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The extent of occupational segregation in the US: Differences by race, ethnicity, and gender*

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Abstract

By using data from the American Community Survey, this paper studies occupational segregation by ethnicity/race and gender in the US by comparing the distribution of any demographic group with the employment structure of the economy. The analysis shows that occupational segregation is particularly intense in the Hispanic and Asian population groups, even though the performance of the former seems to be more disturbing than that of the latter given its higher concentration in low-paid jobs. As opposed to what happens for African and Native Americans, human capital variables explain a substantive part of Hispanic and Asian segregation. The analysis also reveals that the differential between women and men is not reduced after controlling for human capital characteristics. In addition, segregation disparities are much larger among male groups than among female groups. A distinctive characteristic of Hispanic workers is that segregation is higher for men than for women.

Keywords: occupational segregation, local segregation, race, ethnicity, gender.
JEL Classification: J15, J16, J71, D63.

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1. Introduction

Racial and ethnic diversity is one of the distinctive characteristics of the labor market in the United States compared with other countries. According to the American Community Survey, minorities accounted for about 30% of the overall employed population in 2007, with those of Hispanic origin representing the largest share (14%) followed by African Americans (11%). The corresponding proportions for Asians and American Natives were, respectively, 4.5% and 0.7%. Given this diverse society, it is not surprising that wage disparities among these groups has been widely documented, as well as residencial and school segregation. However, additional sources of racial/ethnic inequality in the labor market, such as occupational and workplace segregation, are less known. Among the studies exploring occupational segregation from a race/ethnic perspective, most have focused on explaining black-white (or black-non-black) segregation trends in the second half of the 20th Century; some have also included Hispanic-white (or Hispanic-non-Hispanic) segregation, and others have additionally considered differences by gender (Albelda, 1986; King, 1992; Springgs and Williams, 1996; Rawlston and Spriggs, 2002; Mintz and Krymkowski, 2005; Tomaskovic-Devey et al., 2006; Queneau, 2009). In other words, most of the analyses undertaken so far are based on pairwise comparisons and little is known about the differences among ethnic/racial-gender groups, in part due to the difficulties of the pairwise comparison approach used so far.

In this paper, we aim to shed some light on the analysis of occupational segregation by ethnicity/race and gender in the US by comparing the distribution of any demographic group (white male workers included) with the employment structure of the economy, which facilitates comparisons among multiple groups. Are Hispanic female workers more segregated than Asians or blacks? Is segregation more severe among women or among men in these groups? To answer these questions, we use several segregation measures recently proposed in the literature satisfying some good properties (Alonso-Villar and Del Río, 2010). These indexes allow quantifying the extent of segregation for each group so as to determine their relative position. Certainly, two demographic groups having the same segregation level might differ in their well-being depending on whether they concentrate in high- or low-paid occupations. For this reason, this paper also

explores the type of segregation experienced by the demographic subgroups taking into account the economic status of occupations.

In addition, this paper investigates the role played by human capital workers' characteristics such as education and English proficiency to explain segregation disparities among groups. Are highly-educated white workers more segregated across occupations than low-educated? Is a lower ability to speak English associated with a larger segregation for Hispanic workers? And what effect does the high proportion of college graduates have on segregation of Asians? To assess the importance of these variables, we estimate various specifications of an econometric model by exploiting the geographical and demographic variability of the US population.

The paper is structured as follows: Section 2 offers a review of segregation measurement in a multigroup context, presenting, in particular, the measures that are used in Section 3 to quantify the extent of segregation of the ethnic/racial-gender groups in the US. Section 4 undertakes the regression analysis. Finally, Section 5 shows the main conclusions.

2. Background: Segregation in a Multigroup Context

When exploring segregation in the US, both in analyses of spatial and occupational segregation, scholars have traditionally considered a dichotomous classification of individuals: blacks-whites, whites-non-whites, women-men, and foreign born-natives.[1] The study of segregation in a multigroup context does not have such a long tradition, even though in recent years this topic has received increasing attention and several indexes have been proposed (Silber, 1992; Reardon and Firebaugh, 2002; Frankel and Volij, 2007). These multigroup measures allow quantifying the disparities among the population subgroups into which the economy can be partitioned and provide an aggregate or overall segregation value (Watts, 1995; Iceberg, 2004; Frankel and Volij, 2009). However, one can be also concerned with the performance of a target group, an issue that gains special relevance in a multigroup context. To address this issue, the

[1] For spatial segregation studies, see Farley et al. (1978), James and Taeuber (1985), Spriggs and Williams (1996), Reardon and Yun (2001), Iceberg (2004), Cuttler et al. (2008), and Frankel and Volij (2009), inter alia. For occupational segregation analyses, see Anker (1998), Blau et al. (1998), and Cohen (2004).

literature has mainly opted to undertake pairwise comparisons. Thus, in ethnic/racial analyses, for example, Hispanics are often contrasted with whites, but also with blacks, Asians, or with non-Hispanics in general; while in gender-ethnic studies, black women are compared with either white women or black men. Consequently, these studies measure Hispanic-white segregation, Hispanic-black segregation, black-white female segregation and so on (Duncan and Lieberson, 1958; Massey, 1979; Albelda, 1986; Massey and Denton 1987; King, 1992; Reardon and Yun, 2001; Iceland, 2004; Queneau, 2009, inter alia).[2]

A different approach has been proposed in Alonso-Villar and Del Río (2010), where to explore the performance of a target group, its distribution across organizational units is contrasted with the distribution of the whole population.[3] Thus, in measuring occupational segregation, the distribution of reference against which to compare that of any demographic group is the employment structure of the economy. This approach places emphasis on how the different demographic groups fill the job positions and allows easy comparisons among groups. Do highly-educated black women distribute across occupations according to their weight in the labor force? What about Hispanic men with English proficiency? To answer these questions, these authors propose to use what they call local, as opposed to overall, segregation measures with which to quantify the segregation of any population subgroup. These local segregation measures, which satisfy several basic properties, are naturally related to the corresponding overall measures, since when they are aggregated according to the demographic weights of the mutually exclusive subgroups into which the population can be partitioned, they add up to the whole segregation. Consequently, this approach allows determining the contribution of each demographic group to overall segregation, which allows delving more deeply into the segregation analysis.

It is important to keep in mind that measuring the segregation level of a target group does not imply, however, that the segregation of that group can be determined without taking into account the remaining population subgroups. Segregation is indeed a phenomenon that requires considering the relative position of individuals with respect to

[2] For analyses focusing on wage disparities among these groups, see Neal and Johnson (1996), Kim (2002), Kmec (2003), and Hirsch and Macpherson, (2004), inter alia. For workplace segregation, see Carrington and Troske (1998), Tomaskovic-Devey et al. (2006), and Hellerstein and Neumark (2008).
[3] For an empirical implementation of this method in the case of women immigrants in Spain, see Del Río and Alonso-Villar (2010a).

others, as is done when measuring poverty according to a relative approach. As in that case, Alonso-Villar and Del Río (2010) maintain that the segregation level of a target group can be calculated insofar as the distribution of the group across occupations is compared with the occupational structure of the economy. These tools are introduced in what follows.

Local segregation indexes and curves

Let us denote by $c^g \equiv \left(c_1^g, c_2^g, ..., c_J^g\right)$ the distribution of the target group g among $J > 1$ occupations (distribution c^g could represent, for example, Hispanic women, black women, Asian men, etc.) and by $t \equiv \left(t_1, t_2, ..., t_J\right)$ the employment structure of the economy, where the total number of workers is $T = \sum_j t_j$. Vector t represents the distribution of reference against which that of any population subgroup is compared. The total number of workers in occupation j is $t_j = \sum_g c_j^g$, and the total number of individuals of target group g is $C^g = \sum_j c_j^g$.

In order to compare the segregation level of two distributions, these authors propose, first, the use of local segregation curves, which are related to the Lorenz curves used in the literature of income distribution. To build this curve for target group g, denoted by S^g, occupations have to be ranked in ascending order of the ratio $\frac{c_j^g}{t_j}$. Then, the cumulative proportion of employment, $\sum_{i \le j} \frac{t_i}{T}$, is plotted on the horizontal axis and the cumulative proportion of individuals of the target group, $\sum_{i \le j} \frac{c_i^g}{C^g}$, is plotted on the vertical axis.[4] Therefore, to build the local segregation curve for Hispanic women, for example, occupations have to be ranked from low to high relative presence of Hispanic women, so that the first decile represents 10% of total employment, and it includes those occupations in which Hispanic female workers have the lowest relative presence;

[4] In a binary context, the overall segregation curve is obtained by comparing the distribution of one population subgroup among organizational units with that of the other subgroup (see Duncan and Duncan, 1955).

the second cumulative decile represents 20% of total employment, and it includes those occupations in which the target group has the lowest relative presence; and so on. Next, the proportion of Hispanic women corresponding to each cumulative decile of total employment has to be calculated. Consequently, the local segregation curve shows the under-representation of the target group with respect to the employment structure of the economy, decile by decile. In the case where the target group was distributed among occupations in the same manner as the distribution of total employment, the local segregation curve would be equal to the 45º-line, and no segregation would exist for that demographic group. The further away the curve is from this line, the higher the occupational segregation of the target group.

