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DISCRIMINATION, NEPOTISM, AND LONG-RUN WAGE DIFFERENTIALS*

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The wage discrimination model developed by Becker has been criticized for predicting that competitive forces will lead to the disappearance of racial discrimination in the long run. We have reformulated the model in terms of nepotism toward white workers rather than discrimination against black workers. In this new framework, both nepotistic and taste-neutral firms are expected to survive the competitive struggle in the long run. Therefore, the new framework is consistent with long-run as well as short-run racial wage differentials.

I. INTRODUCTION

The economic theory of discrimination is largely due to Becker [1971b]. His approach treats wage differentials between otherwise identical workers differing only in race as being the observable manifestation of "tastes for discrimination," that is, disutility associated with market contact between the races. While several authors have recently proposed an alternative theoretical framework designed to explain wage differentials [Arrow, 1972, 1973; Borjas and Goldberg, 1978; Phelps, 1972], the Becker model retains its position as the most influential one in the literature.

Despite its great impact, Becker's model has been severely criticized, since one of its predictions is apparently at odds with empirical evidence. According to Becker:

> If all firms had the same linear and homogeneous production function, firms that discriminated would always have larger unit net costs than firms that did not. The smaller (in absolute value) the discrimination coefficient of any firm, the less would be its unit net costs. The firm with the smallest discrimination coefficient would produce the total output, since it could undersell all others [1971b, p. 44].

Unfortunately, this prediction of the disappearance of discrimination with the passage of time does not seem to have been borne out by the data. This has led Arrow [1973, p. 10] to state, "Only the least discriminatory firms survive. Indeed, if there were any firms which did not discriminate at all, these would be the only ones to survive the competitive struggle. Since in fact racial discrimination has survived for a long time, we must assume that the model . . . must have some limitation." Similar criticisms have been leveled against Becker's

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theory in recent survey articles by Cain [1976, pp. 1219, 1232], Freeman [1974, pp. 517–20], and Marshall [1974, pp. 852, 854].

The point of this paper is to argue that the objections raised against Becker's model are essentially misdirected. It will be demonstrated that by shifting the origin and dealing with "nepotism" toward whites in contrast to "discrimination" against blacks, one arrives at a theory that is consistent with not only the existence but also the *persistence* of wage differentials. That is, while it is a well-known implication that discriminatory firms tend not to survive, it will be shown that firms exhibiting nepotism will not only survive but in fact thrive in the long run.

II. Theory of Discrimination

It will prove convenient to present in this section a slightly more formal statement of Becker's discrimination model than is currently available in the literature. Once this has been accomplished, the modifications necessary to yield a theory of nepotism will follow in a straightforward fashion.

According to Becker, a firm facing a market wage W_b for black workers acts *as if* the wage were $W_b(1 + d_b)$, where $d_b \geq 0$ is the firm's "discrimination coefficient" against black workers. In the simplest case, d_b is taken to be a constant for all employment levels within a given firm, although d_b may vary across firms. For this to be the case, the firm's utility function must be of the form,[1]

$$U = \pi - d_b W_b L_b, \tag{1}$$

where U = utility level, π = profit level, and L_b = black employment in the firm. We further define profit as

$$\pi = Q(L_w + L_b) - W_w L_w - W_b L_b, \tag{2}$$

where W_w = market wage for white workers, L_w = white employment in the firm, and $Q(\ )$ = production function. Note that output is taken to be the numeraire, and also that blacks and whites are perfect substitutes in *production*, so that only total employment enters into $Q(\ )$. The production function is assumed to be strictly concave.

We may combine (1) and (2) to obtain

1. The notion that firms maximize utility rather than profit is central to the managerial discretion literature pioneered by Williamson [1967]. Williamson asserts that the utility-maximization hypothesis is most relevant for large firms, firms in highly concentrated industries, and firms with diffuse ownership. Williamson's assertion has received empirical support in studies by Kamerschen [1968]; Monsen, Chiu, and Cooley [1968]; Hindley [1970]; Palmer [1973]; and Edwards [1977].

