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BLACK MIGRATION AND RACIAL WAGE CONVERGENCE IN THE NORTH, 1940-1970

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ABSTRACT

In the mid-twentieth century, relative black wage growth in the North lagged behind the Jim Crow South. Inter-regional migration may explain this trend. Four million black southerners moved North from 1940 to 1970, more than doubling the northern black population. Black migrants will exert more competitive pressure on black wages if blacks and whites are imperfect substitutes. I use variation in the relative black-white migrant flows across skill groups to estimate the elasticity of substitution by race in the northern economy. I then calculate a counterfactual rate of black-white wage convergence in the North in the absence of southern migration. Migration slowed the pace of northern convergence by 50 percent, more than accounting for the regional gap. Ongoing migration appears to have been an impediment to black economic assimilation in the urban North.

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I. Introduction

The economic position of African-Americans improved dramatically in the decades following the Second World War, both absolutely and relative to whites. In 1940, the average black male worker earned only 43 percent as much as his white counterpart; by 1970, the black-to-white earnings ratio had risen to 64 percent (Smith and Welch, 1989). However, the pace of racial convergence was not uniform throughout the country. Rapid convergence in the South is well-documented for the 1960s, a pattern that is attributed to federal intervention in the southern labor market after passage of the Civil Rights Act of 1964 (Butler and Heckman, 1977; Donohue and Heckman, 1991; Heckman and Payner, 1989).

Less recognized is the fact that relative black progress was faster in the South than in the North in the 1940s as well, despite war-related labor demand in northern factories and early anti-discrimination legislation in northern states. The growth in black labor supply through inter-regional migration may explain this trend. From 1940 to 1970, four million southern blacks moved northward, increasing the black population in the North by 133 percent.¹ If black arrivals were more likely to compete with existing black workers, this labor supply shock could have depressed black wages and reduced the pace of northern convergence. Black migrants may have been closer substitutes with existing black workers, either because blacks and whites occupied different portions of the skill distribution or because discrimination in the hiring process led blacks and whites with the same level of skill to be used differently in production (or both).

In this paper, I conduct a counterfactual exercise to determine what the pace of racial convergence would have been in the North from 1940 and 1970 in the absence of southern migration. Following Borjas (2003) and Ottaviano and Peri (2006), I start with a CES production

¹ An equal number of southern whites also moved North during this period (Gregory, 2005). Because of the large number of existing whites in the North, their arrival only increased the northern white population by 4.6 percent.

function in which the aggregate labor input is subdivided into skill groups by education and experience level.² Within each group, black and white men are allowed to be imperfect substitutes. Southern migration flows generate significant variation in the racial composition of the labor force in northern skill groups over time. I estimate the relationship between the relative black-to-white labor supply and the black-white wage gap within skill groups, and from this association recover the elasticity of substitution by race.

I find that black wages are only sensitive to changes in black labor supply, but I cannot reject that white wages are equally affected by competition from both races. My preferred estimate translates into an elasticity of substitution between similarly-skilled black and white men of 8.3, which is far from the benchmark of perfect substitution.³ This finding is robust to reclassifying skill groups by occupation or quality-adjusted education levels. The result also holds when instrumenting for southern migrant flows with the stock of southern-born men in a skill cell. The instrument addresses the concern that southerners will choose to move North when wages in their race-by-skill cell are high.

Using the estimated elasticity of substitution by race within skill groups, I calculate what the black-white wage gap would have been in the North under a no-migration scenario. The actual northern wage gap declined from 45 log points in 1940 to 31 log points in 1970. Without southern migration, the wage gap would have declined by an additional five to seven points, resulting in a 50 percent increase in the pace of convergence. Migration appears to be wholly

² Borjas (2003) was building on Welch (1979) who develops a similar framework to explore the effect of changes in the age distribution on the labor market. See also Card and Lemieux (2001).