Alonso-Villar and Del Río (2010) show that when the segregation curve of a distribution is above that of another (which can represent either that of another demographic group or that of the same target group in another period of time), any local segregation index satisfying some basic properties will conclude that segregation is higher for the lower distribution.[5] This makes the use of these curves a powerful procedure for empirical analysis since it allows identifying those cases in which the conclusions reached are robust against changes in the local segregation index used. However, if the local segregation curves of two distributions cross, or if we are interested in quantifying the extent of local segregation, the use of indexes seems the best course to take. For this reason, the aforementioned authors propose several local segregation indexes related to the above curve:

$$G^g(c^g;t) = \frac{\sum_{i,j} \frac{t_i}{T}\frac{t_j}{T}\left|\frac{c_i^g}{t_i} - \frac{c_j^g}{t_j}\right|}{2\frac{C^g}{T}}, \qquad (1)$$

[5] These properties are: symmetry, scale invariance, insensitivity to proportional subdivisions of occupations, and sensitivity to disequalizing movements between occupations. The first property means that in measuring the segregation of a target group, occupations' labels are irrelevant. The second property implies that if the number of individuals of the target group in each occupation doubles, for example, and the number of total jobs in each occupation triples, segregation is unaltered. The third property indicates that if an occupation is divided into two units in such a way that the weight of the target group in each of them is the same ($\frac{c_j^g}{C^g}$) and these units also share a common proportion of total jobs ($\frac{t_j}{T}$), the segregation of the target group does not change. Finally, the fourth property implies that when the target group losses employment in an occupation in favor of another that, having the same number of jobs, has more positions for the target group, the segregation of the group must increase.

$$\Phi_a^g(c^g;t)=\begin{cases}\dfrac{1}{a(a-1)}\displaystyle\sum_j \frac{t_j}{T}\left[\left(\frac{c_j^g/C^g}{t_j/T}\right)^a-1\right] & \text{if } a\neq 0,1\\ \displaystyle\sum_j \frac{c_j^g}{C^g}\ln\left(\frac{c_j^g/C^g}{t_j/T}\right) & \text{if } a=1\end{cases}, \tag{2}$$

$$D^g(c^g;t)=\frac{1}{2}\sum_j\left|\frac{c_j^g}{C^g}-\frac{t_j}{T}\right|, \tag{3}$$

where the first measure is a variation of the classic Gini index, the second represents a family of indexes related to the generalized entropy family (a can be interpreted as a segregation sensitivity parameter), and the third is a variation of the index of dissimilarity.[6] Both index G^g and the family of indexes Φ_a^g satisfy the aforementioned basic properties and, therefore, are consistent with the criterion given by the local segregation curves so that if the local segregation curve of a distribution dominates another (i.e. if the former lies at no point below another and at some point above the latter), these indices will take a higher value when they are evaluated at the dominated distribution (i.e. the lower distribution).

One should keep in mind that when curves cross, the conclusion reached with an index may differ from that of others since even though all these local indexes have some basic properties in common, they disagree regarding additional properties. As it happens in the inequality literature, this is a consequence of the different weights that each index gives to discrepancies between the benchmark and the distribution of the target group in low and high tails. On the contrary, index D^g, which measures the maximal vertical distance of the curve to the 45º-line, is not consistent with the above criterion (as also happens with the dissimilarity index and the traditional segregation curve proposed by Duncan and Duncan, 1955, in the binary case) since it does not satisfy the property of sensitivity to disequalizing movements.

The weighted average of several of these local segregation indexes give rise to overall segregation measures existing in the literature. Thus, the mutual information index, M, borrowed from the information theory and characterized by Frankel and Volij (2007) in

[6] This index has been proposed in a binary context by Moir and Selby Smith (1979) even though its properties in a multigroup context have been studied in Alonso-Villar and Del Río (2010). Both D^g and G^g take values within the interval $[0,1)$, while Φ_a^g can easily be transformed in order to take values within that interval.

terms of basic segregation properties, can be written as the weighted average of local segregation index Φ_1^g, since $M = \sum_g \frac{C^g}{T}\Phi_1^g$, where g represents each demographic group into which the economy has been mutually and exclusively partitioned. Analogously, the unbounded version of the multigroup Gini index, G, proposed by Reardon and Firebaugh (2002), can be written as $G = \sum_g \frac{C^g}{T}G^g$. Finally, the multigroup index of dissimilarity extended by Silber (1992), I_p, can be written as $I_p = \sum_g \frac{C^g}{T}D^g$.

3. Measuring Occupational Segregation in the US: Ethnicity/Race and Gender

The data used in this section come from the 2007 Public Use Microdata Sample (PUMS) files of the American Community Survey (ACS) conducted by the US Census Bureau.[7] This survey was conducted throughout the US using a series of monthly samples jointly accounting for 1 percent of the overall population living in both housing units and group quarters. After selecting people who were employed, the sample includes 1,399,724 observations. This survey provides a variety of information about the demographic and labor-related characteristics of workers. Regarding race and ethnicity, people are asked to choose the race or races with which they most closely identify and to answer whether they have or not Spanish/Hispanic/Latino origin. Based on this self-reported identity, we produce six mutually exclusive groups of workers composed by the four major single race groups that do not have a Hispanic origin, plus Hispanics of any race, and others: Whites; African Americans or blacks; Asians; American Indian, Alaskan, Hawaiian or Pacific Islander natives (referred here for simplicity as Native Americans); Hispanics; and other races (those non-Hispanics reporting some other race or more than one race). These groups will be crossed with gender in most of the analysis. Occupations are considered at a 3-digit level of the Census recode classification, which includes 469 occupations based on the 2000 Standard Occupational Classification (SOC) System.

[7] We have chosen the 2007 rather than the 2008 release of the ACS in order to avoid the distortion produced by the soar in unemployment rates in 2008. In this way, we show the situation when the economy was still strong.

Differences among the distributions of ethnic/racial groups across jobs may arise from several sources apart from discriminatory employers' views or attitudes toward some demographic groups.[8] More specifically, educational disparities among groups may affect the type of jobs to which workers can apply. In addition, language and cultural differences are factors which affect the range of jobs that workers coming from other countries are offered (Maxwell, 2010), especially if the number of years of residence in the US is low.[9] In addition, gender has also been identified as an important source of ocupational segregation.[10] For these reasons, in this section, we analyze the extent of inequalities in the distribution of employment by ethnicity/race, gender, educational achievements, and English proficiency.

Differences across race-ethnic-sex groups

By doing pairwise comparisons, it has been documented that, in the 1990s, occupational segregation by gender in the US was more intense than segregation by race or ethnicity (Blau et al., 2001; Reskin et al. 2004). If we calculate overall multigroup segregation indexes for 2007 we corroborate this previous empirical evidence (see Table 1, where the mutual information index , M , the unbounded version of the multigroup Gini index, G , and the multigroup index of dissimilarity I_p , are shown).

OVERALL SEGREGATION	M	I_p	G
ETHNICITY/RACE	0.07	0.12	0.16
GENDER	0.20	0.25	0.34

Table 1: Overall segregation indexes

However, little is known about occupational discrepancies among minority groups and also if these disparities affect women and men in the same way. For this purpose, we

[8] Mintz and Krymkowski (2005) contrast the relevance of several theories to explain occupational segregation by gender and race/ethnicity in the US. For a review of theories, see Altonji and Blank (1999).

[9] Note also that the job opportunities of newly arrived immigrants are likely to depend on migrant networks (Hellerstein et al., 2009), which may reinforce the concentration of immigrants of a race/ethnic group in occupations/establisments with a high presence for that group (Patel and Vella, 2007).

[10] Gender disparities in the labor market can emerge from several causes as well, including differences in education and experience, differences in their preferences for jobs (especially if social roles induce women to assume most of the domestic responsibilities, including child and elderly care), and different kinds of discrimination against women.

first analyze disparities among the six ethnic/racial groups and then we add the effect of gender.

Figure 1 shows the segregation curves for each ethnic/racial group, when comparing each group with the occupational structure of the US economy. The horizontal axis represents the cumulative proportion of total employment and the vertical axis represents the cumulative proportion of individuals of the corresponding demographic group, once occupations have been ranked from low to high relative presence of the group.

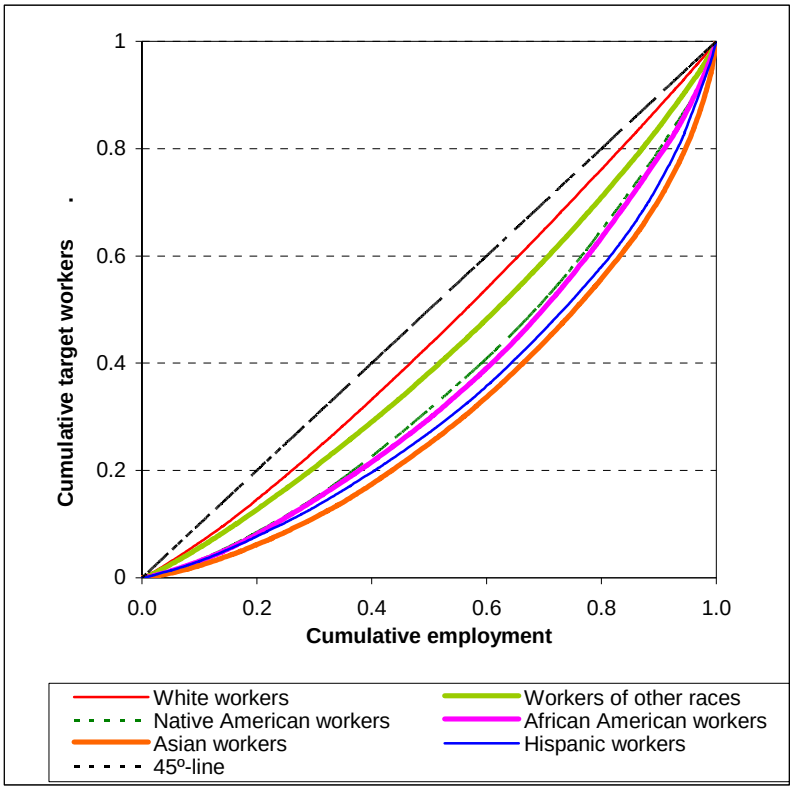

Figure 1. Segregation curves for each ethnic/racial group

The graph suggests that whites have the lowest segregation (their curve is above that of any other group), followed by workers of "other races," with the remaining minorities showing larger disparities. Thus, Asians are the demographic group with the highest segregation level, and Native and African Americans have an intermediate magnitude (even though their curves are much closer to those of Hispanics and Asians than to that of whites). Note that the curve of Hispanics crosses those of Native and African Americans before the first decile, so that the use of indexes becomes in this case imperative to rank these groups. When calculating theses indexes, we find that

segregation is always higher for Hispanics compared with African Americans (see indexes G^g, D^g, and Φ_a^g in Table 2).[11] It is also higher as compared with Native Americans (except for the index that is more sensitive to the bottom of the employment distribution, $\Phi_{0.1}^g$).

