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DISCRIMINATION AGAINST NEGROES IN THE LABOR MARKET:
THE IMPACT OF MONOPOLY POWER ON
NEGRO MALE EMPLOYMENT PATTERNS

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employment, 1950 to 1960. The impact of these variables depends on the occupation in question: Industrial concentration had a generally depressing effect on employment in the middle- and high-level occupations and a favorable effect in the low-level occupations. Unions, as expected, have a depressing, occupation-specific effect on Negro employment. Expansion of employment had a depressing effect on Negro employment.

Because educational attainment was standardized when measuring employment representation, it follows that attitudes or prejudice, reinforced by monopoly power, are the primary obstacles to increased Negro employment. Thus, where Negroes have been employed, it would seem attitudes of white employers and employees have been moderated; also it would seem to be the more fruitful place to pressure for further Negro employment. Unless the government is willing to persuade the most powerful firms and unions in the nation to hire Negroes and break the color barrier, it will find it easiest to pressure for more Negro employment where it already exists. Because the membership of unions benefit economically from the exclusion of any additional workers, moral suasion seems doomed to fail. Direct economic penalties here then are probably the only means to effectively deal with employment discrimination.

Section I.

INTRODUCTION

The purpose of this study to measure sensibly the absence or presence of job discrimination against Negro males at a moment in time. Occupational and industrial exclusion is widely believed to exist, and it is the task of this study to indicate where, industrially and occupationally, this has occurred.[1]

That Negroes experience differential treatment in the market place is widely accepted and generally documented. We know that Negro families tend to be poor more often than their white counterparts; we know that Negro males suffer two times the white unemployment rate; we know that Negro families, on average, earn less than their white counterparts; and we know that income among Negro families is more unequally distributed than among white families.[2] If we standardize for educational attainment, part of the family income differential disappears, though a difference of about $900[3] remains which is generally ascribed to discrimination. Similarly, if we standardize for occupation of employment, about half of the unemployment rate differential disappears;[4] the inference here is that Negros are concentrated in occupations that have unusually high rates of unemployment. Finally we know that, in terms of residency, Negro families are highly segregated which, because of transportation problems, may, in turn, severely limit the labor market in which Negroes can participate.[5]

Industrial employment patterns of Negro males are of interest for several reasons. First, an industry is the logical object for fair employment enforcement pressures. Pressure to upgrade Negroes occupationally must be brought to bear on employers, and industrial affiliation is the

most obvious point of identification. Secondly, save for Myrdal's earlier

pioneering work and Ashenfelter's[6] recent study, we know very little about

where Negroes are employed.

To put in perspective the research reported below, I digress to discuss

Ashenfelter's recent study using data from the Equal Employment Opportunity

Commission. Firms reported data concerning the composition of their estab-

lishment work force and these data were aggregated to two digit Standard

Industrial Classification industries. On this basis Ashenfelter created an

index of occupational position for the major ethnic groups in the U.S. He

then regresses the Anglo index against percent Negro across industries. He

also regresses the ratio of Negro to Anglo index against relative median

educational attainment. The first correlation turns out to be significantly

negative, the second turns out to be significantly positive.

Since his index of occupational position for the i'th industry and e'th

ethnic group is the average money value of the occupational distribution of

a particular ethnic group:

$$\text{Index}_{ie} = \sum_{o=1}^{9} \left[\frac{E_{ioe}}{E_{ie}} \cdot Y_{io} \right]$$

e'th ethnic group

Y_{io} = annual median income in i'th industry for o'th occupation

E_{ioe} = number of ethnic group e, in i'th industry, o'th occupation

E_{ie} = total number of ethnic group e in i'th industry

The first negative realtionship between the Anglo index and percent Negro is

interpreted to mean: "the more high paying jobs there are in the industry,

[i.e., the higher the dollar value of the Anglo index], the lower the prob-

ability that a Negro is employed in that industry."

The second positive relationship indicates that, as Negro educational

attainment approaches that of whites per industry, the Negro-white difference

in average industry earnings decreases.

Unfortunatley, Ashenfelter does not disaggregate by occupation to see how ethnic groups fare within an occupation, nor does he assess what might explain higher and lower index values in terms of industrial characteristics. But he is the first to investigate post-1960 inter-industry differences in the position of Negroes while holding constant occupational structure.

Since we know Negroes suffer from an unfavorable occupational structure, i.e., they are heavily concentrated in lower-paying and unstable (with regard to employment) occupations, it is of interest to ascertain at a disaggregated level why Negro (males) are employed by certain industries within occupations.

Discrimination is usually the first explanation for the industrial absence of Negro employment. But because "discrimination" denotes both acts of preference as well as acts of prejudice, it is notoriously difficult to define. To guide our distinction between preferences and prejudices we may focus on the context of choice. If market choice (hiring, buying, selling) occurs within generally accepted ethical bounds, then we may say discrimination in the preferential sense is operative. For example, we might expect nonprejudicial employment practices to be based on productivity considerations alone. Refusal to hire equally productive Negroes then constitutes job discrimination (in the prejudicial sense) on the part of the employer. Paying equally productive Negroes a lower wage than white counterparts constitutes wage discrimination. In both cases, expected ethical behavior is to treat equally productive Negroes and whites the same. To ascertain that discrimination in the prejudicial sense has occurred, it must be established that differential treatment has occurred.

It is the task of this study to develop a method of inference which allows us to distinguish between expected and unexpected employment patterns.

In particular, I wish to focus on occupational and industrial patterns by race at a moment in time. The general question addressed is: Where (occupationally and industrially) are Negro males employed and how does this compare with where, in the absence of job discrimination, we expect Negro males to be employed. The relative absence of Negro employment, holding productivity constant, will be interpreted to be due to job discrimination or exclusion.

It should be noted that pre-labor market discrimination in education and housing, for example, is not analyzed here. Rather, productivities are taken as given, and the utilization of these productivities is analyzed. Secondly, in the theorizing to follow on labor market behavior, it is assumed that wage discrimination per se does not occur. There is evidence supporting this assumption.[7]

The format of the study is as follows: Section II develops the three indices of Negro, male employment representation; all three compare actual with expected employment patterns. The second and third are unique cross-sectional indices because: (a) they rely on an occupational classification that is directly related to the skills required per occupation; (b) educational attainment of the labor force is standardized for; and (c) rational job search behavior is postulated, which makes the industry-occupation observations on Negro employment interdependent in nature.

Section III, using 1960 employment data, presents the measurement results for these three indices of Negro male employment representation. Each measure is aggregated across occupations to give overall industry employment profiles.

In Section IV, I proceed via regression analysis to evaluate hypotheses about the determinants of job discrimination.

In Section V, the policy implications of the research findings are discussed.

Section II

INDICES OF NEGRO EMPLOYMENT REPRESENTATION

The chief difficulty in measuring anything at a moment in time is that, because we do not know what process generated our snapshot or cross-section, we are forced to compare any behavior to the calculated average behavior which occurred when we took the snapshot. This sounds essentially harmless and reasonable, for something above the mean seems "high" and below the mean seems "low." Of course, if we have additional information, we might wish to hold other things constant to compute the mean for the purposes of comparison.

For example, opponents of a 10 percent Negro share in employment in every occupation and industry might argue that this is too high a failure because less than 10 percent of a particular local population may be Negro, less than 10 percent of the Negro population is "qualified," or less than 10 percent of the Negro population ever apply for jobs.

Implicit in these objections are the notions that, if an employer does not discriminate when hiring, he still might not have 10 percent Negro employees because Negroes never applied for jobs; there are not enough qualified Negroes to fill a 10 percent quota in certain occupations; or Negroes simply do not constitute 10 percent of the local labor market. Imposing a national, average Negro population percentage on him as a fair employment test would, in light of these considerations, seem unreasonable. The question then is: What is a fair yardstick for comparison if not the national population percentage? Three measures are forwarded which answer, with increasing sophistication, this question.

Measure 1

An immediate improvement on the national population percentage, as the benchmark for comparison, is the Negro percentage of employment in a particular occupation. A firm that is below this average for that occupation is more reasonably said to be "low." More exactly, define the percent Negro employment in an occupation as PCN_o:

$$PCN_o = \frac{\sum\limits_{i=1}^{n} E_{N_{io}}}{\sum\limits_{i=1}^{n} \left[E_{N_{io}} + E_{W_{io}} \right]}$$

i'th firm   i = 1,...n
o'th occupation   o = 1,...m
$E_{N_{io}}$ = Negro employment in i'th industry, o'th occupation
$E_{W_{io}}$ = white employment in i'th firm, o'th occupation

We might expect firms that discriminate, (refuse to hire Negroes), to be below average and firms that do not discriminate to be at the average. Firms with a preference for Negro employees would be thought to be above the average PCN_o.

The ratio of percent Negro in occupation o for a particular firm to the overall PCN_o constitutes our first measure of Negro employment representation. Alternatively stated, the ratio of actual to expected percent Negro employment for a firm and occupation is Measure I or P_{io}:

$$P_{io} = \frac{E_{N_{io}}}{E_{N_{io}} + E_{W_{io}}} \Bigg/ \frac{\sum\limits_{i=1}^{n} E_{N_{io}}}{\sum\limits_{i=1}^{n} \left[E_{N_{io}} + E_{W_{io}} \right]}$$

i'th firm
o'th occupation

While P_{io} may be appealing and is certainly conventional, it fails to meet several of the above objections. If we know nothing else about the

employment process, then P_{io} would seem to be a reasonable indicator of whether or not job discrimination took place in firm i, occupation o. The earlier objections indicate that people generally know something about the employment process, and how it occurs, and we can build this into our measurement procedure.

One final point should be made with regard to this normalized percent measure. If we knew that, historically, a particular firm hired a disproportionate share of Negro employees, then we might temper our judgment about low percent Negro firms in that labor market. Fewer than PCN_o were available for them to hire. Ford Auto Company in Detroit might be an example of the former kind of firm. The next two measures account for this possibility.

Measure 2

To improve on P_{io}, we need to account for a likely process that generated the observed distribution of Negro employment. The first thing to account for is that not everyone can work in all occupations. To find a benchmark for intra-occupational comparisons, we need first to form an expectation of where a person will be employed occupationally. To do so, we need to know what skills he has and what skills are needed in all occupations. Let us suppose we can create an occupational classification that is ordinal with respect to skill-requirements. To distinguish this classification scheme from that used in Measure I, denote these ordinal classifications or skill-occupations by the subscript j, j = 1 is the highest skill-occupation; j = 2 is the next highest skill-occupation, and so forth. Since this is an ordinal hierarchy, those workers with the highest skill-level who could be in the highest skill-occupations (j = 1) can also do the work in the next highest skill-occupation (j = 2). Obviously this is an oversimplification of reality, in which there

will be some aspects of occupations or some composition of abilities among workers that may prevent an easy transition from a "high" skill-occupation to a "lower" one. Nevertheless, over the level of aggregation to be dealt with below, the assumption of possible downward (but not upward) transitions seems reasonable.

Denote Q_{N_j} and Q_{W_j} as the number of Negro and white workers with skills adequate for skill-occupation j. This then is the qualified labor supply available to employers of skill level j. Let us call Measure 2, I_{ij}; we generally define I_{ij} for the i'th firm, j'th skill-occupation to be:

$$I_{ij} = \frac{E_{N_{ij}}}{Q_{N_j}} \Big/ \frac{E_{W_{ij}}}{Q_{W_j}}$$

where: $E_{N_{ij}}$ is the number of employed Negroes in the i'th firm, j'th skill-occupation

$E_{W_{ij}}$ is the number of employed whites in the i'th firm, j'th skill-occupation

Q_{N_j} is the number of Negroes qualified to work in occupation j and who have skill level j

Q_{W_j} is the number of whites qualified to work in occupation j and who have skill level j

That is, we generally expect Negroes to be employed in the same proportion to their qualified labor supply as whites are. When $I_{ij} < 1.0$, we know that fewer than expected Negroes are employed, and when $I_{ij} > 1.0$, a greater than expected number of Negroes are employed. We may interpret a value for I_{ij} to be the percentage fulfillment of our expectations. Suppose a firm employed

1 Negro and 20 whites and there were 10 qualified Negroes and 100 qualified whites respectively. Then I_{ij} would equal:

$$I_{ij} = \frac{1}{10} \Big/ \frac{20}{100} = .5$$

Or, our expectations of Negro employment were only half-fulfilled; were he to double its Negro employment then $I_{ij} = 1.0$, i.e.:

$$I_{ij} = \frac{2}{10} \Big/ \frac{20}{100} = 1.0$$

Having standardized for available skills of workers _among_ occupations, we need to now standardize for the available skills _within_ an occupation. We could simply compare I_{ij} with the average by creating:

$$I_j = \frac{\sum_{i=1}^{n} E_{N_{ij}}}{Q_{N_j}} \Big/ \frac{\sum_{i=1}^{n} E_{W_{ij}}}{Q_{N_j}} \qquad \text{(notation as above.)}$$

and comparing I_{ij} with I_j. Such a normalized measure, however, would fail to meet the last criticism of P_{io}, namely that not every employer is facing the same labor supply when hiring, even if they do not discriminate. For example, different firms may offer different wages within one skill-occupation, some firms making more attractive job offers than others, thus decreasing the labor supply available to other firms once hiring takes place.

