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METROPOLITAN AREAS

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Abstract

Segregation by race, ethnicity and income is a persistent feature of U.S. cities and communities, and ethnic enclaves have formed ever since immigration became more diverse. For low-skilled immigrants in particular, settling in an ethnic enclave may offer important opportunities and facilitate coping with the new environment. However, immigrant enclaves may also foster occupational segregation and retard assimilation, with the willingness to invest in language acquisition playing a key role. This paper expands on earlier work focusing on the linkage between spatial segregation and language acquisition. Using data from the 2000 U.S. Census the study stratifies immigrants by their location in one of four metropolitan areas by educational attainment and national origin in order to determine the effect of these individual characteristics on English proficiency. The probability of speaking English was found to vary across the four locales and educational attainment. Language acquisition was highest in the metropolitan area where the immigrant share is smallest, and is increasing in educational attainment.

Key words: immigration, human capital, language acquisition
JEL codes: I21, J10, R20

1. Introduction

International migration has become a hotly debated issue throughout the world. Typically, states unilaterally[1] determine how many migrants are allowed to enter, who is allowed to enter, when, and for how long (Duncan 2008). Once immigrants have entered their host country, there may be additional restrictions on where they live and where they work. In the U.S., for example, refugees' locations are influenced by refugee resettlement programs and some visa types are linked to employers, thus indirectly also affecting immigrants' decisions on where to live. For the most part, however, the United States has a *laissez-fair* attitude and immigrants are free to choose where to live.

This same *laissez-fair* attitude also characterizes U.S. federal policy towards immigrant assimilation and integration. In fact, unlike many other immigrant-receiving countries, the U.S. government does not have programs that assist immigrants with their integration into their new environment. This neglect is quite surprising since speaking and understanding English is the key for immigrants' integration into U.S. society. Again and again, the literature finds that learning the language of the host country fosters immigrants' upward mobility and has positive pay-offs (see, e.g., Berman, Lang and Siniver 2003; Chiswick 1998; Chiswick and Miller 1999, 2002). But not only the immigrants themselves will benefit from assimilation aid, especially language training, society at large will also benefit since a shared language is a necessary condition for social cohesiveness and 'trade' among individuals (Lazear 1999).

The lack of a federal integration and assimilation policy implies that immigrants' personal characteristics and their immediate environment will have a disproportional influence on their chances to integrate and, ultimately, be successful. In fact, the immigrant's human capital upon arrival and the characteristics of the community where the immigrant chooses to locate are expected to strongly influence the immigrant's assimilation behavior and chances of integration. An immigrant enclave may have positive but also negative externalities (Borjas 1998) for immigrants' willingness to assimilate. When it comes to learning English, large ethnic neighborhoods are disadvantageous as immigrants can function quite well without having to invest time and money into learning English. In fact, Lazear (1999) argues that the expected revenue of language acquisition is inversely related to the size of the ethnic enclave. The strength of the inverse relationship may, however, differ by national origin or by the immigrants' human capital.

This study looks at the interplay between immigrant assimilation, represented by English language proficiency, in different spatial locales, and differentiated by national origin, and human capital. We chose four metropolitan areas (Boston, Chicago, Dallas and San Francisco) that represent different environs for different immigrant groups. Focusing on Chinese and Mexican immigrants, the study addresses two questions. First, is immigrants' language proficiency influenced by where they live? The expectation is that the four metropolitan areas offer immigrants different incentives to invest in language acquisition. Following Lazear (1999) and Florax, de Graaff and Waldorf (2005) we argue that immigrants living in a metropolitan area with a large immigrant enclave are less likely to invest in learning the language than those living in a metropolitan area with a small immigrant enclave. Second, we ask whether this effect varies by educational attainment and by national origin. The findings regarding the above issues will have important policy implications for selectively targeting particular segments of the immigrant population for language classes and other types of assimilation aid.

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[1] There are a few exceptions, such as the bilateral agreement (the so-called *bracero* program) between Mexico and the United States that was signed during World War II, but was unilaterally terminated by the U.S. in the 1960s.

The analysis uses data from the 2000 U.S. Census. We estimate a series of discrete choice models and focus on the probabilities that immigrants are proficient in English. We stratify immigrants by their location in one of the four metropolitan areas, by educational attainment, and national origin. We control for immigration related variables, such as personal and family attributes.