LOCAL SEGREGATION: ETHNICITY/RACE	$\Phi_{0.1}^g$	$\Phi_{0.5}^g$	Φ_1^g	Φ_2^g	D^g	G^g	Population (%)
Whites	0.016	0.016	0.015	0.014	0.067	0.093	69.1
Hispanics	0.185	0.185	0.191	0.231	0.243	0.338	13.8
African Americans	0.145	0.139	0.136	0.147	0.209	0.289	10.6
Asians	0.264	0.247	0.260	0.371	0.264	0.377	4.5
Other Races	0.065	0.048	0.046	0.048	0.119	0.166	1.3
Native Americans	0.190	0.134	0.130	0.159	0.191	0.270	0.7
							100%

Table 2: Local segregation indexes: ethnicity/race.

We now compare the three largest minority groups in more detail. Figure 2 provides the density function of each group across occupations (ranked from lowest to highest average hourly wage).[12] It indicates that African Americans and, especially, Hispanics tend to concentrate in the low-paid occupations to a larger extent than any other group. On the contrary, Asians are markedly bipolarized between some low-paid occupations (such as "miscellaneous personal appearance workers," "tailors, dressmakers, and sewers," and "sewing machine operators") and highly-paid occupations linked to scientific, medical, and computer engineering jobs.

In order to quantify to what extent high levels of occupational segregation among minorities can be driven by very different specialization patterns into low- and high-paid occupations, we use status-sensitive local segregation measures recently proposed in the literature so as to assess the segregation of a target group by penalizing its concentration in low-paid occupations (Del Río and Alonso-Villar, 2010b). According to these measures, and in line with the local measures we have previously used, the segregation level of a target group increases when there is a movement of individuals from an occupation to another with the same number of jobs but with a higher number

[11]By using the coworker segregation measure, Hellerstein and Neumark (2008) also give evidence that workplace segregation between Hispanics and whites is remarkable higher than segregation between blacks and whites.

[12] We have trimmed the tails of the hourly wage distribution to prevent data contamination from outliers. Thus, we computed the trimmed average in each occupation eliminating all workers whose wage is either zero or is situated below the first or above the 99 percentile of positive values in that occupation.

of positions for the group. In addition, now a movement toward an occupation with a lower status fosters segregation to a higher extent than a movement toward an occupation with the same status.

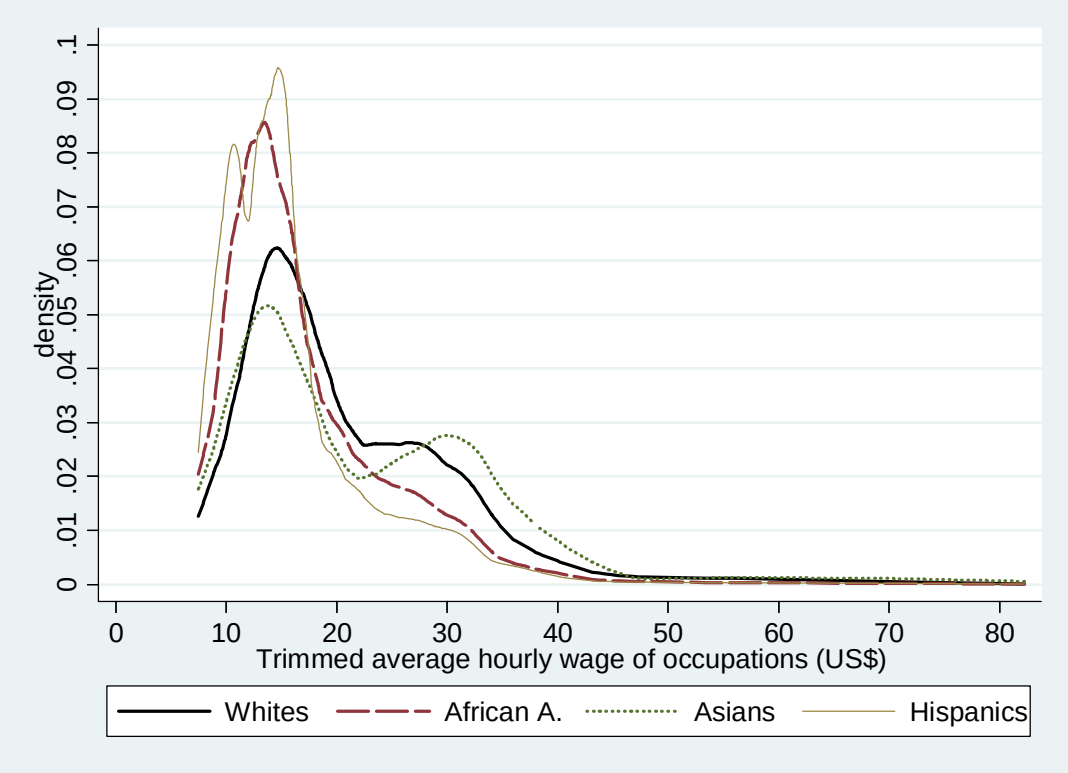

Figure 2: Density estimates using the adaptive kernel estimation method with a Gaussian kernel function.

The corresponding curves for African Americans, Asians, and Hispanics are shown in Figure 3 and the indexes are given in Table 3 (technical details are given in the Appendix). The analysis reveals that the segregation curve for African Americans and Hispanics do substantially change departing from the 45º-line, while the curve for Asians remains almost unaltered. This indicates that when taking wages into account, the performance of the former two groups worsens with respect to that of Asians. Hence, even if Asians were previously shown to face the highest level of segregation, as far as the status of occupations is considered, the segregation of Hispanics and African Americans turns to be more severe.

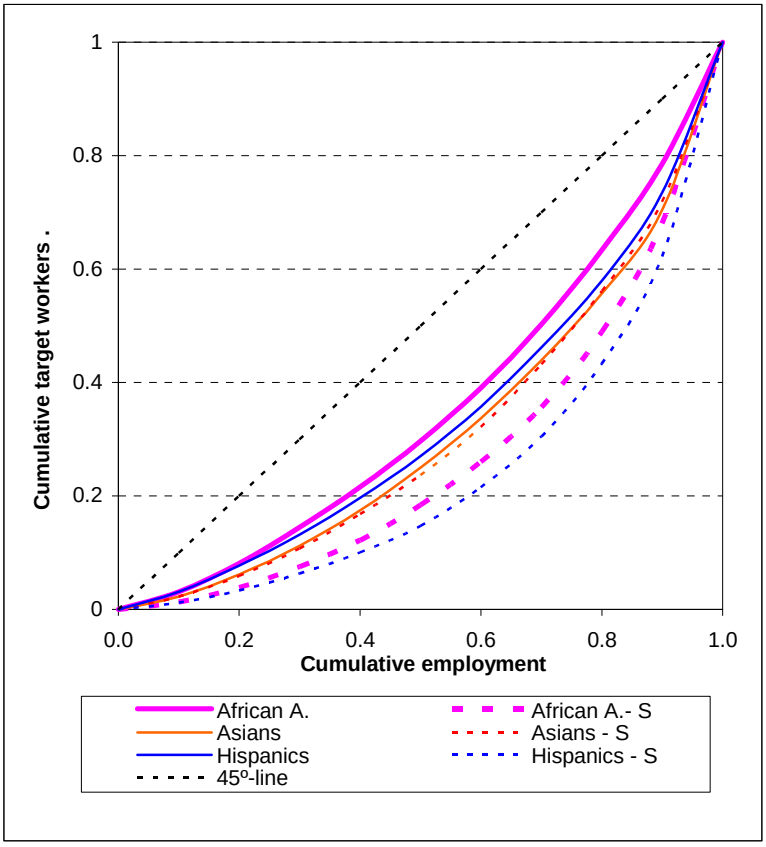

Figure 3. Status-sensitive segregation curves (-S) and segregation curves for the three largest minorities.

STATUS-SENSITIVE LOCAL SEGREGATION: ETHNICITY/RACE	$\Phi^g_{s,\,0.1}$	$\Phi^g_{s,\,0.5}$	$\Phi^g_{s,\,1}$	$\Phi^g_{s,\,2}$	D^g_s	G^g_s
Whites	0.071	0.069	0.067	0.068	0.146	0.204
Hispanics	0.490	0.468	0.480	0.670	0.396	0.525
African Americans	0.388	0.363	0.359	0.436	0.345	0.464
Asians	0.268	0.249	0.260	0.398	0.278	0.383
Other Races	0.224	0.203	0.204	0.238	0.254	0.352
Native Americans	0.483	0.363	0.345	0.414	0.337	0.455

Table 3: Status-sensitive local segregation indexes: race/ethnicity.

