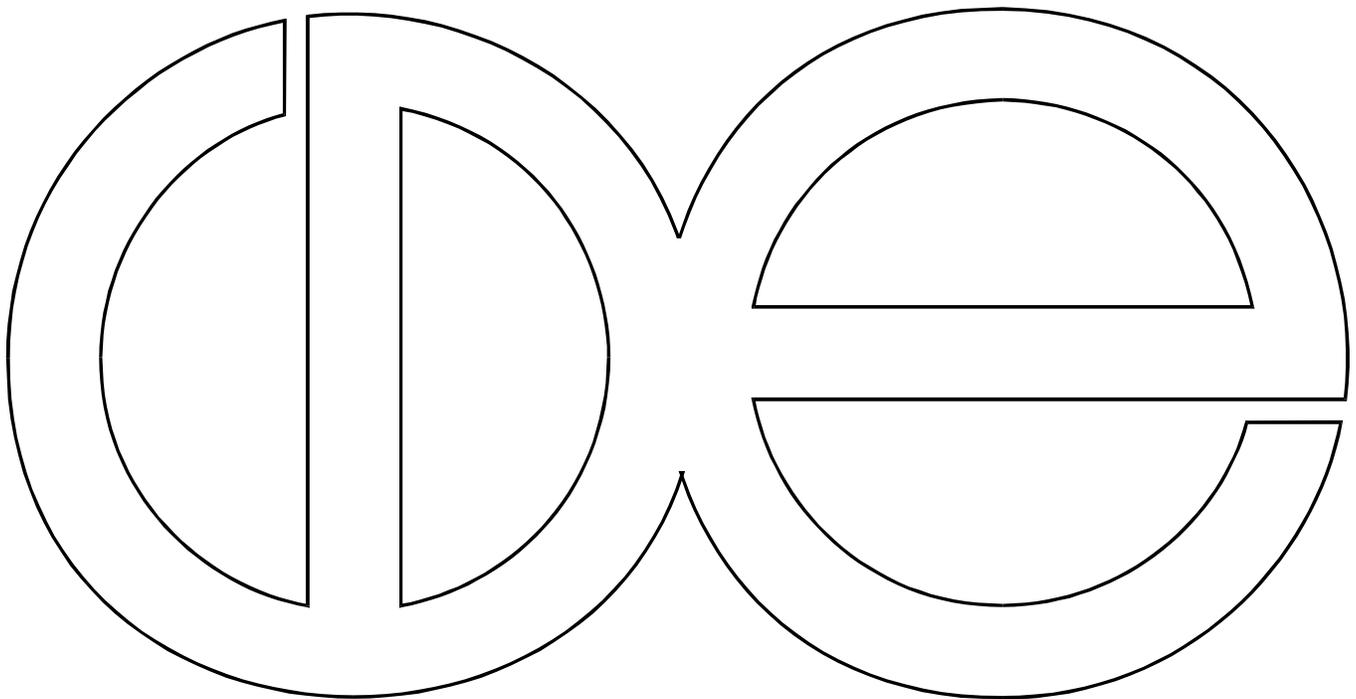


**Center for Demography and Ecology
University of Wisconsin-Madison**

**Labor Specialization, Ethnicity,
and Metropolitan Labor Markets**

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Labor Specialization, Ethnicity, and Metropolitan Labor Markets

Abstract

This paper provides an empirical assessment of the extent to which co-ethnic workers are under- or over-represented in industry and occupation-based employment sectors based on the characteristics of workers themselves, attributes and resources of ethnic groups in which workers are affiliated, and characteristics of metropolitan areas. Specifically, this paper evaluates two claims to be found in the extant literature in economic sociology. First, that ethnic affiliation, as reflected in group-based attributes and resources, affects the relative concentration of co-ethnic workers in employment sectors. Second, that metropolitan labor markets provide the context within which members of ethnic populations are sorted into employment sectors on the basis of worker characteristics, group-based resources, and supply and demand conditions prevailing in local labor markets, including the presence of similarly endowed members of other groups. Results partly confirm these claims and indicate that indicators of ethnic affiliation and local labor market conditions substantially affect the under- or over-representation of co-ethnic workers in employment sectors.

Key Words: Ethnicity, Labor Specialization, Ethnic Niche, Metropolitan Labor Markets

INTRODUCTION

The resurgence of immigration as a major source of both population growth and redistribution has intensified interest in understanding why and under what conditions do immigrants become “ethnics” (See Zhou, 2001, Collins, 2001). Much previous work indicates that mode of incorporation of new native and immigrant workers into the labor market is often structured through ethnic affiliation (Portes and Sensenbrenner, 1993; Portes, 1995, 1998). Although considerable effort has been devoted to an assessment of the role of ethnicity in promoting and sustaining labor market specialization among workers of the same origin, these studies have been limited either in the scope of labor market activities analyzed, the ethnic groups studied, and/or in geographic coverage (see Wilson, forthcoming).

This paper seeks to extend previous work by comparatively focusing on the linkage between worker productivity characteristics, ethnic affiliation, and metropolitan location, and the extent of concentration of co-ethnic workers in labor market sectors. Accordingly, two claims reported in the literature on ethnic economies are evaluated (see Light and Gold, 2000 for reviews). The first claim is that ethnic group affiliation substantially influences the extent of labor specialization observed among co-ethnic members. This occurs either because owners of firms in ethnic-owned economies draw their labor supply from a labor pool consisting primarily of co-ethnic workers, or because co-ethnic workers with jobs in the general local economy are able to substantially influence who gets access to employment opportunities available in their sector. The second claim to be evaluated is taken from the literature on ethnic-owned economies, and suggests that the specific level of entrepreneur activities observed among members of an ethnic group in a given city is the result of the interaction of the resources base of

the group to which they belong, and the demand conditions prevailing in the local economy. I apply this observation to labor specialization in general, and suggest that the extent of labor specialization observed among co-ethnics as well as sector of specialization is influenced by opportunities and constraints present in local labor markets. Thus, while a particular group may have a predisposition or motivation to specialize in certain kinds of activities, in reality this may not be possible because of insufficient demand for workers with certain characteristics, because the demand for ethnic market-based goods may not have reached the required threshold necessary to support a firm, or because the presence of other workers may make it difficult for co-ethnics to concentrate in a sector.

The discussion is organized as follows. First, the literature on ethnic group-based labor specialization, or ethnic niching, is reviewed for the purpose of identifying factors associated with labor specialization. Second, a structural model is developed in an effort to account for the relative concentration of workers of a given ethnicity in employment sectors. Although labor specialization is the central focus of this paper, the majority of workers are not situated in labor market activities in which members of their groups are over-represented. Thus, the model which is evaluated here attempts to account for the labor market participation of workers distinguished by ethnic/ancestry affiliation along a continuum from under to over-representation. Third, data sources and methods are outlined, followed by the presentation of results from a multi-level linear model. The reported results support extant findings that the distribution of co-ethnic workers reflects the relative skills and experiences of the workers themselves; and confirms the claims that both ethnic affiliation and metropolitan location play key roles in structuring the extent of labor specialization among co-ethnic workers in employment sectors.

BACKGROUND

Ethnicity and Labor Specialization

Ethnic affiliation can provide a basis for collective action involving sharing information, resources, and the provision of social support for the purpose of exploiting labor market opportunities in the production of goods and services. This has important implications for the social organization of labor market activities. It suggests that group membership is in itself a resource, structuring the individual's location and activities in labor markets, and many of the attributes shared by co-ethnics may facilitate or enhance group members' ability to exploit available labor market opportunities through social capital formation centered on the family, voluntary associations, and residential concentrations. The intergenerational transfer of capital, usually in the form of business ownership, is one example of how the specialization of groups in a given activity can persist and become spatially diffused; particularly if entrepreneurship is associated with the formation of cooperative economic enterprises, as is characteristic of ethnic economies, where labor and capital are shared, and trust and mutual obligations are often essential (see Portes and Manning, 1986; Portes, 1995; Granovetter, 1995).

A substantial body of work suggest that occupational attainment processes allocate individuals with similar productivity characteristics into to similar labor market positions (see Featherman and Hauser, 1978; Grusky, 1994, Introduction). This suggests that co-ethnic workers may occupy similar positions because they share similar labor market-relevant attributes such as education, experience, propensity for entrepreneurship, facility with the language of the host society, nativity, etc. However, if co-ethnics possess special skills, experiences, or other attributes that employers consider relevant to productivity and if these attributes are the basis of

their selection, or if co-ethnics are able to exploit labor demand through social capital and/or financial capital formations, then specialization or over-presentation would be based more on group processes. In addition, the availability of labor market opportunities mediated through geographic location, the timing of settlement, and the receptivity of the host society also affect group differences in labor market specialization (see Lieberson, 1980; Portes, 1995; Light and Gold, 2000).

Labor markets are structured to facilitate a match of the skills and experiences of individual workers with labor market positions linked to the production of goods and services. Moreover, since individuals of diverse ethnic affiliations may be similarly qualified for a large array of labor market positions, structuring access through group affiliation narrows the pool of candidates for any one position, excluding all non-ethnic group members from consideration. This is the strategy often employed by ethnic groups who have established a presence in an employment sector where the objective is to limit access to co-ethnics, particularly under conditions of labor surplus, or when opportunities to employment in other sectors are limited (see Light and Gold, 2000). In addition, concern for the maintenance of productivity goals may lead employers to exploit the supply of labor from a single group, believing that this recruitment strategy will reduce uncertainty as to the quality of the labor supply, or that drawing labor from a single group could minimize disruption in production which might result from reliance on a heterogeneous labor supply (see Waldinger, 1996a).

How extensive is labor specialization among ethnic groups, taking into account both concentrations linked to co-ethnic business ownership and associated with occupational specialization in the general labor market? Characteristics of workers and ethnic groups previously identified as being associated with labor market specialization include ethnic markets

dominated by co-ethnic entrepreneurs; groups with high percentages of workers with limited English proficiency, low education attainment, and immigrants; and where group members encounter barriers limiting their access to the broad array of occupational opportunities in a labor market for which they are qualified. As we show below, these factors are interrelated, and it may not be possible to uniquely identify their effects on labor market specialization.

Evidence of the share of the labor force of ethnic groups concentrated in specialized employment sectors varies considerably. Light and Gold (2000) provide the most extensive review of previous studies on this issue, and concluded that approximately 41 percent of the labor force of the average ethnic group is concentrated in ethnic economies; consisting of 21 percent in ethnic-owned economies, and 20 percent in co-ethnic employment concentrations in industries and occupations in the general labor market (p. 52). Included in their estimate are workers and owners employed in the informal sector and in illegal enterprises.

