous market valuation data and credit scores. To date, the CAPD has been used to examine a wide variety of financial and social topics for this population, including wealth and asset accumulation, mobility, postpurchase counseling, loan prepayment, neighborhood satisfaction, community involvement, and parental attitudes. After discussing the scope of the data, we compare the key demographics of the panel survey respondents with those of Current Population Survey respondents. To the best of our knowledge, no other publicly available data source combines longitudinal borrower survey data with comprehensive loan performance information.

Introduction

The Community Advantage Program Database (CAP Database, or CAPD)[1] is a unique database that combines information from the following three sources:

1. Community Advantage Panel Survey (CAP Survey, or CAPS)—an annual survey of approximately 5,200 low-to-moderate-income and minority U.S. homeowners and renters.
2. Loan-level data—origination and monthly servicing information for all original mortgage loans issued to homeowners participating in the CAP Survey.
3. Property valuation data—quarterly ZIP Code-level property evaluations for homeowners participating in the CAP Survey.

In the following text, we describe each component of the database. We conclude by examining the extent to which research based on the CAP Database can be generalized to a larger population of interest by comparing the key demographic variables of CAP Survey respondents with those of the May 2003 Current Population Survey (CPS) respondents.

Community Advantage Panel Survey

The CAP Survey fills an important research need because few existing data sources provide information about the housing experiences of the low-to-moderate-income and minority U.S. population. Moreover, the other available data generally have not been collected with this specific purpose in mind (Dietz and Haurin, 2003; Herbert and Belsky, 2008, 2006). In this section, we discuss the context and scope of the survey and data.

Background

The Community Advantage Program (CAP), from which the CAP Survey participants were drawn, was established as a partnership among the Ford Foundation, Fannie Mae, and Self-Help, a large community development financial institution located in Durham, North Carolina. Under CAP, Self-Help purchases primarily 30-year, fixed-rate mortgages (FRMs) originated through the Community Reinvestment Act-related lending activities of participating lenders. Almost all the loans made to survey participants are structured as 30-year FRMs and all were originated to finance home purchases. The CAP Survey provides an indepth examination of the experiences of a representative sample of CAP borrowers and a similar cohort of renters.

Because all the original loans made to CAP Survey homeowners originated between 1999 and 2003, the survey spans the housing market boom that peaked in early 2006 and the bust period of subsequent declines in property values and the economic recession of 2008.

[1] The Ford Foundation funds the CAPD.

Therefore, the survey provides researchers with an opportunity to examine the experiences of low-to-moderate-income and minority borrowers under varied and changing economic conditions. It also gives them an interesting counterfactual regarding subprime lending for this population.

Scope

The CAP Survey is designed to enable researchers to evaluate the financial and social effects of homeownership among low-to-moderate-income and minority households in the United States. The homeowners in the CAP Survey constitute the primary sample of interest; the renters, who were matched to the homeowners based on geographic location and an income ceiling, form a comparison group. In addition to collecting routine demographic information, the survey collects data in the following primary areas.

Housing Experiences and Mortgage Finance

Respondents provide details about the housing unit in which they live, any improvements they have made, and their overall reasons for being satisfied or dissatisfied with their housing. They also discuss new home purchases, refinancing terms, second mortgages, home equity lines of credit, and broker involvement in the mortgage process. Both homeowners and renters report on their payment habits, including delinquencies and foreclosures, and other reasons why they may have moved. Renters in the survey also discuss their plans and expectations regarding future homeownership.

Household Wealth, Assets, and Debts

The survey collects information about all household assets and debts, including wage and nonwage income sources, retirement accounts, cash equivalents, nonliquid investments, educational and medical debt, and credit card balances. Respondents also detail the costs and causes of any bankruptcies they have experienced.

Financial Literacy, Counseling, and Savings Behavior

Researchers can examine the relationships between homeownership and self-reported financial knowledge and thriftiness as well as the effects of prepurchase and postpurchase delinquency counseling. Respondents compare their economic situations with those of their parents and discuss their money-management habits, such as credit card repayment patterns, the use of payday lenders, and whether they play the lottery or send money to friends and family.

Social and Family Outcomes and Behaviors

Respondents rate their neighborhoods and discuss their social networks, neighborhood involvement, and volunteering and voting habits. They also report on their children's academic performance, their children's behaviors, their involvement as parents and expectations of their children, and their stress levels across a variety of life dimensions.