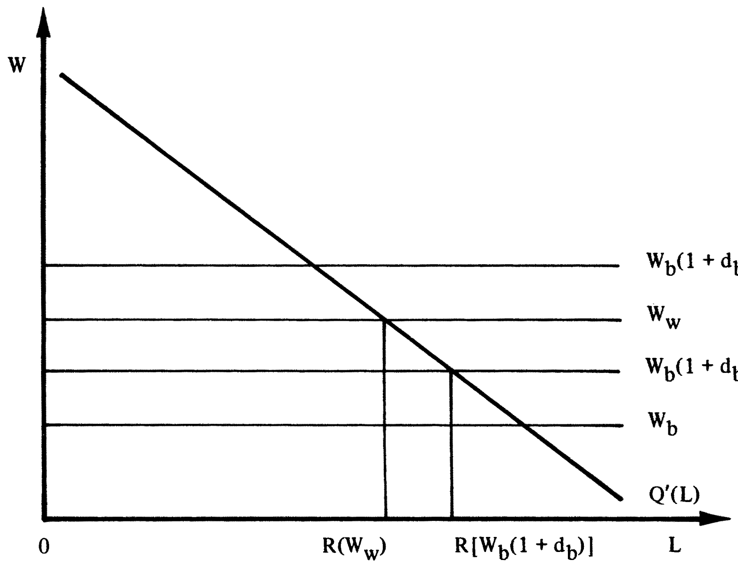

FIGURE I

$$U = Q(L_w + L_b) - W_wL_w - (1 + d_b)W_bL_b. \tag{3}$$

It follows from (3) that the firm's behavior is identical to that of a profit-maximizer with a black wage of $W_b(1 + d_b)$ rather than W_b.[2]

We assume initially that the market wages for black and white labor satisfy the condition $W_b < W_w$; it will be seen presently that this condition is in fact consistent with full labor market equilibrium. Firms take these wages as parametrically given, and since both types of labor are perfect substitutes, firms hire all-white or all-black work forces as

$$W_w \lesseqgtr W_b(1 + d_b) \qquad \text{or} \qquad d_b \gtreqless (W_w - W_b)/W_b. \tag{4}$$

If $W_w < W_b(1 + d_b)$, whites are hired until the point at which $W_w = Q'(L_w)$. By the strict concavity of $Q(\ )$, this may be inverted to yield $L_w = R(W_w)$, where $R'(\ ) < 0$. By similar reasoning, firms for whom $W_w > W_b(1 + d_b)$ hire $L_b = R[W_b(1 + d_b)]$ black workers. The hiring decision is illustrated in Figure I.

2. This particular utility function was implicit in Becker's earlier work, although it seems to have been made explicit first in Becker [1971a, p. 71]. Arrow [1972, 1973] has suggested a somewhat more general specification in which $U = U(\pi, L_w, L_b)$, with $U_\pi > 0$, $U_w \gtrsim 0$, $U_b < 0$. One can then define d_b as the marginal rate of substitution between profits and black labor, evaluated at the point of equilibrium. We have taken d_b to be a constant in order to preserve the spirit of the original Becker model.