In order to explore differences by gender, segregation curves have been estimated separately for men and women in each ethnic/racial group (Figures 4 and 5). As expected, the segregation levels are higher than those displayed in Figure 1, since our previous analysis did not include gender disparities within each group. The examination of these curves also reveals that disparities are much larger among male groups than

among female groups.[13] In addition, while males of any race and ethnicity are present in almost all occupations, there are many in which female groups do not work (there are almost no women in at least 10% of jobs in the sample--the first decile of the total employment distribution--and there are only a few women in the second decile).

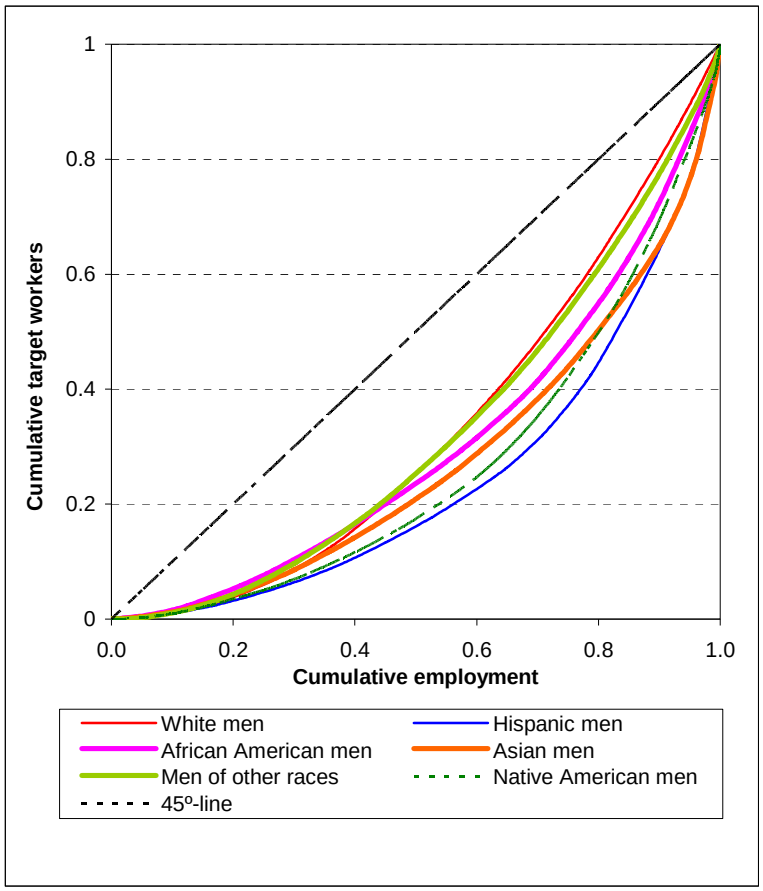

Figure 4: Segregation curves for male ethnic/racial groups.

It is interesting to note that the ranking of segregation among male groups by ethnicity/race differs from the ordering shown in Figure 1 for males and females considered together. Indeed, the segregation curve of white men crosses those of other groups (even though the indexes shown in Table 4 reveal that this is still the group with the lowest segregation). In fact, the curve for African Americans start above that of whites, but afterwards it is clearly below, which suggests that black men can be found in a wider range of occupations, even though they tend to concentrate in some of them at a larger extent. In addition, Hispanics and Asians switch their relative positions, since Hispanic males become the most segregated group according to a majority of indexes

[13] This is consistent with previous finding obtained by Reskin et al. (2004), in their detailed binary comparisons among 60 ethnic-race-sex groups, and Spriggs and Williams (1996).

(even though there are crosses between the curves of Hispanics and those of Asians and Native Americans). On the contrary, the curves of Hispanic, African American, and Native American female workers are almost indistinguishable, and are very close to the curve of Asians (the local indexes do not allow ranking these groups either, since the results strongly depend on the index used). This suggests that these four female groups have a similar level of segregation across occupations, a level that is clearly higher than that of white females and women of "other races."

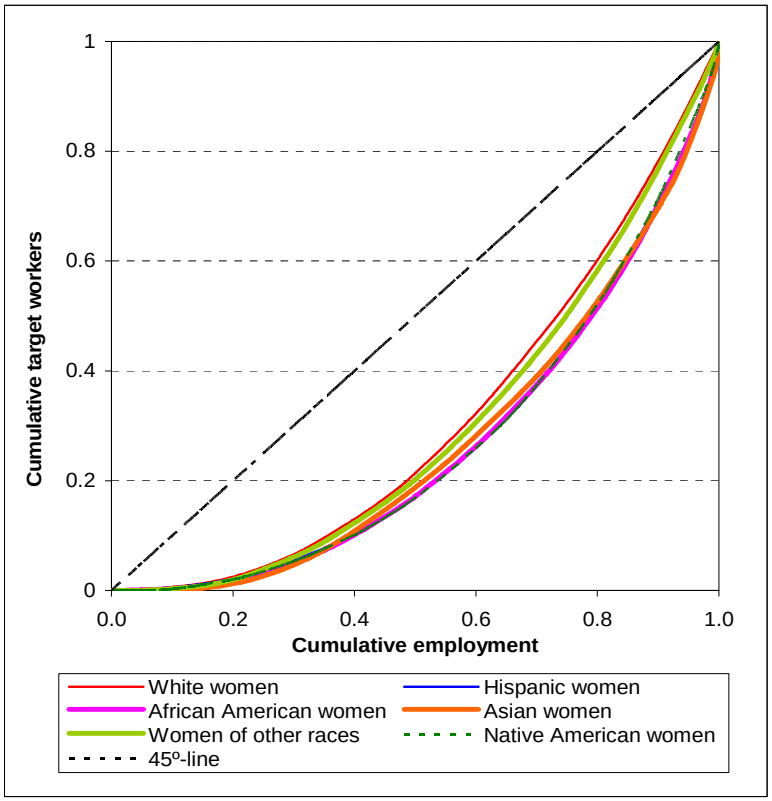

Figure 5: Segregation curves for female ethnic/racial groups.

If we compare the segregation of women and men for each racial/ethnic group, we ascertain that for whites, blacks, and "other races," indices are higher for women (see Table 4) as also happens if we compare the segregation curves of women and men for the whole population (which are not included in the text). With respect to Asians and Native Americans, the curves cross but most indices also show that segregation is higher for women (especially according to those measures which penalize to a larger extent those distributions in which the presence of the group in the first deciles is very low, as in the case of $\Phi_{0.1}$ and $\Phi_{0.5}$). What is more striking is that in the case of

Hispanics, most of the indexes show higher segregation for men than for women, which shows an important difference between this and the remaining groups.[14]

LOCAL SEGREGATION: ETHNICITY/RACE AND GENDER	$\Phi^g_{0.1}$	$\Phi^g_{0.5}$	Φ^g_1	Φ^g_2	D^g	G^g	Population (%)
White females	0.380	0.304	0.255	0.225	0.287	0.384	69.2
Hispanic females	0.534	0.412	0.378	0.452	0.340	0.466	12.0
African American females	0.597	0.434	0.381	0.417	0.338	0.469	12.2
Asian females	0.810	0.459	0.395	0.529	0.319	0.459	4.5
Females from other races	0.749	0.364	0.288	0.262	0.298	0.406	1.4
Native American females	0.890	0.436	0.369	0.400	0.340	0.464	0.7
							100%
White males	0.273	0.230	0.199	0.175	0.248	0.340	69.0
Hispanic males	0.481	0.447	0.448	0.588	0.388	0.510	15.4
African American males	0.282	0.260	0.253	0.290	0.289	0.391	9.2
Asian males	0.390	0.356	0.372	0.550	0.318	0.448	4.5
Males from other races	0.369	0.242	0.210	0.207	0.249	0.350	1.3
Native American males	0.544	0.391	0.372	0.466	0.355	0.469	0.6
							100%

Table 4: Local segregation indexes: race/ethnicity and gender.

Differences by education

Now we briefly analyze the role that education plays in occupational segregation. In doing so, we first explore how education attainment affects the distribution of all workers across occupations and later on we analyze the largest ethnic/racial groups separately. In line with the usual classification of the Bureau of Labor Statistics, workers are classified in four groups according to the attained level: less than a high school diploma, high school graduates with no college, some college or an associate degree, and a bachelor's degree and higher.

Figure 6 shows the local segregation curves of workers depending on their educational achievements. Definitely, segregation does not necessarily decrease when education increases. In fact, those workers with an intermediate educational level (some college) have the lowest segregation level (i.e., they are represented by the upper segregation curve) while the curves for workers with less than a high school diploma and those with a bachelor's degree are close to one another. In any case, it is worth mentioning that even though the latter participate in almost all of the occupations of the economy, the former are barely employed in 20% of jobs and have the highest segregation.

[14] When using status-sensitive curves, the male curve of any race/ethnic group dominates that of the corresponding female group, except in the case of Hispanics, where the curves cross and are rather close to each other.