Geocodes

The addresses of survey respondents in each year have been recorded and geocoded down to the block group level. Therefore, the survey data can easily be matched up with external databases, such as data from the 2000 census.[2]

Loan-Level Data

The survey data for CAP Survey homeowners can be linked to loan-level information that Self-Help has collected from the originating lenders. These data include loan characteristics, such as the amortization term and interest rate and the original loan-to-value ratio, and property characteristics, such as whether the borrower purchased a single-family home or a condominium. Available borrower characteristics include the debt-to-income ratio and both origination and updated credit scores for loans that have remained active over time. Moreover, the data include transactional histories of monthly payments, which indicate delinquencies and cures, as well as transactions for stages in the foreclosure process and changes in the company servicing the loan.

Property Valuation Data

The survey and loan-level data for CAP Survey homeowners can be linked to quarterly ZIP Code-level property valuations from 2003 to the present. These data are made available by Fannie Mae and are estimated using an internal pricing methodology that takes into consideration not only local appreciation trends but also individual property characteristics and tax appraisals.

A Comparison of the Community Advantage Panel Survey and the Current Population Survey

The ability to generalize inferences made using the CAP Database is a crucial measure of the database's potential usefulness.[3] In the following text, we compare the weighted[4] demographics of CAP Survey homeowners and renters who completed baseline interviews with those of homeowners and renters who completed the May 2003 CPS.[5] (See exhibit 1.)

[2] In addition, the Census Bureau has provided industry and occupation codes for the respondents.

[3] A list of selected studies that have been prepared using CAPD data is presented in the Additional Reading section. Additional technical data issues, such as potential sample selection bias due to income, racial, and gender differences between homeowners and renters, are addressed in these peer-reviewed studies.

[4] For details about the CAPS sampling and weighting methodology and respondent attrition, see Riley and Ru (2009a, 2009b).

[5] This administration of the CPS falls roughly at the median of the baseline homeowner interview dates. The baseline homeowner interviews occurred mainly in 2003; the matched renters, however, were selected after the baseline homeowner interviews occurred and were interviewed for the first time in 2004.

Exhibit 1

Comparison of Weighted CAP Survey and CPS Homeowner and Renter Demographics (1 of 2)

Variable	Homeowners		Renters	
	CAP Survey (N=29K) (%)	CPS (N=19M) (%)	CAP Survey (N=19K) (%)	CPS (N=19M) (%)
Gender				
Male	55.9	49.6	32.7	42.4
Female	44.1	50.4	67.3	57.6
Age				
18–25 years old	18.2	4.7	18.7	17.2
26–30 years old	22.6	6.9	14.4	15.9
31–35 years old	17.8	11.1	12.8	15.9
36–40 years old	14.1	12.7	12.1	14.1
41 years old or more	27.3	64.6	42.0	37.0
Race				
White	57.2	58.7	37.8	44.2
Black	17.8	16.8	35.6	24.6
Hispanic	21.4	16.3	22.8	23.6
Other	3.6	8.2	3.8	7.6
Educational attainment				
11th grade or less	9.7	17.5	19.9	23.4
High school graduate/GED	21.9	35.4	28.1	35.0
Some college or associate's degree	43.5	27.9	32.1	26.6
Bachelor's degree or higher	24.9	19.1	19.8	15.0
Marital status				
Married	53.3	51.3	41.3	28.0
Widowed	1.9	5.8	3.7	3.0
Divorced	17.2	20.1	19.3	20.8
Separated	2.2	5.4	6.4	10.0
Never married	25.5	17.2	29.3	38.2
Household size				
One person	21.0	25.1	31.4	36.2
Two people	27.9	25.9	26.5	18.7
Three people	19.9	17.4	17.4	17.7
Four people	16.3	17.0	13.5	14.4
Five people or more	14.8	14.7	11.2	13.0
Employment status				
Working	91.5	70.2	64.5	68.8
Looking for work (unemployed)	3.4	4.6	13.5	7.3
Retired	1.9	8.3	4.2	2.3
Out of labor force	3.2	16.8	17.7	21.6
Geographic coverage				
Midwest	24.2	21.3	10.2	19.7
Northeast	2.7	15.7	0.0	18.8
South	56.1	40.2	72.4	34.9
West	17.0	22.8	17.4	26.6

Exhibit 1

Comparison of Weighted CAP Survey and CPS Homeowner and Renter Demographics (2 of 2)

Variable	Homeowners		Renters	
	CAP Survey (N=29K) (%)	CPS (N=19M) (%)	CAP Survey (N=19K) (%)	CPS (N=19M) (%)
Income				
Less than $20,000	10.8	23.8	47.2	49.9
$20,000–$24,999	13.9	11.9	11.8	12.1
$25,000–$29,999	15.8	12.8	15.3	11.9
$30,000–$39,999	25.2	26.5	14.0	17.3
$40,000–$49,999	21.2	10.9	7.4	6.2
$50,000 or more	13.1	14.1	4.4	5.5

CAP = Community Advantage Panel.