To create a benchmark for comparison within a skill-occupation, we need to standardize for the labor supply that a firm faces. To do so, we need in turn to postulate a pattern of job search; we shall assume here that (a) an individual with skill level j will seek work in the highest skill-occupation for which he is qualified, and (b) he will prefer a higher weekly income to a lower weekly income within that skill-occupation. Should he not find work within the highest skill-occupation for which he is qualified, he moves to the next highest skill-occupation and searches for work on the basis of

expected weekly income. Consider a hypothetical ranking of firms within each occupation by offered weekly income and suppose prospective workers apply for jobs in that order. As Negroes and whites find employment, the number of available, qualified Negroes and whites will, of course, change. Thus Q_{N_j} and Q_{W_j} will change. To calculate I_{ij}, then, the change in Q_{N_j} and Q_{W_j} should be accounted for.

The method of accounting for this change in labor supply is best shown by example. First, let us suppose there is only one skill-occupation and two firms in one labor market. And let us suppose that Firm One pays a slightly higher wage rate than Firm Two. Then I_{11} is simply:

$$I_{11} = \frac{E_{N_{11}}}{Q_{N_1}} \bigg/ \frac{E_{W_{11}}}{Q_{W_1}}$$

Since Firm I does not exhaust the total supply of qualified workers, I_{21} becomes:

$$I_{21} = \frac{E_{N_{21}}}{Q_{N_1} - E_{N_{11}}} \bigg/ \frac{E_{W_{21}}}{Q_{W_1} - E_{W_{11}}}$$

That is, the Negro and white labor supplies have shrunk by the number of Negroes and whites employed by Firm One. Adding a third, less financially attractive firm poses no problems for the computation of I_{31}:

$$I_{31} = \frac{E_{N_{31}}}{Q_{N_1} - E_{N_{11}} - E_{N_{21}}} \bigg/ \frac{E_{W_{31}}}{Q_{W_1} - E_{W_{11}} - E_{W_{21}}}$$

Let us now consider the case of $j = 2$ and $i = 2$ (two skill-occupations and two firms). Then $j = 1$ is the highest skill-occupation and $j = 2$ the second highest. We assume that Q_{N_1} and Q_{W_1} can do jobs in skill-occupation 2. I_{11} and I_{21} are formed as before:

$$I_{11} = \frac{E_{N_{11}}}{Q_{N_1}} \bigg/ \frac{E_{W_{11}}}{Q_{N_1}}$$

$$I_{21} = \frac{E_{N_{21}}}{Q_{N_1} - E_{N_{11}}} \Bigg/ \frac{E_{W_{21}}}{Q_{W_1} - E_{W_{11}}}$$

Let us further assume that Firm One pays a higher wage rate in skill-occupation 2 as well. The I_{12}:

$$I_{12} = \frac{E_{N_{12}}}{Q_{N_2} + [Q_{N_1} - E_{N_{11}} - E_{N_{21}}]} \Bigg/ \frac{E_{W_{12}}}{Q_{W_2} + [Q_{W_1} - E_{W_{11}} - E_{W_{21}}]}$$

The bracketed terms in each denominator are merely those Negroes and whites who could not find work in skill-occupation 1. Thus, the labor supply for the second skill-occupation has been increased by those skill-level 1 holders who could not find employment. Computation of I_{22} follows straightforwardly:

$$I_{22} = \frac{E_{N_{22}}}{Q_{N_2} - E_{N_{12}} + [Q_{N_1} - E_{N_{11}} - E_{N_{21}}]} \Bigg/ \frac{E_{W_{22}}}{Q_{W_2} - E_{W_{12}} + [Q_{W_1} - E_{W_{11}} - E_{W_{21}}]}$$

Whether or not the unemployed skill-level 1 workers found work with Firm One in skill-occupation 2 is accounted for by subtracting $E_{N_{12}}$ and $E_{W_{12}}$ from the total labor supply available to the second skill-occupation.

Changing the order of firm wage rates causes no problems to get I_{ij}, since we need only rank firms within each skill-occupation to form the search queue for that skill-occupation. Suppose, for example, that the second firm paid the higher wage rate in skill-occupation 2. To calculate I_{22} we need only start the queue at I_{22} rather than at I_{12} as done above.

Measure 3

Our third measure of employment representation is similar to the second, except that the assumption determining job search pattern is now changed. It was assumed in Measure 2 that job searchers began looking for work in the

highest skill-occupation for which they were qualified. Within that skill-occupation, they applied to firms on the basis of highest offered weekly income. If unable to find work in that skill-occupation, they "moved down" to the next skill-occupation and looked for work again on the basis of expected weekly income.

Because lower-skilled work may pay higher wages (to compensate for higher risk, dirtier working conditions, or due to labor market imperfections), we change the assumption of within-skill-occupation job search in the creation of this second index of employment representation, D_k. Now, workers apply for the highest paying job for which they are qualified. To calculate D_k, we must keep track of the rank of the offered wage rate in addition to the firm number and skill-occupation. An example will make this more clear.

Suppose $i = j = 2$ and that Firm One pays higher wages in both skill-occupations (skill-occupation 1 being the highest) than the second firm. Let k denote the rank of mean weekly incomes of each of the four jobs. The most attractive job available is in the $i = 1$, $j = 1$ cell and Q_{N_1} and Q_{W_1} apply. Then D_1 equals:

$$D_1 = \frac{E_{N_{11}}}{Q_{N_1}} \bigg/ \frac{E_{W_{11}}}{Q_{W_1}}$$

which is calculated the same as I_{11} would be. D_2, however, is in skill-occupation 2, so unemployed Q_{N_1} and Q_{W_1} apply. D_2 then is:

$$D_2 = \frac{E_{N_{12}}}{Q_{N_2} + (Q_{N_1} - E_{N_{11}})} \bigg/ \frac{E_{W_{12}}}{Q_{W_2} + (Q_{W_1} - E_{W_{11}})}$$

The third most attractive job available is in skill-occupation 1, Firm Two, and remaining unemployed Q_{N_1} and Q_{W_1} apply. The last cell has remaining

Q_{N_1}, Q_{W_1}, Q_{N_2}, and Q_{W_2} as applicants. As in I_{ij}, there is interdependency

in the expectations of Negro and white employment; however, the search pattern which generates this interdependency depends now only on expected weekly income.

When I_{ij} and D_k are less than 1.0, fewer Negroes are employed than expected--the expectation being based on proportional representation of productive Negroes and whites and on job search behavior. That fewer Negroes are employed than expected on the basis of these considerations suggests they are being excluded. Nondiscriminatory hiring behavior would lead to I_{ij} and $D_{ij} = 1.0$. What these two measures do is allow us to infer if exclusion is taking place on a cell-by-cell basis. The fact that few Negroes are employed by a firm tells us that many more should be employed by others if nondiscriminatory hiring exists. Looking at simple percent Negro by industry-occupation will not tell us this; rather, average behavior is the basis for comparison. The contribution of the I_{ij} and D_{ij} indices is that they are interdependent in nature, and, I believe, based on reasonable assumptions about labor supply and demand phenomena.

Section III

MEASUREMENT RESULTS

In this section the three indices of Negro employment representation created in Section II are measured. The first part of this section operationalizes the notion of skill-occupation which is essential to the formulation of I_{ij} and D_k. The second part contains the measurement results of actual/expected percent Negro for major Census occupations and three-digit Census industries. The third part contains the measurement results for

I_{ij} and the fourth part contains the results for D_k. The fifth part compares

aggregations of the three indices. Several general questions are addressed

in the first three sections: Is industrial employment behavior among occupa-

tions consistent? Are there regional differences in the employment representa-

tion of Negroes? Does increasing representation of Negroes entail higher/lower

absolute incomes? Does increasing representation of Negroes entail a widening

of the Negro-white income gap?

1 *Creation of Skill-Occupations*

Major Census occupational classifications do not contain the ordinal

skill properties which were assumed in the formulation of I_{ij} and D_k. For-

tunately, some progress in this area has been made. Following Eckhaus[8],

Scoville[9] went through the Estimate of Worker Traits Requirements for 4000

Jobs[10] and assigned to three-digit Census occupations two kinds of skill re-

quirements: General Educational Development and Specific Vocational Prep-

aration. Units for General Educational Development are school-year equiva-

lents. In his paper, Scoville presents the results of this linkage of skill-

requirements to Census occupations. To get an ordinal hierarchy of skill-

occupations, Scoville's results for General Educational Development-Census

occupation were sorted by General Educational Development. Generally speak-

ing, professionals (doctors, lawyers, etc.) are at the top of the hierarchy

and unskilled laborers (porters, bootblacks, etc.) are at the bottom of

the hierarchy.

To aid later empirical analysis, this hierarchy was grouped into 11

sections or skill-occupations (abbreviated skill-occ.). The grouping is

purposeful in that each group corresponds to a Census educational attainment

categoy. Each skill-occ. has homogeneous skill-requirements in school-year-equivalents. For example, the highest skill-occ. (skill-occ. 1) has a requirement of 17+ school-year-equivalents; we might expect all workers with 17+ years of education to be in one of those 3-digit Census occupations which comprise skill-occ. 1. The second highest skill-occ. requires 16 school-year-equivalents, similarly, we might expect those with 16 years of education to be in one of those Census occupations in skill-occ. 2, and so forth.

Appendix I contains the 3-digit Census occupations grouped into 11 skill-occs. The 30 Census occupations not assigned a General Educational Development score by Scoville were allocated among the 11 skill-occs. on a judgmental basis. Actual skill-occupations were created by using the 1960 1/100 Census sample for males, 18 to 65-years-old, not in school.[11]

Not surprisingly, a chi-square (X^2) test for the relationship between educational attainment and occupation reported as classified by skill-occs. is highly significant; the $X^2 = 2,762.7$. Similar regional cross-classifications by race (see Table 1) indicate a significant relationship between eduation and skill-occ. Note, however, that the relationship between education and skill-occ. is much weaker for Negro males, though still statistically significant. Whether this weaker relationship is due to occupational exclusion or educational quality differentials,[12] or a combination of the two, cannot be ascertained. It is clear, however, that educational attainment is a poorer predicator of where Negro males will be occupationally than it is for white males.

2 Actual/Expected Percent Negro Measurement Results

Ideally, we would like to measure actual/expected percent Negro (males) for local labor markets and at the firm level. Such detailed information is,

unfortunately, unavailable. What is available is employment by race, sex, 3-digit industry, 2-digit occupation, and age at the national level.[13] Table 2 presents percent Negro male employment for nine major Census occupations.[14]

The first question arising concerns the shape of the distributions of actual/expected percent Negro for each occupation. Are industries normally distributed around 1.0? Table 3 shows the frequency distribution of actual/ expected percent Negro by occupation for 148 industries. The underlined frequency shows the location of the median industry ratio for each occupation. In all but the Service Workers occupation, the median ratio is less than 1.0. This means that the majority of industries in every occupation except the Service Workers occupation has a smaller percentage of Negro employment than the overall percent Negro. This in turn tells us that the minority group of industries beyond 1.0 are large employers of Negroes; this must be so for the median ratio to be below the average.

A second question realtes to the consistency of industrial behavior. If most industries have a smaller than average percent Negro employment per occupation, does that group of industries have a smaller than average percentage in all occupations?

Kendall's coefficient of concordance, W, provides a compact statistic to answer this question.[15] Suppose we rank each industry by its actual/ expected percent Negro employment per occupation. W provides a measure of agreement of these nine sets of rankings. W is defined as:

$$W = \frac{S}{j^2(i^3-i)/12} = \frac{12S}{j^2(i^3-i)} \qquad \begin{array}{l} j \text{ occupations} \\ i \text{ industries} \end{array}$$

where S is the sum of the squares of the deviations of the ranks obtained by each industry from the average of these totals. W varies from 0 to +1,

Table 1

x^2 Tests for the Relationship between Reported Skill-Occupation and
Educational Attainment by Region and Race; for Males, 18-65, 1960

Region	Race	x^2	Z statistic*	Z W/NW
Northeast	W	5468.0	89.9	
	NW	492.9	17.4	5.1
North Central	W	6209.6	97.4	
	NW	526.5	18.6	5.2
South	W	4976.9	85.5	
	NW	1501.2	3.2	26.8
West	W	2806.1	60.8	
	NW	165.9	4.7	12.6

*Note: All tests are significant at 99% level.

signifying total agreement among the rankings. A significance test of W is available:

$$F = \frac{(j-1)W'}{1-W'}$$

where W is W adjusted for continuity:

$$W' = \frac{12 \ (S-1)}{j^2(n^3-n) + 24}$$

Two calculations are reported below: first, the rank correlation between an occupation's rank and the average rank of the rest of the occupations and then Kendall's global measure.

Table 4 shows the rank correlation between the rank of an occupation and the average of all others for eight occupations and again for nine occupations including the category, "not reported elsewhere." For both samples, the Managers and Officials occupation is the most typical in that its rank order is most correlated with the average rank order of the other occupations.

Kendall's W for the group of nine occupations is .3732, and for eight occupations it is .3768. Both are highly significant. Thus, for any industry, knowledge of Negro representation in one occupation is a good predictor of Negro representation in the rest, 37 and 38 percent of the time.

We may conclude that the majority of industries have low-percent, Negro, male employment, but that those having larger than average percent are very large employers. Secondly, those industries with few Negro employees tend to have few Negroes in all occupations.