Light and Gold's estimate of the overall share of the labor force employed in ethnic economies differs considerably from those I report on ethnic labor specialization using a larger sample of ethnic groups and labor markets. Table 1 reports summary labor force statistics for one hundred ethnic/ancestry groups included in the analysis reported below. For the issue at hand, the percentage employed in niches, or specialized employment sectors, is reported in column 7. On average approximately 14 percent of the labor force of the 216 metropolitan areas studied was employed in specialized employment sectors. One can observe considerable variation between the groups with respect to the size of their labor force employed in niches, and only four groups have niche employment shares equal to or greater than 40 percent. With respect to region of origin, average niche employment varies from less than 11 percent for groups from Sub-Saharan Africa, North Africa and the Middle East, and Europe; between 12 and

20 percent for groups from South America, Other Hispanic, and North America; between 23 and 26 percent for groups from Asia and the Caribbean; and 43 percent for Mexicans and groups from Central America.

Differences in concepts and measurement (i.e., ethnic niche versus ethnic economy) are undoubtedly one source of the difference.¹ For example, Light and Gold attempt to estimate the extent of employment in both the informal economy and employment in illegal enterprises, distinctions which would be difficult if not impossible to observe in census data. While Light and Gold base their estimates on a large number of individual studies, the fact remains that the universe of ethnic groups and local areas included in these studies are considerably fewer than used in this analysis. I suspect that differences in coverage of groups and areas are the major reasons for the differences. While some groups may be disproportionately concentrated in

¹The term *niche* is used here to designate labor specialization involving the tendency of members of a specific ethnic group to be over-represented in an activity or job associated with the production of a good or service. Sociologically, an ethnic niche is a socially constructed formation or collectivity in which members are linked by ties of culture, shared genealogy and history, religion, race, or national origin. These linkages provide the basis for collective social action, involving sharing information, resources, and the provision of social support for the purpose of exploiting labor market opportunities related to the production of goods and services. Although ethnic niches are often formed through self-selection, I use the term to refer to any labor market based social collectivity in which members of an ethnic group are concentrated at a higher level than members of other groups (see the methodological discussion below). Viewed in this way, a niche may arise from the activities of entrepreneurs, acting as separate entities or jointly, or from the activities of workers and/or in conjunction with entrepreneurs. This definition differs somewhat from that provided by Light and Gold (2000), who distinguish between workers employed in an ethnic economy, consisting of co-ethnic owners and workers; and ethnic-controlled economy, consisting of co-ethnic workers in specialized industry and/or occupational sectors of the general labor market. The definition used here encompasses both workers and owners in ethnic-owned economies, and workers in ethnic controlled economies. The census data used in the analysis reported below do not contain the relevant information needed to make the kinds of distinctions made by Light and Gold. It is also important to note, however, that this paper primarily focuses on the kinds of activities in which individuals are involved, without regard to whether they are workers or owners. The differences between this definition and that of Light and Gold are probably minor.

gateway cities, others such as Europeans and African Americans are not. Thus, focusing on a limited number of metropolitan areas overstates niche concentration for some groups and understates it for others.

Entrepreneurs are key actors responsible for promoting the development of ethnic economies, through the establishment of business enterprises which either rely on co-ethnic labor or workers of other ethnic groups. Residential concentration and the institutionalization of the provision of resources, goods, and services are also important, because they facilitate access to a co-ethnic labor supply through social networking, particularly if English is not the standard medium of discourse. Indeed, residential concentration under dense conditions contributes both to the saliency of ethnic boundaries, and through networking, provides avenues for the transfer of labor market-relevant information and resources. Thus, through the action of entrepreneurs, ethnic groups not only may compete for existing labor market opportunities, but, through marshaling their own resources, may exploit opportunities to produce and distribute goods and services for which no previous demand existed, some of which may be in response to ethnically specific demand. These patterns of associations are well documented for European ancestry groups (see Lieberman, 1980; Lieberman and Waters, 1988; Morawska, 1990); and some recent immigrant groups (see Waldinger, 1996b; Logan, et al., 2000; and Light and Gold, 2000).

Immigrants from the same origin tend to concentrate in the same labor market sectors, in part because of heavy reliance on social networks as a means of gaining entrance to a sector (see Waters, 1999; Waldinger, 1996a and 1999; Morawska, 1990). As previously noted, employers, particularly in the secondary sector, may consider immigrants an attractive labor supply, because they are willing to work for lower wages and are least likely to organize around employment related issues (see Wilson and Jaynes, 1999). In addition, employing workers who share a

common language reduces confusion and misunderstandings which inevitably would arise if workers are unable to effectively communicate with each other (see Waldinger, 1999; Waters, 1999).

However, limited skills and proficiency in English are just two of the most important characteristics of immigrants which may contribute to over-representation in labor market sectors. Selective immigration from origin reflecting the application of occupation criteria as a basis for securing entrance visas can contribute to the over-representation of immigrants in selected employment sectors. Since the INS guidelines stress the issuance of employment visas to individuals with specialized skills in occupations where demand is high but in which there is a limited supply of native-born workers, many highly technical and professional occupations have high concentration of immigrants from the same origin. Eaton (1998) reports that in many metropolitan areas immigrants are concentrated in a large array of occupations, ranging from those requiring minimal skills and education to those that require professional and technical training, and that many of these activities would not exist were it not for immigrants.

Of course, the foreign-born is not the only group of workers over-represented in labor market sectors. While immigrants may initiate a process of concentration, over-representation may persist over generations, if wages and other benefits are attractive relative to those in occupations requiring similar skills, and if an ethnic groups can provide a steady supply of workers and is able to substantially influence worker selection. For example, previous research suggests that individual ethnic groups played a major role in the formation of many labor unions, through their ability to control access to essential job-related information and selection into training programs (see Barrett and Roegider, 1997; Morawska, 1990; Waldinger, 1994 and 1996a). Moreover, Lieberson and Waters (1988) report considerable declines in the over-

representation of European ancestry groups in selected occupations, which suggests that as individuals acquire experience and education, the occupational opportunities to which they are attracted expands (see also Waldinger, 1996a).

Finally, labor market discrimination faced by immigrants and members of native minority groups may lead to the formation of employment niches in sectors of the local labor market in which there are few if any discriminatory barriers and in which members of other ethnic groups are not present in appreciable numbers (Granovetter, 1995; Sassen, 1995). For example, among members of the least desired group in the labor queue, niches may emerge not just through self-selection but also because group members are more or less forced to accept whatever residual jobs are available once groups higher up in the queue have made their selection. Historically, the concentration of blacks in low-skill/low-wage occupations can in part be attributed to limited access to the broad array of occupations available in labor markets in which they are situated (see Lieberman, 1980; Model and Ladipo, 1996; Waters, 1999).

Intermetropolitan Variation

The attributes and resources of groups most likely interact with characteristics of metropolitan labor markets, such as ethnic diversity, industrial structure, and general supply and demand conditions, to produce particular outcomes for co-ethnic workers. Metropolitan labor markets differ with respect to the mix of resident firms, particularly with regard to the types of firms responsible for generating income flows into the community, and in the potential for promoting the growth of new firms. Thus, there is a need to pay particular attention to the role of metropolitan context in shaping the employment options available to ethnic group members.

Some indication of the role of metropolitan context in providing opportunities for and constraints on the extent of ethnic niching can be gleaned from geographic variations in ethnicity and industrial structure. For example, it has long been known that urban context plays a major role in structuring labor market opportunities for populations of diverse backgrounds (see Fischer, 1995). Fischer's (1975, 1995) reformulation of Louis Wirth's theory of urbanism suggests that size, through migration and structural differentiation, promotes the development, nurturing, and persistence of a diversity of subcultures via group differences in cultural background, language, religion, and ancestry. The competition for scarce resources, such as housing, jobs, and services provided by government, and the desire to maintain distinctive world views and life styles aid in providing salience to social formations that preserve a group's prerogatives and identity.

The literature on ethnic niching is weakest with respect to comparative studies of its association with characteristics of metropolitan areas. A search of the literature found only seven studies that involved analysis of the concentration of the employment activities of ethnic groups in more than three metropolitan areas, including three focusing on the concentration of workers (Rosenfeld and Tienda, 1999; Wilson, 1999, forthcoming); two on the concentration of both workers and owners (Logan, Alba, and McNulty, 1994; Logan, et al., 2000:); and four on owners (Light and Rosenstein, 1995; Razin and Langlois, 1996; Razin and Light, 1998; Portes and Zhou, 1999). One could hypothesize, for example, that ethnic niching is a collective response to conditions prevailing in local labor markets. Niching emerges from the interaction of labor force-relevant attributes and resources of ethnic groups with the opportunity structure and other conditions prevailing in local labor markets, including the presence of other ethnic groups, supply and demand conditions, and the industrial structure of the area.

Much of what is known about ethnic niching is based on case studies of selected ethnic groups in individual metropolitan areas, such as New York, Miami, Los Angeles, Chicago, Toronto, and San Francisco (see Light and Gold, 2000 for reviews). Most of the groups studied have been those that have increased in size due to substantial immigration in the last quarter of a century, including Mexicans, Hondurans, Salvadorans, Chinese, Filipinos, Koreans, Vietnamese, Haitians, Cubans, West Indians, Dominicans, Guatemalans, Russians, and Colombians concentrated in major gateway cities (see Portes and Rumbaut, 1996, p. 36, Figure 1). Although this approach can be fully justified on the basis of the importance that immigration has played in the economy of these places, there is also a danger in misrepresenting the role that ethnic niching plays as a mechanism for organizing an ethnically diverse population, whether or not local areas have received significant flows of immigrants in the recent past. In addition, a comparative analysis of the labor market experiences of a limited number of ethnic groups in a local labor market which is multi-ethnic in character, can only provide an incomplete picture of how intergroup dynamics have an impact on the labor market position of the groups studied.

Finally, a comparative analysis involving a large number of ethnic groups living in a large number of metropolitan areas would provide the opportunity to assess the salience of ethnicity as a form of affiliation with respect to labor force participation, particularly as this is reflected in ethnic niching. By studying generational differences in ethnic niching among individuals of a given ethnic group, and by studying ethnic groups that differ both with respect to the timing of their arrival in the United States and the forces promoting immigration, we can provide insight into the role that assimilation and acculturation plays in the niching process. Indeed, one can ask whether native-immigrant differences in niching are associated with generational differences in attributes that promote labor market success.