CPS = Current Population Survey.

GED = general equivalency diploma.

Notes: All differences are statistically significant with p<0.05. The sample size indicated for each group is the sum of the survey weights.

Data Preparation

The CPS is a survey of 50,000 households that the Census Bureau and Bureau of Labor Statistics conduct monthly. The survey is designed to represent the noninstitutionalized civilian population in the United States. Thus, it collects information about demographics and other household characteristics to provide an integrated picture of the U.S. labor force and its experiences. Because the CAP Survey represents households meeting Self-Help lending criteria and certain age requirements, we subset the CPS using similar criteria so that respondents of the two surveys can be more readily compared.

Specifically, because the survey respondent for the CAP Survey is the head of the household, we restrict the CPS to the reference person of each household, whom we identify as the person whose name is on the property deed or rental contract for that household. In addition, we exclude full-time students and respondents over the age of 65 because efforts were made to exclude such individuals from the CAP Survey pool.

We further subset the CPS to include only those households that meet a simplified version of the CAP lending criteria. That is, the CPS household income must but be no greater than 80 percent of the Area Median Income (AMI) at the metropolitan statistical area level or no greater than 115 percent of the AMI if the respondent is a minority.

Homeowners

The first two columns of exhibit 1 provide demographic proportions for the CAP Survey homeowners who completed the baseline interview and CPS homeowners. Compared with the CPS homeowners, the CAP Survey homeowners are more likely to be male (56 versus 50

percent) and more likely to be Hispanic (21 versus 16 percent). The proportions of White and Black respondents in these two samples are roughly comparable, however.

The demographic data also show that CAP Survey homeowners tend to be younger and more educated than CPS homeowners and are also more likely to be employed. About 40 percent of CAP Survey homeowners were 30 years old or younger when interviewed, compared with only 12 percent of CPS homeowners. In addition, only 27 percent of CAP Survey homeowners were 41 years old or older when interviewed, while 65 percent of CPS homeowners were in that age cohort when surveyed. Regarding educational attainment, CPS homeowners are nearly twice as likely as CAP Survey homeowners not to have finished high school. Moreover, CPS homeowners are only 70 percent as likely as CAP Survey homeowners to have completed at least some college. More than 90 percent of CAP Survey homeowners were employed as of the baseline interview, compared with 70 percent of CPS homeowners.

Despite these differences, CAP Survey homeowners and CPS homeowners are very similar regarding their overall household size distribution, and both sets of respondents have about a 50-percent likelihood of being married. The income distribution of CAP Survey homeowners is also similar to that of CPS homeowners, except that only 11 percent of CAP Survey homeowners are in the lowest annual income bracket (less than $20,000), compared with 24 percent of CPS homeowners.

The greatest difference between CAP Survey homeowners and CPS homeowners concerns geographic coverage. The CAP Survey has very little coverage in the Northeast and overrepresents the South.

Renters

The second set of columns in exhibit 1 provides demographic proportions for the CAP Survey renters who completed baseline interviews and renters in the CPS. Compared with the CPS renters, the CAP Survey renters are more likely to be female (67 versus 58 percent), less likely to be White (38 versus 44 percent), and more likely to be Black (36 versus 25 percent). Despite these differences, the proportions of Hispanic respondents in these two samples are roughly comparable.

The data also show that CAP Survey renters tend to be older and more educated than CPS renters. About 42 percent of CAP Survey renters were 41 years old or older when interviewed, compared with 37 percent of CPS renters. The CAP Survey renters are 4 percentage points less likely to not have completed high school. Moreover, 52 percent of CAP Survey renters had completed at least some college, compared with 42 percent of CPS renters.

CAP Survey renters were slightly less likely to be employed than CPS renters were (65 versus 69 percent) but nearly twice as likely to be unemployed (that is, not working but looking for work) than CPS renters were. It appears that the CAP Survey renters who were not working were more likely to be looking for work, while comparable CPS renters were more likely instead to have opted out of the labor force.

The income and household size distributions are similar for CAP Survey renters and CPS renters, although the former are more likely to have a second person living in the household in addition to the survey respondent. The CAP Survey renters are also more likely than CPS renters to be married (41 versus 28 percent) and less likely to have separated or never been married than their CPS counterparts.