³ By this metric, blacks and whites in North were more substitutable than the foreign-born and the native-born within similarly-defined skill groups are today (elasticity = 5.6; Ottaviano and Peri, 2006). However, we must use some caution when comparing across time periods. The degree of general substitutability across education groups and across experience levels was higher in the 1940s. Native- and foreign-born men in the same skill group are four times more substitutable than men in two different education groups today, while black and white men were only 2.5 times more substitutable than men in different education groups in 1940. For comparison, Section V presents the elasticity estimates across education groups in both time periods.

responsible for the slow pace of northern convergence; absent migration, northern wage convergence would have surpassed its southern counterpart.

These findings modify the prevailing view of the Great Black Migration as a general avenue for black economic advancement. Smith and Welch (1989) estimate that migration from the low wage South can explain 20 percent of national black-white wage convergence during this period (see also Maloney (1994) and Margo (1995) on the 1940s). However, the elevation of southern blacks exacted a toll on existing black communities in the North. Labor market competition from ongoing southern migration depressed black wages and helps to explain the slow pace of black economic assimilation in the urban North (Lieberson, 1980; Wilson, 1987).

The paper also contributes to a broader literature on migration as a force for wage convergence between countries or regions (Hatton and Williamson, 1994, 1998; Barro and Sala-I-Martin, 1991). As expected, black migrants flow from the low wage region to the high wage region. In a labor market without frictions, this migration may have generated widespread convergence between the northern and southern economies. However, in the presence of labor market discrimination, we only observe convergence among black workers in the two regions. In general, the degree of convergence will depend on institutional features of the labor market.

II. Historical patterns in racial wage convergence and inter-regional migration, 1940-1970

A. Black-white wage convergence by region

Blacks experienced two major episodes of wage convergence in the twentieth century, one during the 1940s and the other in the late 1960s and early 1970s. After 1975, the pace of black wage growth has drawn even with or even fallen below that of white wages (Bound and Freeman, 1992; Grogger, 1996; Couch and Daly, 2002; Chandra, 2003). Donohue and Heckman

(1991) demonstrate that the second episode of convergence (1965-75) was driven by changes in the southern economy. Widespread southern convergence, they argue, is most consistent with an increase in the demand for black labor due to federal enforcement of the Civil Rights Act. They dismiss the main alternative, improvements in either the quantity or quality of black education, by noting that wage convergence occurred throughout the age distribution.

While not strictly necessary for their claim, Donohue and Heckman also contend that rapid southern convergence was unique to the 1960s. Drawing on evidence from Smith and Welch (1989), they show that the black-white wage gap remained 20 points larger in the South than the North from 1940 to 1960. However, given the high rates of inter-regional migration, a regional comparison of raw black-white wage gaps can be misleading. Black migrants were positively selected and earned more than northern-born blacks, even upon first arrival in the North (Masters, 1972; Long and Heltman, 1975; Margo, 1990; Vigdor, 2001). Therefore, migration served to narrow the racial wage gap in the North and widened it in the South. Indeed, if we restrict our attention to wage convergence among non-migrants, the South outperforms the North in *both* the 1940s and 1960s.⁴ Blacks experienced some divergence from whites in both regions in the 1950s.

Table 1 presents decadal changes in the black-white wage gap by region for all men (panel A) and separately for non-migrants (panel B). In the full sample, the pace of wage convergence in the South does not exceed the rest of the country until the 1960s, a pattern that is consistent with Smith and Welch (1989). However, among non-migrants, the pace of wage convergence was already faster in the South than in the North in the 1940s (10.1 points versus 8.9 points). While the southern edge was not large in the 1940s, the *very fact* that wage

⁴ Throughout the paper, I collectively refer to all non-southern states as “the North.” This region includes the Northeast, the Midwest, and the West, as well as three states usually classed with the South (Delaware, the District of Columbia, and Maryland). All states in this group received net black in-migration during this period.

convergence was faster in the Jim Crow South than in the progressive North is worth investigation.

B. Temporal Patterns in Southern Migration

One explanation for low rates of relative black wage growth in the North is the large increase in black labor supply due to southern in-migration. The growth of industrial production during World War II attracted southern migrants to northern cities. Table 2 measures the resulting change in the share of the northern workforce who were born in the South.⁵ The largest migration occurred in the 1940s, when the southern-born share of the northern workforce increased from 6.3 to 8.8 percent. The pace of southern in-migration slowed in the 1950s, and then reversed in the 1960s.⁶ Furthermore, while only 3.8 percent of the northern workforce was black in 1940, black migrants made up over 40 percent of the new southern inflow. In-migration thus represented a much larger *percentage change* in the number of blacks in the northern workforce.