3 Measurement Results for I_{ij}

Measuring I_{ij} from the 1960 1/1000 Census sample follows the development in Section II and part 1 of this paper. The geographic unit of analysis

Table 2

Number of Negro Males/Total Male Employment for
Nine Census Occupations; 1960

	Occupation 0 = 1, ... 9	Percent Negro
1	Professional or Technical	2.52
2	Managers, Officials	3.10
3	Clerical Workers	6.07
4	Sales Workers	1.62
5	Craftsmen and Foremen	4.19
6	Operatives	10.26
7	Service Workers	20.11
8	Laborers	23.93
9	Not Reported Elsewhere	15.53
		100.00

Source: See footnote 13.

Table 3

Distribution of Actual/Expected Percent
Negro Male Employment for 148 Industries, 1960

Occupation	Range of Actual/Expected Percent Negro										
	0-.19	.2-.39	.4-.59	.6-.79	.8-.99	1.0-1.19	1.2-1.39	1.4-1.59	1.6-1.79	1.8-1.99	2.0
1 Professional	59	29	20	4	7	6	4	1	0	1	17
2 Managers	79	25	8	8	9	3	2	1	0	1	12
3 Clerical	10	28	20	18	21	11	10	8	5	3	14
4 Sales	62	21	13	7	10	6	6	2	2	1	18
5 Craftsmen	6	13	22	29	14	12	7	15	7	2	22
6 Operatives	8	10	16	14	15	16	10	17	6	10	26
7 Service	3	3	5	16	15	29	14	12	11	8	32
8 Laborers	8	14	22	32	23	19	10	9	7	1	3

Note: Underline frequency is location of median industry for each occupation.
Source: See footnote 13.

Table 4

Rank Correlation between Rank of Actual/Expected Percent Negro in
Occupation J and the Average Rank of All Other Occupation's Average/
Expected Percent Negro*

For all Occupations   Excluding Not Reported

Occupation	Spearman's ρ	
Professional, Technical	.3818	.3742
Managers, Officials	.5045	.5114
Clerical Workers	.3484	.3649
Sales Workers	.3470	.3712
Craftsmen, Foremen	.4828	.4879
Operatives	.4733	.4782
Service Workers	.3277	.3411
Laborers	.3085	.2690
Not Reported Elsewhere	.3474	--

*All correlations are significant at the 99% level

is the Census region.[16] Within each region, individuals are mapped to skill-

occs. on the basis of their educational attainment. Within each skill-occ.,

the three-digit industries are ranked in order of attractiveness by mean

weekly income. The subtraction process outlined earlier then takes place.

Some people reported skill-occs. for which their educational attainment did

not qualify them. This may occur because of on-the-job training, learning

by doing, or post-public school vocational training. To account for this,

the following is done: to calculate I_{ij}, we begin with skill-occ. 1 and

keep track of the educational attainment of each employed worker as the

subtraction process is calculated. If the educational attainment of the

employed worker is greater or equal to that required in the skill-occ., the

labor supply available to the next industry decreases by that number. If,

however, his educational attainment is less than required, the labor supply

to the next industry does not decrease, because we did not expect him to be

searching for employment in that skill-occ. in the first place. Secondly,

if attainment is less than required, but several are employed in the higher

skill-occ. anyway, the number so employed is subtracted from the Q_j where

the workers are expected to look for work. So if there are 400 workers

with j=4 (high-school degree), and 100 get jobs in skill-occ. 3, then, when

we go to skill-occ. 4 to calculate I_{i4}, the total number of qualified workers

is 300 high-school degree holders plus those unemployed workers with higher

educational attainment who were not employed in the higher skill occs.

To aggregate from the regional to the national level, each of the four

parts of I_{rij} was summed.

$$I_{ij} = \frac{\sum_{r=1}^{4} E_{n_{rij}}}{\sum_{r=1}^{4} Q_{n_{rij}}} \Big/ \frac{\sum_{r=1}^{4} E_{w_{rij}}}{\sum_{r=1}^{4} Q_{w_{rij}}}$$

Table 5 shows the mean I_j for the 11 skill-occ. where the mean is

defined:

$$I_j = \frac{\sum_{i=1}^{n} I_{ij}}{n}$$

i'th industry
j'th skill-occupation
n   non-zero observation

A non-zero ij cell, then, must have both Negroes and whites employed as

well as qualified Negroes and whites "available" for work. (See Appendix

II for a discussion of this problem of zero ij cells.)

Surprisingly, the mean I_{ij} was greater than 1.0 in all skill-occs. To

see why this occurs, the distribution of I_{ij} for each j was normalized by

the average I_{ij} shown in Table 5. Table 6 shows the resulting frequency

distribution. The underlined frequencies indicate the location of the median,

and, as in the case of actual/expected percent Negro, the median is well be-

low the mean in all skill-occs. This signifies that most industries have

I_{ij}'s less than the average I_{ij}, but those few outlying index numbers have

very large values. While concordance and rank correlation tests are unavail-

able for tables with missing data, the frequency distribution of Table 6

agrees with the results in the discussion of actual/expected percent Negro;

holding productivity and relative numbers constant, we find that most in-

dustries (for which we have index values) have fewer than expected Negro

employees than the average I_{ij} suggests. A few industries have many more

Negro employees than expected.

We now turn to investigate the relationship between Negro representa-

tion and absolute and relative weekly income. Recall that Ashenfelter

found that industry percent Negro was inversely related to Anglo average in-

dustry earnings; we seek here to see if a more complete measure of representa-

tion by skill-occ. is similarly inversely related. Table 6 shows the correla-

tion between regional I_{ij} and mean weekly income per ij, and Table 7 shows

the correaltion between I_{ij} and Negro/white mean weekly incomes.

Table 5

Mean I_j for j=1, ...11

Skill-Occ.	Mean I_j	Number of Non-Zero Observations
1	2.0938	4
2	10.9674	11
3	2.9208	9
4	2.9372	13
5	1.1392	61
6	1.4156	74
7	1.7990	68
8	2.6755	114
9	4.1136	39
10	5.4282	75
11	18.4337	16

Table 6

Distribution of I_{ij}/Mean I_{ij} for Skill-Occs. 1, ...11

Range

Skill Occ.	0.0-.19	.2-.39	.4-.59	.6-.79	.8-.99	1.0-1.19	1.2-1.39	1.4-1.59	1.6-1.79	1.8-1.99	2.0-	Number of Observations on I_{ij}	Mean I_{ij}
1	0	1	1	1	0	0	0	0	0	0	1	4	2.0938
2	2	1	2	3	0	1	0	1	0	0	1	11	10.9674
3	0	2	2	2	1	1	0	0	0	0	1	9	2.9208
4	2	3	1	1	1	1	1	1	0	0	2	13	2.9372
5	7	28	12	10	8	5	4	2	0	1	4	61	1.1392
6	10	8	15	10	6	7	3	2	2	3	8	74	1.4156
7	11	20	7	8	3	2	4	2	4	0	7	68	1.7990
8	12	26	16	9	9	12	8	1	4	2	15	114	2.6775
9	6	7	10	1	0	5	1	0	0	0	9	39	4.1136
10	1	14	15	10	12	3	3	4	5	1	7	75	5.4282
11	1	0	3	1	4	2	3	0	1	0	1	16	18.4337

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Only 20 percent of the correlations between regional I_{ij} and average weekly income[17] are significant at the 90 percent confidence level. Of these 10 significant correlations, 4 are negative and 6 are positive, which suggests that increasing Negro representation and increasing income are positively related 60 percent of the time. Of the 5 correlations significant at do the 95 percent level, 4 are negative. Representation and absolute income, then, do not vary consistently. Note, however, that Ashenfelter's results are for annual earnings, while I have in effect standardized for weeks worked.

When we analyze the correlation between I_{ij} and relative (N/W) mean weekly income, we find a more consistent pattern of results. (See Table 8.) Of the 39 correlations performed, 11 are significant (28 percent of the total number of correlations) at the 90 percent level. Only 2 of these are negative. At the 95 percent level, only one of 8 significant correlations is negative. Thus, at both significance levels, representation of Negro males is positively associated with narrowing racial income differentials. It may well be that employers shrink from discriminating against Negroes via differential wage rates as Negroes become more numerous. Certainly it becomes more difficult to disguise such discrimination, and this increased difficulty may in part explain the narrowing income differentials.

To ascertain if there are regional differences in the occupational representation of Negro males, difference between means tests were performed for the eleven skill-occs. and six regional comparisons. The null hypothesis in each comparison is that there is no regional difference in mean I_{rij}. Table 9 presents the results; note that the cell entry is the t-statistic.

We see that, of the available 55 comparisons, significant differences occur 19 times at the 90 percent level and 15 times at the 95 percent level.

Table 7

Correlation between I_{rij} and Mean Weekly Income, 1959

Region	Skill-Occupation										
	1	2	3	4	5	6	7	8	9	10	11
NE	–	-.644	.755	-.589	.242*	-.279**	-.220	-.213	-.108	.036	-.526
NC	–	–	–	.544	.051	.433**	-.157	.069	-.412	-.005	-.422
S	.768	.828*	-.476	-.325	-.056	-.182	-.014	-.300**	-.373*	-.367	-.937**
W	–	-.982	.645	.857*	-.357*	.001	.808**	-.021	-.072	-.409	-.876

Note: * denotes a significant correlation at the 90% level
    ** denotes a significant correlation at the 95% level
    – denotes insufficient data to perform correlation

Table 8

Correlation between I_{rij} and Negro/White Mean Weekly Incomes

Region	Skill-Occupation										
	1	2	3	4	5	6	7	8	9	10	11
NE	–	.475	.350	-.110	.136	-.056	-.215	-.091	.586**	-.076	.715*
NC	–	–	–	-.331	.030	.436**	-.157	.248	-.171	-.206	-.222
S	-.166	-.965**	.950**	.819**	.002	-.050	.313**	.279**	.278	.159	-.089
W	–	-.673	-.938	.975**	.187	.106	-.517**	.266*	-.147	-.209	-.831

Note: * denotes a significant correlation at the 90% level
    ** denotes a significant correlation at the 95% level
    – denotes insufficient data to perform correlation

Table 9

Tests of Differences between Regional Mean I_{ij}'s

Ho					Skill-Occupation						
	1	2	3	4	5	6	7	8	9	10	11
NE-S=0	-.5517	.7259	4.1795	.1783	2.3564**	.7614	.8037	-1.8142**	.1312	-1.4354*	-1.0502
NC-S=0	-	-	-	.4757	1.644**	4.0026**	.9978	1.8300**	.5415	.8544	-.3438
W-S=0	-	.8585	.4939	1.0286	3.8481**	2.3096**	4.0822**	2.1641**	-.3869	1.1899	-.5506
NE-NC=0	-	-	-	.7344	.1928	2.3192**	-.1431	-2.3547**	.6193	1.8115	-.0945
NE-W=0	-	.4594	.4542	1.2819	1.9661**	1.4676*	-2.5673**	-3.5585**	-.2894	-2.4015**	.0223
NC-W=0	-	-	-	.4329	1.4546*	.3233	-2.2674**	-.8566	-.9448	-.5955	.0735

Note: Cell entry is t statistic
 * denotes significance at 90% level (one tail test)
 ** denotes significance at 95% level (one tail test)
 - denotes insufficient data to perform test

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In skill-occs. 5, 6, and 7, the non-South has greater average repre-
sentation of Negroes than the South. Within the non-South, we see that for
skill-occs. 5 and 6, the Northeast and North Central regions have signifi-
cantly greater representation of Negroes than the West; in skill-occ. 6,
the Northeast has significantly greater average representation than the North
Central region. In skill-occ. 7, the West has significantly greater Negro
representation than the Northeast and North Central regions.

The pattern of regional differences changes in the lower skill-occs.
In skill-occs. 8 and 10, the South now has greater Negro representation than
the Northeast. For South vs. North Central and West comparisons, the earlier
pattern prevails: in skill-occ. 8, both regions have significantly more
Negro employment than the South. When the Northeast is compared to the West and
North Central, we see that the Northeast has significantly fewer Negroes in
both cases. In skill-occ. 10, the pattern is the same: the Northeast has
significantly fewer Negroes than the South, and also significantly fewer than
the West.

The overall pattern of the South vs. the other regions suggests that,
when there is any significant difference between regions, the NE, NC, and W
exclude to a lesser extent than the South.

4 Measurement Results for D_k

The process for measuring D_k follows the development in Section II and
part of this section. Recall the difference between I_{ij} and D_k: to obtain
an expectation of Negro and white employment for D_k, we assume they search
for the highest paying job for which they can qualify.

The average D_k for skill-occs. 1-11 is presented in Table 10. Note
that the average D_k is greater than the average I_{ij} except for skill-occ. 2,

Table 10

Mean D_k per Skill Occupation

Skill-Occ.	Average D_k	Number of Observations
1	2.2038	4
2	5.4565	11
3	2.5024	8
4	1.8055	13
5	3.7025	81
6	1.4726	74
7	2.0897	68
8	3.1063	114
9	5.0777	39
10	5.8571	75
11	16.0799	16

though again we see the average index of representation is always greater than one. As the frequency distribution of D_k/mean D_k per skill-occ. in Table 11 shows, this result is due largely to a few large (index values) outliers. The median (underlined range in Table 11) in all eleven skill-occs. is again below the mean.

To see if representation of Negroes as measured by D_k is related to increasing average weekly income and increasing average relative income, regional correlations between D_k and the two income measures were performed. Table 12 and 13 show the results of these correlations.