As with the homeowners, the greatest difference between CAP Survey renters and CPS renters concerns geographic coverage. More than 70 percent of CAP Survey renters are located in the South, compared with 35 percent of CPS renters. Moreover, 19 percent of CPS renters live in the Northeast but none of the CAP Survey renters do.

Conclusion

The CAP Database is a unique resource for researchers interested in the housing experiences of low-to-moderate-income and minority households. The survey data include a broad range of social and financial outcomes collected during an unusual period of U.S. economic history and are linked with rich proprietary loan-level data concerning mortgage performance and housing appreciation. The CAP Survey participants are similar to comparable CPS respondents regarding household size, income distribution, and minority representation, although, compared with CPS respondents, CAP Survey participants tend to be slightly more educated, to demonstrate greater attachment to the workforce, and to be much more likely to live in the South.

In the years since the study began, some respondents have moved from their original locations and/or changed tenure status, thereby blurring the distinction between the original groups of renters and homeowners. Because the survey continues to follow respondents after a move and/or a tenure change, respondent mobility adds additional richness by expanding the range of topics that can be examined using the data. As is common for surveys, sample sizes may also be a statistical concern in some cases. Survey modules that intentionally target a subset of respondents, such as mobility or parenting questions, may provide data for several hundred respondents rather than for several thousand.

A version of the CAP Database that omits the personally identifying information of respondents is currently being prepared for public use. In all likelihood, researchers will be able to access most of these de-identified data. Confidential and proprietary information may be made available through special arrangements. Researchers who are interested in using the data or who want to receive more information about the upcoming public-use data sets should contact the Center for Community Capital at The University of North Carolina at Chapel Hill.

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Industrial Revolution

Every home makes compromises among different and often competing goals: comfort, convenience, durability, energy consumption, maintenance, construction costs, appearance, strength, community acceptance, and resale value. Often consumers and developers making the tradeoffs among these goals do so with incomplete information, increasing the risks and slowing the adoption of innovative products and processes. This slow diffusion negatively affects productivity, quality, performance, and value. This department of Cityscape *presents, in graphic form, a few promising technological improvements to the U.S. housing stock. If you have an idea for a future department feature, please send your diagram or photograph, along with a few, well-chosen words, to dana.b.bres@hud.gov.*

Framing for Strength and Efficiency

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Abstract

Typical construction for a single-family home uses lumber to create a light-wood frame, commonly called "stick framing." This construction method can be refined to consume less material, cost less, and provide greater energy efficiency through the application of concepts collectively called Optimum Value Engineering (OVE). OVE techniques identify inefficiencies in the design and framing of a home, yielding a project that provides the necessary strength and performance more affordably.

The Status Quo

Most conventional home construction relies on the use of dimensional lumber, generally 2 x 4s or 2 x 6s that provide the frame for a house on the job site. Often called light-wood framing (in contrast to timber framing, which uses heavier timbers), the design relies on the prescriptive (using established design requirements) provisions of the building code. Some disadvantages of the current approach include the following:

- Materials costs increase because light-wood framing uses lumber that does not contribute to the strength of the home.

- Insulating the home for energy efficiency is more difficult because the wood is not as good an insulator as the insulation used and excess wood may actually make insulation more difficult.
- Labor costs are higher because light-wood framing uses more lumber than optimized framing methods would.

Traditional residential framing methods suggest the use of 2-x-4 lumber installed every 16 inches for wall panels, regardless of whether the wall is load bearing, transferring the load of upper floors or the roof, or is nonload bearing.