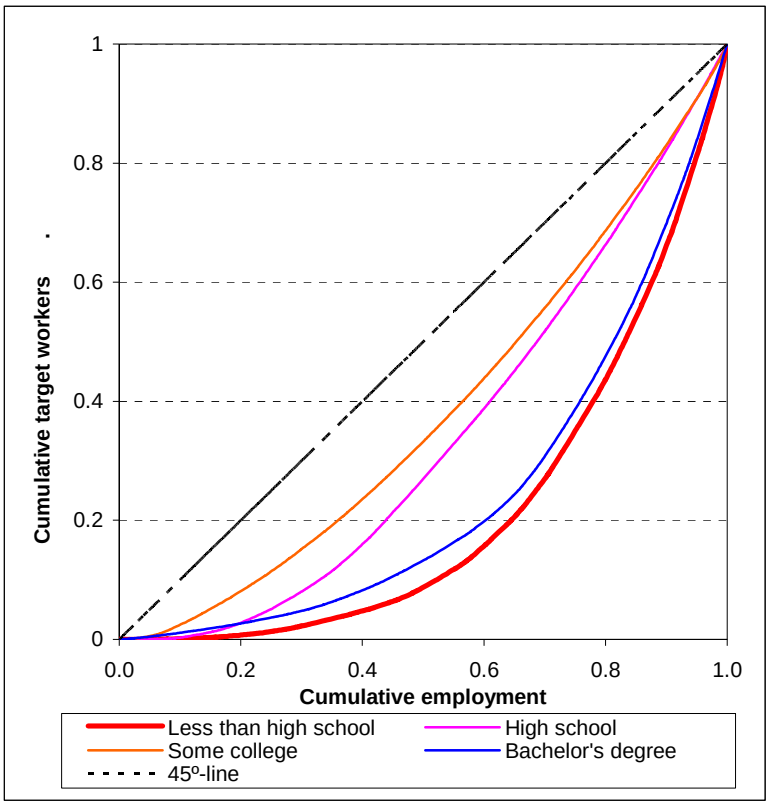

Figure 6: Segregation curves for workers according to their educational levels.

Status-sensitive local segregation curves have been calculated with the objective of distinguishing the different nature of segregation among low- and high-educated workers (see Figure 7). Obviously, it is reasonable to assume that the large segregation of college graduates is simply the result of them declining low-paid jobs. Similarly, low-educated workers can experience higher segregation because they do not fulfill the skill requirements of better jobs.[15] These curves show that, as expected, the distribution of workers with less than a high school degree is indeed qualitatively different from that of workers with a bachelor's degree. The higher concentration of the former in low-paid occupations induces segregation to increase when using measures which are sensitive to this issue. On the contrary, in the highly-educated group, segregation decreases when status-sensitive segregation measures are used. For this reason in what follows we only compare the segregation curves of workers of different ethnicity/race who share a common education achievement.

[15] In fact, Hellerstein and Neumark (2008) find that among white workers there is remarkable workplace segregation between the high and the low educated. These differences are also important among black workers.

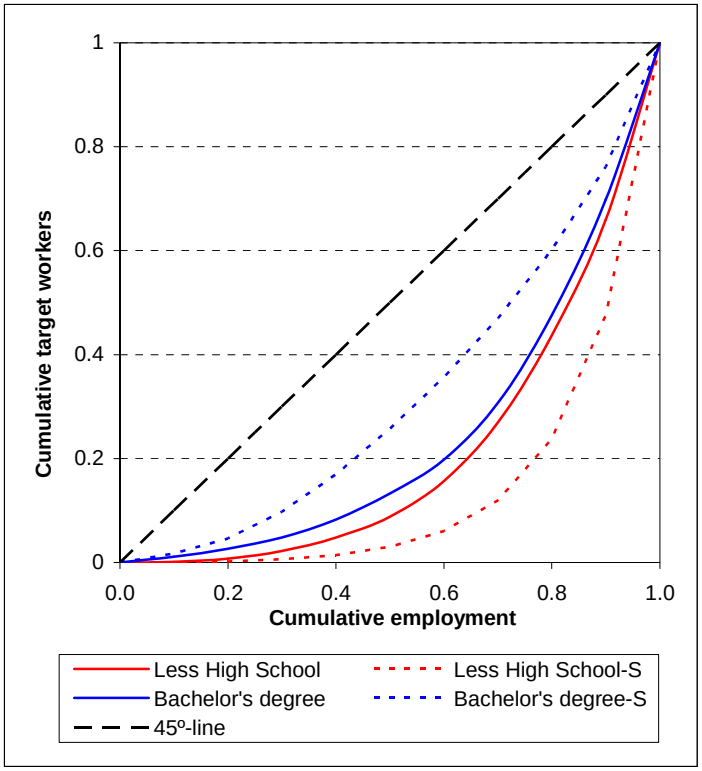

Figure 7. Status-sensitive local segregation curves (-S) and local segregation curves for the most and the least educated workers.

Figure 8 shows that segregation patterns diverge across groups by ethnicity/race (the indexes are shown in Table A1 in the Appendix). Among workers with a low educational level, whites are again remarkably less segregated than others with the same level of education (no important differences exist among the three largest minorities). However, whites and African Americans holding a bachelor's degree have similar segregation curves (and, therefore, are equally distant from the 45º-line). Hispanics and Asians with a university degree depart, however, from the other groups, although in a different way. Indeed, Hispanics are the group with the lowest segregation, perhaps because they are more over-educated than others (which may explain why they work in occupations where other highly-educated workers do not work and are more evenly distributed across occupations).[16] The segregation curve of highly-educated Asians is

[16] Even though high-educated Hispanic workers tend to concentrate in high-paid occupations, their presence in low-paid occupations is not negligible (installation, maintenance, and repair workers; graders and sorters of agricultural products; shoe and leather workers and repairers; preschool and kindergarten teachers; and miscellaneous woodworkers, among others). Chiswick and Miller (2009) show that highly-educated immigrant men tend to be more overeducated in the US labor market than native-born men, even though they do not distinguish by race/ethnicity.

clearly below that of Hispanics, which implies higher segregation for the former.[17] Note, however, that the curve for Asians is similar to that of whites and African Americans until the sixth decile, while afterwards it is considerably lower. This suggests that Asians with a bachelor's degree are more concentrated in a few occupations than any other group.[18] Consequently, the analysis reveals that there are important differences in the types of jobs filled by highly-educated Asian and Hispanic workers, and also between them and the remaining groups.

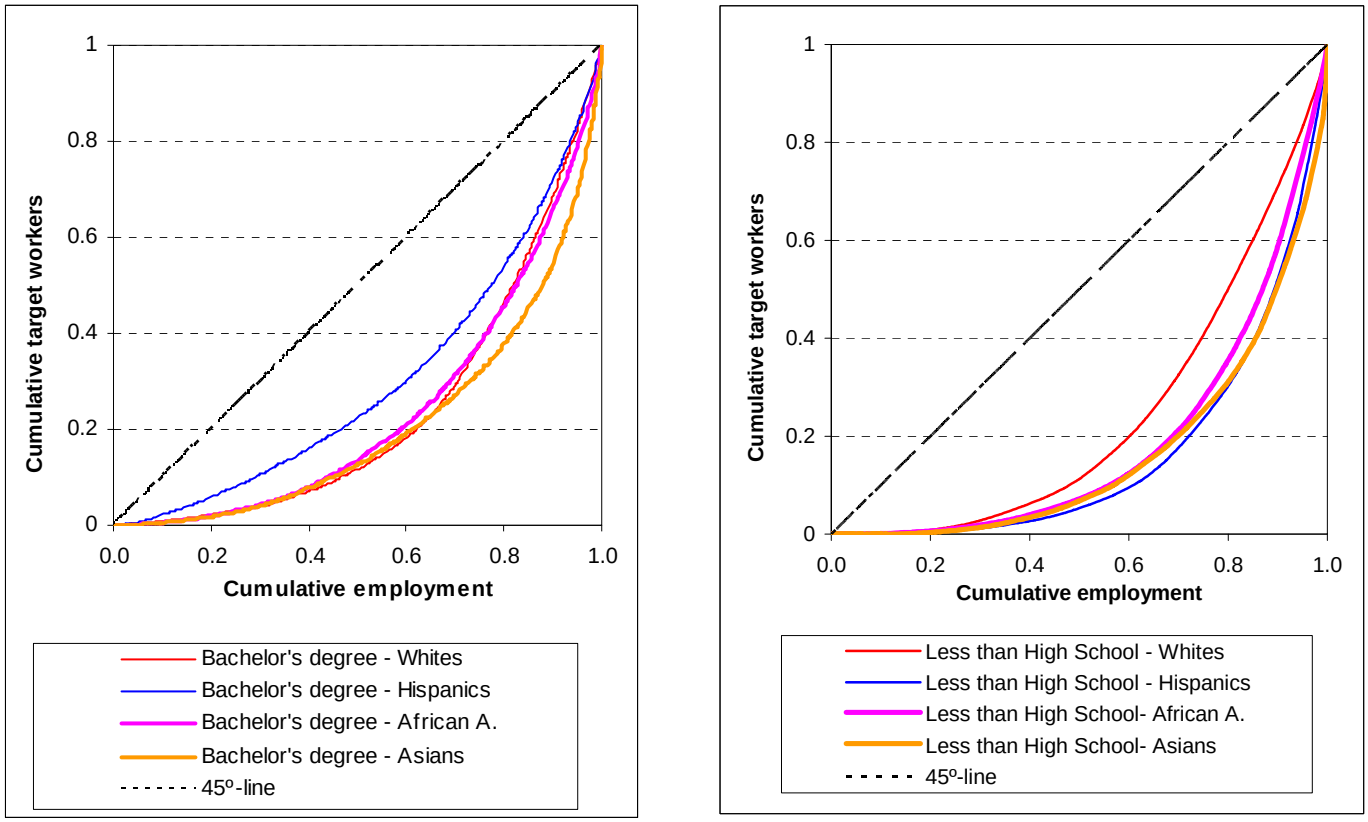

Figure 8: Segregation curves of the largest racial/ethnic groups by educational level.