Of the 39 correlations between regional D_k and mean weekly income, only 10 (or 25 percent of the total) are significant at the 90 percent level. Of these, half are positive and half are negative. Three of the significant negative correlations are for southern skill-occupations. Seven correlations remain significant at the 95 percent level; 4 are positive and 3 are negative (all three being in the South). Hence, we may conclude that half the time the industries in which Negroes are more prevalent are low-paying.

Eleven correlations between regional D_k and relative, mean weekly income are significant at the 90 percent level; 9 are positive, 2 negative. Ten correlations remain significant at the 95 percent level; 8 are positive, 2 negative. These results concur with those correlations for regional I_{ij}: as more Negroes are represented in an industry, the Negro-white income differential narrows.

We perform tests of differences between regional, mean D_k's to see if there are regional differences in the skill-occupation representation of Negroes. Table 14 presents the results of these tests.

Table 11

D_k/Mean D_k for Skill-Occupations 1-11

						Range					
Skill-Occ.	0.0-.19	.2-.39	.4-.59	.6-.79	.8-.99	1.0-1.19	1.2-1.39	1.4-1.59	1.6-1.79	1.8-1.99	2.0-	Total
1	0	1	1	<u>1</u>	0	0	0	0	0	0	1	4
2	2	2	1	<u>1</u>	2	0	2	0	0	0	1	11
3	2	<u>3</u>	1	1	1	0	0	0	0	0	1	9
4	1	4	1	<u>1</u>	0	3	0	0	0	0	3	13
5	<u>49</u>	22	6	1	1	0	0	0	0	0	2	81
6	9	12	12	<u>8</u>	5	10	2	4	1	1	10	74
7	10	17	<u>11</u>	6	1	4	5	3	1	1	8	68
8	13	26	14	<u>10</u>	11	9	8	4	1	3	15	114
9	4	8	<u>10</u>	1	0	4	2	0	1	1	8	39
10	1	15	13	<u>12</u>	11	1	8	2	3	2	7	75
11	1	2	1	1	<u>5</u>	2	1	1	1	0	1	16

Table 12

Correlation between Regional D_k and Mean Weekly Income

Region	Skill-Occupation										
	1	2	3	4	5	6	7	8	9	10	11
NE	–	-.461	.808*	-.552	.367**	-.229*	-.190	-.220*	-.106	-.134	-.580
NC	–	–	–	.563	.099	.470**	-.188	.137	-.380	.040	-.435
S	-.735	.878	-.332	-.118	-.088	-.136	-.027	-.276**	-.413**	-.302	-.931**
W	–	-.923	.661	.906**	-.163	.038	.839**	.039	-.048	-.265	-.859

Note: * denotes a significant correlation at 90% level
      ** denotes a significant correlation at 95% level
      – denotes insufficient data to perform correlation

Table 13

Correlation between Regional D_k and Negro/White Mean Weekly Incomes

Region	Skill-Occupation										
	1	2	3	4	5	6	7	8	9	10	11
NE	–	.374	.592	-.152	.010	-.076	-.215	-.085	.588**	-.109	.663**
NC	–	–	–	-.318	.006	.485**	-.187	.314	-.114	-.152	-.208
S	-.161	-.976**	.987**	.685**	-.020	-.049	.387**	.305**	.318*	.107	.063
W	–	-.802	-.945	.995**	.172	.139	-.519	.277**	-.138	-.231	-.876

Note: * denotes significance at 90% level
      ** denotes significance at 95% level
      – denotes insufficient data to perform correlation

Table 14

Tests of Differences Between Regional Mean D_k's for Skill-Occupations 1-11:

Cell Entry is t-statistic

| | Skill-Occupation | | | | | | | | | | |
Ho	1	2	3	4	5	6	7	8	9	10	11
NE-S=0	-.4471	.3887	.9504	.0466	2.9235**	-.0611	.4020	-4.2026**	-.0399	-.9447	-.0479
NC-S=0	-	-	-	1.6992*	2.0957**	2.4006**	1.3153*	2.6361**	-.2904	1.9140**	.3735
W-S=0	-	.5407	.8091	1.4320*	4.6355**	2.4471**	4.3719**	2.9379**	.5897	2.6304**	.1167
NE-NC=0	-	-	-	-2.0087**	-.3260	-2.2184**	-.7926	-3.4403**	.2863	-2.0691**	-.4150
NE-W=0	-	-.3036	-.1774	-1.3142	-7.1762**	-2.3882**	-3.2581**	-3.2067**	-.6279	-2.8923**	-.1980
NC-W=0	-	-	-	-.6624	-1.1213	.0014	-2.4530**	-.6464	-.7785	-.5068	.2012

Note: * denotes significance at 90% level
       ** denotes significance at 95% level
        - denotes insufficient data to perform test

We see that there is no significant difference among regional, average D_k's in skill-occupations 1-3, 9, and 11. In skill-occs. 4-8 and 10, the non-South has statistically larger average D_k's than the South, save for the Northeast-South comparison in skill-occ. 8.

Within the non-South, the Northeast has significantly larger D_k's than the North Central region (skill-occs. 4, 6, 8, and 11), and the Northeast has significantly larger D_k's than the West in skill-occs. 5, 6, 7, 8, and 11.

Using regional D_k as our benchmark, we thus find persistent South-nonSouth differences in the employment representation of Negro males, with relatively fewer than expected Negroes employed in the South vis-a-vis the rest of the United States for the middle-range skill-occs.

5 Aggregation of P_{io}, I_{ij}, and D_k

Because the occupational definitions used for P differ from those used to create I_{ij} and D_k, we cannot easily compare the three indices for an industry $\underline{and}$ an occupation. If we aggregate across occupations, however, such comparisons can be made.

A simple and appealing aggregation procedure for P_{io} is to find the percent Negro for an industry and then divide this by the percent of total employment that is Negro:

$$P_i = \frac{\sum\limits_{o=1}^{9} N_{io}}{\sum\limits_{o=1}^{9} (N_{io}+W_{io})} \; / \; \frac{\sum\limits_{i} \sum\limits_{o} N_{io}}{\sum\limits_{i} \sum\limits_{o} (N_{io}+W_{io})} \qquad \begin{array}{l} \text{i'th industry} \\ \text{o'th census occupation} \end{array}$$

The expected percent Negro is, then, the overall Negro share of total employment. The actual is, of course, percent Negro in that industry.

To obtain summary measures for I_{ij} (I_i) and D_k (D_i) we add up each of the component parts across the eleven skill-occupations:

$$D_i, \; I_i = \frac{\displaystyle\sum_{j=1}^{11} E_{N_{ij}}}{\displaystyle\sum_{j=1}^{11} Q_{N_{ij}}} \Bigg/ \frac{\displaystyle\sum_{j=1}^{11} E_{W_{ij}}}{\displaystyle\sum_{j=1}^{11} Q_{W_{ij}}}$$

where D_i is distinguished from I_i by the way the Q_N and Q_W's are formed.

Each of these summary measures may be readily interpreted as the percentage fulfillment of our expectations of Negro, male employment. The measures differ, of course, because the assumptions underpinning our expectations vary from measure to measure. In the first case, we expect Negro males to be employed in an industry as they are represented in the overall employed male population. In the case of the second and third summary measure, we expect Negro males to be employed as they are represented in their overall male population and holding constant the regional location of industry and relative numbers of Negro workers, the relative numbers of qualified Negro workers available for each occupation, and the relative numbers of qualified Negro workers available within an occupation on the basis of job search patterns.

Table 15 presents 149 3-digit Census of Population industries and the three summary measures for 1960. The immediately striking result of Table 15 is that, for the vast majority of industries, the P_i measure, when compared to the I_i and D_i measures, is not altogether different. We naturally expect it to be smaller than I_i and D_i, because P_i does not hold constant relative quantities of labor productivity which the former two do. P_i would then tend to overstate the amount of job discrimination that occurs. In many industries, however, the differences are not altogether large.

Table 15

Summary Measures of Negro Male Employment Representation
by Industry, 1960 (See Notes at end of Table).

Census of Population Industry Code	Industry Title	$\frac{Actual}{Expected}$ o/oN	I_i	D_i	ΔE_N
16	Agriculture	121.8	142.1	141.3	-133,345
17	Forestry	119.3	123.4	119.8	-860
18	Fisheries	77.6	52.2	51.4	3,001
126	Metal Mining	11.0	16.1	17.1	4,928
136	Coal Mining	43.9	29.0	25.9	22,394
146	Crude Petroleum & Nat. Gas	6.9	5.1	5.1	29,047
156	NonMetallic Mining	80.0	75.5	73.5	2,628
196	Construction	113.1	109.4	109.7	-26,531
206	Logging	296.3	410.6	445.7	-35,944
207	Sawmills	195.1	283.3	271.5	-48,017
208	Misc. Wood Products	173.8	294.4	286.8	-9,255
209	Furniture & Fixtures	81.6	136.7	132.9	-6,357
216	Glass & Glass Products	37.7	55.1	55.2	3,757
217	Cement & Concrete	108.2	157.7	134.5	-5,700
218	Structural Clay Products	172.7	273.6	263.6	-7,485
219	Pottery & Related Products	38.6	153.0	132.5	-331
236	Misc. Nonmetal, & Stone Mineral	72.0	487.1	537.2	-5,973
237	Blast Furnaces	119.5	172.9	164.9	-25,727
238	Other Primary Iron & Steel	170.6	225.2	224.1	-25,777
239	Primary Non-Ferrous	82.3	98.2	99.7	229
246	Cutlery	37.4	24.1	24.3	10,483
247	Fabricated Struct. Metal Prod.	48.9	79.6	81.1	3,513
248	Misc. Fabricated Metal Prod.	54.0	69.1	68.4	15,941
249	Not Specified Metal Ind.	121.8	0.0	0.0	----
256	Farm Machinery	46.6	41.5	39.5	7,782
257	Office, Computing	17.0	26.9	30.8	5,245
258	Misc. Machinery	27.3	20.8	21.5	110,602
259	Electrical Machinery	34.0	25.1	27.0	91,363
267	Motor Vehicles & Equipment	96.6	143.3	138.1	-20,292

	Industry	Actual/Expected o/oN	I_i	D_i	ΔE_N
268	Aircraft & Parts	31.9	25.9	25.1	49,096
269	Ship & Boat Building	101.6	114.9	108.9	-1,066
276	Railroad & Transport.	61.6	130.5	130.0	-1,066
286	Profess. Photo Equip.	18.0	21.7	23.3	11,204
287	Photo Equipment	26.5	59.0	62.8	782
289	Watches, Clocks	16.9	998.3	997.5	-203
296	Misc. Manufact. Indust.	50.3	15.8	15.7	65,447
306	Meat Products	149.2	195.8	192.4	-16,704
307	Dairy Products	28.9	31.1	26.4	19,206
308	Canning & Preserving	107.7	103.9	105.1	-542
309	Grain Mill Products	103.1	132.7	132.7	-3,171
316	Bakery Products	67.7	107.3	103.4	-876
317	Confectionery	89.8	329.9	324.2	-2,290
318	Beverage Industry	73.9	86.9	140.1	-1,608
319	Misc. Food Preparation	148.0	205.3	196.2	-8,831
326	Not Specified Food Industry	58.4	0.0	0.0	----
329	Tobacco Manufact.	238.7	258.1	228.8	-6,295
346	Knitting Mills	54.0	43.9	35.4	5,156
347	Dyeing & Finishing	61.7	95.7	80.9	373
348	Floor Covering	47.0	0.0	0.0	----
349	Yarn, Thread	64.1	78.5	97.7	3,116
356	Misc. Textile Products	97.2	45.4	48.7	3,690
359	Apparel & Accessories	70.1	104.3	102.3	-536
367	Misc. Fabrics, Textiles	89.0	127.9	125.9	-883
386	Pulp, Paper	70.6	59.1	56.0	13,017
387	Paperboard Containers	77.3	66.5	62.9	5,007
389	Misc. Paper & Pulp	53.6	69.7	65.8	2,009
396	Newspaper Publishing	33.3	36.8	49.6	17,360
398	Printing, Publ. & Allied Print.	46.2	41.6	43.9	26,363
406	Synthetic Fibers	41.3	23.1	23.9	5,651
407	Drugs & Medicines	47.9	15.1	16.6	17,419
408	Paints, Varnishes	72.8	112.4	101.7	-258
409	Misc. Chemicals	74.4	101.7	105.4	-1,300