The size of both the initial stock of southern migrants and the flow of new migrants over time varied by education group, occupation, and experience level. Variation in southern migration flows was driven both by rapid increases in southern educational attainment and by regional differences in skill premia (Collins, 2007). Table 2 demonstrates this fact for three representative education groups. In all years, southerners made up the largest share of the least-educated group (men with 0-5 years of schooling). From 1940 to 1970, the southern-born share in this group increased from 13.4 percent to 23.5 percent (an increase of 75 percent). However,

⁵ The southern-born share of the northern labor force could, in theory, change over time without in-migration due to the aging out of older, low-migration cohorts. The total workforce shares presented here are nearly identical to the average of cohort-specific shares (not shown).

⁶ The average annual growth of southerners to the North in the 1940s is akin to the high rate of immigration to the United States in the 1990s when the foreign-born share of the US population increased from 7.4 to 10.3 percent.

over 80 percent of these new arrivals were white, so the increase in the southern black share of this education group was far smaller (15 percent). In percentage terms, the southern stock increased fastest among better educated men. For example, southerners represented 5.2 percent of northern workers with 8-10 years of schooling in 1940 and 11.7 percent of this group in 1970 (an 125 percent increase). Moreover, black in-migration represented over 50 percent of the flow into this group.

C. Evidence of Labor Market Segmentation by Race

Black workers can be closer substitutes with other black workers for race-neutral reasons (blacks and whites have different skills) or for race-specific reasons (blacks and whites with similar skills have access to – or choose to engage in – a different set of jobs). In either case, black migration will exert stronger negative pressure on black wages. I consider evidence for both propositions here.

In the mid-twentieth century, black and white workers in the North possessed very different sets of skills. However, the racial skill gap was notably smaller among the northern-born. Figure 1 subdivides the northern workforce into 40 skill groups – five education categories and eight experience levels within each education group – in a representative year (1950).⁷ Panel A contains the full northern workforce, while Panel B focuses on the northern-born. In the full sample, racial differences in skill level are readily apparent. For example, 61 percent of northern black workers had completed fewer than ten years of schooling, compared to only 36 percent of northern whites. Among the northern-born, the racial skill gap, while still present, was substantially smaller. For example, only 49 percent of northern-born blacks had completed fewer than ten years of education, compared to the same 36 percent of northern-born whites.

⁷ The education and experience categories are defined in Section III.C.

Even among men with the same level of schooling and years of job experience, black workers often found themselves limited to a proscribed set of jobs.⁸ Case studies document that blacks were prevented from working at some firms, holding certain occupations – including skilled crafts, retail, and clerical work – and ascending to supervisory positions (see, for example, Bodnar, Simon and Weber, 1982; Trotter, 1985; Gottlieb, 1988; Grossman, 1989; Broussard, 1993).⁹

Overtly discriminatory hiring practices were banned in many northern states in the 1940s and 1950s (Collins, 2003).¹⁰ Until that time, some firms simply refused to hire black workers. For example, for many years Ford Motor Company was the only automobile manufacturer in Detroit willing to hire black employees. As a result, in the early 1940s, Ford employed 50 percent of black Detroiters and only 14 percent of local whites (Maloney and Whatley, 1995).

Even within “integrated” firms, blacks faced limited job opportunities. In manufacturing, blacks were often restricted to the hottest, dirtiest, or most dangerous parts of the factory. At U.S. Steel Corp. in Pittsburgh, for example, “black men could advance no higher than first helper in the open hearth department” (Gottlieb, 1988, p. 98-99). Trotter (1985) describes a similar process in Milwaukee, whereby tanneries employed blacks only in “the beam house, where dry hides were placed into pits filled with lime to remove hair,” and packinghouses “relegated Afro-

⁸ Another explanation for imperfect substitutability is the existence of long-standing areas of occupational or industrial specialization across groups. For example, Grant (2003) illustrates that in the late 19th century German immigrants, who were concentrated in artisanal trades, were particularly susceptible to competition from new Central and Eastern European migrant groups. While, in theory, this channel could also help to explain a low elasticity of substitution by race, the historical record is more consistent with the presence of labor market discrimination.