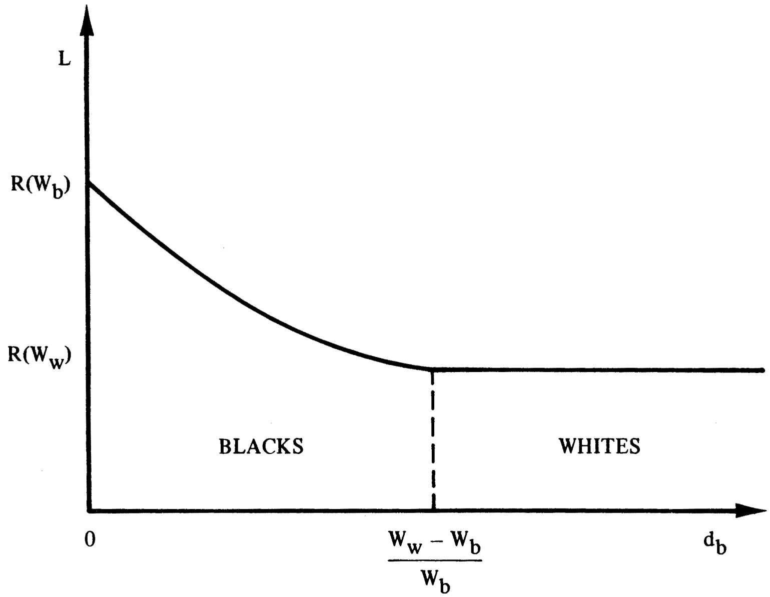

FIGURE II

Employment, or firm size, is plotted as a function of d_b in Figure II. We observe that, even in the short-run analysis, firm size is monotonically non-increasing as a function of the desire to discriminate.[3]

To obtain wages W_w and W_b that are consistent with market equilibrium, we re-express the hiring criterion so that the work force is all-white or all-black as $W_b/W_w \gtrless X$, where $X = 1/(1 + d_b)$. If d_b is distributed across firms by the rule $f(d_b)$, then by a change-of-variables, X must be distributed across firms by the rule $g(x) = (1/x^2)f[(1/x) - 1]$. Let the supply functions of white and black workers be $S_w(W_w)$ and $S_b(W_b)$, respectively, where $S'_w(\ ), S'_b(\ ) \geq 0$. These supply functions depend upon *relative* prices, in view of our earlier

3. The employment function is continuous at the critical value, $d_b^* = (W_w - W_b)/W_b$. To see this, recall that the wage relevant for the firm's decision is $W(d_b) = \min[W_w, W_b(1 + d_b)]$. For the "marginal" firm that is located at d_b^*, we have $W(d_b^*) = W_w = W_b(1 + d_b^*)$. The function $W(d_b)$ has equal limits at d_b^* whether approached from the right or from the left:

$$\lim_{d_b \to d_b^{*+}} W(d_b) = \lim_{d_b \to d_b^{*+}} W_w = W_w, \quad \text{and}$$

$$\lim_{d_b \to d_b^{*-}} W(d_b) = \lim_{d_b \to d_b^{*-}} W_b(1 + d_b) = W_b(1 + d_b^*) = W_w.$$

Hence $W(d_b)$ is continuous at d_b^*. But $L(d_b) = R[W(d_b)]$, and since $R(\ )$ is a continuous function, it follows that $L(d_b)$ is continuous at d_b^* as well.

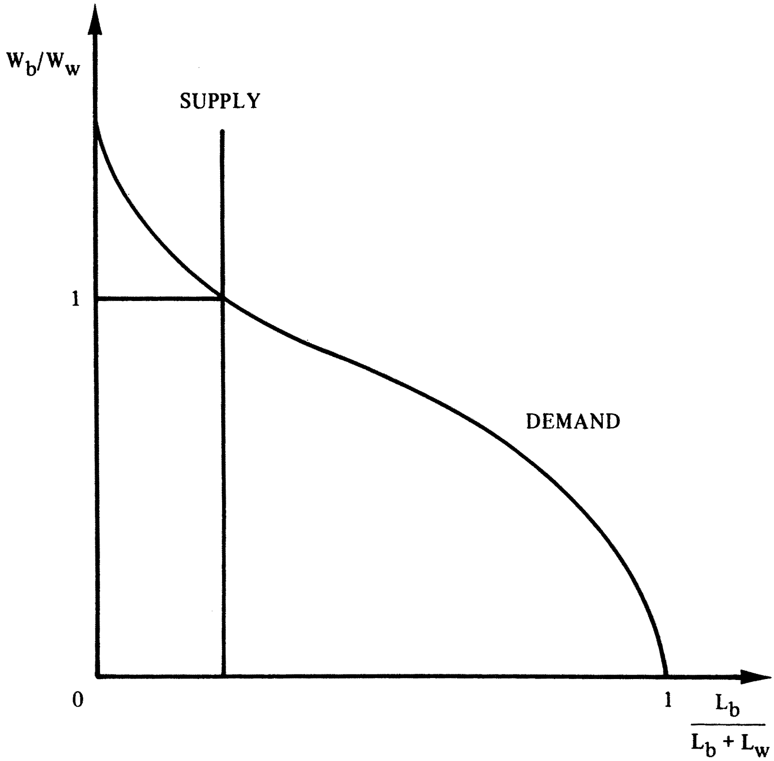

FIGURE III

choice of output as the numeraire. Then W_w and W_b are determined by the equations,