CURRENT ANALYSIS

As previously noted, this paper seeks to evaluate two claims reported in the extant literature by estimating the extent to which characteristics of workers, attributes of ethnic groups and of local labor market areas contribute to labor specialization. Here, I adopt an approach similar to that applied to entrepreneur niching (see Razin and Light, 1998; Light and Rosenstein, 1995), in which it is suggested that a comparative analysis of ethnic labor specialization requires the application of a multi-group/multi-locality research design in which it is possible to observe and account for variation within ethnic groups across localities, between-ethnic-group variation within and across localities, and variation between localities in the extent to which local conditions limit or enhance labor specialization.

Although labor market specialization is of primary interest, in the analysis which follows, I focus on the extent to which workers of a given ethnic group are both under- and over-represented in employment or labor market sectors. Thus, the dependent variable is the log of the concentration ratio, given by the formula

$$CI_{ijk} = ((e_{ijk} / e_{jk-i}) / (o_{ijk} / o_{jk-i})) * 100$$

where CI_{ijk} is the concentration ratio calculated for co-ethnic workers in the i^{th} industry/occupation sector, the j^{th} ethnic group living in the k^{th} metropolitan area; e_{ijk} is the number of workers of ethnic group (j) who are associated with the i^{th} industry/occupation sector and living in the k^{th} metropolitan area; e_{jk-i} is all other workers of ethnic group (j) in metropolitan area (k); and o_{ijk} and o_{jk-i} are similarly defined for the employment of workers of all “other” groups in the i^{th} industry/occupation sector and living in the k^{th} metropolitan area. This measure

is an odds ratio, and as such is independent of the proportion a group represents of the total population.²

This paper employs a multi-level linear model to account for variation in the concentration of workers in employment sectors. Level one of the model hypothesizes that the distribution of co-ethnic workers across employment sectors reflects in part a match between the relative skills and experiences of workers and the productivity requirements of jobs associated with the production of goods and services. The level-one equation contains the following specifications:

$$\mathbf{Log}(\mathbf{CI}_{ijk}) = \pi_{0jk} + \sum \pi_{pjk} \mathbf{X}_{pijk} + \sum \lambda_{mik} \mathbf{Y}_{mik} + \mathbf{e}_{ijk} \quad (1)$$

Where \mathbf{CI}_{ijk} is the concentration ratio for the ijk^{th} employment (industry/occupation) sector; the \mathbf{X}_{pijk} 's are relevant productivity characteristics of workers in a sector, $p = 1, \dots, P$, including mean years of schooling completed, mean value on an index of English fluency, proportion of workers long-term immigrants, proportion workers recent immigrants, proportion of workers self-employed at the industry level, number of occupations ($n=19-1$) in an industry in which co-ethnics are concentrated at least 1.5 times more than workers of other ethnic groups, and ethnic competition or the average mean value of the concentration ratio greater than 1.5 for

²See Rosenfeld and Tienda (1999) for a discussion of the use of the odds ratio as a measure of labor specialization.

workers of other ethnic groups in a sector;³ also included in X_{pijk} are control variables, including mean years of work experience of workers, proportion female workers, number of workers of ethnic group J in the sector, the share of all workers in a sector who are members of ethnic group J ; the Y_{mik} 's are attributes of the i^{th} employment sector summed over all ethnic groups resident in metropolitan area K , and the π 's and λ 's are parameters to be estimated by the model. All variables on the right hand side of equation (1) are grand-mean centered, meaning they are expressed as deviations from their respective mean values based on the total sample. [The means and standard deviations of all variables are reported in Appendix A.]

I use the Hierarchical Linear Model (HLM) program to estimate the proposed model, although the model is multi-level but not hierarchical in structure. This is because the first level consists of observations of co-ethnic workers associated with an employment sector, but sector is not a sub-set of an ethnic group, the next level in the model. The use of HLM is still appropriate because the model estimates whether workers of group J are on average under or over-represented in all sectors in which co-ethnic workers are present in the K^{th} metropolitan area.

Much previous work has identified self-employment, English proficiency, education, and nativity as important factors promoting under- or over-representation of co-ethnic workers in employment sectors. Immigrant status has been particularly important because of findings that immigrants rely more heavily on social networks to secure jobs, and will often seek employment within co-ethnic enterprises where workers are likely to speak the same language. Long-term immigrants are distinguished from recent immigrants, those who immigrated within five years of

³A value of 1.5 for the concentration ratio is used to identify labor specialization or whether a group has a niche in a sector (for a discussion of this operationalization, see Logan, Alba, and McNulty, 1994; Rosenfeld and Tienda, 1999; Wilson, forthcoming; and footnotes 9 and 10.

the census, because with length of residence reliance on established co-ethnic networks should decline while the acquisition of skills and experiences increases the chances of securing employment in the general labor market.

Self-employment is included because of the expectation that a high proportion of individuals who are self-employed increase the likelihood that workers of a given ethnicity in a sector will be employed in establishments owned by co-ethnics. However, it is just as likely that if self-employment is more associated with professional-based individual proprietorships, as would be the case with the offices of doctors, dentists, accounts, and consultants, it may well be that the opportunity for employment may be very limited. In this case, the relationship of self-employment with co-ethnic employment would be negative rather than positive. Unfortunately, it is not possible a priori to indicate which of these alternatives is most likely.

The model also takes account of the pervasiveness of the presence of co-ethnic workers in an industry sector. Industries in which co-ethnic workers are over-represented in a large number of occupational sectors could have implications for the ethnic composition of the work environment, in the sense that being numerically dominant in a large number of occupational sectors increases the chances that worker selection would be made on the bases of ethnicity, or at least there would be fewer barriers to the entry of co-ethnics. On the other hand, one would expect the extent of concentration of workers of one group would be affected not only by the presence of members of other ethnic groups, but more importantly, by whether workers of other groups are over-represented in that sector. Since over-representation in a sector indicates group level specialization, members of other groups may encounter barriers to entry to a sector. Although this variable is labeled “ethnic competition,” it should be apparent that what is being observed is not competition itself, but rather the outcome of competition.

Finally, among the control variables, the level-one model includes indicators for sector of employment. Employment sectors may have characteristics which encourage under- or over-representation of workers regardless of ethnic background. For example, sectors may vary with respect to the attractiveness of work environment or wage returns to productivity. It is for this reason I have included (log) size of sector and average hourly wage of workers in a sectors.⁴

Although the characteristics of workers in a sector are important in determining whether co-ethnic workers are under- or over-represented in that sector, the effects of workers' characteristics are not constant across ethnic groups and labor markets. The estimated values of the π 's of equation (1) represent the average effect of workers' characteristics on the relative presence of co-ethnic workers in sectors for the j^{th} ethnic group and the k^{th} metropolitan area. The level-two equations seek to determine whether the variation associated with the average π 's for the j^{th} ethnic group and the k^{th} metropolitan area are responsive to ethnic group differences in attributes and resources. In other words, the level-two model postulates that the effects of workers' characteristics on co-ethnic worker concentration are in part affected by ethnic group membership.

The level-two equations treat the ethnic group by metropolitan area specific π 's for some of the variables from equation (1) as a function of the attributes and resources of ethnic groups.

Thus,

⁴Ideally, the most appropriate variable to include in the model as a control for sector influence would be dummy variables for (i-1) sectors. Unfortunately, that approach is not practical because this specification overwhelmed HLM's capacity to estimate the model. In including two variables to represent the effect of sectors, I am assuming that these variables capture all of the systematic influences associated with sector of employment.

$$\pi_{0jk} = \beta_{00k} + \sum \beta_{pqk} W_{qjk} + \tau_{0jk} \quad (2)$$

$$\pi_{pjk} = \beta_{p0k} + \sum \beta_{pqk} W_{qj} \quad (3-13)$$

Where π_{0jk} and the π_{pjk} 's are, respectively, the intercept and slope coefficients from equation (1) for the j^{th} ethnic group and the k^{th} metropolitan area; W_{jk} 's are attributes, $q = 1, \dots, Q$, of ethnic groups, including, mean education attainment, mean English fluency index, share of workers who are self-employed in an industry, proportion foreign-born, average duration of residence in the U.S. of the foreign-born (in years), (log) of ethnic group population, and nine dummy variables representing region of ancestral origin; and β_{00k} , β_{p0k} , and β_{pqk} are coefficients to be estimated by the model. The π_{pjk} and λ_m terms, slope coefficients for control variables, are set equal to β_{p0k} .

There are several aspects of these equations that require comment. First, note that equations (3-13) contain no error term. Since we are estimating population parameters based on the known universe of ethnic groups, it is assumed that group effects on variations in the π_{pjk} slopes from equation (1) are fixed. The dummy variables for region of ancestral origin are included to capture the effects of any unmeasured attributes of ethnic groups.⁵ Second, all of the measured attributes of ethnic groups are based on their respective total population, except proportion self-employed, not of the labor force of the group. Finally, the equations for the slopes of control variables (experience, gender, size of employment sector, etc.) are

⁵Before the regional dummies were included, I attempted to estimate a model which did include error terms, but the HLM program was not able to achieve an iterative solution.

hypothesized as being affected only by an intercept, π_{pjk} , $\lambda_m = \beta_{p0k}$ as I am not interested in whether the π coefficients for these variables are affected by ethnic group attributes.

There are two substantively important ways in which group membership matters in the relative concentration of co-ethnic workers in employment sectors. First, the effects of worker characteristics may merely reflect compositional differences between ethnic groups, such that once group characteristics are entered at level two, the effects of worker characteristics either disappear or are substantially reduced. The other possibility is that group attributes may contribute contextually to co-ethnic workers' relative concentration; that is, co-ethnic worker concentration may be additionally affected because group attributes may incrementally magnify the effects of workers' characteristics on level-one outcomes. Such would be the case, for example, if the sources of self-employment among group members are not simply a function of individuals' attributes and their own initiatives but also reflect social processes derived from group norms based on principles of reciprocity and exchange. Similarly, immigrants' co-ethnic workers may concentrate in the same employment sector, particularly those associated with ethnic markets, either because of strong social network ties within the ethnic community and/or because of perceived training advantages associated with working in an enterprise which primarily serves members of one's own group (see Bailey and Waldinger, 1991). In these and other instances, ethnic group membership is the primary mechanism for embeddedness.

The effect of education, nativity, English Fluency, and self-employment should magnify the influence of workers' attributes. That is, for ethnic groups with high average education or English fluency the effect of workers' characteristics on relative concentration of co-ethnic workers should be reduced, while in the case of groups with greater proportion foreign-born or self-employed the effect of worker characteristics on co-ethnic worker concentration should

increase. I include the average duration of residence of a group's foreign-born component as a means of assessing whether longer average years of residence in the U.S. of a group diminishes the otherwise positive influence of the immigrant status of workers on co-ethnic concentration in a sector; while the negative effects of workers' average education and English fluency on relative concentration would increase, because the average level of both would be expected to increase with increased average duration of residence. Ethnic groups with immigrant components who have been in the U.S. for longer periods of time should be more successful in securing jobs typically dominated by native-born workers, in part because of increased skills, experience, and greater facility with English. Contextually, if working in the general labor market increases with average duration of residence, education and English fluency, then there is the possibility that even members of recent immigrant groups may benefit because the network of available jobs will have expanded.