⁹ In contrast, payroll data show that when black men were employed in the same job at the same firm as a white co-worker, they were usually paid the same wage (Foote, Wright and Whatley, 2003). Higgs (1977) presents similar evidence for the South.

¹⁰ In addition, Collins (2001) shows that Roosevelt’s Fair Employment Practice Committee, established during World War II to ensure anti-discrimination in defense industries, had a much stronger effect on black employment in the North than in the South.

Americans to the worst occupations...[in which they] unloaded trucks, slaughtered animals, transported intestines, and generally cleaned the plant” (Trotter, 1985, p. 53).

Case studies of particular industries emphasize that race-based job assignments cannot be satisfactorily explained by skill differentials (Wright, 1986). Many factory positions required only a few weeks of on-the-job training. As one of Gottlieb’s interview subjects in Pittsburgh, Wesley M., attests: “I worked in that mill and I have learned those white boy[...] jobs. [They] would put them on my job, [and I would] learn them their jobs, but still I couldn’t get the [better] job” (Gottlieb, 1988 p. 100). Blacks were barred from crafts and trade work not for lack of ability but because all-white or segregated unions limited their access to apprenticeships (Foner, 1974). Similarly, blacks were bypassed for promotion because many white workers refused to report to a black boss. Even in West Virginia’s relatively equitable coal mining industry, in which blacks had access to high-skilled machine-cutting jobs, black workers rarely attained a supervisory position (Fishback, 1986).

Census records provide supporting evidence of occupational segregation by race (Margo, 1990; Sundstrom, 1995). As one illustration, Figure 2 depicts the fifteen most commonly-held occupations among northern-born men with exactly an eighth grade education in 1950. Only three jobs – truck drivers, mechanics, and clerical workers – employ a sizeable share of men of both races. Black men are most likely to work in the stereotypical positions of janitor, cook, porter, and service worker, while white men hold three union posts (mine operatives, carpenters, and machinists), two supervisory positions (foremen and managers) and one position that requires interaction with the public (salesman).

III. A Framework for Measuring the Effect of Migration on Wages

A. Production Function

The historical evidence suggests that similarly-skilled blacks and whites were not perfect substitutes in the northern labor market. In this case, the migration of black southerners would represent a larger shock to existing black workers than to their white counterparts. This section lays out a simple production function to demonstrate the conditions under which black in-migration from South would slow racial wage convergence in the North. The rest of the paper will use this framework, along with estimated elasticity parameters, to gauge the effect of southern migration on the black-white wage gap in the North.

Consider a Cobb-Douglas production function in which capital (K) and a labor composite (L) are combined to produce output:

$$Y = A L^{\alpha} K^{1-\alpha} \quad (1)$$

To simplify notation, I suppress time subscripts on output and the factor inputs. Following Borjas (2003) and Ottaviano and Peri (2006), I model the labor composite as a nested set of functions, each of which exhibit constant elasticity of substitution (CES). The layers of the labor composite include education groups (e), experience levels within each education group (x), and two racial groups (black and white) within each education-experience cell (r).

Total labor supply can be written as an aggregation of the contributions from each education group (L_e):

$$L = [\sum_e \theta_e L_e^{(\delta-1)/\delta}]^{\delta/(\delta-1)} \quad (2)$$

The θ_e terms are technology parameters that shift the relative productivity of education groups (normalized to sum to one). The variable $\delta > 0$ denotes the elasticity of substitution between workers with different levels of educational attainment.

In turn, the labor supply of each education group is a combination of the contributions of workers with different levels of experience:

$$L_e = [\sum_x \theta_{ex} L_{ex}^{(\eta-1)/\eta}]^{\eta/(\eta-1)} \quad (3)$$

η measures the elasticity of substitution across experience levels within an education category. It is likely that workers are closer substitutes within education categories than across them; in this case, we expect $\eta > \delta$.