Optimum Value Engineering

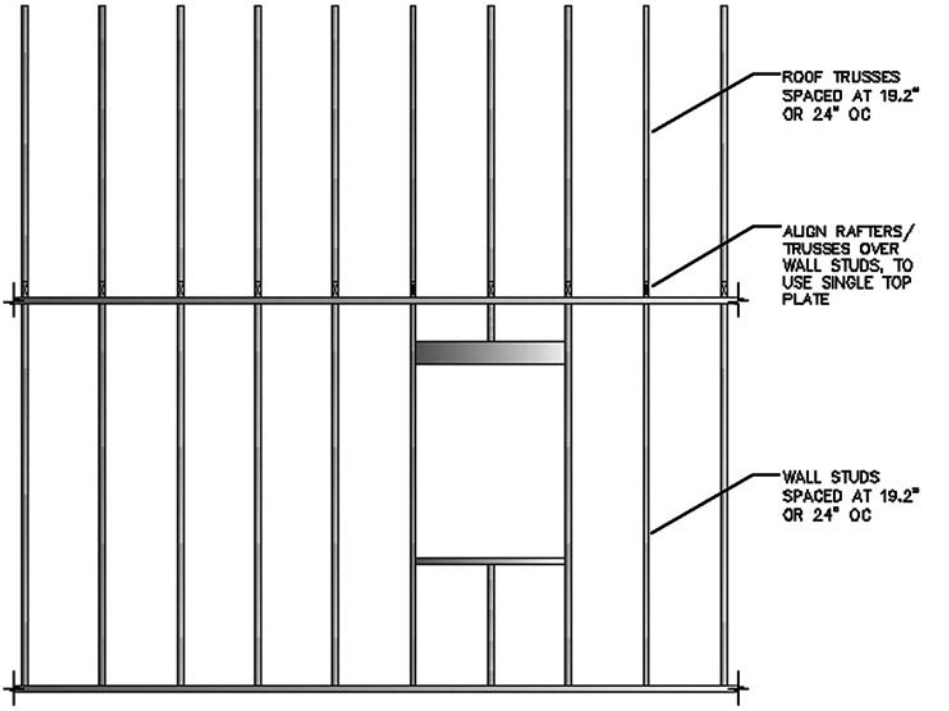
Framing using engineering principles can improve performance and save money. This framing concept, called Optimum Value Engineering (OVE), is a design and construction process that installs lumber where it is needed and omits lumber that does not contribute to the structural strength of the home. Although the term suggests that engineering is required, OVE framing is more of a process that follows the load path, or the route building loads follow when going from the roof to the foundation. When load paths are not considered, builders may use additional lumber (at additional cost) that provides little or no benefit. Load paths must be continuous for the structure to be effective, where a load in one framing member is cleanly transferred to another member.

OVE techniques can result in lower material and labor costs and improved energy performance for the building. Although OVE processes can be applied comprehensively in a home, many OVE elements can be used independently, depending on a project's specific needs. OVE can include the following:

- **Increasing stud spacing.** Studs, or the vertical members of walls, are typically spaced every 16 inches (generally called 16 inches on center, or 16" OC). Increasing the spacing of the studs to 19.2 or 24 inches on center decreases the amount of lumber needed while still allowing for easy attachment of the drywall on the interior or sheathing on the exterior. (Spacing studs at 16 inches means an 8-foot-long piece of sheathing is attached to seven studs when the sheathing is installed horizontally. At 19.2-inch spacing, the number of studs is reduced to six and, at 24-inch spacing, the number is just five studs.) Framing with studs at 16 inches on center requires additional lumber, which must be purchased and installed, and typically provides no structural benefit to the home.
- **Eliminating double top plates.** Conventionally framed walls consist of a horizontal bottom plate attached to the studs, the vertical studs, and a double horizontal top plate fastened on top of the studs. An OVE approach allows the double top plate to be changed to a single top plate by ensuring the studs or rafters above are directly aligned with the studs located above to provide a continuous load path. If one places a rafter in the center of a stud bay (the area between two studs) rather than directly above the studs, there is little strength to resist vertical loads from the roof. Exhibit 1 shows a wall with a single top plate and the rafters aligned directly over the studs in the wall.

Exhibit 1

Rafters Aligned Over Studs Use a Single Top Plate and Provide Structural Strength



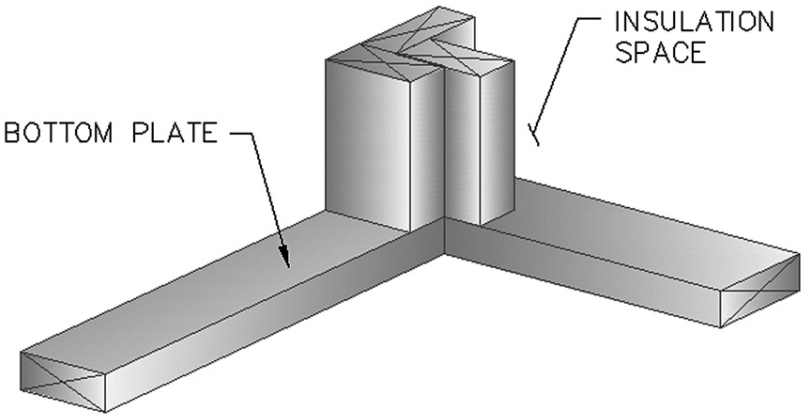
OC = on center.