$$S_w(W_w) = \int_0^{W_b/W_w} R(W_w)g(x)dx; \tag{5}$$

$$S_b(W_b) = \int_{W_b/W_w}^{1} R\left(\frac{W_b}{x}\right) g(x)dx. \tag{6}$$

In interpreting these equations, recall that the all-white firms are of size $R(W_w)$, while the all-black firms are of size $R[W_b(1 + d_b)] = R(W_b/x)$. Market equilibrium is illustrated in Figure III for the special case in which $S'_w(\ ) = S'_b(\ ) = 0$, so that supply is inelastic.[4] It is obvious that as long as $d_b \geq 0$ (or equivalently, $X \leq 1$) for all firms, then

4. The convenient geometrical representation of Figure III is invalid of $S'_w(\ )$ and $S'_b(\ )$ are different from zero, since then the relative supply cannot in general be expressed as a function solely of the *ratio* of W_b to W_w. Equations (5) and (6), of course, remain valid in any case.

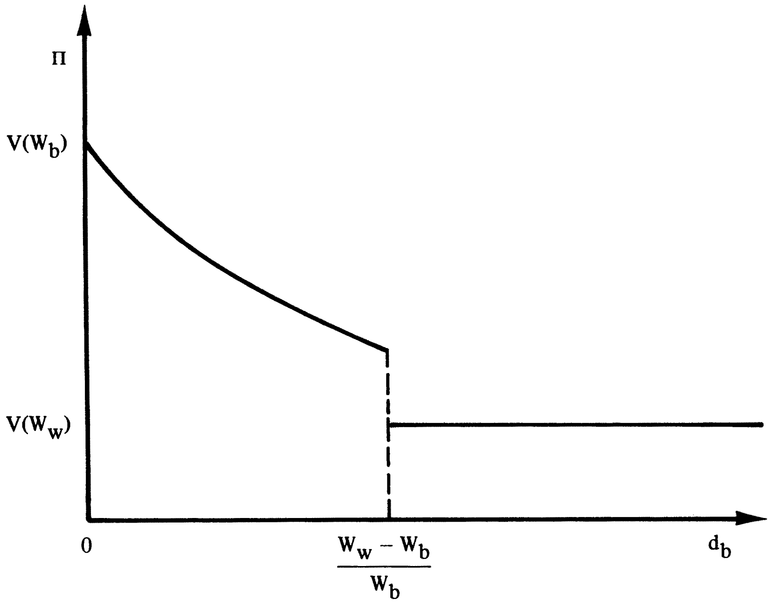

FIGURE IV

equilibrium must occur with the wage ratio W_b/W_w being less than unity.

Having established the existence of short-run wage differentials, we now move on to a long-run analysis. Consider first the equilibrium profit levels, and then the equilibrium utility levels, achieved by firms that are indexed by alternative values of d_b. If $d_b > (W_w - W_b)/W_b$, the firm has been shown to hire $L_w = R(W_w)$ white workers at the wage W_w. Its profits are given by

$$\pi_w = Q[R(W_w)] - W_w R(W_w). \tag{7}$$

Define the (indirect) profits of a single-input competitive firm at the wage W by the function,

$$V(W) = \max_L \, [Q(L) - WL]. \tag{8}$$

From the envelope theorem [Samuelson, 1947, pp. 34–36], we have $V'(W) < 0$. Thus, the all-white firm enjoys a profit level of $V(W_w)$.