Finally, I allow black and white workers in the same skill group to be imperfect substitutes, perhaps due to discrimination in the labor market. The labor supply within an education-experience cell combines the contributions of black and white workers:

$$L_{ex} = [\theta_{exw} L_{exw}^{(\sigma-1)/\sigma} + \theta_{exb} L_{exb}^{(\sigma-1)/\sigma}]^{\sigma/(\sigma-1)} \quad (4)$$

The θ_{exr} terms ($r = w, b$) are race-specific productivity parameters and σ is the elasticity of substitution between black and white men in the same skill cell.

In a competitive equilibrium, workers earn a wage equal to the value of their marginal product. Choosing output as the numeraire, we can recover the wages of men in a particular skill group by differentiating equation 1 with respect to L_{exr} .¹¹ The logarithm of wages for men with education level e , experience x , and race r is:

$$\ln w_{exr} = \ln(A^{1/\alpha} \kappa^{(1-\alpha)/\alpha}) + 1/\delta \ln(L) + \ln \theta_e - (1/\delta - 1/\eta) \ln(L_e) + \ln \theta_{ex} - (1/\eta - 1/\sigma) \ln(L_{ex}) + \ln \theta_{exr} - 1/\sigma \ln(L_{exr}) \quad (5)$$

¹¹ Following Ottaviano and Peri (2006), I first express output as a function of the capital-output ratio ($\kappa = K/Y$); this substitution will become useful later on.

Wages in a skill cell depend positively on the education-, experience- and race-specific productivity terms and negatively on own-group labor supply.

Equation 5 indicates the channels through which an increase in black labor supply into a specific skill group could affect the wages of men in that and other groups. Existing black workers within the skill cell will face an increase in own-race own-skill labor supply (term 8), a general increase in own-skill labor supply (term 6), an increase in labor supply within their education level (term 4) and an increase in economy-wide labor supply (term 2). White workers in that skill cell will face only the last three supply shocks, workers in other experience levels will face only the last two, and so on.

A general expression for the effect of an increase in the supply of factor b on the wages of factor a is given by:

$$d \log w_a / d \log L_b = s_b Y_{ab} Y / Y_a Y_b \quad (6)$$

where s_b is the share of income earned by factor b and Y_x denotes the partial derivative of output with respect to a factor x (Hamermesh, 1993). For the nested CES production function used here, an increase in black labor supply to skill group $e-x$ will have the following effect on the white wage in that skill group:

$$\Delta w_{sxw} / w_{sxw} = [1/\delta + (1/\eta - 1/\delta) (1/s_e) + (1/\sigma - 1/\eta)(1/s_{ex})] \cdot s_{exb} \cdot \Delta L_{sxb} / L_{sxb} \quad (7)$$

Likewise, the effect of an increase in black labor supply to a different experience level in the same education category or to a different education category on white wages in skill group $e-x$ can be written as:

$$\Delta w_{sxw}/w_{sxw} = [1/\delta + (1/\eta - 1/\delta) (1/s_e)] \cdot s_{exb} \cdot \Delta L_{sxb}/L_{sxb} \quad (8)$$

$$\Delta w_{sxw}/w_{sxw} = 1/\delta \cdot s_{exb} \cdot \Delta L_{sxb}/L_{sxb} \quad (9)$$

Adding equations (7)-(9) across all skill groups contained in a black migrant flow provides the total effect of a percentage change in black labor supply on the wage of white workers in group e - x :

$$\Delta w_{sxw}/w_{sxw} = 1/\delta \sum_i \sum_j (s_{ijb} \Delta L_{ijb}/L_{ijb}) + (1/\eta - 1/\delta) (1/s_e) \sum_j (s_{ejb} \Delta L_{ejb}/L_{ejb}) + (1/\sigma - 1/\eta) (1/s_{ex}) (s_{exb} \Delta L_{exb}/L_{exb}) \quad (10)$$

The wage will fall with entrants into the workers' own education level and education-experience cell (terms 2 and 3). As a counterweight, the wage will rise with an increase in labor supply into skill cells that are complements in production (term 1). For the time being, I will maintain the assumption that capital completely adjusts to new labor supply over a decade, in which case we can ignore the impact of this inflow on K or the capital-labor ratio. I will relax this assumption below.