Differences by English-language proficiency

A large share of American workers consists of recent immigrants to the US, mainly from Hispanic and Asian countries. These workers not only have distribution by education achievements that differ from that of the native-born, but often they lack the ability to speak English that is required in most jobs. Figure 9 shows that segregation

[17] The relative positions of Asians, African Americans, and Hispanics do not change when comparing the corresponding status-sensitive local segregation curves.

[18] Highly-educated Asian workers tend to concentrate in highly-paid occupations to a larger extent than others. Thus, Asians are especially overrepresented among computer software engineers, computer and information system managers, management analysts, physicians and surgeons, dentists, and pharmacists.

decreases dramatically with the English level that workers report, but English proficiency does not seem to affect all races and ethnicities in the same way (see Figure 10, and Table A2 in the Appendix, where the segregation curves and indices for the largest ethnic/race groups are shown).[19]

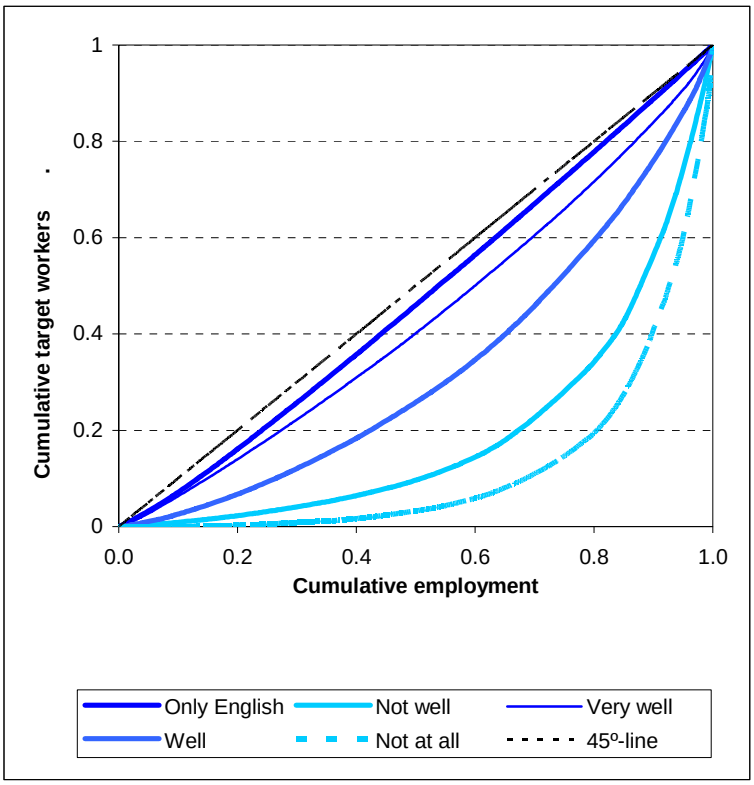

Figure 9: Segregation of workers according to the English-proficiency level they report.

Among workers who report speaking English not well, whites are the least segregated, (their segregation curve lies above all of the others). Moreover, they work in almost all occupations of the economy. On the opposite side, the segregation curves of Hispanics and African Americans, lying well below that of whites, show that these minorities are excluded from some types of occupations (which represent over 20% of jobs). Things change starkly when focusing on those who speak English very well, since the segregation curves for Hispanics and whites are now rather close to one another and above those of the other two groups, while Asians are the most highly segregated group. This suggests that when having a high English level, Hispanics fill the same types of

[19] In Figure 10, we focus on two English levels: Those having a high English level (very well) and those having a poor English level (not well). We discard those who are English-speaker natives from the analysis since in this case differences may strongly depend on educational disparities among national-born groups. In addition, we do not study those who do not speak English at all since they only represent 1.5% of the workers.

jobs than immigrant whites having the same level, while this is not the case of blacks and Asians. When comparing the segregation curves of each demographic group for these proficiency levels, we find that English proficiency appears as an important source of segregation for Hispanics.[20] This result is in line with that obtained by Hellerstein and Neumark (2008), who find that nearly one third of workplace segregation between Hispanics and whites is explained by language segregation.

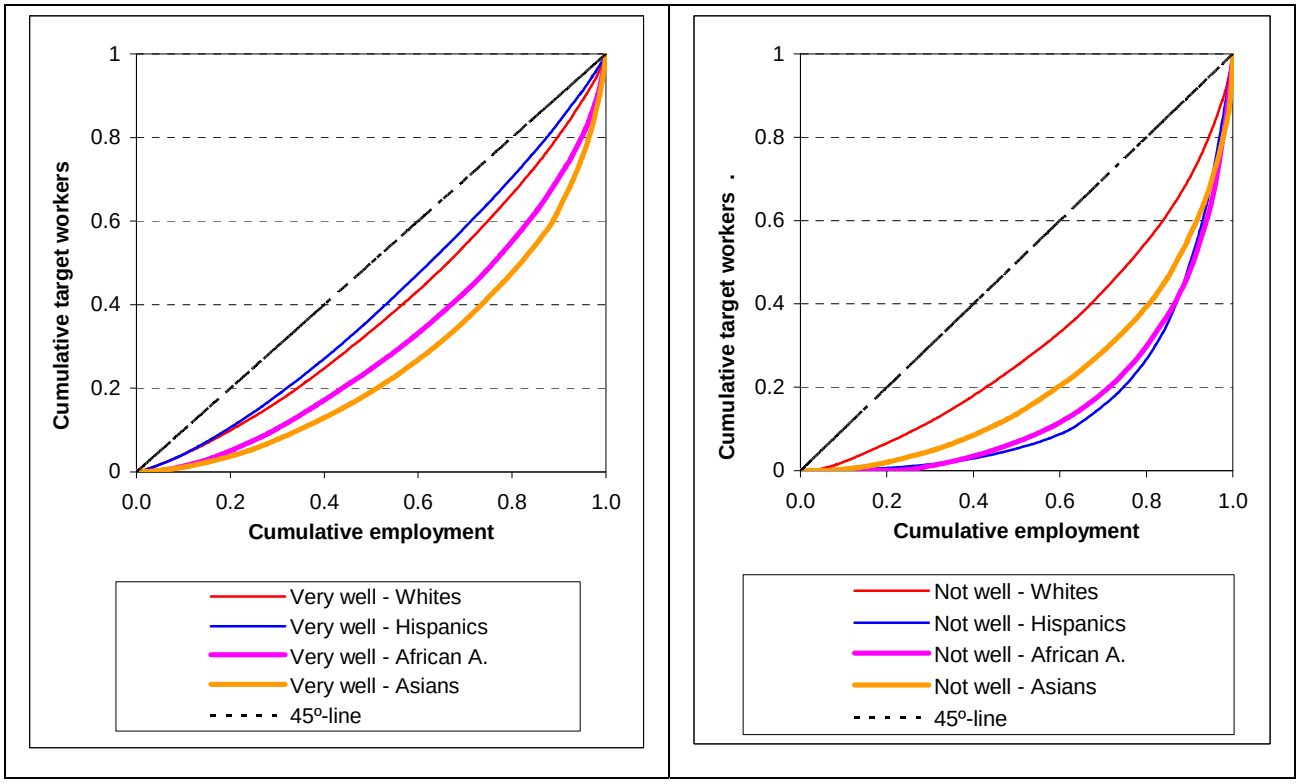

Figure 10: Segregation of race/ethnic groups who report speaking English very well or not well.

4. Explaining Local Segregation of Ethnic/Race-Gender Groups: A Regression Analysis

The previous section provided evidence on segregation disparities among ethnic/racial-gender groups at the national level. However, the experience of a demographic group may also depend on the characteristics of the local labor market in which it works (Abrahamson and Sigelman, 1987; Catanzarite, 2000); in particular, on the mix of jobs it offers and also on the tolerance toward minority groups. In this section, we aim at

[20] Even though the analysis has not been included in the text, we find that segregation also decreases more sharply for Hispanics than for Asians when the number of years of residence in the US increases.

using the large geographical variability on both segregation and human capital characteristics of demographic groups across local markets in the US to examine the effect of gender and ethnicity/race, as well as a group's characteristics, such as attained education or English proficiency, in explaining the level of segregation of each demographic group.[21] Given that occupational segregation also varies across regions (black women being historically more segregated in the South, see King, 1992), the regional dimension has been also considered in the regression analysis, together with the size and metropolitan status of the area in which individuals work.

In order to implement this analysis, we calculate the segregation level of each demographic group in each local market separately. By local markets we mean the 140 largest Metropolitan Statistical Areas (MSA),[22] together with the remaining metropolitan areas and the non-metropolitan areas categorized, respectively, in nine large geographical regions.[23] Consequently, 158 local markets are defined. To increase the number of observations of each demographic group per geographical area, in this section we use the 2005-07 ACS 3-year PUMS file with a sample size of 4,123,320 workers. In addition, we now use the two-digit level Census recode classification of occupations (which includes 23 categories) to avoid occupations with none or very few observations.[24] Furthermore, to tackle the potential bias of small units that could lead to overestimated segregation of smaller demographic groups in local markets, we have included in the analysis only those cells with at least a total of 230 observations such that the total sample for the regression analysis amounts to 815 observations.[25]

[21] The values of segregation indices and covariates substantially diverge across local markets not only between demographic groups but also within these groups. See the mean values and corresponding standard deviations in Table A3 in the Appendix.