- **Reducing members used for corner framing.** In the past, corners were often framed with as many as four studs. This technique was generally done not for strength but to allow the interior drywall to be fastened easily. Using OVE framing techniques, the corner can be reduced to three or two studs without any decrease in building strength. Exhibit 2 shows a three-stud corner.
- **Eliminating headers or reducing header sizing.** Often, builders may install unnecessary or oversized headers over doors and windows to simplify the construction process by doing the construction only a single way (that is, using a single design approach in all cases to avoid confusion). In nonload-bearing walls, however, headers may not be required or they may be reduced in size.

Although the initial benefit of OVE framing techniques may be considered as decreasing the construction costs for materials and labor, these framing techniques also yield a two-fold energy benefit. The first benefit is increased opportunities to insulate the house and the second is the opportunity to reduce the energy losses associated with lumber. With an insulation value of R 1.25 per inch, lumber is not as good an insulator as any of the commonly used fiberglass or foam insulation materials (with R-values ranging from R 3.3 per inch for fiberglass to R 5 to 6 per inch for many types of foam).

Exhibit 2

A Three-Stud Corner Reduces the Amount of Lumber Without Decreasing Structural Strength



In the case of a 2-x-4 wall, changing from 16-inch OC framing with a double top plate to 24-inch stud spacing with a single top plate reduces the amount of the wall that is wood (and therefore uninsulated) from 13.8 to 9.8 percent. In a 4-x-8-foot section of wall (that is covered by a sheet of drywall), that means 186 square inches of wall that can now be better insulated. The lumber savings are also significant. Continuing the example described previously, the lumber required for a 4-x-8-foot section of wall is reduced by 11 feet, which amounts to about $3 worth of lumber.

Some walls will continue to require additional framing as specified by the building code or designers to accommodate seismic, wind loading, or other environmental requirements.

Training

Because framing carpenters may be unfamiliar with many of the techniques for OVE framing, crews may require training and additional supervision until mastery is achieved. After the carpenters learn the techniques, however, framing will be faster and less expensive.

Sources

ToolBase TechSpecs: Advanced Framing Techniques at http://www.toolbase.org/pdf/techinv/oveadvancedframingtechniques_techspec.pdf.

Consult the International Residential Code for specific framing requirements.

Author

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Impact

A regulatory impact analysis must accompany every economically significant federal rule or regulation. The Office of Policy Development and Research performs this analysis for all U.S. Department of Housing and Urban Development rules. An impact analysis is a forecast of the annual benefits and costs accruing to all parties, including the taxpayers, from a given regulation. Modeling these benefits and costs involves use of past research findings, application of economic principles, empirical investigation, and professional judgment.

The Impact of the Final Rule on Income and Rent Determination Requirements in Public and Assisted Housing

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Abstract

Applicant or tenant failure to correctly report income in U.S. Department of Housing and Urban Development (HUD)-assisted housing programs may result in overpayment or underpayment of housing assistance. To mitigate the issue, HUD issued a final rule on rent and income determination in assisted housing. Assuming the rule is 100-percent effective in eliminating earned-income–based rent errors, if no oversubsidized tenants left in response to rent increases based on correct determination of earned income, then the net transfer to new tenants would be about $480 million a year, resulting in about 92,000 new tenants served. At the other extreme, if all households that were oversubsidized due to earned-income error left HUD-assisted housing in response to rent corrections under the rule, the transfer to new tenants would amount to about $1.72 billion a year (a figure that includes the subsidies they are properly entitled to under the law), resulting in about 337,000 new tenants served. The rule is unlikely to be 100-percent effective, however. The corrective actions of income and rent discrepancies may not necessarily lead to a reduction in subsidy; they could, in fact, lead to an increase in program funding needed to maintain the number of households served by the program if formerly oversubsidized households withdraw from the programs and are replaced by households with incomes still lower than theirs.

Analytic Problem

In January 2009, the U.S. Department of Housing and Urban Development (HUD) published a final rule aimed at streamlining the process of upfront verification of the income of assisted families, including the use of the Enterprise Income Verification (EIV) System.[1] The rule's goal is to reduce errors and overpayment of subsidies caused by incorrect income determinations and rent calculations in HUD's public and assisted programs. Proper income determination and cost controls are key determinants of the level of federal assistance for operating subsidies, which is calculated in theory as the difference between operating costs and income-based rents charged to tenants.

HUD's Office of Policy Development and Research determined that a Regulatory Impact Analysis (RIA)[2] was required because the refinement of income and rent determination requirements in public and assisted housing programs could result in transfers of funding to and among stakeholders of more than $100 million a year.