Population size and the nine dummy variables representing region of ancestral origin are included to control for the effects of unmeasured group attributes on workers' relative concentration. For example, it was not possible to include such a measure as the "thickness" of workers' identification with an ethnic group (see Cornell and Hartmann, 1998), whether based on primordial or situationally constructed attributes, because such information is not available in the decennial census.

As previously noted, metropolitan context plays an important role in shaping the employment options available to members of individual ethnic groups. The relative concentration of co-ethnic workers in employment sectors is substantially determined by the productivity attributes of workers themselves, the attributes and resources of the ethnic group to which the workers are affiliated, prevailing labor market opportunities, and other conditions of

local labor markets, including the presence of other ethnic groups, general supply and demand conditions, and the industrial structure of the area. Level three of the model incorporates characteristics of metropolitan areas, including labor market indicators as well as other relevant characteristics of the resident population, as determinants of variation in the β 's estimated via the level-two equations. Thus,

$$\beta_{pqk} = \eta_{000} + \sum \eta_{pqs} Z_{sk} + u_{pqk} \quad (14-20)$$

$$\beta_{pqk} = \eta_{pq0} + \sum \eta_{pqs} Z_{sk} \quad (21-132)$$

Where the β_{pqk} 's are intercepts and slope coefficients (β 's) from equations (2-13); the Z_{sk} 's are characteristics of metropolitan areas, $s = 1, \dots, S$, including (log) size of labor force, (log) size of resident population, percent of labor force in ethnically specialized labor market sectors, percent of population of non-European and non-North American ancestry, percent of population foreign-born, number of ethnic groups resident in a metropolitan area, (log) mean household income, proportion of labor force unemployed, and seven variables representing the proportion of the labor force employed in major industry groupings; and the η 's are coefficients to be estimated by the model.

The equations for intercepts include all of the variables noted above, except size of resident population, and these equations contain error terms which are absent from those for slopes. The variables included in the equations for slope coefficients vary depending on whether the slope coefficient being explained represents the effect on coefficients of control or explanatory variables from equation one, effects of ethnic group attributes, or of the dummy

variables for ethnicity. A complete specification of all equations from levels one through three are available from the author upon request.

Labor force size is included in the level-three model as an indicator of the potential diversity in occupational opportunities available in larger local labor markets. Large size places are associated with a greater mix of industries and associated occupational structures, affording workers greater employment options. However, one would expect that the enhanced opportunities afforded by size could be affected by whether employment is organized according to ethnic affiliation, as would be indicated by the percentage of workers employed in sectors in which co-ethnics are over-represented. Similarly, the presence of a large number of ethnic groups in the market should increase the structuring of employment opportunities through ethnic affiliation, because ethnic diversity should increase inter-group competition and conflict. On the other hand, higher average income, as a measure of household consumption potential, could expand employment opportunities, through expanded demand for goods and services, and thus reduce the influence of ethnic affiliation. On the other hand, higher average income may actually expand employment for co-ethnic workers if households' consumption of ethnically specific goods increases with income.

It is not clear in which direction to predict the effect of higher unemployment, as its effect may depend on whether slack labor conditions influence employer preferences and how workers are recruited; and, on the worker side, whether workers' individual search activities are channeled into particular areas because of network ties. On the surface, it seems reasonable to argue that employers would have the advantage, as they may pick and choose from a pool of available workers. However, the advantage to employers could be substantially affected by the degree to which ethnic affiliation plays a role in the training and selection of workers. This

would be the case, for example, if employers rely on the recommendation of current workers to recruit additional workers, or if workers are organized into collective bargaining units through which both worker selection and training are controlled. On the other hand, under conditions of high unemployment, it could be argued that competition for available jobs may become intense, in which case reliance on social networks anchored in ethnic group affiliation to secure a job may become crucial. Indeed, it is very possible that a constructed ethnic identity may coalesce around a particular employment activity.

Major industry groups are identified because of the expectation that employment conditions in some industries are more conducive to labor specialization based on ethnicity. Industries with heavy blue-collar work-forces characterized by either low wages -- such as extractive, non-durable goods, or consumer services -- or in which workers are collectively organized -- such as durable goods, construction, transportation and utilities -- are probably more likely to have a higher incidence of ethnic niching.

RESEARCH DESIGN

Data

The data for this analysis are derived from the Public Use Microdata Sample (PUMS) files for 1990, 1 and 5 percent samples. I have merged the 1 and 5 percent PUMS, since they are independent representative samples of the U.S. population. This has the advantage of increasing the sample counts for small ethnic populations in individual metropolitan areas. These files have sufficient sub-samples for individual metropolitan areas to calculate measures and perform

analysis for each area as if they were independent samples. The actual number of metropolitan areas included in the sample is 215. The selection of individual metropolitan areas was based largely on whether the estimated population count for a metropolitan area derived from the 5 percent PUMS was within 95 percent of the estimated count derived from the 1 percent PUMS. Population counts based on the 1 percent PUMS for most metropolitan areas are more accurate because the geography corresponds to that given in the official definition of PMSA's and MSA's. Included in the 215 metropolitan areas are 21 consolidated metropolitan statistical areas (CMSA) composed of 68 PMSA's, with the remaining 194 units being metropolitan statistical areas (MSA).⁶

Measurement of Variables

Ethnicity. In generating tabulations of ethnic populations in industry- and occupation-specific employment sectors for individual metropolitan areas, I have attempted to preserve as

⁶The 5 percent PUMS file does not provide representative samples of the population of all metropolitan areas, including New York, Memphis, Houston, Cincinnati, Baltimore, Miami, and Philadelphia, among others. In the vast majority of affected metropolitan areas, the population in the omitted territory represents less than 5 percent of the total population. The under-representation occurs because identifying the population of an excluded area would have violated confidentiality rules. A number of metropolitan areas include counties with total populations too small to be identified on the 5 percent sample files, particularly if the missing county was located in another state. In these cases, small counties were combined with other counties that were a part of the same metropolitan area or with adjacent nonmetropolitan counties or counties that were a part of another metropolitan area. In other instances, metropolitan counties located in a different state were merged with other counties of that state. I use the Public Use Microdata Areas (PUMA) codes available on the 5 percent PUMS to reassign areas that properly belong to a metropolitan unit, provided the additional geography does not increase the population of the metropolitan areas by more than 5 percent of its official size. In other instances, if parts of the territory of one metropolitan area are combined with the territory of other metropolitan areas, I combine the entire territory of both metropolitan areas and treat them as one unit. A complete listing of the CMSA's and MSA's included in the sample are available from the author.

much detail as possible in categorizing ethnicity, occupation, and industry. Ethnicity consists of 100 groups, derived from information on first and second ancestry, and race and Hispanic origin. Data on ancestry is the only available means for distinguishing non-Hispanic whites in the 1990 PUMS. Although first ancestry is used to identify individual European ethnic groups, additional categories are also included if 1,000 or more respondents of European ancestry reported the same double ancestry, such as England/France, England/Germany, England/Ireland, Germany/Poland, etc. In all instances except one, an ancestry, ethnic or racial category had to have 1000 or more sample respondents in 1990 to be separately identified.

There is substantial evidence indicating that the reliability of the ancestry information is modest at best, particularly for European groups whose periods of greatest migration occurred during the 19th and early 20th centuries. This is because of high rates of inter-ethnic group marriages, geographic mobility, and declining differences in socioeconomic attainment levels (see Farley, 1991; Lieberman and Waters, 1988). Lieberman and Waters (1988) suggest a pervasive pattern of fluidity in the identification of ancestry due in part to an increasing share of individuals of European origin who are of multiple ancestries, making it difficult for individuals to unambiguously classify themselves into only two categories. In addition, an increasing number of individuals of multiple ancestry simply identify themselves as “Americans.”

Although I agree with these assessments of the quality of ancestry data, there is no reason to expect that these data are of no use in identifying statistical regularities in the distribution of ethnic populations across employment sectors (see Farley, 1993; Neidert and Farley, 1985). However, it must be acknowledged that the extent of reliability of the ancestry data requires caution in the interpretation of observed patterns.

The distribution of individual ethnic populations across the 215 metropolitan areas will vary considerably, with some, such as English, German, Irish, Mexican or African American having substantial representation in most if not all metropolitan areas; while others, such as Haitian, Salvadorian, Dominican or Croatian, having a substantial presence in a limited number of metropolitan areas. However, the key issue for this analysis is that each ethnic group is sufficiently concentrated in at least one metropolitan area to allow for the possibility of labor market specialization (see below).

Employment Sector. An employment sector is the basic observation unit for analyzing the extent of labor market specialization for individual ethnic groups. Given the overall objectives of this research, information on both industry and occupation are used to defined an employment sector. This approach differs from others reported in the extant literature, where either industry or occupation are used as the observational unit for studying ethnic niching or labor market specialization. Industries consist of firms, the basic unit of production for an economy, based on similarities in the types of goods and services produced. To the extent that members of an ethnic group specialize in the production and/or provision of a good, as often occurs in an ethnic economy, the use of industry as an observational unit is appropriate (see Logan, Alba, and McNulty, 1994; Logan and Alba, 1999).⁷ But labor market specialization can also be occupationally specific, involving technical activities that may or may not be transferable among firms in different industries, but in which individuals of the same ethnic groups may be

⁷Although this approach will be applied in subsequent work in which the presence of owners are important for identifying ethnic economies, it is not applied in this paper.

concentrated. Occupations describe the technical skills and associated human capital attributes that link individuals to the specific jobs available in a firm (see Kalleberg and Berg, 1988).⁸

In identifying an employment sector, I use a 48-category breakdown of industry and a 19-category breakdown of occupations. The combination of industry and occupation provides an alternative measure of work activities in which individuals are engaged, involving the application of technical skills and experience in the production of a good. Accordingly, the over-representation of members of an ethnic group, often referred to as an ethnic niche, is defined as an employment sector consisting of an industry/occupation cell in which members of a specific ethnic group are 1.5 times more likely to be concentrated in that sector than members of all other ethnic groups, as measured by the concentration ratio. Its important to note here that the operational definition of an ethnic niche is only used to facilitate the construction of other variables to be used in the multivariate analysis reported below.^{9,10} In estimating analytical models, the focus will be on the entire distribution of values on the concentration ratio.

⁸Moreover, because firms differ in product lines, size, internal division of labor, market share, technological base, capital intensity, the number and types of jobs, and the rewards associated with them will also differ.