[22] We have considered those MSA with at least 4,000 sample observations. Workers have been assigned to the MSA using the information of Public Use Microdata Area corresponding to the place of work (POWPUMA) available in public accessible ACS files, which in some cases requires assigning a given POWPUMA to the MSA in which it has more population according to the Census. Workers with a job abroad have been removed from the sample, and workers with a job but not currently working have been assigned according to their area of residence.

[23] That is, New England, Mid-Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific.

[24] Occupations labeled as "agriculture workers" and "fishing and hunting, and forest and logging workers" have been jointly considered to avoid lack of data for some areas. This criterion is also used in the Current Population Survey recode. Even considering this aggregate classification of 23 occupations, there are 6 local markets in which some occupations have no observations. Our study focuses on the remaining 152 geographical areas.

[25] Each observation corresponds to a given ethnic/racial-gender group working in a specific local market, such as, for instance, black females working in Pittsburgh MSA. White women and men are present in each of the 152 areas with employment in the 23 occupations. Our data, however, are unbalanced with respect to minorities. Thus, Hispanic males (females) are only considered in 88 (75) out of 152 areas;

In Table 5, we report the results of four different specifications of our OLS regression for local index Φ_1^g. The first column reports the estimates when only gender and race are included as explicative variables. The coefficients of this ANOVA model should be interpreted as the differential with respect to the omitted category (respectively, male and whites) predicted by the model for our data. The results show that all estimated differentials are significant, and that the differential between the average segregation of any minority group and that of whites, regardless of its gender, is larger than the differential between women and men regardless of their race (0.011). The largest differentials are observed for those of Hispanic and Asian origin (0.177 and 0.110, respectively). [26]

The second column in Table 5 reports similar estimates when adding interactions between female and minorities, so allowing for gender differentials varying by race (as well as racial differentials differing by gender). The coefficient for race/ethnicity now refers to the average minority-white differential in segregation for males. Hispanic males show the largest differential (0.300), followed by Asians, Native and African Americans. The displayed results also point to the minority-white differentials in segregation being on average larger for males than for females (interaction coefficients are negative and significant), except for African Americans and those of "other races." For the same reason, the women-men differentials are larger for whites, African Americans, and those of "other races" than for other groups. In line with the results displayed in the previous section, females of Hispanic origin are the only group showing lower segregation on average than their male counterparts (the net effect of summing the female and interaction coefficients is clearly negative).

black males (females) are in 84 (87) areas; Asian males (females) in 45 (42); Native American males (females) in 14 (17); and men (women) from other races in 29 (30).

[26] This does not contradict the fact that overall segregation between women and men is larger than overall segregation by ethnicity/race. Note that the estimate of "female" in the first column in Table 5 refers to the differential between the predicted average segregation of female ethnic/racial groups and that of male groups across local markets, while overall gender segregation is the weighted sum of segregation for men and women at the national level.

	Model specification			
Explanatory Variables	(1)	(2)	(3)	(4)
Female	0.011*	0.077***	0.077***	0.087***
	(0.006)	(0.009)	(0.007)	(0.008)
African American	0.061***	0.070***	0.064***	0.077***
	(0.009)	(0.010)	(0.009)	(0.011)
Asian	0.110***	0.147***	0.038	0.019
	(0.011)	(0.013)	(0.026)	(0.026)
Native American	0.085***	0.111***	0.118***	0.128***
	(0.017)	(0.021)	(0.020)	(0.021)
Hispanic	0.177***	0.300***	0.060**	0.068***
	(0.009)	(0.010)	(0.024)	(0.026)
Other Races	0.025*	0.020	0.006	0.019
	(0.013)	(0.015)	(0.014)	(0.015)
African A. x female		-0.019	-0.020	-0.020
		(0.014)	(0.012)	(0.012)
Asian x female		-0.074***	-0.078***	-0.080***
		(0.018)	(0.016)	(0.016)
Native A. x female		-0.055*	-0.050**	-0.049**
		(0.029)	(0.024)	(0.024)
Hispanic x female		-0.262***	-0.161***	-0.159***
		(0.015)	(0.014)	(0.014)
Other Races x female		0.009	0.020	0.015
		(0.0229)	(0.018)	(0.018)
Non-metropolitan area			0.022**	0.024**
			(0.008)	(0.009)
No. of workers in the area			-0.007***	-0.008***
			(0.002)	(0.002)
% Speaking English very well			-0.001***	-0.001***
			(0.000)	(0.000)
% Speaking English well			0.005***	0.004***
			(0.001)	(0.001)
% Speaking English not well/not at all			0.006***	0.004***
			(0.001)	(0.001)
% High school				-0.002**
				(0.001)
% Some college or associate degree				-0.004***
				(0.001)
% Bachelor or higher				-0.001
				(0.001)
Intercept	0.162***	0.129***	0.119***	0.322***
	(0.006)	(0.006)	(0.013)	(0.071)
No. of observations	815	815	815	815
R^2	0.352	0.553	0.680	0.692

Table 5: OLS analysis for segregation by race/ethnicity and gender across local markets
Note: Standard errors in parentheses. Additional dummies for geographical regions omitted.
Legend: * p<0.1; ** p<0.05; *** p<0.01

Taking into account that differences in educational achievement or English proficiency could be behind the larger segregation of some minorities in the US, the other two model specifications inquire as to what extent controlling for those factors mitigate the differentials of segregation by race/ethnicity and gender. For this purpose, the third column of the table reports the estimates after including a set of other covariates which control for geographical location and level of English proficiency attained by each demographic group in each local market (defined as the proportion of population in

each category), where the omitted variable to avoid multicollinearity is the percentage of workers who speak only English. The estimates for the new covariates show that segregation levels tend to be larger in nonmetropolitan and less populated areas.[27] Further, the estimated coefficients also show that segregation tends to be higher, the larger the proportions of workers in a group with a low ability to speak English. Interestingly, the results make clear that after controlling for these covariates, the level of segregation of Asian males becomes not significantly different to that of whites. At the same time, the differential of segregation between Hispanic and white men is substantially reduced (from 0.30 to 0.06), becoming lower than that of African and Native American men. Similarly, the differential for Hispanic women is also reduced, in this case reversing the sign (the sum of the Hispanic ethnicity and the interaction coefficients is negative). As a consequence of all of the above, a substantial part of the segregation level of mostly immigrant minorities, like Latino and Asians, is clearly associated to their larger share of population with low English proficiency.

The last specification in the fourth column adds as an explicative factor the percentage of population in each group for each educational level (omitting the percentage with less than a high school diploma). It shows that segregation is lower, the higher the proportion of workers with an intermediate educational level, i.e., those with a high school diploma who have not obtained a bachelor's degree. This indicates that, consistently with our previous results, the relationship between segregation and education is U-shaped.[28] After controlling for both the ability to speak English and education, the differentials by race continue to be lower for females than for males, in line with what was obtained in previous specifications. Further, the additional impact of including education, once English proficiency has been accounted for, is rather small and tends to increase rather than reduce differentials on the basis of race/ethnicity and gender. Segregation for neither women nor the mostly autochthonous minorities of

[27] Controlling for the population size of the area helps to avoid the potential bias produced by the higher random probability of segregation as unit size declines (Tomaskovic-Devey *et al.*, 1999). We also find that segregation tends to be higher in the West Central regions (both North and South) and Mountain.

[28] Obviously, there is a high correlation between education and English proficiency, so that including both sets of variables in the regression can cause multicollinearity problems. For that reason, we separate them, including only English proficiency in the third specification because it happens to have the largest impact on the coefficient by race.

African and Native Americans is reduced by taking human capital variables into account.[29]

5. Conclusions

This paper has shown evidence of important inequalities in the distributions of ethnic/racial-gender groups across occupations in the US. For that purpose, we have performed a detailed examination of the segregation of each minority group at the national level and an econometric analysis that makes use of the geographic variability of both segregation and characteristics of these groups across local labor markets.

We found that occupational segregation is particularly intense among Hispanics and Asians. The latter is the most segregated group when segregation is measured at the national level using the overall distribution of employment as the benchmark, while the former stands as the group that on average faces more segregation across the country when local markets are taken as reference. Segregation does not, however, affect all minorities in the same manner. Hispanics, African and Native Americans tend to concentrate to a larger extent than Asians or whites in low-paid occupations and they also differ in the factors that help to explain such differences.

Differences among groups in human capital characteristics, such as the ability to speak English or the level of attained education, appear to be crucial in understanding occupational segregation of US minorities. Demographic groups with a larger share of workers with low English proficiency or with either low or high educational levels, tend to be more segregated. In fact, after controlling for the human capital characteristics of each group (and several geographical variables), there is a clear difference between minorities with a large share of recent immigrant population (Asians and Hispanics) and the rest (African and Native American). Indeed, once those characteristics have been taken into account, Asians face on average a similar level of segregation than whites, Hispanics see their differential with respect to whites substantially reduced, while African and Native Americans stand out as the most segregated groups.

[29] The main results discussed here hold when measuring local segregation according to other indexes as dependent variable, although the effects associated with females of any race and Asian males are larger when the index is more sensitive to the bottom of the distribution (occupations where the group is missing).

The analysis also showed that segregation patterns are very similar across groups of low-skilled workers of minorities, while there are notwithstanding differences in the occupational distributions of highly-educated workers by race/ethnicity. Thus, even though the distributions of African Americans and whites across occupations are rather similar, the others are not. On the one hand, highly educated Hispanics are more evenly distributed than any other racial group across a wider range of occupations, including low-paid jobs. This is a sign of a higher degree of overeducation, a characteristic of certain types of immigration. On the other hand, Asians with a university degree tend to concentrate on a fewer range of occupations than other groups, particularly on selected high-skilled jobs related to medical and engineering services.