The all-black firm, on the other hand, hires $R[W_b(1 + d_b)]$ black workers at the wage W_b. This leads to profits of

$$\pi_b = Q[R(W_b(1 + d_b))] - W_b R[W_b(1 + d_b)]. \tag{9}$$

Figure IV plots profits as a function of d_b.[5]

It would seem that Figure IV captures the classical argument in the literature for why discrimination should disappear in the long run. This argument, as exposited by Alchian and Kessel [1962, pp. 160–61], for example, is phrased in terms of the acquisition of the highly discriminatory firms by firms displaying a lesser desire to discriminate. In the presence of perfect capital markets, if one firm has a smaller value of d_b than its rival, then due to the spread between their money profit levels, the first firm can buy out the second firm. Indeed, the firm with the smallest value of d_b in the market can profitably buy out *every* other firm in the industry. Hence discrimination must disappear in the long run.

The above argument leads to the correct conclusion, but unfortunately, the reasoning is slightly flawed. The sellout price of a firm is not equal to its money profit level, but rather to its *utility* level as given in equation (1).[6] Recall that d_b was interpreted as the marginal rate of substitution between profits and black labor. Hence d_b converts units from employment into dollars, so that equation (1) expresses utility as a monetary equivalent. For example, a firm with a positive value of d_b that hires an all-black work force is willing to sell out for some amount *less* than its profit level, since its "real" rate of return lies below its money rate of return due to the nonpecuniary disadvantages of remaining in business.

With this in mind, what is required is an expression for equilibrium utility levels as a function of the parameter d_b. The all-white firm avoids contact with black workers; hence from equation (1) with $L_b = 0$,

$$U_w = \pi_w = V(W_w). \tag{10}$$

For the all-black firm, we must subtract $d_b W_b R[W_b(1 + d_b)]$ from π_b as given by equation (9), yielding

$$U_b = Q[R(W_b(1 + d_b))] - W_b(1 + d_b)R[W_b(1 + d_b)] = V[W_b(1 + d_b)]. \tag{11}$$

5. The profit function is discontinuous at d_b^*. For the marginal firm with $W_w = W_b(1 + d_b^*)$, total employment is equal to $R(W_w) = R[W_b(1 + d_b)]$. But money profits are higher if blacks are hired rather than whites, since the former group is cheaper, $W_b < W_w$. This explains the "jump" in $\pi(d_b)$ at d_b^*. Moreover, in the interval $0 < d_b < d_b^*$, $\pi(d_b)$ is monotonically decreasing. To see this, differentiate (9) to yield $\pi'(d_b) = W_b R'(Q' - W_b)$. But by the equilibrium condition, $Q' = W_b(1 + d_b)$, or $Q' - W_b = W_b d_b$. Hence $\pi'(d_b) = W_b^2 d_b R' < 0$.

6. This analysis ignores discounting, without loss of generality. If all firms have equal discount rates, and if Firm A places a higher money value on its operations at each moment in time than Firm B does, then the same comparison holds true in terms of present values as well. Equality of discount rates will be assumed throughout.