⁹The value of 1.5, though arbitrary, attempts to set a lower limit for the extent to which members of an ethnic group are specialized or over-represented in an activity relative to members of other ethnic groups. It should also be noted that an employment sector must also have 15 or more sample respondents, representing approximately 270 workers, to be identified as a niche. Although this constraint is also somewhat arbitrary, it is necessary to ensure the reliability of the results. Finally, this measure primarily focuses on the kinds of activities in which individuals workers are involved, without regard to whether they are salaried workers or owners.

¹⁰Not only does this operationalization assume that values of greater than 1.5 represent labor market specialization, it is also assumed that social processes underlie this level of concentration of an ethnic group's workforce in an employment sector.

The cross-classification of 48 industry and 19 occupation categories yields a table containing 912 cells, or employment sectors. However, 14 of the cells contain structural zeros.¹¹ For the total sample population, 60 percent of the remaining 898 employment sectors include workers of at least one ethnic group working in a niche.¹² While this 898-cell table is constructed for each ethnic group in each metropolitan area in which members of that group reside, many of the cells contain zero entries. This is the case even for groups such as Mexican, African American, English, or German who are of sufficient size to have workers present in all cells. This simply reflects the fact that ethnic group members are not randomly distributed across employment sectors or metropolitan areas.

The explanatory and control variables previously discussed under the level-one through level-three specifications for the HLM model were constructed from the PUMS file, representing mean values for employment sectors, ethnic groups, and metropolitan areas. These values are then grand mean-centered for input into the HLM model.

¹¹The structural zeros are associated with the following employment sectors: 1) food service, and cleaning and building maintenance occupations in the private household industry; and 2) extractive occupations in food, textile mill, truck and warehouse storage, communications, general merchandise, eating and drinking, other personal services, hospital, health services, elementary and high schools, colleges and universities, and other educational service industries.

¹²Employment sectors differ considerably not only in whether or not workers are concentrated in niches, but also the share of workers in a sector who are concentrated in niches. It may be that the industry and occupation associated with a particular employment sector are characterized by demand and supply conditions which facilitate the concentration of workers from the same ethnic group. For example, where employment in a firm and/or occupation is based more on informal recruitment practices, such as reliance on worker referrals, the opportunity for workers of the same ethnicity to concentrate would be greater. Similarly, establishments that provide goods unique to members of a particular ethnic group, such as ethnic based cuisines, printed materials, clothing, etc., are also likely to have greater concentrations of workers from the same ethnic group.

RESULTS

A key question to be addressed in evaluating the claims that ethnic group affiliation and metropolitan context affect the extent of labor specialization is whether a share of the variation in the concentration of co-ethnic workers in employment sectors is in fact associated with ethnicity and metropolitan location. To determine whether this is the case, I calculate intra-class correlation ratios from variance components derived from a random effects model which included controls for the size of a sector and average hourly wages of all workers in a sector, the two variables included to estimate the effects of sectors on worker concentration. Results from this calculation indicate that 39 percent of the variation in co-ethnic worker concentration is associated with ethnic group affiliation and metropolitan location (not shown), and that 84 percent of the between group/metropolitan variation is associated with ethnic group affiliation. These results suggest that in attempting to account for variations in co-ethnic worker concentration, it would be most appropriate to include measures of both ethnic group attributes and attributes of metropolitan areas.

Table 2 presents coefficients for the average effects of worker characteristics on the extent of concentration of co-ethnic workers in employment sectors for the j^{th} ethnic group in the k^{th} metropolitan area under different modeling specifications. The coefficients for model one are derived from a model which only includes predictor and control variables for workers in sectors; model two adds controls for ethnic group attributes; and model three adds controls for metropolitan areas. If one only considers the characteristics of workers all coefficients are substantially larger than their respective standard errors, and are in the predicted direction. The

addition of ethnic group attributes substantially reduces or alters the effects of worker characteristics of primary interest. Specifically, the effects of the two immigration status variables and English fluency are reduced by at least 50 percent; education attainment by 30 percent; the effect of self-employment changes from positive to negative; and the effect of ethnic competition becomes stronger, increasing by 544 percent. The addition of metropolitan characteristics slightly changes the effects of long-term immigrants, education attainment, self-employment, and ethnic competition; and reduces the effect of recent immigrant and English fluency such that they are no longer statistically significant.

These results indicate that much of the variation in co-ethnic worker concentration in employment sectors is clearly compositional in character, reflecting the relative status of ethnic groups and conditions prevailing in metropolitan areas. That recent immigrant status and English fluency have no independent effects on co-ethnic worker concentration indicates that co-ethnic workers of recent immigrant origin are under- or over-represented in sectors based on the characteristics of the ethnic group to which they belong and the metropolitan area in which they are concentrated. The same can be said for self-employment, except that the addition of attributes of ethnic group membership changes the hypothesized positive effect to a negative one. Although the negative effect of self-employment is consistent with the alternative hypothesis of employment in professional-based individual proprietorships with few employees, it is still possible that the average level of self-employment at the ethnic group level could be positively associated with co-ethnic worker concentrations in sectors.

Reported results for the other variables under model three are also of substantive interest. The intercept value can be interpreted as the adjusted mean value of the log of the concentration

ratio for co-ethnic workers of Northern and Western European ancestry, the omitted or reference category for the other ethnic/ancestry groups included in the model. The exponent of the value of the intercept indicates that workers of Northern and Western European ancestry are two-and-a-half times more likely to be specialized in the sectors in which they are concentrated than members of other ethnic groups.

Among the control variables, mean work experience of workers in a sector is inversely associated with the concentration of co-ethnic group members, suggesting that co-ethnic workers with the least experience are more likely to concentrate. The percentage of women employed in a sector is positively associated with co-ethnic concentration as expected, as women are more highly concentrated in a limited number of sectors than men. Finally, the likelihood of labor specialization in one sector by members of an ethnic group is greater if members of that group have also established niches in other occupational sectors within an industry. As previously noted, the dominance of an ethnic group in an industry sector probably has consequences for worker recruitment and selection.

The results reported in Table 3 address the question of whether ethnic group attributes influence the effects of worker characteristics on the relative concentration of co-ethnic workers in employment sectors. Much of the economic sociology literature which focuses on economic economies, enclave economies, and co-ethnic worker specialization in industry and occupational sectors suggests that ethnic affiliation is a group resource which substantially influences the mode of incorporation of ethnic group members into the labor market, because of its link to primordial ties, social networks, and cultural capital (see Portes, 1995; Waldinger, 1996a, Logan, et al., 2000). The reduction in the effects of worker characteristics on the extent of co-ethnic

worker concentration in employment sectors with the addition of ethnic group attributes clearly suggests that these workers share attributes rooted in ethnic group affiliation (see Model II, Table 2). I now show that in addition to these compositional effects, ethnic group affiliation also has a substantial impact on co-ethnic worker concentration directly.

The column headings in Table 3 identify the specific variables whose effects are related to the attributes of ethnic groups; the row headings are the specific attributes of ethnic groups used as explanatory variables. The coefficients are net average deviations from the effects of worker characteristics on co-ethnic concentration for the j^{th} ethnic group in the k^{th} metropolitan area. The π coefficients for control variables, including those for sectors, were not allowed to vary by ethnic group attributes; they are fixed and assumed to be a function of intercept terms, i.e., $\pi_{pjk}, \lambda_m = \beta_{p0k}$.

Overall, ethnic group attributes explain approximately 27 percent of the total variance explained in co-ethnic worker concentration as estimated via the full model (model three). Ethnic group attributes are associated with ethnic group variation in the π coefficients, particularly those representing the Intercept, Education Attainment, Self-Employment, and Ethnic Competition. The strongest effects of group attributes are associated with variation in the intercept term, or the adjusted means of ethnic groups with respect to the co-ethnic concentration of workers. Large size groups and those in which group level self-employment is high have lower average levels of co-ethnic concentration. On the other hand, high proportion foreign-born increases the extent of co-ethnic concentration in sectors in which they are present. This result is probably due to the influence of the foreign-born on the presence of ethnic market economies, and the heavy reliance of the foreign-born on social networks to secure employment.

Results also indicate that ethnic groups with higher average English fluency and education attainment are also likely to be over-represented in employment sectors. Although these findings are contrary to what was expected, it may be that the over-representation of co-ethnic workers might be reflective of the concentrations of selected ethnic groups in managerial, and professional/technical occupations. Indeed, as I have shown else where, a substantial number of co-ethnic members of Middle-Eastern, Asian, and Northern and Western European ancestry are over-represented in high-skilled white-collar occupations (Wilson, forthcoming).

One can also note that, with the exception of the residual Hispanic ancestry group, the adjusted mean concentration of co-ethnic members of the ethnic/ancestry groups reported in the table is significantly higher than that of groups from Northern and Western Europe (the reference category). European groups have been present in the U.S. over a longer period of time, and thus their tendency to concentrate has diminished considerably overtime. Ethnic groups from South America, and to a lesser degree Sub-Saharan Africa, are particularly over-represented in employment sectors. The significant positive values for all of these groups suggest the influence of other group-related factors not directly measured in this analysis.

Variation in the slope coefficient for the effect of long-term immigrant on co-ethnic worker concentration is positively associated with a group's foreign-born share, negatively associated with groups of Caribbean and South American ancestry, and positively associated with those of North American ancestry. Variation in the slope coefficient for recent immigrant is also positively associated with share of a group foreign-born, but it is negatively associated with duration of residence of the foreign-born. These findings indicate that when a group's foreign-born share is high, there is a greater likelihood that immigrant co-ethnic workers will be

over-represented in employment sectors; but in the case of recent immigrants, such over-representation is counter-balanced by length of residence in the U.S. With respect to the coefficient for English fluency, its effect on co-ethnic worker concentration is reduced by share of a group's workers self-employed and group size.

Variation in the π coefficients for the effect of workers' average education attainment on the concentration of co-ethnic workers in employment sectors is also responsive to variation in the attributes of ethnic groups. High average English fluency for a group lowers the effects of workers' education attainment, while the effects of average group duration of residence, group level average education attainment and self-employment, and group size are positively related to the effect of the education attainment of workers on concentration. The effects of group level education attainment and self-employment probably reflect the tendency of some groups to be over-represented in skilled-white-collar occupations in which self-employment is also high. The effect of education attainment on co-ethnic worker concentration is lower for seven of the nine ethnic/ancestry categories relative to groups from Northern and Western Europe.