	Industry	Actual Expected $^{o/oN}$	I_i	D_i	$\frac{\Delta E}{N}$
416	Petroleum Refining	34.7	25.9	27.3	20,706
419	Misc. Petroleum Ind.	142.4	110.4	113.1	-350
426	Rubber Products	77.7	82.3	84.0	3,120
429	Misc. Plastics	56.7	61.1	66.4	2,502
436	Leather: Tanned	88.2	49.9	46.5	2,806
437	Leather Footwear	18.3	8.9	8.8	21,421
438	Leather, except Footwear	91.9	33.5	32.6	5,238
459	Not Specified Leather	114.7	75.4	53.7	2,452
506	Railroads & Rail Express	84.9	90.7	85.8	10,192
507	Street Railways	115.2	68.8	67.7	13,551
508	Taxicab Service	159.1	286.1	292.1	-12,078
509	Trucking Service	68.4	60.4	59.6	32,998
516	Warehousing & Storage	148.7	146.6	133.1	-3,844
517	Water Transportation	151.8	150.5	167.7	-9,740
518	Air Transportation	52.2	36.9	39.2	30,064
519	Petroleum & Gas Pipe	19.9	0.0	0.0	---
520	Services Including Trans.	69.1	0.0	0.0	---
536	Radio Broadcasting	20.7	71.9	85.5	363
538	Telephone	20.7	21.4	22.6	21,701
539	Telegraph	54.7	106.6	135.4	-219
567	Electric Light & Power	35.4	23.1	23.1	48,210
568	Gas & Steam	45.5	82.4	82.0	1,182
569	Electric Gas Utilities	45.5	62.8	66.2	6,955
576	Water Supply	93.9	65.9	62.0	4,008
578	Sanitary Services	284.4	399.8	376.4	-29,332
579	Other not Specified Util.	27.0	0.0	0.0	---
606	Motor Vehicles	36.5	37.7	38.3	5,906
607	Drugs, Chemicals	44.8	94.3	95.1	179
608	Dry Goods & Apparel	58.7	68.7	58.9	1,716
609	Food & Related Products	85.9	61.3	63.9	17,819
616	Farm Products	46.9	0.0	0.0	---
617	Electrical Goods	38.4	47.1	50.2	6,814
618	Machinery	30.8	11.6	12.7	45,450
619	Petroleum Products	21.4	8.4	9.1	31,494

	Industry	$\dfrac{\text{Actual}}{\text{Expected}}$ o/oN	I_i	D_i	ΔE_N
626	Misc. Wholesale Trade	99.1	118.9	120.8	-7,715
629	Not Spec. Wholesale	57.8	51.3	56.6	3,820
636	Food Stores	51.0	68.6	47.6	40,073
637	Dairy Products Stores	72.7	34.1	61.2	34,273
638	General Merchandise	69.5	80.7	84.3	864
639	Limited Price Variety	72.5	23.5	23.0	41,009
646	Apparel & Accessories	---	52.2	49.2	5,743*
647	Shoe Stores	32.1	23.9	25.3	7,066
648	Furniture & House Furn.	70.4	34.7	33.9	29,197
649	Household Appliances	41.5	41.7	35.5	9,482
656	Motor Vehicles	74.1	97.1	92.5	2,792
657	Gasoline Stations	67.8	62.2	54.1	28,738
658	Drug Stores	81.2	74.6	74.8	5,134
659	Eating & Drinking	123.1	76.5	149.9	-10,301
666	Hardware & Farm Equip.	33.4	60.5	55.4	4,662
676	Lumber & Building	98.3	128.4	123.9	-5,850
678	Liquor Stores	65.1	162.7	161.8	-1,609
679	Retail Florists	74.0	123.4	125.2	-553
686	Jewelry Stores	34.7	47.8	52.3	1,779
687	Fuel & Ice Dealers	96.5	166.0	164.7	-3,558
689	Misc. Retail Stores	47.8	69.2	69.3	6,307
696	Not Specified Retail Trade	64.5	135.4	138.3	-1,043
706	Banking & Credit	30.8	39.2	40.1	16,896
716	Sec. & Commod. Brokers	13.3	131.4	123.7	-290
726	Insurance	19.6	29.3	30.4	26,250
736	Real Estate	101.8	116.8	105.7	-4,038
806	Advertising	23.7	61.3	64.3	1,094
807	Miscellaneous Bus. Serv.	63.1	60.6	55.2	17,828
808	Auto Repair	302.5	122.9	106.2	-6,742
809	Misc. Repair	41.1	36.4	30.9	24,053
816	Private Households	416.9	1262.0	1156.6	-13,065
826	Hotels & Lodging	166.8	205.6	176.1	-21,572
828	Laundering & Cleaning	183.5	341.6	327.8	-33,569
829	Dressmaking Shops	162.3	0.0	0.0	22,176
836	Shoe Repair Shops	196.5	267.7	297.9	-5,156

	Industry	$\dfrac{\text{Actual}}{\text{Expected}}$ %N	I_i	D_i	ΔE_N
838	Barber & Beauty Shops	104.7	100.7	103.7	-472
839	Misc. Personal Services	95.3	17.6	16.5	43,348
846	Theaters & Motion Pictures	67.3	43.1	47.4	9,759
848	Bowling Alleys, Pool Halls	102.4	172.4	179.0	-2,505
849	Misc. Entertainment	148.1	226.6	193.4	-12,283
867	Medical & Other Health Serv.	40.5	58.8	65.9	8,538
868	Hospitals	199.4	309.5	269.3	-53,773
869	Legal Services	15.1	23.4	23.2	8,114
876	Educational Services	81.5	97.8	60.1	26,056
879	Welfare & Religious Organiz.	79.9	78.0	74.0	8,360
888	Nonprofit Membership Org.	85.9	123.2	128.3	-2,240
896	Engineering & Architects	11.6	0.0	0.0	----
897	Accounting & Auditing	5.1	0.0	0.0	----
898	Misc. Professional Services	21.6	35.4	43.1	2,307
906	Postal Services	153.1	182.1	178.8	-32,232
916	Federal & Public Admin.	103.3	118.7	122.6	-14,127
926	State Public Admin.	38.9	40.9	38.1	14,181
936	Local Public Admin.	57.8	81.4	72.6	12,297
999	Industry Not Reported	170.9	331.2	332.4	-184,146

Notes to Table 15

Column 1, Actual/Expected Percent Negro, was calculated from the Special Census Table referred to in footnote 13. Columns 2 and 3 were created from the 1/1000 Census Sample as discussed in part 1 of Section III of the text. Column 4 uses Special Census Table employment figures and the mean of $I_i + D_i$ given in Columns 2 and 3. Zero entries for I_i and D_i indicate no Negroes were employed as reported in the 1/1000 Sample. Generally speaking, P_i was very small in such cases, suggesting sample error.

*Employment in Industry 646 estimated from 1/1000 Sample to calculate ΔE_N.

Thus, in the Crude Petroleum and Natural Gas Extraction Industry

(industry code 146) our first measure, P_i, indicates that our expecta-

tion of the Negro share of employment was only 4.8 percent fulfilled; or,

to put it another way, there was discrepancy in the Negro share of employ-

ment of 95.2 percent (100.0 - 4.8 = 95.2). Both I_i and D_i indicate our

expectations of Negro employment, based on more reasonable assumptions, are

5.1 percent fulfilled, or the discrepancy, having standardized for many things,

is now 94.9 percent.

In some industries, the elaborate standardization processes used to

create I_i and D_i changes our judgment of an industry's employment practices.

For example, Miscellaneous Petroleum (industry code 419) has P_i = 94.0 so

we may infer there is a 6 percent deficit in the share of Negro employ-

ment. I_i and D_i indicate a "surplus" of over 10 percent. Thus, having

accounted occupational skill requirements, number of qualified Negroes, re-

gion, etc., about 10 percent more Negro males were hired than expected.

Interestingly, this reversal in judgment of the presence or absence of

job discrimination occurred in only 20 industries. This in turn suggests

that the simple percent employed comparison is likely to be a fairly reason-

able indicator for the detection of job discrimination. The amount of dis-

crimination, based on more reasonable assumptions about what constitutes

fair hiring, is better derived from I_i and D_i.

To broadly outline the numbers of Negro males who would have to be

hired or fired for employment patterns to fit our expectations, I have cal-

culated the overall change in Negro employment that would need to occur were

I_i = 1.0. Column 4 of Table 15 shows the needed employment change. It is

found as follows:

$$\Delta E_{N_i} = E_{N_i} \left(1 \Big/ \frac{I_i + D_i}{2} - 1 \right)$$

So if $I_i = .7$, $D_i = .3$, and $E_{N_i} = 1,000$, the required change in employment is: $1000. (2/10 - 1) = 1,000 \cdot 1 = 1000$. Thus, 1,000 more Negro males should be hired in that industry for our expectations to be fulfilled. Such a calculation is impressionistic because it abstracts from the possibility of firing whites and hiring some Negroes or combinations of the two to force $I_i = 1.0$, and it abstracts from the occupational distribution of such new employees. Since I_i and D_i were aggregated to take account of available skill supplies in the first place, these numbers should be attainable, i.e., available qualified workers exist.

While it is impossible to discuss each industry even at this level of aggregation, several will be discussed. Beginning with the public employment sector, we find an over-representation of Negro males employed by the federal government (see industry 910) and an under-representation at the state and local levels. Postal Services, treated separately, has an over-representation of Negro males. In the private sector, Negro males were, in absolute numbers, most over-represented in Agriculture and in Hospitals.

Industries from which Negroes are most excluded include Miscellaneous Machinery (industry 258), Aircraft and Parts (industry 268), Electric Light and Power (industry 567), and Trucking Service (industry 509).

Several industries have, on an overall basis, surprising employment profiles. For example, Construction (industry 196) has a slight over-representation of Negro males. Examination of occupational data indicates a large over-respentation of Negro males in the lowest occupations which counterbalances their exclusion from skilled trades, which is widely documented. Sizable over-representation of Negro males in the Taxicab Industry is surprising. We are not surprised that Negro males in 1960 were over-represented in Sanitary Services (industry 578), and Laundering and Cleaning (industry 828).

5 Summary

Examination of three indices of employment representation for 1960 indicates that industries tend either to hire Negro males in all occupations or not at all. Generally, Negro males tend to be over-represented in lower skill-occupations. As one moves down the occupational ladder, our expectation of Negro male employment is increasingly fulfilled. Using Census occupational definitions, we see that, at the operatives level, parity with regard to over-all employment representation is achieved, while below the operatives occupation, Negro males are, on average, "over"-represented.

Even after holding educational attainment, job search patterns, and region constant, the over-representation of Negro males in lower skill-classes is apparent. This result indicates that many Negroes are being under-utilized in terms of their productivity. This under-utilization of skills is most pronounced in the middle-range of skills in the South.

Comparisons of regional employment patterns at the top and bottom of the occupational scale indicate no difference among regions: Negro males are excluded from the top occupations at the same rate among regions and are over-represented in the bottom occupations at equal rates. In the middle, essentially supervisory occupations, Negro males are significantly less represented in the South than in other regions. This accords with Dewey's (see footnote 7) earlier observation that it is a virtual law in the South that Negroes cannot supervise whites.

When we look at patterns of regional representation and weekly income, the surprising finding is that so little relationship exists. The bulk of the correlations were not statistically significant. Of those significant, the positive relationship between indices of representation and relative weekly income was most numerous. Thus, where Negro males are employed

relatively more, Negro-white income differentials are smaller. Industries that tend to hire Negro males in all occupations seem also more willing to pay on a productivity basis.

While these results from the analysis of industry-occupation employment patterns paint a bimodal picture of industry employment practices, it should be reiterated that Negro males are generally under-utilized in terms of actual skills, and that there exists substantial variation in industrial employment behavior.

Aggregation of each measure across occupations for industry provides a summary for industrial employment practices. Negro males were generally over-represented in Agriculture, many service industries, and a variety of manufacturing industries. Some of these, such as Blast Furnaces, fit the popular notion that Negroes are employed in dirty and dangerous industries. The apparent exclusion of Negro males from Insurance, Banking and Credit, and Accounting industries is not surprising. How many of us can recall dealing with a Negro insurance agent in 1960? Or 1970?

Having noted patterns in industrial employment practices, we move now to explain these patterns. I have generally refrained from ad hoc explanations of the relative absence or presence of Negro males. So far, this has been merely recorded. We move next to test hypotheses about the determinants of exlusionary practices.

Section IV

THE DETERMINANTS OF EXCLUSION IN MANUFACTURING INDUSTRIES

1 Hypotheses

A survey of the literature[19] on discrimination suggests that the following variables determine exclusionary hiring practices: union strength, degree of

monopoly power in the product market, rate of growth of an industry, poten-

tial worker contact, and the extent to which an industry is concentrated in

the South.

The impact of unions on Negro employment is generally held to be adverse

and has been documented on a case basis by Marshall[20] and Marshall and Briggs.[21]

Unions benefit from excluding any additional labor supply and, especially in

the craft skills, have historically excluded Negroes. We seek here to identify

the overall impact of unions.

Moving to the goods market, we expect monopolists to exclude Negroes be-

cause they can better afford to absorb the costs of hiring only white workers.[22]

Hiring only whites is expected to be more costly because the effective labor

supply has been reduced by disregarding qualified Negro workers. That monopo-

lies prefer to exclude is assumed at the outset.

The effect of industrial growth on Negro employment is uncertain. Myrdal

observed that Negroes would benefit last from occupational or industrial ex-

pansion:[23]

> When there were technical innovations, making work less strenuous,
> less dirty, and generally more attractive, this often implied a re-
> definition from "Negro jobs" to "white man's jobs."

Hiestand,[24] in contrast, argues that rapid growth leads to tight labor markets

which force employers to hire Negroes out of necessity.

Dewey[25] observed in 1952 that, in the South, Negro and white could not

work side by side because of historical taboos. We expect, then, that indus-

tries characterized by large plants will have fewer Negro employees because of

employee discrimination. The presence of small plants creates the possibility

of separate Negro and white production lines. But where technology requires

large assembly lines, we expect fewer Negro employees.

We know from Section II that southern Negroes are more excluded from
middle skill-range occupations than are Negroes in other regions. A regional
correction seems sensible when doing regression analysis. This regional dif-
ference can be explained again by tradition and "taboo."