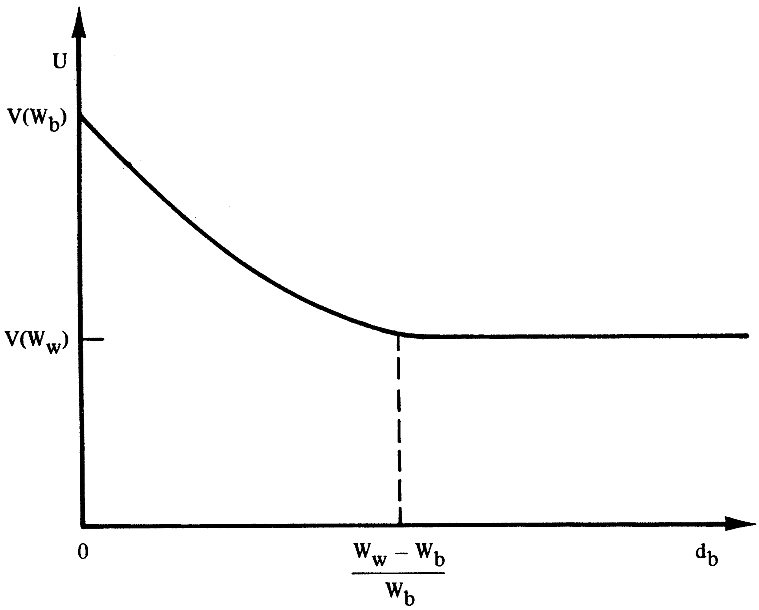

FIGURE V

Figure V graphs U as a function of d_b.[7] The classical result is still seen to be valid, since the sellout price is a monotonically non-increasing function of d_b. Hence only the least discriminatory firms should survive in the long run.

III. THEORY OF NEPOTISM

Having reviewed the theory of discrimination rather exhaustively, we now find it a simple matter to lay out the closely related (but not identical) theory of nepotism. Proofs of the major results will not be given, since they closely parallel those of the previous section.

The utility function becomes

$$U = \pi + d_w W_w L_w = Q(L_w + L_b) - (1 - d_w) W_w L_w - W_b L_b, \tag{12}$$

where $d_w \geq 0$ is the "nepotism coefficient" measuring the marginal rate of substitution, assumed constant, between profits and white labor.

The firm acts as if the white wage were $W_w(1 - d_w)$, and hires

7. The function $U(d_b)$ is continuous at d_b^*. In the notation of footnote 3, $U(d_b) = V[W(d_b)]$. But it was also shown in footnote 3 that $W(d_b)$ is continuous at d_b^*, hence so must be $U(d_b)$.

exclusively blacks if $W_b < W_w(1 - d_w)$, or if $d_w < (W_w - W_b)/W_w$. In this case we have $L_b = R(W_b)$, and profits are equal to $V(W_b)$. Since no whites are hired, potential utility gains from nepotism are absent, and hence utility and profit levels are equal to

$$U_b = \pi_b = V(W_b). \tag{13}$$

If $d_w > (W_w - W_b)/W_w$, whites are hired in the amount $L_w = R[W_w(1 - d_w)]$. Profits are equal to

$$\pi_w = Q[R(W_w(1 - d_w))] - W_w R[W_w(1 - d_w)]. \tag{14}$$

Adding in the utility gains from nepotism, we arrive at

$$U_w = Q[R(W_w(1 - d_w))] - W_w(1 - d_w)R[W_w(1 - d_w)] = V[W_w(1 - d_w)]. \tag{15}$$

Figure VI depicts the crucial profit and utility functions.[8] Utility is given by the horizontal segment in the interval $0 < d_w < d_w^*$, and by the rising curve for $d_w^* < d_w < 1$, where $d_w^* = (W_w - W_b)/W_w$. Profit is given by the horizontal segment in the interval $0 < d_w < d_w^*$, and jumps discontinuously to the falling curve for $d_w^* < d_w < 1$.

The fact that profits are non-increasing in d_w should come as no surprise. Firms with larger values of d_w tend to distort their input choices, hiring expensive white workers rather than cheap black workers. However, these firms receive some compensation for their monetary losses in that utility is given by the sum of profit plus the

8. Several technical issues must be resolved at this point. First, the discontinuity in $\pi(d_w)$ at d_w^* may be demonstrated along the lines of footnote 5 above. Second, money profits need not necessarily turn negative within the unit interval as depicted in Figure VI. One may encounter a situation in which $\pi(d_w) > 0$ throughout the unit interval. The easiest way to see this is to suppose that $Q'(L^*) = 0$ for some $L^* < +\infty$. Then consider the firm for whom $d_w = 1$, so that it acts as if the white wage were zero and hires L^* white workers. Total revenue equals the area under the marginal productivity curve, or

$$\int_0^{L^*} Q'(L)dL,$$

while total costs equal $W_w L^*$. The difference between these two numbers may be of either sign. The final issue concerns the asymptote in $U(d_w)$ as $d_w \to 1$. If $Q'(L)$ remains positive for all $L > 0$, then