The paper is organized in four sections. Following this introduction, the second section provides background information on assimilation and language acquisition, as well as a brief profile of the selected metropolitan areas. The third section presents the empirical analysis, with subsections dedicated to data, methods and results. The paper concludes with a summary and conclusions.

2. Background

2.1 Immigrant Concentration and Language Acquisition

The United States is an immigration country, admits large numbers of immigrants every year, and provides a well defined path towards citizenship. While each immigrant's path is different, a necessary condition of acquiring citizenship is language proficiency. In fact, preconditions for immigrants' naturalization are a certain length of stay in the U.S. (usually five years after being granted a permanent residence permit or "green card"), and passing a civics as well as a language test. The U.S., unlike other immigration countries, does not take on an active role in the assimilation of immigrants (Fix 2007). It is left to the immigrants themselves to decide to what extent they wish to assimilate, whether to learn the English language, and whether to ultimately apply for citizenship. Under these circumstances, the immigrants' personal characteristics as well as the characteristics of the local community will be influential for the decision to assimilate and learn English. For example, for low-skilled immigrants in particular, settling in an ethnic enclave may offer important opportunities and facilitate coping with the new environment. However, immigrant enclaves may also foster occupational segregation and retard assimilation, with the willingness to invest in language acquisition playing a key role.

The theoretical foundation of this study is Lazear's model of language acquisition (Lazear 1999). In short, Lazear's model focuses on the probability of immigrants acquiring the language of the majority culture. It is based on a random encounter model, in which the probability of meeting an individual of one's own group is proportional to the group's share of the total population, p_X. It further assumes that trade occurs when two people meet who share the same language. Not knowing the language of the host society implies that a person's expected gains of trade are proportional to p_X. Investing into learning the language of the host society enhances trade opportunities and yields expected revenues proportional to $1 - p_X$. On the other hand, Lazear also introduces the costs of learning the new language. The interplay between expected revenues and transaction costs influences the probability of investing in learning the host society's language and Lazear shows analytically that the probability of acquiring the host country's language is inversely related to the share of the minority population, p_X. He concludes that the value of language acquisition is higher for small immigrant groups than for large minorities. Lazear empirically tested his model using 1900 and 1990 U.S. census data, estimating logit models of whether immigrants are fluent in English. The key explanatory variable was the percentage of immigrants of the same nationality living in the same county as the respondent. The focus on the county is a constraining assumption as it assumes that interaction and trade are spatially restricted within county boundaries.

Florax, de Graaff and Waldorf (2005) extended the Lazear model by allowing for spatial interaction going beyond the immigrant's area of residence.[2] When testing the model for four non-western immigrant groups in the Netherlands they found only ambiguous support for the inverse relationship between the size of the immigrant community and language acquisition or language proficiency in The Netherlands.

In this study we take a different approach and lift the spatial interaction constraint by extending the encounter space to the entire metropolitan area. Metropolitan areas are groups of counties that form a functional entity by requiring that the included counties are linked via commuter flows to the core counties (Isserman 2005, Waldorf 2007). In the following section the metropolitan areas used in this study are profiled, placing special emphasis on the size and composition of the immigrant population.

2.2 Demographic Profile of Study Areas

The four metropolitan areas, Boston, Chicago, Dallas and San Francisco, are located in different corners of the United States. Boston is part of a highly urbanized area along the East coast, and forms the northern edge of the Eastern megalopolis that stretches from Boston to Washington, DC. Its area penetrates four different states and in total it had 5.8 million residents in 2000. With 9.1 million residents, the Chicago metropolitan area is by far the largest of the four metropolitan areas. It stretches along the southern tip of Lake Michigan, from Wisconsin to northwestern Indiana, with Cook County as its core county located in Illinois. The Dallas-Fort Worth metropolitan area is located in the center of Texas and is, with 5.2 million inhabitants, the smallest of the four metro areas. Finally, the San Francisco metropolitan area has seven million residents and is part of the emerging Western megalopolis along the California coast.