The effect of an increase in black labor supply on the wages of black workers in skill group e - x contains an additional term that captures the potentially imperfect elasticity of substitution between men of different races in the same skill group:

$$\Delta w_{exb}/w_{exb} = \Delta w_{exw}/w_{exw} - 1/\sigma (\Delta L_{exb}/L_{exb}) \quad (11)$$

In the case of perfect substitution, σ is equal to ∞ and black migration will have an equal effect on black and white wages in the same skill group. If σ is less than ∞ , the arrival of new black workers will have a larger negative effect on existing black workers.

Equations 10 and 11 indicate the effect of a shock to black labor supply on the wages of white and black men in specific skill cells. The effect of a given shock on *average* black and

white wages will be a weighted sum of these cell-specific effects. The average effect on black wages will be larger than that for white wages if: (1) the elasticity of substitution by race (σ) is low, increasing the effect of black migration on black wages *within* each skill cell, or (2) the skill distributions of whites and blacks are sufficiently different, such that the average black worker is a greater substitute than the average white worker for black arrivals.

B. Estimating Equation

Finding an unbiased estimate of the elasticity of substitution by race (σ) is central to understanding the effect of black migration on black-white wage convergence. An estimate of σ can be obtained by regressing the black-white wage ratio on the relative labor supply within skill groups. From equation 5, the ratio of black to white wages in the same skill group is determined by the ratio of black to white labor supply and the ratio of the race-specific productivity terms:

$$\ln(w_{\text{exb}}/w_{\text{exw}}) = -(1/\sigma) \ln(L_{\text{exb}}/L_{\text{exw}}) + \ln(\theta_{\text{exb}}/\theta_{\text{exw}}) \quad (12)$$

If blacks and whites are perfect substitutes ($\sigma = \infty$), the wage ratio will be invariant to relative supply. A positive coefficient on the relative supply term implies that black and white workers in the same skill are not used interchangeably in production ($\sigma \neq \infty$).

A simple regression of the wage ratio on the ratio of labor supply will suffer from omitted variables bias. The race-specific productivity terms are unobserved and may be correlated with labor supply. In addition to measuring unobserved skill, the “race-specific productivity” term also reflects relative barriers in the labor market. Highly-educated black workers will be less productive than highly-educated whites if employers are only willing to hire blacks for menial tasks. As discrimination abates, the productivity of black workers will increase. A reduction in

discrimination may also influence black human capital decisions, leading to a potential correlation between race-specific productivity and labor supply.

However, because education decisions occur early in life, any human capital response will occur with a lag. Thus, it is less likely that contemporaneous *changes* in the productivity terms will be correlated with *changes* in labor supply, which are predetermined by the education decisions of earlier cohorts. To estimate an equation in changes, I pool data from four Census years (1940-70). My estimating equation is:

$$\ln(w_{\text{exbt}}/w_{\text{exwt}}) = \beta \ln(L_{\text{exbt}}/L_{\text{exwt}}) + e + x + \tau + (e \cdot x) + (e \cdot \tau) + (x \cdot \tau) + \varepsilon_{\text{exbt}}/\varepsilon_{\text{exwt}} \quad (13)$$

The regression includes vectors of dummy variables for education, work experience, and Census years and all two-way interactions. The interactions $(e \cdot \tau)$ and $(x \cdot \tau)$ allow the returns to schooling and experience to change over time, and the interaction $(e \cdot x)$ lets experience profiles differ by education. β is identified from changes in the black-white labor supply within education-experience cells over time. The implied elasticity of substitution (σ) is equal to $-1/\beta$.

C. Data and Definitions

A skill group-level dataset can be constructed from individual records in the Integrated Public Use Microdata Series (IPUMS) (Ruggles, et al., 2004). I partition the northern economy into forty skill cells in each year defined by five education categories and eight experience intervals. I define five levels of educational attainment: elementary school (0-5 years of schooling), middle school (6-9 years of schooling), high school attendees (10-11 years of schooling), high school graduates (12 years of schooling) and men with at least some college (13 or more years of schooling). I consider alternative divisions as a robustness exercise below.