$$\lim_{d_w \to 1-} V[W_w(1 - d_w)] = \lim_{W \to 0+} V(W) = +\infty,$$

since the firm may expand indefinitely and still remain within the region of positive marginal productivity. If we insist upon finite employment and utility levels, then we must restrict the admissible set of values of d_w so that $d_w < 1$. On the other hand, if $Q'(L^*) = 0$ for some $L^* < +\infty$, then even firms with $d_w \geq 1$ will choose finite employment levels. Note that utility becomes an increasing function of W_w in this case, $\partial U_w/\partial W_w = V'(1 - d_w) > 0$, so that firms may actually increase their utility levels by paying white wages above the market level. However, this practice will reduce money profits, $\partial \pi_w/\partial W_w = (d_w - 1)R' W_w d_w - L_w < 0$, until the budget constraint is eventually reached. The final outcome will be finite values of W_w as well as L_w.

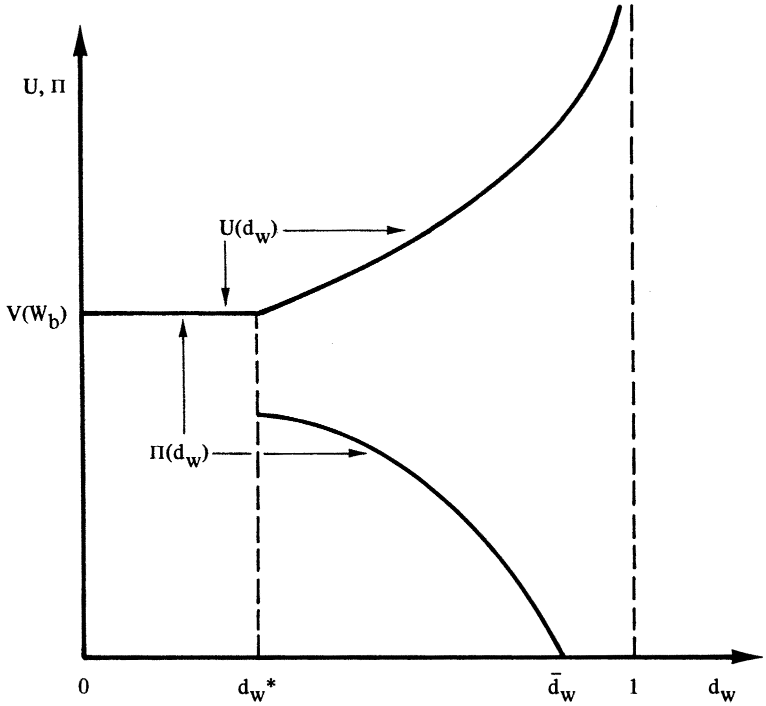

FIGURE VI

correction term, $d_w W_w L_w$. As d_w increases, L_w will increase along with it, so that the correction term increases a fortiori. What we have demonstrated is that the increase in the correction term outweighs the reduction in profits, so that total utility is an increasing function of d_w.

This result may be explained both intuitively and mathematically. Intuitively, consider two firms that both hire all-white work forces, $d_w^b > d_w^a > d_w^*$, and suppose that Firm A is in equilibrium. Now Firm B could employ the same amount of white labor as Firm A, in which case Firm B's profit level would equal that of Firm A, but Firm B's utility level would be greater than that of Firm A. Moreover, any adjustment toward optimality by Firm B would yield still higher utility levels. Therefore, utility is an increasing function of d_w.[9]

Mathematically, the key is to look back at equation (12). The objective function for the utility-maximizer characterized by d_w is identical to that of a profit-maximizer facing wages $W_w(1 - d_w)$ and

9. I owe this explanation to an anonymous referee.

W_b for the two types of labor. But profit-maximizers achieve a higher maximum when the wages that they face are lower. Thus, the maximized value rises as d_w rises, since a rise in d_w implies a fall in the net wage, $W_w(1 - d_w)$. This may also be seen in equation (15), where the value of the utility maximum equals that of a profit maximum when the wage is given by $W_w(1 - d_w)$. Clearly, $\partial U_w/\partial d_w = - W_w V' > 0$.