2 *Data Sources and Method of Analysis*

Data on labor market power is from Weiss[26] and refers to 1963. The
actual measure employed is percent of the industrial labor force covered by
a collective bargaining contract. The monopoly power in the product market
is also due to Weiss.[27] The concentration ratio per industry is measured as
the ratio of value of sales of the four largest firms to value of total sales
in the industry, and the resulting percent measuring concentration is corrected
for regional concentrations of industry.

The measure of industrial growth is the percentage change in male employ-
ment from 1950 to 1960 per industry as given in a Special Report of the 1960
Census of the Population.[28]

The potential worker contact measure which is actually a size-of-firm
variable (due to Weiss),[29] is the percentage of industrial employment in plants
of more than 250 employees and refers to 1958.

The regional correction is merely the percent of total industrial employ-
ment that is in the South and is calculated from the 1/1000 Census Sample.

Table 16 summarizes the variables, their units of measure, acronyms, and
the expected signs of their regression coefficients.

The statistical technique to be employed is weighted least squares.
Denoting R_{io}, as a measure of Negro employment representation for the i'th
industry, o'th occupation as the dependent variable, we fit a regression

Table 16

Variables Thought to Determine Representation
of Negroes by Industry

Theoretical Variable	Proxy	Units	Acronym	Expected Sign with Regard to Representation
Monopoly Power, Labor Market	Collective Bargaining Coverage	%	U	−
Monopoly Power, Product Market	4 Firm Concentration Ratio	%	CRR	−
Growth of Industry	% Change in Total Industrial Employment	%	GRTH	?
Degree of Potential White-Negro Worker Contact	% of Labor Force in Large Establishments	%	PSZ	−
Southern Correction	% Employment in the South	%	STH	+

of the following kind:

$$W_{io}R_{io} = B_oW_{io} + B_1W_{io}U_i + B_2W_{io}CR_i + B_3W_{io}GTH + B_4W_{io}PSZ_i +$$
$$B_5W_{io}STH_i + W_{ioei}$$

where: W_{io} is the square root of total employment in the i'th industry, o'th occupation

U_i, CR_i, GTH_i, PSZ_i, and STH_i are determining or conditioning variables

ei is a random shock term, presumably heteroskedastic

This technique is employed for several reasons.[30] The distributions of Measures 1, 2, and 3 appear skewed (so t-Test for significance are inappropriate), and weighted least squares will correct for this. Heteroskedasticity is likely in 2 and 3 because of small sample size and the weights will keep correct for this. Finally, for policy purposes, we wish to give more importance in our regression analysis to large industries. If they are large discriminators, they create larger welfare losses than smaller discriminating industries with the same P_{io}, I_i, or D_i.

3 Regression Results for P_{io}

Table 17 presents regression results for manufacturing industries on percent Negro male employment. Regressions were fit for eight Census occupations. The Not Reported Category has been ommitted because it represents a residual occupational category without any economic content.

The impact of unions on Negro employment representation clearly depends on the occupation in question. However, in only two occupations is there a statistically significant effect: We find negative effect in the Clerical and Kindred Workers category and a positive one in the Sales Worker category. We see in the former occupation that an average size, completely unionized,

Table 17

Weighted Least Squares on Percent Negro Male
Employment for Eight Census Occupations

t ratio in parentheses

Occupation	Constant	U	CRR	GTH	PSZ	STH	R^2
Professional, Technical and Kindred Workers	1.0696** (2.6901)	-.0049 (-1.0426)	-.0003 (-.0968)	.0013 (.8125)	-.0003 (.6000)	-.0031 (.6200)	.5976
Managers, Officials and Proprietors	.3673 (.6928)	.0060 (1.0345)	-.0094** (-3.1333)	-.0009 (-.3000)	-.0012 (-1.0909)	.0155* (2.0129)	.5359
Clerical and Kindred Workers	10.4162** (6.0067)	-.0457** (-2.3436)	-.0333** (2.6016)	-.0200** -2.5641	-.0013 (-.4914)	-.0295 (-1.1434)	.7210
Sales Workers	-3.6819** (-4.4689)	.0642** (6.4848)	-.0008 (-.0777)	.0072 (1.1613)	-.0024 (-1.1428)	.0189 (1.3039)	.6676
Craftsmen	3.9627** (2.8576)	.0170 (1.1258)	-.0316** (-3.3978)	-.0077 (1.1159)	-.0028 (1.1200)	.0089 (.4684)	.8159
Operatives	8.9948** (2.6210)	-.0040 (.1173)	.0125 (.4209)	-.0239 (1.3977)	-.0015 (-.2273)	.0108 (.2269)	.7450
Service Workers	13.4078* (1.9710)	-.0656 (.8129)	.3170** (5.6007)	-.0749** (-2.3480)	-.0039 (.3047)	.1325 (1.4111)	.8853
Laborers	16.6297** (3.6834)	-.0309 (.0468)	.0771** (3.0717)	-.0396 (-1.6229)	-.0023 (.2706)	.2673** (4.2429)	.9650

 * Regression coefficient significantly different from zero at 90% confidence level
** Regression coefficient significantly different from zero at 95% confidence level

industry will have a lower percent Negro by a full 4 1/2 percentage points.
In the Sales category, a fully unionized industry will have a 6 percentage
point higher percent Negro. Surprisingly, the unionization measure shows
no statistically significant impact in the occupations in which we most ex-
pect there to be an effect, namely in the Craftsmen and Operatives occupa-
tions.

The monopoly power measure is statistically significant in five of the
eight occupations and shows a negative impact in the higher-skilled occupa-
tions (e.g., Managers, Officials and Proprietors and Clerical Workers)
though not a very large effect. A 100 percent concentrated industry will
have a 1 percentage point smaller percent Negro representation in the mana-
gerial category and a 3 percentage point drop in the Clerical and Craftsmen
categories. This latter result may well reflect the unionization measure
since the two are highly correlated.

In the two lowest occupations, we find a reverse effect for industrial
concentration. In the Service and Laborers categories, we find statistically
significant and rather large preferences for Negro males. Apparently, con-
centrated industries exclude in the higher occupations and prefer to employ
Negro males in the lowest occupations.

Our measure of industrial growth indicates that, where it had any effect
at all, it was negative in consonance with Myrdal's earlier observations.
This negative effect is not large in either occupation; a doubling of total
employment for an average size industry between 1950 and 1960 leads to only
a 2 percentage point decline in the Clerical and Kindred Worker category, and
a 7 percentage point decline in the Service Worker occupation.

The measure for potential worker contact proved statistically insigni-
ficant in all occupations, suggesting perhaps that, once having accounted
for monopoly power, industrial growth and regional location, little other
variation in Negro employment patterns remained to be explained.

The regional correction proved statistically significant in two occupations: surprisingly, positive in the Managers occupation and positive in the Laborers occupations. This first result may be due to the relatively large number of Negro-owned businesses in the South. The second is generally as expected, since it is known that occupationally, southern Negro males are more concentrated in the lower Census occupations than their non-southern brethern.

Interpretation of the regression results for P_{io} is aided by the calculation of elasticities at the means. Table 18 provides such elasticities. Union impact is relatively small in the Clerical and Kindred Workers occupation; a relative increase of one percent in union collective bargaining coverage suggests a .6 percent relative decline in the measure of representation. Note this is a relative decline in percent Negro, not a decline of .6 percentage points. In the Sales category, a 1 percent relative increase in coverage suggests a 7 percent relative increase in the measure of representation, a startling result.

Monopoly power in the product market has a generally small relative impact on percent Negro, though in the Managers, Officials and Proprietors, a 1 percent relative increase in the concentration ratio suggests a .8 percent relative decline in percent Negro. The figures for Craftsmen and Clerical categories are half as large.

The statistically significant elasticities for the industrial growth measure are also small, -.0892 and -.0662 respectively, so while growth may induce whites to leave certain industries for more attractive ones, the overall impact on Negro employment is slight. The regional correction, where statistically significant, also has rather small elasticities, though the larger of the two is in the Managerial category. This rather surprising

Table 18

Elasticities at Means of Selected Determinants with Respect to Percent Negro Male Employment Per Census Occupation

Elasticity:

Occupation		U	CRR	GTH	PSZ	STH
Professional, Technical, and Kindred Workers	1	-.3740	-.1725	.0329	.0177	-.0958
Managers, Officials and Proprietors	2	.7467	-.8732**	-.0372	.1159	.7813*
Clerical and Kindred Workers	3	-.6141**	-.3371**	-.0892**	.0316	-.1606
Sales Workers	4	7.3264**	-.0684	.2740	.2137	.9805
Craftsmen	5	.3264	-.4528**	-.0490	.0417	.0692
Operatives	6	-.0462	.0633	-.0537	.0079	.0297
Service Workers	7	-.1439	.6301**	-.0662**	.0081	.1429
Laborers	8	-.1006	.1873**	-.0428	.0058	.3523

* Elasticity based on Regression Coefficient Significant at 90% Level
** Elasticity based on Regression Coefficient Significant at 95% Level

result may be due to the relatively large number of Negro-owned businesses in the South vis-a-vis the rest of the United States.

4 Regression Results for Measure 2; I_{ij}

The paucity of information on I_{ij} for skill-occs. 1-4 and 11 prevents computing regressions comparable to those reported in the first part of this section. Results reported below are for skill-occs. 5-10. In terms of how we think the determining variables ought to operate, the information loss does not appear to be too great, for the occupational titles comprising skill-occs. 1-4 appear to be mostly self-employed occupations, which we would not expect to be affected by CRR, U, etc. Table 19 presents the weighted least squares regression results. Note that each regression coefficient indicates the change in our expectation-fulfillment, given a unit change in the conditioning variable.

We may interpret a coefficient of -.65 for U in skill occ. 5 to mean that an increase in collective bargaining coverage of 1 percentage point is accompanied by a decline in the fulfillment of our expectation of Negro employment of 6/10's of a percentage point. Moreover, should the industry be completely unionized, we predict in skill-occ. 5 that Negro employment will be 65 percent less than expected because of unions. While we find statistical significance for U in only two skill-occs. in both cases (skill-occs. 5 and 10) the impact of unions on Negro employment is quite severe.

The industrial concentration measure proves significant in two skill-occs. and is positive both times. Since the skill-occupations being analyzed are essentially subprofessional; these positive coefficients agree with those obtained in the lower-skilled Census Occupations (see Table 17). In both skill-occs., the impact of such concentration is positive and very

Table 19

Weighted Least Squares Regressions on I_{ij} for
Skill-Occupations 5 through 10

ratio in parentheses

Skill-Occupation	Constant	U	CRR	GTH	PSZ	STH	R^2
5	95.2500** (3.2640)	−.6500** (−2.4346)	.0500 (.3862)	−.1800 (−1.4323)	−.0400 (−1.0235)	−.0600 (−.1413)	.8091
6	149.9100* (1.7781)	−.5300 (−.6042)	−.6200 (−1.1864)	−.3100 (−.8996)	.0000 (.0181)	−.2300 (−.1881)	.5657
7	30.91 (.3919)	−.4800 (−.6448)	2.6800** (3.8051)	−1.4700** (−2.8503)	.1400 (.9503)	.9700 (.7782)	.7881
8	−4.3700 (−.0723)	.3400 (.5212)	1.7200** (3.0450)	−.5800** (−2.1412)	.0500 (.5470)	1.52* (1.8401)	.7157
9	−71.29 (−.2432)	2.9000 (1.0880)	.2500 (.1296)	3.8600 (1.4456)	−.5800 (−.9098)	.8500 (.2526)	.5074
10	611.5500** (2.9239)	−3.6900* (−1.9337)	1.1300 (.8597)	−.4600 (−.3900)	−.3300 (−.9266)	−.2800 (−.0999)	.8572

* Regression Coefficient significantly different from zero at 90% confidence level.
** Regression Coefficient significantly different from zero at 95% confidence level.

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large. A one point increase in CRR in skill-occ. 7 suggests a 2.68 percentage point increase in the fulfillment of our expectations.

The negative impact of industrial expansion on Negro employment is apparent in skill-occs. 7 and 8; and the impact is very large. As in the percent Negro regressions, the measure of potential contact proves insignificant throughout, while the regional correction proves significant and positive in a lower skill-occupation (compare results for Laborers in Table 17 with that for skill-occ. 8 in Table 19).

5 Regression Results for D_k

The regression results for D_k show the same pattern of statistical significance as those for I_{ij}, though the sizes of the regression coefficients differ slightly. Table 20 shows the ratio of D_k to I_{ij} regression coefficients and significance level for each comparison. The impact of U on D_k is smaller in skill-occ. 5, but that of CRR is larger in skill-occ. 7. The results are sufficiently similar to suggest that the cell rank in the I_{ij} search process is similar to that of the D_k search process, which is to say that mean weekly incomes decline as one goes down the skill-occupation ladder.