Because the Census does not collect information on work experience, I assign each individual a predicted level of work experience based on his age and years of completed schooling. I allow men to begin accruing labor market experience in the year after they leave school, but constrain the earliest age of labor market entry to be 13.¹² Work experience is thus defined as $[\text{age} - \max\{\text{education} - 6, 12\}]$. I consider individuals who, by this measure, have one to 40 years of work experience and divide this group into five-year intervals (1 to 5 years, 6 to 10 years, *et cetera*).¹³

I allocate all men between the ages of 18 and 64 who are employed in the northern labor force into a skill cell, with the exception of men who reside in group quarters, are in the armed forces, or work in the farm sector. I split the labor force in each skill cell into blacks and non-blacks. While I refer to non-blacks as “whites” throughout the paper, this group contains a small number of Asians and Native Americans.

The key right-hand side variable is the black-white labor supply ratio in a skill cell ($L_{\text{exbt}}/L_{\text{exwt}}$). I focus on labor supplied by southern migrants. Changes in this ratio over time measure the relative supply shock due to southern migration. All men who were born in a southern state and reside in the North are classified as migrants.¹⁴

The black-white earnings ratio for a skill cell is calculated from the annual earnings of men who meet the sample criteria and who, in addition, are not enrolled in school, self-employed, or working part time (fewer than 40 hours per week). The last two restrictions are

¹² Alternatively, I impose the assumption that work experience gathered before age 13 does not earn a market return.

¹³ Men with 0-5 years of education accrue 1-5 years of experience between the ages of 13 and 18. Because entry into the sample begins at age 18, the lowest experience cell is unobserved for men in this education group. The remaining sample contains 156 skill cells (4 years \cdot 5 education groups \cdot 8 experience levels – 4 cells).

¹⁴ I cannot observe the inter-regional migration activity of the foreign-born. Implicitly, I assume here that the foreign-born do not relocate from South to North once they enter the country. The foreign-born are included with northern-born natives in calculating the dependent variables. I drop individuals whose birthplace is not reported (only 0.1 percent of sample).

added to ensure comparability across Census years.¹⁵ Furthermore, only the earnings of northern-born men count toward the tally. Including the earnings of southern migrants in the dependent variable would raise concerns about composition bias. Migrants contribute a greater amount toward average earnings in cells with higher in-migration rates. Because black migrants earned more than non-migrants, this relationship would generate a bias against finding a negative wage effect of migration. Summary statistics for annual earnings and labor supply by skill group are presented in Appendix Table 1.

IV. Estimating the Elasticity of Substitution by Race within Skill Groups

A. Defining Skill Groups by Education and Experience Level

Table 3 investigates the relationship between the black-white wage gap and race-specific migrant flows within skill cells. The first panel contains results from OLS regressions of the logarithm of black and white earnings levels (or their ratio) on the logarithm of black and white labor supply. Skill cell-level observations are weighted by the number of northern-born men used to calculate the earnings ratio. As the first row demonstrates, black wages fall both in absolute terms and relative to white wages in skill cells that experience a migration-induced increase in relative black labor supply.¹⁶ The coefficient in the first column implies an elasticity of substitution by race within skill group of 8.3 ($=1/0.120$).

In the next two rows, I split the labor supply ratio in two and separately enter the levels of black and white migration. The wages of northern-born black men fall when black southerners in

¹⁵ In 1940, the Census did not collect information on self-employment income. In addition, in that year workers reported the number of weeks worked full time, whereas in all subsequent years respondents reported any week in which they had worked for pay (Margo, 1995). Finally, I exclude full-time workers who report making less than one-half of the prevailing federal minimum wage and replace top-coded incomes with 1.4 times the top-code (Goldin and Margo, 1992).

¹⁶ Sundstrom (2007) finds a similar pattern across southern counties in 1940. Counties with a larger ratio of black-to-white labor supply also had larger black-white wage gaps.

their skill cell move North, but increase slightly with white southern in-migration. On the other hand, an increase of either black or white labor supply reduces the wages of white workers to an equal degree. These results are consistent with the case study evidence documenting that black workers had access to a limited set of jobs and thus faced greater exposure to competition from black arrivals.