It has been suggested by Becker [1962] that firms face a "budget constraint" in that their actions must yield at least zero profits in order to ensure economic survival. If so, then defining $\bar{d}_w$ by the equation $\pi(\bar{d}_w) = 0$, only firms for whom $d_w \leq \bar{d}_w$ will survive even in the short run.[10] Survival in the long run is a more interesting and more subtle question. Consider a comparison of extremes: the neutral firm located at $d_w = 0$ and the break-even firm located at $d_w = \bar{d}_w$. Could the neutral firm buy out the break-even firm? The maximum offer that the neutral firm is willing to make equals $V(W_b)$, or the amount of profit (= utility) that the neutral firm could earn by running its rival's business. The break-even firm, however, requires compensation not only for its money profits, but also for its nonpecuniary income, which equals $U(\bar{d}_w)$. Since $U(\bar{d}_w) > V(W_b)$, no transaction will take place.

Turning the question around, could the break-even firm buy out the neutral firm? The neutral firm, which cares only about money income, requires $V(W_b)$ in cash before it will sell out. The break-even firm, on the other hand, would earn zero money income only if it were to take over its rival's business. Thus, the break-even firm would violate its budget constraint if it attempted to pay out $V(W_b)$ in cash when it only had zero money income. Again, we find that no transaction is possible.

In general, consider any two firms: Firm A with a nepotism coefficient d_w^a and Firm B with a nepotism coefficient d_w^b. For Firm A to buy out Firm B, it must be the case that the money income of Firm A exceeds the utility level of Firm B, $\pi(d_w^a) > U(d_w^b)$. Only if this condition holds, will Firm A be able to pay out enough cash to com-

10. Williamson [1967] suggested an alternative constraint under which profit must exceed some minimally acceptable level $\bar{\pi}$, where $\bar{\pi}$ is determined by stockholders and is independent of the variables over which the firm optimizes. Imposition of this type of constraint leaves our analysis unaffected except for narrowing the range of values of d_w that satisfy the constraint when $\bar{\pi} > 0$. It may appear that excess profits in the industry are necessary for the short-run survival of the all-white firms, since if $\pi(d_w) < \bar{\pi}$ for $d_w > d_w^*$, then the all-white firms are driven out of business. However, the reduction in the number of all-white firms would reduce the demand for white labor and thereby reduce the white wage. This would increase the profitability of the all-white firms. Clearly, some all-white firms must survive, or else white labor would be unemployed in equilibrium.

pensate Firm B for both the money income and the nonpecuniary income that the latter would earn if it were to remain in business. Inspection of Figure VI, however, clearly reveals that there does not exist a pair of firms A and B for which this condition holds. Therefore, firms located along the *entire* range of values of d_w will survive in the long run.

It only remains to resolve the asymmetry between the model of nepotism and the model of discrimination presented earlier. Both discriminatory and nepotistic firms distort their input choices by hiring expensive white workers rather than cheap black workers. Therefore, both of these firms earn lower profits than a neutral firm. Moreover, the discriminatory firm suffers a nonpecuniary loss as well, which can be avoided only by going out of business. On the contrary, the nepotistic firm enjoys a nonpecuinary gain by remaining in business. Therefore, although discriminatory firms tend to disappear, nepotistic firms can coexist along side neutral firms in the long run. The neutral firms extract their utility in the form of money income, while the nepotistic firms reduce money income toward zero in order to earn nonpecuniary income.

IV. Conclusions

This paper has reformulated Becker's theory in terms of nepotism toward whites rather than discrimination against blacks. Both models predict short-run wage differentials, but only the nepotism model is consistent with both perfect capital markets and wage differentials that persist into the long run. The reconciliation of Becker's framework with the existence of long-run wage differentials is evidence that this framework is much more useful than one would surmise from a reading of recent criticisms in the literature.

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