The study also revealed that segregation is generally higher for women than for men, and that this differential is not reduced after having controlled for spatial and human capital characteristics of the groups. Furthermore, disparities by race and ethnic origin are much larger among male than among female groups. In fact, the distributions of Hispanic, African and Native American women across occupations are pretty similar (and that of Asians also lies very close). Only Hispanic female workers show a distinctive feature because, unlike other groups, their segregation is, according to most indexes, lower than that of Hispanic men (who are the most segregated males).

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Appendix

Local status-sensitive segregation curves and indexes

Following Del Río and Alonso-Villar (2010b), the status-sensitive local segregation curve for a group can be obtained by plotting the cumulative proportion of $\sum_{i\leq j}\frac{t_i\frac{w_i}{\overline{w}}}{T}$, rather than $\sum_{i\leq j}\frac{t_i}{T}$, on the horizontal axis and the cumulative proportion of individuals of the target group, $\sum_{i\leq j}\frac{c_i^g}{C^g}$, on the vertical axis, once occupations are lined up in ascending order of the ratio $\frac{c_j^g}{t_j\frac{w_j}{\overline{w}}}$, where w_j represents the wage of occupation j and $\overline{w}$ is the average wage of occupations. The use of these curves leads to robust conclusions when the curves do not cross, since any status-sensitive local segregation index satisfying some basic properties will be consistent with the dominance criterion given these curves. Thus, these authors define the following status-sensitive segregation measures, which are consistent the above curves:

$$G_s^g=\frac{\sum_{i,j}\frac{t_i}{T}\frac{t_j}{T}\frac{w_i}{\overline{w}}\frac{w_j}{\overline{w}}\left|\frac{c_i^g}{t_i\frac{w_i}{\overline{w}}}-\frac{c_j^g}{t_j\frac{w_j}{\overline{w}}}\right|}{2\frac{C^g}{T}}$$

$$\Phi^g{}_{s,a}=\begin{cases}\dfrac{1}{\alpha(\alpha-1)}\displaystyle\sum_j\frac{t_j\frac{w_j}{\overline{w}}}{T}\left[\left(\frac{c_j^g/C^g}{\left(t_j\frac{w_j}{\overline{w}}\right)/T}\right)^a-1\right] & \text{if a}\neq 0,1\\ \displaystyle\sum_j\frac{c_j^g}{C^g}\ln\left(\frac{c_j^g/C^g}{\left(t_j\frac{w_j}{\overline{w}}\right)/T}\right) & \text{if a}=1\end{cases}$$

They are related, respectively, to the Gini index and the generalized entropy family of inequality indexes. In addition, a variation of the index of dissimilarity is also proposed

$$D_s^g = \frac{1}{2}\sum_j \left| \frac{c_j^g}{C^g} - \frac{t_j}{T}\frac{w_j}{\overline{w}} \right|,$$

which, even though is not consistent with the aforementioned dominance criterion, it is related to the above curve since it measures the highest vertical distance of the curve to the 45º-line.

Tables

LOCAL SEGREGATION: ETHNICITY/RACE AND EDUCATION	$\Phi_{0.1}^g$	$\Phi_{0.5}^g$	Φ_1^g	Φ_2^g	D^g	G^g	Population (%)
Whites with less than high school	0.868	0.566	0.467	0.466	0.401	0.518	43.5
Hispanics with less than high school	1.434	0.924	0.833	1.146	0.525	0.675	40.3
African A. with less than high school	1.294	0.775	0.685	0.820	0.488	0.626	10.6
Asians with less than high school	1.862	0.927	0.905	2.136	0.500	0.668	3.6
Other races with less than high school	2.345	0.823	0.642	0.747	0.451	0.596	1.2
Native A. with less than high school	2.722	0.912	0.708	0.889	0.478	0.620	0.8
							100%
Whites with high school	0.473	0.271	0.200	0.158	0.230	0.320	67.8
Hispanics with high school	0.753	0.411	0.327	0.304	0.319	0.434	14.9
African A. with high school	0.748	0.450	0.380	0.390	0.348	0.473	12.7
Asians with high school	1.038	0.552	0.514	0.904	0.369	0.519	2.6
Other races with high school	0.861	0.376	0.286	0.252	0.294	0.391	1.3
Native A. with high school	1.074	0.452	0.359	0.404	0.315	0.441	0.9
							100%
Whites with some college	0.179	0.131	0.111	0.098	0.178	0.249	72.1
Hispanics with some college	0.207	0.145	0.124	0.113	0.182	0.262	10.5
African A. with some college	0.322	0.253	0.229	0.240	0.261	0.369	11.8
Asians with some college	0.456	0.285	0.258	0.313	0.272	0.380	3.2
Other races with some college	0.466	0.218	0.181	0.182	0.228	0.319	1.6
Native A. with some college	0.577	0.262	0.226	0.263	0.250	0.353	0.8
							100%
Whites with a bachelor's degree	0.587	0.510	0.469	0.499	0.423	0.530	77.1
Hispanics with a bachelor's degree	0.329	0.269	0.264	0.308	0.302	0.400	6.1
African A. with a bachelor's degree	0.701	0.508	0.470	0.569	0.394	0.526	7.3
Asians with a bachelor's degree	0.809	0.628	0.642	1.053	0.431	0.585	8.0
Other races with a bachelor's degree	0.951	0.514	0.447	0.488	0.391	0.515	1.1
Native A. with a bachelor's degree	1.407	0.595	0.516	0.739	0.402	0.539	0.4
							100%

Table A1: Local segregation indexes: ethnicity/race and education.

LOCAL SEGREGATION: ETHNICITY/RACE AND ENGLISH LEVEL	$\Phi^g_{0.1}$	$\Phi^g_{0.5}$	Φ^g_1	Φ^g_2	D^g	G^g	Population (%)
Whites who speak very well	0.102	0.093	0.093	0.101	0.166	0.236	26.0
Hispanics who speak very well	0.070	0.063	0.060	0.060	0.132	0.189	47.6
African A. who speak very well	0.503	0.294	0.284	0.395	0.270	0.389	5.4
Asians who speak very well	0.500	0.404	0.420	0.644	0.339	0.475	18.3
Other races who speak very well	0.745	0.275	0.224	0.246	0.232	0.343	1.4
Native A. who speak very well	0.904	0.386	0.339	0.475	0.304	0.430	1.3
							100%
Whites who do not speak well	0.454	0.268	0.263	0.359	0.272	0.379	9.5
Hispanics who do not speak well	1.294	0.932	0.879	1.237	0.548	0.691	73.2
African A. who do not speak well	2.729	1.001	0.893	1.541	0.514	0.679	2.6
Asians who do not speak well	1.070	0.635	0.675	1.691	0.414	0.570	13.8
Other races who do not speak well	4.648	1.466	1.306	2.930	0.594	0.776	0.7
Native A. who do not speak well	6.412	1.894	1.709	5.995	0.690	0.847	0.2
							100%

Table A2: Local segregation indexes: ethnicity/race and English proficiency.

Group	Segregation Φ^g_1	% High School diploma	% Some college or associate Degree	% Bachelor degree or higher	% Speaking English not well/not at all	% Speaking English well	% Speaking English very well
White males	0.129 (0.027)	29.4 (5.8)	31.5 (3.9)	30.5 (7.1)	0.4 (0.3)	0.7 (0.6)	3.7 (2.6)
White females	0.206 (0.049)	26.4 (5.4)	35.7 (4.0)	31.5 (6.7)	0.4 (0.3)	0.7 (0.6)	3.5 (2.4)
African A. males	0.199 (0.053)	37.3 (5.6)	32.4 (5.5)	16.7 (5.0)	0.8 (1.3)	1.7 (2.7)	5.0 (4.2)
African A. females	0.257 (0.060)	31.3 (4.9)	37.9 (4.5)	19.5 (4.7)	0.8 (1.4)	1.5 (2.7)	3.9 (3.5)
Asian males	0.276 (0.116)	16.7 (4.8)	21.1 (7.4)	52.8 (12.2)	11.3 (3.2)	21.4 (3.2)	44.4 (7.3)
Asian females	0.279 (0.061)	18.7 (4.6)	23.5 (5.6)	46.1 (9.9)	12.1 (3.7)	20.7 (2.5)	42.5 (7.0)
Native A. males	0.241 (0.073)	38.7 (4.5)	32.6 (4.2)	13.7 (3.7)	0.9 (1.0)	3.7 (3.0)	19.7 (14.6)
Native A. females	0.263 (0.032)	33.5 (4.9)	38.3 (4.2)	15.6 (3.1)	0.7 (0.6)	3.2 (2.6)	20.7 (16.0)
Hispanic males	0.430 (0.163)	30.0 (3.7)	19.8 (5.8)	11.1 (4.4)	31.4 (10.5)	16.8 (4.0)	30.5 (8.5)
Hispanic females	0.244 (0.060)	29.6 (3.5)	28.4 (5.2)	15.5 (5.2)	20.7 (8.6)	12.6 (3.9)	39.2 (9.3)
Males of Other Races	0.149 (0.055)	28.7 (6.7)	34.4 (5.4)	23.4 (7.7)	3.5 (4.1)	4.0 (3.5)	12.2 (6.5)
Females of Other Races	0.235 (0.052)	24.7 (5.8)	38.2 (5.4)	26.2 (7.7)	2.3 (3.1)	3.1 (3.2)	11.9 (4.7)

Table A3: Descriptive statistics for main variables in regression by ethnicity/race and gender across local markets: average values (standard deviation in parentheses).