Group level education attainment reduces the effect of workers' average level of self-employment, while a group's level of self-employment and group size substantially increase the effect of co-ethnic worker self-employment on concentration. This suggests that when the self-employment of a group is high, self-employed workers increases co-ethnic concentration in particular industry sectors. Thus, the expectation that high average self-employment in an industry sector would increase co-ethnic over-representation is apparently conditional on the overall level of self-employment of the ethnic group itself; such that when group level self-employment is high, a higher level of self-employment among co-ethnic workers is likely to

increase co-ethnic worker concentration. The positive effect of ethnic group size on the effect of self-employment on co-ethnic concentration attests to the strong influence of consumer market potential and entrepreneurial presence on the provision of employment opportunities for co-ethnic workers (see Razin and Langlois, 1996; Portes and Rumbaut, 1996). Finally, variation in the effect of average self-employment among workers in a sector is strongly negatively related to co-ethnic over-representation for three of the ethnic/ancestry categories.

Four of the ethnic group variables are related to variation in the effect of ethnic competition. Group level English fluency and education attainment are inversely related, while group level self-employment and group size are positively related to variation in the effect of ethnic competition on co-ethnic worker concentration in an employment sector. The negative effect of English fluency might be a consequence of workers of other ethnic groups not being able to penetrate employment sectors in which co-ethnic workers of a reference group form concentrations in which language may act as a major barrier for entry, such as employment in an ethnic market economy. The positive effects of group-level self-employment and group size suggest that the negative effect of ethnic competition is not as strong for large size groups and those in which entrepreneurial activities are high.

As noted in the previous discussion of level-three, all of the β 's representing the effects of ethnic group attributes on the π 's from the level-two equations are in turn treated as outcome variables in the level-three equations. The level-three model seeks to ascertain whether the effects of ethnic group attributes are associated with the characteristics of metropolitan areas. Table 4 reports partial results from the level-three analysis, mainly the effects of metropolitan attributes on the intercept term, η_{pq0} , for the primary predictor variables. Not reported are the

results for the η_{pqS} coefficients for the effects of metropolitan characteristics on the β -slope coefficients, as most are not statistically significant. These findings indicate that in most instances variation in the β -slope coefficients are not affected by metropolitan characteristics (results are available from the authors).

With respect to the intercept, deviations from the grand mean of co-ethnic worker concentration are substantially affected by metropolitan attributes. Labor force size, the proportion of the labor force in ethnic niches, and proportion foreign-born each increased the level of co-ethnic work concentration in employment sectors. The evidence is fairly strong that the pervasiveness of ethnic group specialization in a labor market and the share of a local population foreign-born significantly increases the chances of workers being organized into ethnic niches. The share of a metropolitan population non-European (and non-North American), number of ethnic groups, and mean household income are negatively associated with co-ethnic concentration.

The negative effects of non-European (and non-North American) ancestry and the number of ethnic groups with workers in the market are contrary to expectations. Descriptive results reported elsewhere indicate that European ethnic groups have the lowest percentage of their workers concentrated in niches. Apparently, the bivariate positive association of ethnic diversity is altered considerably once the effect of group attributes and attributes of metropolitan areas are taken into account. As expected, higher average household income, as a measure of household consumption potential, reduces co-ethnic concentration of workers, possibly as a result of its positive effect on the expansion of employment opportunities through increased consumer demand. Finally, it can be noted that industrial structure of a metropolitan area does

not affect the average level of co-ethnic concentration, as indicated by the non-statistical significance of the industrial composition variables.

Variation in the average effects of level-two intercept coefficients on variation in level-one slope coefficients for the primary predictor variable are also of interest. First, note that the higher the share of the metropolitan population foreign-born, the lower the average level of co-ethnic concentration attributable to the effect of long-term immigrants. This confirms the expectation that the higher the share of immigrants who are long-term residents, the lower the level of co-ethnic concentration, probably because of the higher average skill acquisition and accumulated experience of co-ethnic members. Second, higher average metropolitan household income increases the extent of co-ethnic concentration associated both with long-term and recent immigrant status, possibly because of the former's effect on the average household's consumption of ethnically specific goods.

Third, the effect of average worker education attainment on co-ethnic concentration is positively associated with the size of the labor force and share of metropolitan labor force in ethnic niches, but inversely associated with number of ethnic groups, household income, and the unemployment rate. Although these associations are complex with respect to their substantive import, they attest to the sensitivity of the effect of education of workers on co-ethnic concentration within the context of variation in conditions prevailing in metropolitan environments. The same can be said for the average effect of self-employment and ethnic competition on co-ethnic worker concentration. With respect to self-employment, labor force size and household income are positively associated, and the number of ethnic groups is negatively associated with the effect of this variable.

Finally, the effect of ethnic competition also varies considerably by metropolitan characteristics. The share of workers employed in ethnic niches, number of ethnic groups, and employment in extractive, nondurable, and consumer services industries are inversely associated with the presence of other ethnic group members with niches in a sector on the concentration of co-ethnic workers of a reference group; while labor force size, and the share non-European (and non-north American) are positively associated with co-ethnic worker concentration.

DISCUSSION

Conclusions

The well documented finding that the distribution of workers across industry and occupational sectors reflects in part a match between the relative skills and experiences of workers and the productivity requirements of jobs linked to the production of goods and services is confirmed by the empirical analysis reported here. However, my primary interest has been to confirm two other claims reported in the literature. First, I evaluate the claim that ethnic affiliation plays a key role in structuring labor market experiences, in particular, the relative concentration of co-ethnic workers in specific sectors of local labor markets. This occurs because group affiliation provides co-ethnic members access to information and other resources that may not be available to all workers. The second claim I evaluate is that metropolitan labor markets provide the context within which ethnic group members develop employment strategies taking into account their skills and experiences, resources at their disposal, and prevailing local supply and demand conditions, including similarly endowed members of other groups.

Empirical results partly support both claims. The relative concentration of co-ethnic workers in employment sectors is directly influenced by ethnic group-level variables, as indicated by the effects of such group level variables as share foreign-born, levels of English fluency and education attainment, and group size on the adjusted mean level of co-ethnic concentration (intercept). In addition, all of the ethnic/ancestry groups, except Other Hispanics, have co-ethnic worker concentration in employment sectors which are substantially higher than those of co-ethnic workers of Northern and Western European ancestry, the groups with the longest continuous residence in the U.S..

Findings of ethnic group effects are also reflected in the effects of group attributes on variations in the effects of workers' characteristics on co-ethnic worker concentrations. Specifically, results indicate the following: 1) The effect of immigrant status varies positively with a group's percent foreign-born, but among recent immigrants the effect is counter-balanced by the negative effect of duration of residence in the U.S.; 2) influence of workers' English fluency level varies negatively with a group's share of workers self-employed and group size; 3) the effect of workers' average education attainment on co-ethnic concentration is mediated via an ethnic group's average level of English fluency, education attainment, self-employment, and group size; 4) a group's level of self-employment positively affects the effect of workers' self-employment level on co-ethnic concentration, while group level education attainment negatively affects this association; and 5) a group's level of English fluency, education attainment, self-employment, and group size affect the extent to which competition from other groups affect co-ethnic worker concentration of a reference group.

Second, results from the level-three analysis indicate that the effects of metropolitan characteristics appear to be limited to their effects on variations in the values of selected intercepts estimated in the level-two models, most notably the main intercept and the level-two intercepts for education attainment, self-employment, ethnic competition. Few of the slope coefficients for the effects of worker characteristics on ethnic group attributes vary by metropolitan characteristics. With respect to the main intercept, labor force size, share of the total labor force in ethnic niches, and share foreign-born are positively associated with the average adjusted level of co-ethnic worker concentration; while non-European ancestry, the number of ethnic groups with workers in the market, and household income are inversely related to co-ethnic worker concentration. Perhaps the most important of these findings are that in large metropolitan areas with ethnically differentiated employment sectors and with large shares of the foreign-born, co-ethnic worker concentrations are likely to be high.

Variation in the intercept term predicating the slope coefficient for the effect of education attainment on co-ethnic concentration is positively associated with labor force size, share of labor force in niches, and inversely associated with the number of ethnic groups, household income, and unemployment. The effect of ethnic competition, which captures the extent to which other ethnic groups have a niche in a sector, vary positively with labor force size, non-European ancestry, and employment in extractive, nondurable goods, and consumer service industries; and varies negatively with share of labor forces in niches and the number of ethnic groups.

The effects of immigrant status and English fluency were the only worker characteristics whose effects on co-ethnic worker concentration were reduced to non-significance once

metropolitan characteristics were introduced. However, it is clear that the influence of immigrant status is substantial, as reflected in the influence of foreign-born composition of ethnic groups themselves, and of the foreign-born composition of individual metropolitan areas. These results largely confirm the often cited effect of immigrant status on the extent of concentration of co-ethnic workers in employment sectors. The effect of English fluency appears to function in a similar manner, except that a group's average level of English fluency (as well as education attainment) is positively associated with co-ethnic concentration. This finding reflects the influence of both native-born workers and highly skilled foreign-born workers who arrived in the U.S. fluent in English.

Implications

The implication of reported results are in some respects quite clear. First, workers' involvement in labor markets is substantially influenced by ethnic group affiliation, and such influence is not limited to the overall level of co-worker concentration, but also includes variations in the effects of workers' characteristics on co-ethnic worker concentration. Second, the presence of other workers with niches in an employment sector negatively impacts the overall level of co-ethnic concentration observed for members of a reference group. Although this finding suggests that members of different ethnic groups compete to control or otherwise limit the influx of non-group members, the data source used in this analysis can only be used to infer the outcome of competition, not the actual process itself.

Third, conditions prevailing in metropolitan areas also influence co-ethnic workers' level of labor specialization. Although this finding was expected, to my knowledge, this is the first empirical study that has reported results confirming it. The metropolitan environment can both

enhance or limit the employment options available to ethnic group members, as suggested by the effect of labor market size. In addition, occupational opportunities, while more numerous in large metropolitan areas, may not be open to all equally qualified workers because of the pervasiveness of ethnic group-based specialization. Although results indicate that the actual number of ethnic groups present in a labor market reduces the extent of co-ethnic concentration, it may well be that what matters most are the distinctive characteristics of the groups themselves. For example, a large size place with high concentration of primarily European ancestry groups probably would not have a labor market structure in which group specialization is high, because the saliency of ethnic identification would likely be lower.

Is labor specialization simply an employment strategy adopted by ethnic group members in response to settling in a new and challenging environment? The results clearly suggest that immigrant status, as an attribute of workers, of ethnic groups, and of metropolitan areas, is a key factor associated with labor specialization. I find, as does Waldinger (1996a), that while the foreign-born tend to be over-represented in selected employment sectors, it is also evident that the native-born several generations removed from their immigrant ancestors also tend to specialize, although not to the same extent. As previously noted, over-representation may persist over generations, if wages and other benefits are attractive relative to those in occupations requiring similar skills. Although it was not possible to assess the interaction effect of nativity and socioeconomic attainment on co-ethnic concentration, the combination of high English fluency and education attainment can also be observed among recent immigrants, many of whom gained entrance to the U.S. through employment visas.