Table 1. Total and Foreign-born Population in Selected Metropolitan Areas, 2000

Metropolitan Area	Population	% Foreign-born residents	% Residents born in China	% Residents born in Mexico
Boston–Worcester–Lawrence, MA–NH–ME–CT CMSA	5,819,101	12.4	0.9	0.1
Chicago–Gary–Kenosha, IL–IN–WI CMSA	9,157,540	16.0	0.5	6.6
Dallas–Fort Worth, TX CMSA	5,221,801	15.0	0.4	8.8
San Francisco–Oakland–San Jose, CA CMSA	7,039,362	27.0	4.0	6.6

Source: U.S. Census Bureau

Important in the context of this study is the variation in the demographic composition of the population across the four metropolitan areas. Foreign-born residents make up over a quarter of the population in the San Francisco metropolitan area, whereas with 12.4% the Boston area has the smallest share of foreign-borns among the four study areas. Moreover, residents born in China make up four percent of the population in San Francisco, but less than one percent in the three other metropolitan areas. With respect to the Mexican-born population, Dallas tops the list making up almost nine percent of the population. In contrast, Mexicans in Boston only account for one-tenth of the population. San Francisco and Chicago, where Mexican-born residents make up about 6.6% of the population, take on a middle position.

[2] Their study also explicitly incorporates spatial segregation as well as behavioral differences of immigrants with respect to their level of assimilation into the host country and differences in networking within their own ethnic community.

Given the variations in the size of the Mexican and Chinese immigrant communities as a proportion of total population, and following the arguments by Lazear, we expect that English language proficiency is most likely for Mexicans residing in Boston, and for Chinese immigrants living in Dallas. Chinese in the San Francisco area on the other hand should have little incentive to have acquired the English language, and similarly Mexicans in Dallas should be less likely to have learned English. However, language acquisition is not only affected by location, but also by other attributes such as the length of stay in the U.S. Interestingly, there are substantial differences in the year of entry distributions of Mexicans of Chinese, and these distributions also differ across the four metropolitan areas.

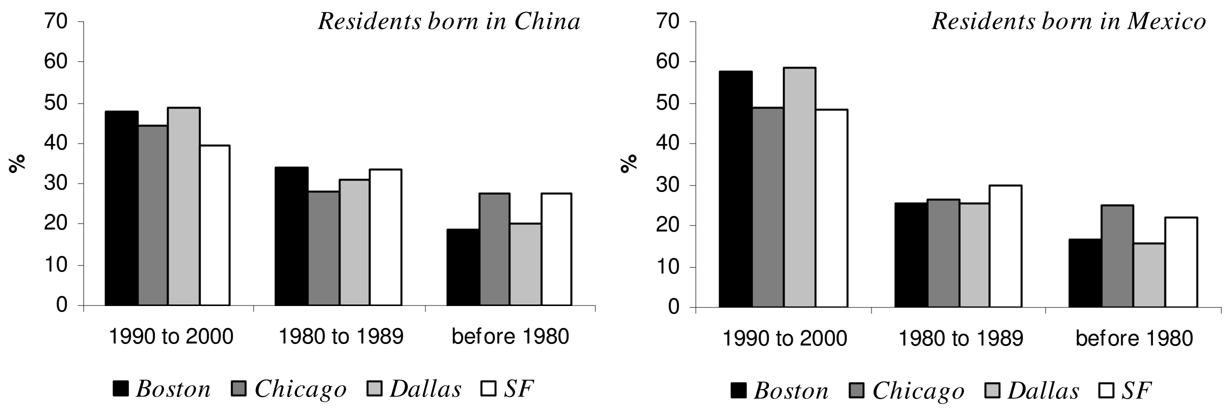

Figure 1. Immigrants by Year of Entry, Selected Metropolitan Areas, 2000

Figure 1 shows the distribution of Chinese and Mexican residents by length of stay in the U.S. For both groups, more recent arrivals with entry between 1990 and 2000 outnumber the earlier cohorts. However, the disparities are much more pronounced in the case of Mexican immigrants than in the case of Chinese immigrants. The graphs also show that recent arrivals have a larger share of both the Chinese and Mexican population in Boston and Dallas than in San Francisco and Chicago. San Francisco and Chicago both have a long tradition of being gateway cities of immigration. Thus, it is not surprising that, for example, the share of established Mexican immigrants with entry before 1980 is 1.6 times higher in Chicago than in Dallas.

3. Empirical Analysis

3.1 Data and Methods

To disentangle the effects of location and other language proficiency affecting variables, the empirical analysis is based on a sample of persons born in China or in Mexico taken from the 1% Public Use Micro Samples (PUMS) of the 2000 U.S. census, extracted from the IPUMS data base of the Minnesota Population Center. At the time of the survey, the persons were at least 18 years old and resided in one of the four metropolitan areas, Boston, Chicago, Dallas, or San Francisco. In total, the data set includes 31,766 observations.