6 Summary of Regression Results

It is difficult to combine results for these three rather different indices of Negro employment representation. The results for I_{ij} and D_k are sufficiently similar to warrant a two-way comparison. Several similarities between the P_{io} and combined I_{ij}-D_k results obtain: The measure of worker contact, PSZ, proved statistically insignificant in both sets of regressions. Secondly, the regional correction, STH, proved to be positively significant in both sets of regressions in the lower level occupations (the Laborers occupation in the percent Negro regression set and

Table 20

Absolute Ratio of I_{ij} to D_k Regression Coefficients

Skill-Occ.	Const	CRR	U	STH	PSZ	GRTH
5	.93*	.20	.86*	.67	1.00	.94
6	1.00*	1.01	.89	1.30		1.10
7	1.65	1.02*	.80	1.01	1.14	1.18*
8	2.21	1.19*	1.53	1.27*	1.20	1.24*
9	1.69	2.60	1.34	1.54	1.43	1.31
10	.93*	1.30	.87	2.04	1.33	.15

*ratio based on regression coefficients significant at 90% level or better.

skill-occ. 10 for I_{ij} and D_k regression sets). This result is consistent with the results of the difference between means test reported earlier. A dissimilarity is the significant positive relationship in the Managers category for percent Negro. Since skill-occs. 5-10 were analyzed via regression analysis, the top of the occupational structure, skill-occs. 1-3 especially, may exhibit the same relationship. One can only speculate.

Another similarity to both sets of results is the negative effect in several lower occupations on Negro employment of rapid employment expansion. Negro males tend not to be in industries that are growing rapidly. Whether one wishes to ascribe a causal relationship per se here appears to be a matter of judgment. The negative sign is consistent with Myrdal's earlier observations.

The monopoly power measure performed in the same fashion for both I_i and D_k regressions; positive relationships are evidenced in the lower occupations. For the P_i (percent Negro) regressions, a negative relationship obtains.

Perhaps the greatest difference in the two sets of results is the impact of unions on each measure. Both positive and negative significant relationships in white collar occupations obtain for the percent Negro regressions, while we find significant inverse relationships for two blue collar occupations in the I_{ij} and D_k regressions. When we standardize in our index calculation for region, relative numbers of qualified workers, and job search pattern, union power becomes an important, negative determinant of Negro employment in a blue-collar occupation. But when we do not hold these constant and merely use the regression model to standardize for factors other than union strength, we find no significant union effect in blue-collar Census occupations (namely Craftsmen, Operative, Service Workers, and Laborers).

To compare the effects of the determining variables on the three measures of employment representation, we need to put the percent Negro regressions into an actual/expected framework. To do so, we need only divide each occupation's set of regression coefficients by the overall fraction of Negro employment in that occupation. The regression coefficient can then be interpreted as the percentage decline (or increase) in the expected Negro share of employment, given a unit change in the particular determining variable. So, for example, the effect of a change in U on this actual/expected percent Negro measure can be readily interpreted as $\frac{\partial P_i}{\partial U_i}$. Table 17 divided by Table 4 gives us these new regression coefficients and are given in Table 21 below.

We see from Table 21 that, in a completely unionized industry in the Clerical and Kindred Workers Category, the Negro share of employment is 75.3 percent less than expected due to the effect of union exclusion. This very large impact compares with the 65 percent smaller than expected Negro employment due to unions which we found in skill-occ. 5 with the I_{ij} measure. Interestingly, the impact of industrial concentration in the Craftsmen occupation is virtually identical to that in the Clerical and Kindred category: The Negro employment share is 75.4 percent less than expected due to industrial concentration. As noted before, this may reflect union power as well, since the two variables are highly correlated.

The very sizable positive effect of industrial concentration in the Service Workers occupation is matched in good measure by the positive effects in skill-occs. 7 and 8 In the Service Workers category, a unit increase in industrial concentration is accompanied by a 1.5 percentage point increase in the actual/expected share of Negro employment. In skill-occ. 8 the increase is 1.7 percentage points and in skill-occ. 7 it is 2.7

Table 21

Weighted Least Squares Regressions
on Actual/Expected Percent Negro Employment
for Eight Census Occupations

Occupation	Constant	U	CRR	GTH	PSZ	STH	R^2
Professional, Techn. & Kindred Workers	42.4444**	-.1944	-.0119	.05159	-.0119	-.1230	.5976
Managers, Officials and Proprietors	11.8484	.1935	-.0290**	-.290	-.0387	.5000*	.5539
Clerical and Kindred Workers	171.6013**	-.7529**	-.5486**	-.3295**	-.02142	-.4860	.7210
Sales Workers	-227.277**	3.9630**	-.0494	.4444	-.1481	1.1481	.6676
Craftsmen	94.5752**	.4057	-.7542**	-.1838	-.0668	.2124	.8159
Operatives	87.6686**	-.0389	.1218	-.2329	-.0146	.1053	.7450
Service Workers	63.5441*	-.3109	1.5024**	-.3549**	-.0185	.6280	.8853
Laborers	69.4931**	-.1291	.3222**	-.1655	-.0096	1.1166**	.9650

* Regression coefficients significantly different from zero at 90% level.
** Regression coefficients significantly different from zero at 95% level.
Source: Tables 4 and 17

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percentage points. In sum, the determining variables have very sizable impacts on the three actual/expected measures of employment representation.

Section V

SUMMARY AND POLICY IMPLICATIONS

Pervasive job discrimination has been documented in this study under several different sets of assumptions. Industries that do hire Negro males tend to do so in all occupations and tend to pay Negroes at a more equal rate. Occupational exclusion is most pervasive in the middle-range of occupations in the South; this result obtains after standardizing for educational attainment and other factors. Generally speaking, Negro males have been crowded into the lower occupations.

Monopolistic industries tend to exclude Negro males from higher occupational jobs more than do nonmonopolistic industries, but then appear to hire in a compensatory fashion in the lowest occupations. The exclusionary impact of unions is apparent from all indices. Where unions do exclude Negroes, actual Negro employment falls below our expectations by some 60 to 70 percentage points.

To eliminate such job discrimination, public policymakers must recognize who in fact is discriminating. The largest corporations and strongest unions appear to be obstacles to equal employment opportunity in the United States, and their behavior will be difficult to change. Unions, because they benefit from the restriction of labor supply, will in all likelihood remain intractable, and, to the extent that concentrated industries are highly unionized, this will further block employment gains for Negroes. Direct governmental intervention, then will probably be ineffective unless attitudes of corporations and benefits accruing to unions can be altered.

A second policy implication of this study, which must be stressed, is that indirect government activity through education to improve the plight of Negro males may have only limited success. If the procedures used to scale occupational categories and identify qualified workers are not grossly inadequate, the need for more education for Negroes will not solve the discrimination problem. For even after holding educational attainment constant, discrimination was frequently found. If there is serious deficiency in the United States, it lies in the white refusal to hire and promote on the basis of what a person does, rather than what race he is.

Appendix I

3-Digit Census Occupations Grouped
Into 11 Skill-Occupations

Census Code	Census Occupational Title	Census Code	Census Occupational Title
	Skill-Occ. 1		Skill-Occ. 3
15	Athletes	10	Actors and Actresses
20	Authors	12	Airline Pilots
30-32,		14	Artists and Art Teachers
34-35,		23	Clergy
40-43,	College Professor	72	Designers
150-154,		75	Editors and Draftsmen
160		80-85,	Engineers, all kinds
71	Dentists	90-93	
105	Lawyers and Judges	102	Farm and Home Managers, Advisors
130-131,			
134-5,	Natural Scientists	171	Social and Welfare Workers, except Group
140,145			
153	Osteopaths	181	Surveyors
162	Physicians and Surgeons	193	Therapists and Healers
172-5	Social Scientists	195	Professors, Teachers and Kindred, NES
180	Sports Instructors and Officials	302	Attendants and Assistants, Library
	Skill-Occ. 2	393	Real Estate Brokers
		395	Stock and Bond Salesmen
0	Accountants		
13	Architects		Skill-Occ. 4
21	Chemists		
22	Chiropractors	8	Nurses
73	Dietitians, Nutritionists	70	Dancers and Dancing Teachers
111	Librarians	74	Draftsmen
120	Musicians, Music Teachers	104	Funeral Directors
152	Optometrists	150	Professional Nurses
154	Personnel or Labor Relations Workers	161	Photographers
		185	Medical Technicians, Dental
160	Pharmacists	190-2	Technicians, NEC
163	Public Relations Men and Publicity Workers	253	Credit Men
		254	Floormen and Floor Managers
165	Recreation and Group Workers	285	Purchasing Agents
		313	Bill Collectors
182-4	Teachers	382	Demonstrators
194	Vetrinarians	410	Cabinet Makers
222	Farm Managers	414	Compositors, Typesetters
250	Buyers and Department Store Heads	474	Radio and TV Repairmen
		491	Millwrights
		493	Motion Picture Projectionists

Census Code	Census Occupational Title	Census Code	Census Occupational Title
	Skill-occ. 4, continued		**Skill-Occ. 5, continued**
504	Piano and Organ Tuners	520	Sanitary Engineers
515	Shoemakers and Repairers	525	Tinsmiths, Coppersmiths
630	Asbestos and Insultation Workers	530	Toolmakers
		601	Apprentice Auto Mechanics
641	Bus Drivers	602	Apprentice Brick-layers and Masons
720	Weavers, Textile		
802	Housekeepers, Private Household	603	Apprentice Carpenters
		604	Apprentice Electricians
821	Boarding and Lodging Housekeepers	605	Apprentice Machinists and Toolmakers
840	Midwives	610	Apprentice Mechanics, except Auto
901	Farm Foremen		
		612	Apprentice Plumbers and Pipefitters
	Skill-Occ. 5	613	Apprentices, Metal Working Trades
151	Student Professional Nurses		
		615	Apprentices, Printing Trades
164	Radio Operators	620	Apprentices, other specified trades
170	Religious Workers		
252	Conductors	621	Apprentices, trade not specified
260	Public Inspectors		
262	Managers & Superintendants	632	Attendants, Auto Parking
265	Officials and Administration (NEC) public administration	643	Checkers, Examiners and Inspectors, Manufacturing
		712	Stationery Firemen
275	Officials, Unions & Lodges	814	Barbers
280	Postmasters	825	Cooks, except Private Household
290	Managers, NEC		
301	Agents, NEC	832	Housekeepers, except Private Household
314	Dispatchers, Vehicles		
321	Insurance Adjusters, Examiners, Investigators	843	Hairdressers and Cosmetologists
		852	Marshalls and Constables
333	Payroll and Time-Keeping Clerks	853	Policemen and Detectives
		854	Sheriffs and Bailiffs
402	Blacksmiths	960	Carpenters' helpers, except logging and mining
403	Boilermakers		
411	Carpenters		
413	Cement and Concrete Finishers		**Skill-Occ. 6**
421	Electricians		
423	Electrotypers	103	Foresters
430	Foremen, NEC	200	Farmers (Owners and Tenants)
450	Inspectors, NEC	305	Bank Tellers
451	Jewelers, Watchmakers	310	Bookkeepers
424	Engravers, except Photo	312	Cashiers
465	Machinists	343	Shipping Clerks
473	Mechanics, Office Machine	345	Stenos, Typists
480	Mechanics, NEC	353	Telephone Operators
502	Patternmakers, except Paper		
510	Plumbers and Pipefitters		

Census Code	Census Occupational Title	Census Code	Census Occupational Title
	Skill-Occ. 6 continued		Skill-Occ. 7, continued
354	Ticket Takers, Agents	394	Sales Clerks
370	Clerical Workers, NEC	401	Bakers
380	Advertising Agents and Salesmen	405	Brickmasons
		415	Crane and Hoistmen
385	Insurance Agents	420	Decorators and Window Dressers
425	Excavating, Grading Workers	470	Mechanics and repairmen, air-conditioning, heating, and refrigerating
431	Foremen		
432	Furriers	490	Millers
434	Glaziers	492	Metal Moulders
435	Heat Treaters	521	Stone Workers
444	Lumber Inspectors, Graders	523	Motel Workers
452	Jobsetters	535	Upholsterers
453	Linemen, Phone, Power	-635	
454	Locomotive Engineers	651	Dressmakers (except Factors)
460	Locomotive Firemen		
461	Loom Fixers	670	Furnacemen
471	Airplane Mechanics	690	Motormen, Mine, Factors, Logging
472	Auto Mechanics		
475	Railroad Mechanics	693	Packers and Wrappers
495	Painters	695	Photograph Process Workers
501	Paperhangers	705	Sewers and stitchers, manufacturing
503	Photoengravers, Lithographers		
		714	Taxi Drivers
505	Plasterers	721	Welders
512	Pressmen	810	Hospital Attendants
514	Roofers	851	Guards, Watchmen
524	Tailors		
545	Craftsmen, NEC		Skill-Occ. 8
634	Blasters		
645	Subway, Streetcar Conductors		
650	Route Men	257	Buyers and Shippers, Farm Products
672	Heaters		
675	Meat Cutters	304	Baggagemen
691	Motormen, Street	323	Mailcarriers
701	Power Station Operators	325	Office Machine Operators
842	Practical Nurses	351	Telegraph Messengers
850	Firemen, Fire Protection	390	Newsboys
995	Occupation Not Reported	404	Bookbinders
		494	Opticians, Lensgrinders
	Skill-Occ. 7	631	Assemblers
		652	Dyers
303	Medical and Dental Attendants	653	Filers, grinders, polishers, metal
341	Receptionists	671	Graders and sorters, Manufacturing
342	Secretaries		
350	Stock clerks and storekeepers	673	Knitters, loopers and toppers, textile
352	Telegraph Operators	674	Drycleaning Operators
360	Typists	680	Milliners

Census Code	Census Occupational Title	Census Code	Census Occupational Title
	Skill-Occ. 8 continued		Skill-Occ. 10 continued
704	Sawyers	860	Watchmen (crossing) and Bridge Tenders
710	Spinners	874	Ushers, Recreation and Amusement
715	Truck & Tractor Drivers		
775	Operatives, NEC	903	Farm Laborers, Unpaid Family Workers
801	Baby-sitters, private household	383	Hucksters and Peddlers
804	Private Household Workers	970	Lumbermen, Woodchoppers
812	Attendants, Professional	985	Laborers, NEC
823	Chambermaids and maids, except private household		Skill-Occ. 11
834	Janitors and Sextons		
835	Kitchen workers, except private household	640	Brakemen, Railroad
902	Farm Laborers	820	Bootblacks
962	Fishermen and Oystermen	841	Porters
971	Teamsters	963	Garage Laborers, Car Washers, Greasers
973	Warehousemen		

Skill-Occ. 9

Census Code	Census Occupational Title
101	Entertainers, NEC
315	Express Messengers, Railway Clerks
324	Messengers and Office Boys
513	Rollers and Roll Hands
642	Chainmen, Rodmen, Axmen
654	Fruit, Nut, Vegetable Packers
685	Mine Operatives and Laborers
694	Painters, not Construction
703	Sailors and Deck Hands
713	Switchmen, Railroad
803	Laundresses, Private
813	Attendants, Recreation and Amusement
815	Bartenders
875	Waiters and Waitresses
890	Service Workers, except Private Houshold
964	Gardeners, except Farm
965	Longshoremen, Stevedores

Skill-Occ. 10

Census Code	Census Occupational Title
903	Farm Laborers, Unpaid Family Workers
692	Oilers and Greasers
824	Charmen and Cleaners

Appendix II

Utilization of the 1960 Census 1/1000 Sample
in the Creation of I_{ij} and D_k

The use of the 1/1000 Census Sample requires amplification beyond
that discussed in the text. Employment was defined to be "at work and/
or with a job." Racial denotation is exact: Negro males were used in
the creation of I_{ij} and D_k (not nonwhite males).