The conclusions in this article are based on an ongoing HUD research study, the Quality Control study (QC study).[3] The findings in the 2005 report imply that the gross transfer resulting from eliminating all the underpayment and overpayment of rents is approximately $925 million ($584 million in rent subsidy overpayment and $341 million in rent subsidy underpayment). Of the $925 million, about $138 million in rent subsidy overpayment and $17 million in rent subsidy underpayment are attributed to errors in earned income reported to, or recorded by, program administrators as determined by QC study interviewers. In addition, data matching with the National Directory of New Hires (NDNH) indicate an additional $359 million in rent underpayment due to tenants' failure to report income to both program administrators and QC study interviewers. The corrective actions of income and rent discrepancies found through EIV may not necessarily lead to a reduction in subsidy; they could, in fact, lead to an increase in program funding needed to maintain the number of households served by the program if formerly oversubsidized households withdraw from the programs and are replaced by households with incomes still lower than theirs.

Background

Third-party program administrators, including public housing agencies (PHAs), public and private project owners, and contracted management agents, administer HUD's rental housing assistance programs on HUD's behalf. Eligible tenants are generally required to pay up to 30 percent of their

[1] Published in the *Federal Register* as a final rule on January 27, 2009. 74 Fed. Reg. 4832.

[2] General requirements for assessing costs and benefits in an RIA were first introduced in Executive Order 12291, "Federal Regulation" (February 17, 1981). These requirements were revised and reissued as Executive Order 12866, "Regulatory Planning and Review" (October 4, 1993), where they continue to apply.

[3] Under contract with HUD, ORC Macro of Calverton, Maryland, conducts an annual quality control study for rental assistance subsidy determinations. The study provides national estimates of the extent, severity, costs, and sources of rent errors for public housing and other assisted housing programs.

income toward shelter costs (rent plus utilities), with HUD providing the balance of the rental payment. New program applicants are required to provide certain information on household characteristics, income, assets, and expenses that are used to determine what rent they should pay. Existing tenants are required to recertify this information annually and sometimes more frequently, when significant changes in household income or composition have occurred.

Applicant or tenant failure to correctly report income may result in HUD's overpayment or underpayment of housing assistance. The failure of the responsible program administrator to correctly interview the tenant or to process, calculate, and bill the tenant's rental assistance may also result in HUD's overpayment or underpayment of housing assistance. After a household income discrepancy is discovered, a PHA may take action to recover the lost rent due to past-unreported income and to prevent further rent payment error. These actions include referral to the HUD Inspector General, termination of housing assistance, rent increases, and rent repayment. If a parallel policy is applied to tenants with overpayment of rent (subsidy underpayments), PHAs would take action to reimburse overpaid rents and adjust future rent payments. Although it is probable that program administrators would move to adjust future rent payments, it is less certain that they would act to cover subsidy underpayment by reimbursing overcharged tenants or to recover the lost rent payment due to past-unreported income. It is, therefore, not known how much of the past subsidy error can be corrected.

This analysis does not consider tenants' reactions to changes in individual subsidy levels caused by the rule. For example, in the case of a household's termination or departure from the housing program, we do not know whether the PHA can or will accept a new tenant in a timely manner. Also, when a new tenant is accepted, we do not know if the new tenant will pay a higher or lower rent. If most newly admitted tenants pay lower rents, this scenario could lead to an increase in subsidy needs. This article assumes that any oversubsidy eliminated by the rule is transferred from oversubsidized tenants to undersubsidized tenants and unsubsidized (new) tenants. If currently oversubsidized tenants whose rents are corrected by the rule subsequently quit the program and are replaced by different tenants, the amount of the subsidy transfer is larger, reducing the number of new tenants.

Using the 2005 QC study data for illustration, under the simplifying assumption that different households do not enter or leave the program because of better income verification, more than $138 million would be redistributed among assisted households each year if the rule were 100-percent effective in reducing subsidy determination errors related to earned income as found in the 2005 QC study. In addition, $359 million of rent underpayment associated with unreported or underreported income as detected in the NDNH income matching study would be corrected[4] if the rule were 100-percent effective.

[4] The NDNH data are used to identify sources of earned income or unemployment compensation not found during the QC study field data collection process. Adding the new sources of income to the incomes already identified during the QC field data collection and recalculating the household's rent determine the rent underpayment (subsidy overpayment) associated with these new sources of income.

The rule is unlikely to be 100-percent effective. Moreover, as stated previously, correct subsidy determination will change participant households' incentives, and thus the set of households served will remain the same. Although the findings of the yearly QC study are indicative of the source and magnitude of the payment errors, the QC study does not elaborate on the fiscal and economic impact of policies that would eliminate the errors. Various interpretations and conclusions have been drawn from the QC study findings.