The variable of interest is the person's English proficiency, categorized as speaking English at least good versus speaking English poorly or not at all. Overall, 53.3 percent of the sampled immigrants indicate that they are proficient in English. The salient explanatory variables are location and education. The respondent's residence in one of the four metropolitan areas is coded as a series of three dummy variables, with Dallas being the omitted category. In total, 41 percent of the respondents are from San Francisco, 30.6 percent from Chicago, and 25.2 percent from

Dallas. As expected, Boston has the smallest share in the sample with only 3.3 percent. The education variable stratifies between those with a medium education level (29 percent with a high school diploma and possibly some college), those with at least a bachelor's degree (11 percent) and the large share (60 percent) of those without a high school diploma.

Table 2. Variable Definitions and Summary Statistics

Variable	Definition	Average	Std. dev.
Mex	1 = born in Mexico; 0 = born in China	0.814	0.389
age	Respondent's age in years	40.407	15.505
female	1 = female; 0 = male	0.459	0.498
married	1 = married; 0 = not married	0.613	0.487
citizen	1 = U.S. citizen; 0 = non-U.S. citizen	0.347	0.476
sojourn	sojourn length in years	17.092	13.073
proficient	1 = speaks English at least well; 0 = not well or not at all	0.533	0.499
income	family's total income as a percentage of the poverty threshold	250	152
atleastone	1 = at least one other household member speaks English	0.775	0.418
nHHse	number of other household members speaking English	1.819	1.581
hs	high school diploma	0.286	0.452
bsplus	at least a bachelor's degree	0.109	0.312
labfrce	1 = in the labor force	0.617	0.486
BOS	1 = resides in Boston MSA	0.033	0.180
CHI	1 = resides in Chicago MSA	0.306	0.461
SF	1 = resides in San Francisco MSA	0.410	0.492

In addition, we control for two types of variables. The first type relates to information that specifically comes into play when dealing with an immigrant population, namely the immigrant's place of birth (Mexico versus China), the immigrant's length of stay in the U.S., and whether or not the immigrant is naturalized. The second type of variables measures other personal characteristics that describe the respondent's demographic and socio-economic background. Included are age, sex, marital status, whether some other English-speaking person lives in the household, and whether the person is in the labor force. Table 2 shows the variable definitions and summary statistics.

We estimate a series of binary choice models where the dependent variable indicates an immigrant's English proficiency. We begin with two models that only include the non-spatial variables (Model 1 and 2). The first model expresses language proficiency as a function of immigration related variables only. The model is then enhanced by also adding the demographic, socio-economic and education variables. Subsequently, we add the three metro dummies in Model 3, and in Models 4 and 5 we allow the location effects to vary by national origin and by educational attainment, respectively. The models were estimated as logit models, with observations weighted by 'person weights' provided by the Census Bureau, and heteroskedasticity-robust standard errors.

3.2 Results

Table 3 shows the results of the logit estimations for the five models. Overall, the models perform quite well and provide support for the Lazear model. Before discussing the effect of location on immigrants' propensities to invest in English language acquisition, we begin with a few general observations that provide a consistent profile of immigrants who are proficient in English.

Model 1 focuses on the impact of immigration-related variables on English language proficiency. Compared to Chinese immigrants, Mexican immigrants are more likely to be proficient. In Model 1, the estimated effect is relatively small, although significant, and the magnitude of the effect increases in the more comprehensive Models 2 and 3. Based on Model 3, the odds of Mexican immigrants being proficient in English are 1.4 times higher than the odds of Chinese immigrants being proficient in English. Not surprisingly, citizenship is also a strong predictor of English language proficiency, with the relative odds amounting to 1.79 in Model 1 and increasing to 1.9 in the more comprehensive models. Similarly expected are the estimated results for the length of stay in the U.S. As immigrants extend their sojourns in the U.S., their propensity to speak English increases significantly, but at a slightly decreasing rate.