Although reported findings clearly affirm the importance of ethnic affiliation on co-ethnic labor specialization, and of the influence of metropolitan context on the overall level of co-ethnic specialization, these results are not definitive. First, it should also be noted here that the effort to measure group attributes and resources was limited by available data. No direct measures of group identification were employed, such as the primordial or situationally constructed cultural symbols or norms that underlie identification. So too, other factors may have aided in illuminating the basis of co-ethnic concentration, such as labor union participation, or employment visa declaration as a criterion for admission to the U.S.

Although reported results are suggestive, they do not speak directly to the question of the extent to which co-ethnic labor concentration varies across generations within the same ethnic group. The history of European ethnic groups' residency in the U.S. suggests this possibility, but documentation of the rate of change in labor specialization over generations has not been adequately documented. In addition, it is not possible from reported results to gauge whether the predictive power of the multi-level model, particularly with respect to the effects of group attributes and characteristics of metropolitan areas, varies across individual ethnic groups. For example, it would be of interest to know whether co-ethnic concentrations predicted for Asian ancestry groups differ from those predicted for Latin American or domestic ancestry groups and why. These issues will be the subject of future investigations.

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TABLE 1
Summary Labor Force Statistics for Ethnic Groups, 1990

ETHNICITY	Metropolitan Areas		Concentration Index				% Lab. Force in Niches (7)
	Labor Force Total (1)	No. MSA's 500+ Wrkrs. (2)	Min. (3)	Mean (4)	Max. (5)	No. Niches (6)	
Central America and Mexico							
Mexico	5602064	130	3.37	282.12	114400.00	1116.00	44.41
San Salvador	291362	20	2.00	820.60	982725.00	116.00	49.75
Guatemala	149737	14	3.13	1555.30	2291100.00	55.00	39.68
Honduras	63537	10	10.49	2053.61	619142.86	18.00	17.19
Nicaragua	97058	11	3.03	1261.20	486600.00	31.00	20.65
Costa Rica	29642	6	17.29	5637.05	1122757.14	0.00	0.00
Panama	46010	9	13.86	3803.70	608366.67	4.00	5.46
South America							
Colombia	210931	17	7.48	1288.54	1621300.00	45.00	20.90
Ecuador	122586	10	9.94	1290.38	611542.86	27.00	21.42
Peru	93781	10	5.50	2122.92	1825100.00	22.00	13.34
Argentina	32899	9	14.96	2996.21	964466.67	3.00	4.30
Chili	35486	6	14.72	3584.28	733400.00	3.00	3.78
Oth. Cen. So. America	152475	27	7.50	1827.00	894850.00	31.00	14.19
Brazil	35790	8	14.77	3665.05	933000.00	6.00	12.56
Other Hispanic Caribbean	1581383	132	11.68	304.74	381000.00	212.00	12.26
Cuba	467825	28	13.45	596.06	1122900.00	70.00	14.89
Dominican Republic	255283	13	5.18	778.16	448766.67	59.00	39.68
Haiti	166633	12	4.43	1009.45	349130.00	42.00	33.24
Jamaica	270262	23	3.88	1131.40	735750.00	43.00	24.07
Trinidad/Tobago	49842	6	11.42	2917.69	964466.67	11.00	19.46
Guyana	56095	5	14.63	3068.84	1677000.00	11.00	19.97
Other Caribbean	180963	19	7.14	1559.14	426450.00	25.00	18.96
Sub-Saharan Africa							
Nigeria	45925	11	10.33	4374.64	441412.50	2.00	2.05
Oth. Sub. Sah. Africa	215570	41	12.54	1733.90	817550.00	23.00	7.47
N. Africa & Mid. East							
Israel	37381	7	13.38	3368.55	1325300.00	7.00	10.41
Lebanon	181681	49	7.59	1640.39	468800.00	17.00	5.81
Iran	117882	24	4.35	1485.09	456225.00	41.00	23.36
Egypt	43571	11	17.99	2731.61	608366.67	10.00	11.47
Syria	55176	15	15.15	4165.51	882925.00	4.00	4.84
Turkey	37226	11	16.21	5645.83	557700.00	4.00	5.63
Palestinian	25818	8	20.31	5321.00	980233.33	3.00	5.70
Assyrian	17727	7	17.08	2285.38	231361.54	2.00	7.99
N. Africa/Mid. East	95451	23	14.93	2109.10	477600.00	20.00	13.14
Asia							
Japan	539721	60	5.90	653.64	323650.00	109.00	18.48

(table continues)

TABLE 1, continued

ETHNICITY	Metropolitan Areas		Concentration Index				% Lab. Force in Niches (7)
	Labor Force Total (1)	No. MSA's 500+ Wrkrs. (2)	Min. (3)	Mean (4)	Max. (5)	No. Niches (6)	
China	997545	74	3.29	459.02	286400.00	261.00	34.83
Philippines	809316	62	3.92	495.04	247150.00	204.00	31.64
Korea	429915	55	2.57	783.58	321050.00	116.00	30.92
Vietnam	282193	53	6.04	1200.38	178970.00	77.00	21.26
India/Pakistan	407513	63	2.55	814.28	381000.00	113.00	24.04
Cambodia	41050	17	6.92	4674.07	937333.33	2.00	2.51
Laos	51463	23	23.72	4752.82	485700.00	4.00	3.10
Thailand	65201	18	15.46	3684.34	498200.00	13.00	13.48
Pacific Islands	98923	23	10.71	2198.72	916360.00	8.00	3.50
Other Asia	140790	29	9.43	1822.46	563500.00	24.00	8.98
North America							
Puerto Rico	832610	68	7.43	479.23	1011100.00	141.00	17.28
American Indian	2827454	201	7.32	260.36	34064.29	264.00	9.07
Hawaii	115575	13	9.66	1891.98	673972.00	19.00	15.08
African American	13353110	193	2.54	211.63	78780.00	2378.00	34.55
Canada	1256035	136	5.80	419.08	90353.85	69.00	4.45
Oth. N. America	18848212	216	6.51	132.96	4466.12	1526.00	10.75
Northern & Western Europe							
Austria	308512	53	5.18	1010.87	575900.00	63.00	18.42
Belgium	147095	40	15.71	2015.53	496400.00	4.00	1.30
England	8416230	216	2.90	153.06	15334.48	885.00	13.58
Denmark	577593	101	8.25	723.55	449700.00	35.00	4.56
Netherlands	1363997	184	7.02	360.42	143700.00	84.00	5.41
France	2185581	201	4.00	274.31	20552.63	121.00	4.39
Germany	16011430	216	2.03	130.15	6660.21	1079.00	7.09
Ireland	9062355	216	4.52	143.30	11602.60	455.00	5.28
Norway	1278397	123	4.85	398.14	121266.67	86.00	6.08
Scandinavia	271195	62	16.56	1341.60	447200.00	17.00	3.59
Scotland	3339969	209	6.50	211.29	26600.00	431.00	12.30
Switzerland	348292	99	9.29	956.37	178725.00	28	4.91
Wales	631102	133	5.14	590.96	110400.00	58	5.50
Oth.N.W.Europe	395702	93	5.38	850.55	425700.00	45	7.94
Sweden	1497336	162	5.79	329.72	91657.14	123	6.55
Finland	266953	49	16.84	1508.58	317100.00	8	2.34
England/France	849801	151	7.69	482.91	159333.33	66	5.57
England/Germany	3961993	206	4.63	188.46	19072.34	458	10.80
England/Ireland	2993049	203	2.07	209.97	35012.50	237	6.37
England/Scotland	1371179	176	6.45	333.05	94100.00	230	14.08
Netherlands/Germany	319574	69	8.59	917.11	447200.00	13	1.90

(table continues)

TABLE 1, continued

ETHNICITY	Metropolitan Areas		Concentration Index				% Lab. Force in Niches
	Labor Force Total (1)	No. MSA's 500+ Wrkrs. (2)	Min. (3)	Mean (4)	Max. (5)	No. Niches (6)	
Netherland/Ireland	899258	165	10.74	470.04	196100.00	29	2.47
France/Germany	600359	158	14.63	698.93	119475.00	11	1.17
France/Ireland	1312442	174	8.29	354.10	114400.00	68	3.04
Germany/Ireland	897538	146	9.71	474.18	71920.00	45	3.55
Germany/Norway	5905153	210	2.94	158.37	12925.00	290	3.64
Germany/Scotland	538272	77	11.01	892.09	450450.00	22	3.32
Germany/Italy	1071015	174	6.79	392.75	59973.33	91	6.74
Germany/Poland	972609	126	7.73	389.82	150150.00	78	6.36
Germany/Sweden	922998	121	10.28	449.19	365300.00	57	4.03
Ireland/Italy	614127	118	5.47	625.18	232583.33	27	2.96
Ireland/Poland	1021240	110	5.59	389.69	432800.00	77	6.27
Eastern & Southern Europe							
Portugal	512986	50	2.88	690.42	459700.00	81	16.00
Armenia	141936	20	12.18	1299.53	571300.00	22	12.04
Czechoslovakia	595779	94	10.72	640.12	174560.00	41	4.14
Romania	202566	38	9.83	1179.65	721600.00	28	9.30
Russia	1144828	95	4.18	368.97	381000.00	297	36.24
Slovenia	724248	96	9.34	522.41	255850.00	61	4.42
Lithuania	302275	53	7.36	1017.42	532700.00	28	5.83
Ukraine	282866	51	12.83	1022.62	357880.00	16	3.10
Hungary	577918	84	8.96	589.09	179434.29	56	6.38
Greece	553534	85	5.97	642.15	450500.00	56	11.45
Italy	5439938	195	6.01	159.03	44955.00	384	7.62
Poland	3040299	165	5.43	200.16	62716.67	233	6.31
Yugoslavia	108227	30	19.71	2422.97	553100.00	9	4.87
Oth. S.E. Cen. Europe	158803	35	10.26	1466.78	154678.95	44	20.69
Croatia	231382	50	10.36	1317.88	178762.50	6	1.49
Serbia	52111	15	21.38	3947.48	1446800.00	1	0.99
Russia/Poland	465781	76	13.21	819.18	901000.00	24	3.00
Italy/England	322105	43	5.10	749.71	491900.00	88	28.73

Table 2: Effects of Worker Characters on the Concentration Ratio

Level One Variables	Model I ¹		Model II ²		Model III ³	
	π	S.E	π	S.E	π	S.E
Intercept	5.687***	.023	5.463***	.044	5.533***	.001
Long-Term Immigrants	.197***	.006	.085***	.010	.071***	.016
Recent Immigrants	.191***	.010	.095***	.020	.067	.038
English Fluency	-.038***	.003	-.009*	.005	-.004	.007
Education Attainment	-.013***	.001	-.008***	.001	-.011***	.002
Self-Employment	.014*	.007	-.039***	.009	-.037***	.016
Ethnic Competition	.009***	.001	-.058***	.001	-.055***	.002
<u>Control Variables</u>						
Work Experience	.001***	.0001	.001***	.0001	.001***	.0001
Gender	.017***	.002	.017***	.002	.015***	.002
Number of Occupational Niches	.206***	.002	.204***	.002	.203***	.002
Number Co-Ethnic Members in Sector	.0006***	.0001	.0005***	.000	.001***	.0000
Share of Workers in Sector Co-Ethnic Member	-4.537***	.008	-4.542***	.010	-4.551***	.008
<u>Sector Characteristics</u>						
Hourly Wages	.130***	.002	.125***	.002	.124***	.002
Size of Sector	-.657***	.001	-.660***	.001	-.661***	.001

Total Variable Explained				53.2 ⁴		
Share Total Variance Attributed to Level One Predictors				37.8 ⁵		

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

1. Model Includes Level One Variables Only

2. Model Includes Level One and Two Variables

3. Model Includes Levels One, Two and Three Variables

4. Total Variance and its components were calculated using the random model which included intercept and the two sector variables.