Analysis

The final rule mandates the use of Upfront Income Verification (UIV). EIV is a tool of UIV. The mandate is the implementation of UIV, not the use of EIV.[5] Other tools, such as computer matching agreements with a federal, state, or local government or private agencies or direct requests to federal, state, or local government agencies or private agencies, are suggested under UIV. Notwithstanding, the use of EIV is suggested whenever it is possible because it is free to PHAs. EIV is a sunk cost already supported by HUD.[6]

Successive QC studies report that incorrect income and deduction amounts were by far the most significant sources of errors in determining rents. These research findings reinforce the notion that the full implementation of the process of UVI, including the use of EIV provision of the final rule, would be the primary factor in reducing rent errors due to unreported and underreported household income. The rule is unlikely to achieve the complete elimination of income-related error found in the QC and income matching studies, however. This analysis focuses on earned-income error because it is the only QC income category that does not also include other income types not covered by the EIV System. The transfer amounts associated with 100-percent effectiveness in eliminating earned-income error stand as a proxy for the overall effectiveness of the rule. Although the rule is unlikely to result in 100-percent elimination of earned-income error, it will result in the correction of error from other types of income.

The following paragraphs address the potential effect on the distribution of subsidies among groups of tenants (transfers attributed to the rule) under the assumption that the rule is 100-percent effective in eliminating earned-income–related error.

Because undersubsidized tenants are more likely to stay in assisted housing programs when their rents are reduced by correct accounting of their earned income, the transfer to these tenants under the final rule is likely to amount to the error reduction of $17 million a year. Because undersubsidy errors are on net smaller than oversubsidy errors, the source of this transfer can be considered oversubsidized tenants.

[5] Although EIV has been available to Office of Public and Indian Housing program administrators for a number of years, its use has not been required, although it may have contributed to some of the reduction in earned-income–based subsidy errors since 2000.

[6] HUD estimates that it would cost between $1 and $45 per verification if PHAs were to implement their own alternative methods of income verification.

Oversubsidized tenants, of course, are faced with a different incentive when their rents are increased due to correct detection of, and accounting for, their earned income. Many may choose to leave HUD subsidy programs if the (reduced) benefits are outweighed by the costs (of income reporting and other rule compliance). In this case, the $497 million a year in oversubsidy error represents a minimum transfer (assuming 100-percent effectiveness of the rule in reducing this error) to undersubsidized and unsubsidized tenants who enter the programs (assuming no change in real funding levels), because those tenants leaving the programs would forfeit to new tenants any remaining subsidy they would receive under their corrected rents.

Assuming the rule is 100-percent effective in eliminating earned-income–based rent errors, if no oversubsidized tenants left in response to rent increases based on correct determination of earned income, then the net transfer to new tenants would be about $480 million a year ($497 million in underpaid rents from underreported income minus $17 million in overpaid rents from overreported income), resulting in about 92,000 new tenants served (assuming an average total subsidy per tenant of $5,091 a year) At the other extreme, if all 337,000[7] households that were oversubsidized due to earned-income error left HUD-assisted housing in response to rent corrections under the rule, the transfer to new tenants would amount to approximately $1.72 billion a year (a figure that includes the subsidies they are properly entitled to under the law), resulting in about 337,000[8] new tenants served, again assuming $5,091 average annual subsidy cost.

Caveats

A potential exists for improvement in the proper payment of HUD subsidies. Rent errors have been declining due to past HUD actions, but there is less consensus on the size of the potential fiscal or economic impact of corrective action measures available to program administrators. Although it is likely that a program administrator would act to correct future rent payments, it is not certain that PHAs would recover the lost rent payment due to past-unreported income, or how much overpaid subsidy can in fact be recovered from households with rent payment errors. The implementation of the final rule would improve the integrity of the programs and would result in some transfers. It will not necessarily lead to a reduction in subsidy needs, however, and could in fact lead to an increase in program funding to maintain the number of households served.

Acknowledgments

The author thanks Alastair W. McFarlane and Kurt G. Usowski for encouraging the development of this article and providing helpful comments on the economic impact analyses of the rule itself.

[7] This estimate does not account for any overlap between oversubsidized tenants with QC study earned-income error (212,000) that may also have had underreported income detected in the income match study (125,000). Therefore, it is an overestimate.

[8] Again, this is likely an upper-bound estimate because new tenants may have incomes even lower than the misreported incomes of formerly oversubsidized tenants, so fewer would be served.

Author

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Additional Reading

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