Starting with Model 2, the demographic and socio-economic variables are included. *Ceteris paribus*, older immigrants are less likely to speak English. This result is expected as the cost of language acquisition increases with age. Being a woman and being married also reduce the probability of English language proficiency. Women are less likely than men to be English proficient. In fact, the odds of a male immigrant speaking English is 1.4 times higher than the odds of a female immigrant speaking English. Being married reduced the probability of speaking English, but the magnitude of the effect is small.

Language proficiency enhancing are income, being in the labor force, and having another English speaker living in the same household. Model 2 suggests that the effect of education is increasing. Compared to those without a high school degree, those with a high school diploma or college degree are substantially more likely to speak English.

Turning now to the influence of location (metropolitan area) on language acquisition, Model 3 suggests that, *ceteris paribus*, language proficiency is significantly better in Boston than in the three other metropolitan areas. Boston has a comparatively small immigrant community and neither the Mexican nor the Chinese make up a substantial portion of the population. Thus, according to Lazear's model, for immigrants living in Boston the pay-off of English language acquisition is higher than in the other three metropolitan areas. Based on Model 3, the differences between Dallas, Chicago and San Francisco are not significant.

Table 3. Regression Results for Binary Logit Models[a]

	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	–0.8609	–1.3212	–1.3460	–0.9121	–1.3249
	(0.0419)	(0.0983)	(0.1022)	(0.2064)	(0.1031)
Mexican	0.0843	0.3395	0.3675	–0.0801†	0.3665
	(0.0365)	(0.0553)	(0.0582)	(0.1915)	(0.0586)
Citizen	0.5846	0.6469	0.6480	0.6519	0.6488
	(0.0319)	(0.0374)	(0.0374)	(0.0375)	(0.0375)
Sojourn	0.0600	0.0908	0.0908	0.0909	0.0908
	(0.0026)	(0.0035)	(0.0035)	(0.0035)	(0.0035)
$Sojourn^2$	–0.0006	–0.0004	–0.0004	–0.0004	–0.0004
	(0.00004)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Age		–0.0499	–0.0497	–0.0496	–0.0497
		(0.0018)	(0.0018)	(0.0018)	(0.0018)
Female		–0.3548	–0.3564	–0.3578	–0.3558
		(0.0309)	(0.0309)	(0.0310)	(0.0310)
Married		–0.1107	–0.1115	–0.1108	–0.1121
		(0.0321)	(0.0321)	(0.0322)	(0.0321)
Income		0.0016	0.0016	0.0016	0.0016
		(0.0001)	(0.0001)	(0.0001)	(0.0001)
High school		0.9863	0.9870	0.9869	0.9407
		(0.0342)	(0.0343)	(0.0343)	(0.0714)
Bachelor or more		2.5788	2.5734	2.5439	2.2559
		(0.0755)	(0.0755)	(0.0757)	(0.1510)
Labor force		0.1768	0.1748	0.1741	0.1751
		(0.0333)	(0.0333)	(0.0334)	(0.0333)
At least one		1.0592	1.0605	1.0592	1.0619
		(0.0383)	(0.0385)	(0.0385)	(0.0385)
Boston			0.2663	–0.2798†	0.0432
			(0.1008)	(0.2072)	(0.1661)
Chicago			–0.0055†	–0.1469†	–0.0237†
			(0.0397)	(0.2147)	(0.0470)
San Francisco			–0.0303†	–0.5142	–0.0675†
			(0.0397)	(0.1884)	(0.0466)
Boston × Mexican				0.9632	
				(0.2963)	
Chicago × Mexican				0.1373†	
				(0.2184)	
San Francisco × Mexican				0.5121	
				(0.1927)	
Boston × high school					0.1438†
					(0.2360)
Boston × bachelor plus					1.0309†
					(0.2839)
Chicago × high school					0.0587
					(0.0908)
Chicago × bachelor plus					0.1169†
					(0.2000)
San Francisco × high school					0.0667†
					(0.0885)
San Francisco × bachelor plus					0.4146†
					(0.1682)
Pseudo log-likelihood	–20620.9	–16750.5	–16744.7	–16733.3	–16734.1
Pseudo R^2	0.06	0.23	0.23	0.23	0.23
Wald test	2011.67	4848.88	4855.49	4894.09	4879.36

[a] Coefficients are reported with robust standard errors in parentheses. Coefficients are significantly different from zero unless they are labeled with a dagger. The sample contains 31,556 observations, except for Model 1, which is based on 31,766 observations.