5. Derived from Model Three.

Table 3. Effects of Ethnic Group Attributes: Level Two Model

Ethnic Group Attributes	Intercept		Long-Term Immigrant		Recent Immigrant		English Fluency		Education Attainment		Self-Employment		Ethnic Competition	
	β	S.E	β	S.E	β	S.E	β	S.E	β	S.E	β	S.E	β	S.E
Foreign Born	.311***	.080	.372**	.126	.431*	.192	-.005	.060	-.028	.023	-.076	.220	.015	.021
Duration of Residence of Foreign Born	-.0003	.004	-.013	.008	-.027*	.012	.001	.004	.003*	.001	.020	.012	.0000	.001
English Fluency	.132***	.011	.051	.027	.032	.047	.013	.012	-.016***	.004	-.015	.033	-.010***	.003
Education Attainment	.053***	.007	-.012	.016	-.028	.028	-.002	.007	.024***	.002	-.046*	.020	-.004*	.002
Self-Employment	-.108	.063	-.188	.179	.051	.352	-.201*	.082	.197***	.023	2.151***	.167	.060**	.019
Group Size	-.526***	.003	.004	.008	-.007	.015	-.008*	.004	.002*	.001	.030***	.007	.044***	.001
Region of Ancestry														
Central America	.146***	.029	-.007	.050	.015	.094	-.038	.023	-.092***	.008	-.078	.095	-.009*	.007
Caribbean	.290***	.067	-.234**	.086	-.545***	.144	-.085	.044	-.053**	.017	.026	.162	.012	.012
South America	1.538***	.074	-.649***	.090	-.583**	.141	-.053	.045	-.045*	.020	-.060	.171	-.046***	.013
Other Hispanic	-2.126***	.040	-.116	.075	-.088	.147	-.054	.033	-.023	.012	.014	.117	.192***	.009
Sub-Saharan Africa	.410***	.084	-.216	.136	.133	.188	-.110	.082	-.026	.030	-.667**	.274	.029	.018
North Africa and Middle East	.277***	.050	-.032	.085	-.072	.146	-.031	.050	-.059***	.018	-.175	.114	.025**	.011
Asia	.113**	.035	.035	.056	-.021	.099	-.029	.028	-.058***	.011	-.247**	.092	-.006	.008
North America	.116***	.011	.121***	.036	-.111	.077	.032*	.013	-.080***	.003	.005	.029	-.003	.003
East, Central, South Europe	.076***	.010	.030	.033	-.057	.079	-.001	.015	-.015***	.004	-.076**	.026	-.003	.003
North & West Europe	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Share Variance Explained Attributed to Ethnic Group Attribute

27.16

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

1 omitted category

Table 4. Effects of Metropolitan Characteristics: Level Three Model

Metropolitan Area Attributes	Intercept		Long-Term Immigrants		Recent Immigrants		English Fluency		Education Attainment		Self-Employment		Ethnic Competition	
	η	S.E	η	S.E	η	S.E.	η	S.E	η	S.E	η	S.E	η	S.E
Intercept														
Labor Force Size	.531***	.008	.021	.018	.015	.034	-.007	.008	.006***	.002	.034*	.017	.007***	.001
Pro. Labor Forces Niches	.007**	.001	.003	.002	.001	.003	.003**	.001	.001***	.0002	-.001	.002	-.003***	.0001
Foreign-Born	.316**	.116	-.524**	.210	-.643	.400	-.113	.101	.035	.030	-.164	.248	.019	.017
Pro. Non-European	-.002***	.0006	.000	-.001	.002	.002	-.0012	.0004	.000	.000	.0002	.001	.0002**	.0001
No. Ethnic Groups	.003***	.001	.002	.002	.002	.004	-.001	.001	-.0005*	.0001	-.005**	.002	-.0004**	.0001
Household Income	.192***	.037	.193*	.079	.305*	.146	.039	.039	-.027**	.010	.183*	.079	.012	.007
Unemployment Rate	-.247	.424	1.222	.969	2.861	1.819	-.872	.468	-.246*	.115	1.562	.922	-.078	.078
Industry														
Extractive	-.125	.191	.560	.426	-.349	.786	.581**	.201	-.064	.052	-.864	.419	.075*	.037
Nondurable	.148	.175	.416	.388	.372	.768	.222	.186	.006	.043	.136	.384	.067*	.029
Durable	-.211	.151	.181	.306	-.566	.538	-.031	.153	.012	.038	-.216	.335	.046	.026
Construct., Trans., Utility	.376	.279	.461	.604	-.555	1.096	-.525	.292	.027	.072	.295	.616	-.042	.050
Consumer Services	-.070	.168	.338	.352	-.249	.685	.256	.176	-.002	.043	.230	.367	.079**	.029
Fire, Professionals	.091	.180	.650	.414	-.274	.750	.301	.199	-.150**	.049	-.210	.401	.055	.035
Share Variance Explained Attributed to Metropolitan Attributes	35.0													

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

Appendix Table A. Summary Statistics for Variables Include the HLM Model

Variable Name	N	Mean	SD	Minimum	Maximum
Level - 1					
Long-Term Immigrants (MNATIVE)	1027696	0.09	0.26	0.00	1.00
Recent Immigrants (MPOBYR3)	1027696	0.02	0.12	0.00	1.00
English Fluency (MSPEAK)	1027696	4.79	0.55	1.00	5.00
Education Attainment (MGRADE)	1027696	6.43	1.38	0.00	9.00
Self-Employment (SELF1)	1027696	0.09	0.15	0.00	1.00
Ethnic Competition (LPODDS1)	1027696	1.53	2.44	0.02	9.31
Concentration Ratio (LODDS1)	1027696	5.25	1.41	0.01	13.42
Control Variables					
Work Experience (MEXPER)	1027696	26.46	11.37	3.00	85.00
Gender (MSEX)	1027696	0.42	0.43	0.00	1.00
Number of Occupational Niches (OCCUPAT)	1027696	0.16	0.58	0.00	14.00
Number Co-Ethnic Members in Sector (COUNT4)	1027696	93.36	449.61	17.98	93549.94
Share of Workers in Sector Co-Ethnic Member (ETHNIC1)	1027696	0.11	0.19	0.00	1.00
Characteristics of Sectors					
Average hourly wage	1027696	2.45	0.51	-2.30	8.78
Average size of sector	1027696	6.90	1.80	2.89	12.93
Level - 2					
Foreign Born (ENATIVE)	9466	0.12	0.22	0.00	1.00
Duration of Residence of Foreign Born (EMIMMIGR)	9466	1.86	2.91	0.00	35.50
English Fluency (ESPEAK)	9466	4.37	0.56	0.00	5.00
Education Attainment (MCOGRADE)	9466	6.55	0.74	0.00	9.00
Self-Employment (ESELF)	9466	0.10	0.06	0.00	1.00
Group Size (ESIZE)	9466	7.66	1.62	0.01	14.37
Central America (CAMERICA)	9466	0.03	0.17	0.00	1.00
Caribbean (CARIBBEAN)	9466	0.02	0.13	0.00	1.00

Appendix Table A. Summary Statistics for Variables Include the HLM Model continued

Variable Name	N	Mean	SD	Minimum	Maximum
South America (SAMERICA)	9466	0.02	0.13	0.00	1.00
Other Hispanic (HISPANIC)	9466	0.02	0.13	0.00	1.00
Sub-Saharan Africa (AFRICA)	9466	0.01	0.09	0.00	1.00
North Africa and Middle East (MIDEAST)	9466	0.02	0.16	0.00	1.00
Asia (ASIA)	9466	0.07	0.26	0.00	1.00
North America (NAMERICA)	9466	0.10	0.29	0.00	1.00
Northern and Western Europe (NWEUROPE)	9466	0.55	0.50	0.00	1.00
Eastern and Southern Europe (ESEUROPE)	9466	0.17	0.38	0.00	1.00
Level - 3					
Labor Force Size (COUNT5)	215	12.09	1.23	9.23	16.20
Pro. Labor Forces Niches (PERCENT7)	215	7.92	5.80	0.00	28.90
Foreign Born (NATIVE)	215	0.05	0.06	0.00	0.39
Pro. Non-European (PERCEN10)	215	8.40	12.86	0.56	82.04
Metropolitan Population (LPOP)	215	12.71	1.22	9.91	16.78
No. Ethnic Groups (COUNT20)	215	80.13	14.77	31.00	100.00
Household Income (INCOME)	215	10.51	0.16	10.02	10.93
Unemployment Rate (MUEMPLOY)	215	0.05	0.01	0.02	0.10
Extractive (MEXTRACT)	215	0.04	0.04	0.01	0.22
Nondurable (MNONDURE)	215	0.07	0.04	0.02	0.26
Durable (MDURABLE)	215	0.10	0.06	0.01	0.31
Construct., Trans., Utility (MCONUTIL)	215	0.13	0.02	0.09	0.19
Consumer Services (MCONSUME)	215	0.27	0.03	0.18	0.48
Fire, Professionals (MPROFESS)	215	0.33	0.05	0.21	0.48
Public Administration (MPUBLIC)	215	0.05	0.03	0.01	0.18

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