Because both I_{ij} and D_k require a total of 6644 industry-skill-occ.
cells (151 industries x 11 skill-occs. x 4 regions = 6644 cells), and
there are 4300 Negro males in the sample, the question of reliability
arises. In the regression analysis of Section 4, use of weighted least
squares attempts to correct for sample size difficulties. As a partial
check on the 1/1000 Sample, the industrial distribution of Negroes in
the 1/1000 Sample was checked against the 1/20 Sample. A regression of
total Negro employment by industry from the 1/1000 Sample was fit on
total Negro employment by industry (i=148) on the 1/20 Sample. Since
the latter is scaled in population terms and the former by 1000, we
should expect the coefficient to be 1000; the results are:

$$\sum_{o=1}^{9} \hat{E}_{N_{io}} = 1026.7524 \; (\sum_{j=1}^{11} E_{N_{ij}}) \qquad\qquad R^2 = .9162$$
$$\phantom{\sum_{o=1}^{9} \hat{E}_{N_{io}} = 1026.7524} \quad\; F = 1443.12$$

$$\underset{(27.0280)}{}$$
$$t = 37.9884$$

$E_{N_{io}}$ = total Negro employment
in i'th industry, o'th
occupation (scaled in
population terms)

$E_{N_{ij}}$ = total Negro employment
in i'th industry, j'th
skill-occupation, un-
scaled

Thus the 1/1000 Sample overpredicts by 2.7 percent a reasonable amount of
errors.

Examination of I_{rij} or D_k indicates that either will "blow up" if

any of the four terms is zero. Since by assumption and by construction

the number of Negroes and whites qualified and looking for work is always

greater than available jobs, the two denominators must be non-zero. Hence

we have three ways in which I_{ij} or D_k can disintegrate: (1) no Negroes

employed, but whites employed; (2) no whites employed, but Negroes employ-

ed; (3) neither whites nor Negroes employed. The fourth logical case of

Negroes and whites employed of course yields a non-zero cell.

Examination of the raw data indicates that case (2) was very rare.

Out of a total of 1661 cells in the national I_{ij} matrix, only 11 had

Negroes but no whites employed. Ten of these 11 were in the bottom 2

occupational categories--these would most likely be "Negro only" jobs in

the sense of being at the bottom of the occupational ladder, likely to

be dirty and unrewarding, etc.

The following table shows the percent distribution of cases (1), (3),

and (4). Not surprisingly, our industrial information is fullest in those

occupations that contain the most workers. Of particular interest is the

nature of case (1). Obviously, the complete exclusion or small sample size,

or some combination of the two. Since in case (1) three of the four parts

of I_{ij} are known, we can set

$$\left(\frac{E_{N_{ij}}}{Q_{N_j}}\right) \Big/ \left(\frac{E_{W_{ij}}}{Q_{W_j}}\right)$$

equal to one, and then solve for $E_{N_{ij}}$, the number of Negroes who would be

employed if there were not discrimination. If this value is greater than

one, we may infer that exclusion and small sample are operative. If this

value is less than one, we may infer that small sample size is causing the

empty cell. That is, if less than one Negro is expected to be employed,

then we cannot clearly argue that job discrimination has occurred. Investigation of the regional I_{ij}'s suggests that less than one Negro was expected to be employed in 85 percent of the industries which had no Negroes, but whites employed.

Table to Appendix II

Distribution of Non-Zero and Zero Cells for National I_{ij} Matrix by Skill-Occupations

Skill-Occ.	% of Industrial Cells with whites but no Negroes	% of Industrial Cells with neither whites nor Negroes	% of Industrial Cells with whites and Negroes	Total
1	24.32	72.97	2.70	100.00
2	65.54	28.37	6.08	100.00
3	60.81	31.75	7.43	100.00
4	66.89	22.97	10.13	100.00
5	41.21	6.75	52.02	100.00
6	46.62	4.05	49.32	100.00
7	48.64	6.08	45.27	100.00
8	16.89	8.78	74.32	100.00
9	29.05	38.51	32.43	100.00
10	28.87	18.24	53.37	100.00
11	10.13	66.21	23.64	100.00

Footnotes

[1] The literature on the economics of discrimination is extensive. For a discussion of the occupational position of Negroes, see for example, Elton Rayack, "Discrimination and the Occupational Progress of Negroes," Review of Economics and Statistics (May 1961), pp. 209-216; Gunnar Myrdal, An American Dilemma (New York: Harper and Row, 1942) remains informative on the industrial distribution of Negro employment; and Gary Becker, The Economics of Discrimination (Chicago: University of Chicago Press, 1957) is the major theoretical piece on the economics of discrimination.

[2] See Andrew Brimmer, "The Negro in the National Economy," The Negro American Reference Book (New York: Prentice-Hall, 1966).

[3] See Martin David, "Income and Dependency in the Coming Decades," American Journal of Economics and Sociology, Vol. 23 (July 1964), pp. 249-268.

[4] See Harry J. Gilman, "Economic Discrimination and Unemployment," American Economic Review (May 1966), pp. 1077-1095.

[5] See John F. Kain, "Housing Segregation, Negro Employment and Metropolitan Decentralization," Quarterly Journal of Economics, Vol. 83 (May 1968), pp. 175-197.

[6] Orley Ashenfelter, Minority Employment Patterns (Kalamazoo; Michigan: W.E. Upjohn Institute for Employment Research, 1966).

[7] Donald Dewey, "Negro Employment in Southern Industries," Journal of Political Economy, Vol. 60 (June 1952), pp. 279-293; and "Four Studies of Negro Employment in the Upper South," Selected Studies of Negro Employment in the South (Washington, D.C.: National Planning Association, 1955). Dewey reported on the basis of field studies that (a) wage discrimination does not exist within a firm, (b) occupational exclusion widely exists, and (c) Negroes and whites do not work side by side. Scattered statistics on type of complaint to the Fair Employment Practices committee during and after World War II indicate very little wage discrimination per se. For example see Fair Employment Practice Committee, First Report: July 1943-1944 (Washington, D.C.: U.S. Government Printing Office, 1954); U.S. Civil Rights Commission, Annual Reports (1959-63) especially the 1961 Report, Part III entitled "Employment"; and U.S. Equal Employment Opportunity Commission, 1965 Report, (Washington, D.C.: U.S. Government Printing Office, 1965). This evidence raises the correlative issue of Negro-white income differentials which are widely documented. The unfavorable income position of Negroes is attributable to a higher incidence of unemployment as well as to occupational exclusion as discussed in the text.

[8] R.S. Eckhaus, "Economic Criteria for Education and Training" Review of Economics and Statistics (May 1964), pp. 181-190.

[9]James G. Scoville, "Education and Training Requirements for Occupations," Review of Economics and Statistics (May 1966), pp. 387-394.

[10]U.S. Department of Labor, Bureau of Employment Security, U.S. Employment Service, Estimates of Worker Traits Requirements for 4000 Jobs (1956).

[11]Certain data used in this thesis were derived by the author from a computer tape file furnished under a joint project sponsored by the U.S. Bureau of the Census and the Population Council and containing selected 1960 Census information for a .1 percent sample of the population of the United States. Neither the Census Bureau nor the Population Council assumes any responsibility for the validity of any of the figures published herein based on this material.

[12]Space does not permit an extended discussion of the educational quality issue. I have experimented with a definition of "real" Negro educational attainment and calculated I_{ij} and D_k. "Real" attainment was obtained by dropping reported educational attainment down one Census category for all Negroes. The overall results of Sections III and IV remain essentially the same.

[13]This data is from a special five percent sample made by the U.S. Bureau of the Census for the Institute for Research on Poverty, University of Wisconsin. I wish to thank the Institute for Research on Poverty, in particular Karl and Alma Taeuber, for making this data available to me. The complete table of D_{io} can be found in Robert P. Strauss, "Discrimination Against Negroes in the Labor Market: the Impact of Market Structure on Negro Employment," unpublished Ph.D thesis, University of Wisconsin, January, 1970.

[14]The reported nine Census occupations are combinations of the usual eleven Major Census occupations. In particular, Farm Laborers and Foremen and Laborers, except Farm and Mine, have been combined to form Laborers; Private Household Workers and Service Workers, except Private Household, have been combined to form Service Workers.

[15]This test is described in detail in: Sidney Siegel, Nonparametric Statistics (New York: McGraw-Hill Book Company, 1956), pp. 229-239.

[16]The Census creates four regions: Northeast (NE), North Central (NC), South (S), and West (W). The states in each region are:

Northeast	North Central	South	West
Maine	Indiana	Delaware	Montana
New Hampshire	Illinois	Maryland	Idaho
Vermont	Michigan	District of Columbia	Wyoming
Massachusetts	Wisconsin	Virginia	Colorado
Rhode Island	Minnesota	West Virginia	New Mexico
Connecticut	Iowa	North Carolina	Arizona
New York	Missouri	South Carolina	Utah
New Jersey	North Dakota	Georgia	Nevada
Pennsylvania	South Dakota	Florida	Washington

North Central	South	West
Nebraska	Kentucky	Oregon
Kansas	Tennessee	California
	Alabama	Alaska
	Mississippi	Hawaii
	Arkansas	
	Louisiana	
	Oklahoma	
	Texas	

[17]Mean weekly income is defined as total income for 1959 divided by weeks-worked in that year (actually the midpoint of the intervals of weeks-worked provided by the Census).

[18]For complete tables of I_{ij} and D_k, see Strauss, op. cit.

[19]For a fuller survey, see Strauss, supra, n. 13, ch. 2.

[20]F. Ray Marshall, The Negro and Organized Labor (New York: John Wiley and Sons, 1965).

[21]F. Ray Marshall and Vernon M. Briggs, The Negro Apprenticeship (Baltimore: The Johns Hopkins Press, 1967). Also see Leonard A. Rapping, "Union-Induced Racial Entry Barriers," unpublished manuscript, Graduate School of Industrial Administration, Carnegie-Mellon University, April, 1969.

[22]See for example, Becker, supra, n. 1, pp. 31-46, and also Arman A. Alchian and Reuben A. Kessel, "Competition, Monopoly, and the Pursuit of Money," Aspect of Labor Economics (National Bureau of Economic Research, 1962). While regression analysis reported below is in terms of a continuous measure of industrial concentration, I have elsewhere reported dummy variable results for regulated and unregulated industries. See Strauss, supra, n. 13, ch. 5. The argument framed here is restated in terms of monosonistic practices by Thurrow. See Lester C. Thurrow, Poverty and Discrimination (Washington, D.C., The Brookings Institution, 1969), ch. VII. To the extent that monopoly in the product market and monopoly in the labor market are correlated (or jointly determined), I am implicitly testing the Thurrow hypothesis as well.

[23]Myrdal, supra, n. 1, p. 1089.

[24]See Dale Hiestand, Economic Growth and Employment Opportunities for Minorities (New York: Columbia University Press, 1964).

[25]Dewey, supra, n. 7.

[26]Leonard Weiss, "Concentration and Labor's Earnings," American Economic Review, Vol. 56 (1966) and Appendix.

[27] Ibid.

[28] U.S. Department of Commerce, 1960 Census of Population: Supplementary Report (PC(S1))-33, December, 1962.

[29] Weiss, supra, n. 26.

[30] For a complete discussion of weighted least squares, see A.S. Goldberger, Econometric Theory (New York: John Wiley and Sons, 1964) pp. 231-236, and N.D. Draper and A. Smith, Applied Regression Analysis (New York: John Wiley and Sons, 1966) pp. 78-81.