Model 4 allows us to have a more nuanced look at the locational effects on language proficiency, differentiated by national origin. Table 4 shows that, as expected, language proficiency among Mexicans is most prevalent in Boston where Mexicans account for only a very small share of the total population. There is very little difference in Mexican language proficiency across the remaining three metropolitan areas, all of which have a substantial Mexican population. For Chinese immigrants, it was expected that English language proficiency is strongest in Dallas which has a very small Chinese population. In contrast, in San Francisco which has a very large Chinese population, language proficiency is significantly smaller than in Dallas.

Table 4. Estimated Probabilities of English Language Proficiency by National Origin[a]

	Boston	Chicago	San Francisco	Dallas
Mexican	0.195	0.108	0.108	0.109
Chinese	0.091	0.102	0.073	0.117

[a] The estimated probabilities refer to a female, 30-year old unmarried immigrant without a high school degree who has been in the U.S. for five years and does not have U.S. citizenship.

Based on Model 5, Table 5 shows the estimated probabilities of English language proficiency by educational attainment level. As in Model 3, the probabilities of speaking English as a function of education are increasing in each of the four metropolitan areas. Interestingly, however, the probability of the least educated immigrants speaking English well is at about 11 percent in all four metropolitan areas while there is quite some variation in the probability for the well educated immigrants. As a result, the disparity between the highest and lowest probabilities varies across the four locales. In Boston, it amounts to 6.6 percentage points whereas in Dallas it amounts to only 4.3 percentage points. This may be due to different behaviors of the well-educated in Boston than in the other locales. Alternatively, the difference can also be due to compositional differences between the well-educated immigrants in Boston and well-educated immigrants in the other three locales.

Table 5. Estimated Probabilities of English Language Proficiency by Educational Attainment Level[a]

	Boston	Chicago	San Francisco	Dallas
Less than high school	0.116	0.109	0.105	0.112
High school or some college	0.280	0.250	0.244	0.244
Bachelor degree or more	0.778	0.569	0.629	0.546

[a] The estimated probabilities refer to a female, 30-year old unmarried Mexican who has been in the U.S. for five years and does not have U.S. citizenship.

4. Summary and Conclusion

This paper focuses on the linkage between where immigrants live and their English language proficiency—an important indicator of immigrant assimilation. Lazear (1999) postulated that acquiring the language of the host society is more likely if the immigrant community makes up a smaller rather than a larger share of the total population. The underlying rationale is that immigrants who do not speak the language of the host society will experience a loss due to not being able to trade with a large segment of the population. In his empirical study, Lazear focused on counties as representing the space in which trade occurs, a set-up that Florax, de Graaff and Waldorf (2005) later criticized as being too spatially constraining. To overcome the spatial constraint, this study focuses on immigrants' language acquisition within the context of metropolitan areas. We chose four metropolitan areas, Boston, Chicago, Dallas and San Francisco that represent different environs for different immigrant groups. Focusing on Chinese and Mexican immigrants, we find that:

- Mexicans are more likely to speak English than Chinese immigrants;
- The prevalence of English language proficiency increases, at a decreasing rate, with the length of stay in the United States;
- The prevalence of being able to speak English decreases with age;
- Language acquisition increases with income;
- Language acquisition is higher for men than for women, and higher for unmarried than for married immigrants;
- The probability of speaking English is increasing with increasing educational attainment levels; and
- Most importantly, the probability of speaking English varies across the four locales, and peaks in the metropolitan area where the immigrant share is smallest, notably in Dallas for Chinese immigrants, and Boston for Mexican immigrants.

Future research will extend the analysis by including a larger sample of metropolitan areas and immigrants from a wider range of origin countries. One of the advantages of extending the sample will be that we no longer have to use fixed effects to capture the different locales, but that we can explicitly measure the variation across metropolitan areas. In addition to including the relative size of the immigrant group we will also consider a range of additional variables that describe the immigrant groups in the different metropolitan areas, most notable the absolute size and the maturity (duration of stay) of the immigrant group.

The above results have important policy implications for efforts to assist new arrivals in the United States. Given that not speaking the language of the host society places an immigrant in a marginal, if not vulnerable position, assistance should be directed toward those being at the highest risk of being marginalized. Our study suggests that some immigrant groups are less likely to assimilate than others; in particular, women and those with less education, as well as those living in a large immigrant community should be especially targeted.

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