One concern with an OLS regression of this nature is that southerners might choose to migrate when northern wages in their race-by-skill cell are high. In this case, migration flows will be correlated with unobserved race-specific productivity terms and OLS coefficients will be biased downward (see equation 12). One solution is to instrument for black and white migrant flows using the stock of southern-born men by race in a skill cell. The stock of southern-born men is composed of men who choose to migrate North and men who choose to remain in the South.¹⁷ As a result, the stock cannot be influenced by the migration decisions of southern men. Instead, the stock of southern-born men in a skill group will vary over time with demographic shifts and changes in educational attainment in the South.

The assumption underlying this instrument is that neither demographic patterns nor educational upgrading in the South are influenced by northern wages. This assumption will be violated if southerners keep the option of migrating to the North in mind when making their human capital decisions. However, as discussed above, education responses can only occur with a lag. With the exception of the youngest skill groups, we can treat the education levels of the workforce as predetermined. At the very least, in relative terms, the southern-born stock will be *less* responsive to northern wages than is the flow of southern migrants.

¹⁷ During this period, 16 percent of white men and 27 percent of black men in the average cell who were born in the South resided in the North.

Table 4 presents a set of first stage results in which the stock of southern-born men in a skill cell is used to predict the flow of southern migrants to the North. The first stage regressions include the full set of dummy variables contained in equation 13. Not surprisingly, the stock of black southerners in a cell strongly predicts the southern black migrant flow into that cell in the North, while the stock of white southerners predicts the white migrant flow; neither stock is significantly associated with the migration patterns of men of the opposite race.

The second panel of Table 3 contains second stage coefficients from an IV regression that instruments for the migrant flows with the southern-born stocks. The qualitative pattern in the IV regressions is similar to OLS, but the standard errors increase. As a result, the effect of relative labor supply on black wages and the black-white wage gap is no longer significant. However, there is no evidence that the OLS coefficients are biased downward by endogenous relocation. If the migrant flow into a skill cell increases when race-specific productivity is high, we would expect the IV coefficients to be larger in absolute value than their OLS counterparts. If anything, they are a little bit smaller. It is important to keep in mind that the migration decision entails a comparison of relative wages in the source and destination regions. Periods of increasing labor demand for black workers in the North could coincide with *even larger* increases in race-specific labor demand in the South.

An additional concern raised by the contemporary immigration literature is the ability of native workers to adjust to immigrant arrivals – for example, by leaving areas with large immigrant concentrations (Card, 2001; Borjas, 2003). In this case, a reduction in native labor supply can counteract the positive supply shock of migration. Using variation by skill group, rather than by geography, limits this scope for adjustment. Education is usually completed early in life and work experience is a function of education and age. Thus, it is highly unlikely that

northerners could shift among skill groups in response to southern migration. The one remaining margin for adjustment is for a northern worker to relocate to the South. The share of northern-born men within a skill group that live in the South is a measure of such “reverse migration.” I find no evidence that northern-born black or white men in skill groups that experience high southern migration are more likely to move South (not shown).

B. Accounting for Unobserved School Quality

Thus far, the results suggest that, even in the postwar North, similarly-skilled blacks and whites were not fully interchangeable in production. This finding crucially depends on the assumption that black and white men in an education-experience group have the same true level of “skill.” However, blacks – particularly those who were educated in the South – attended schools of systematically lower quality, thereby reducing the amount of human capital attained for every year spent in school. Ideally, one could adjust years of schooling for quality differences and re-estimate the elasticity of substitution within more precisely defined skill groups.

The quality of schools attended by the typical black and white student differed along many dimensions. *De jure* black schools in the South provided substantially fewer resources per pupil. As a result, black schools had higher pupil-teacher ratios and shorter term lengths (Margo, 1990). Other aspects of school quality, including the quality of teachers and peers, surely differed as well but remain unobserved.

The literature is unequivocal that time spent in school earns a market return, but is mixed on the value added of small class sizes (Hanushek, 1999; Krueger and Whitmore, 2001). As a result, I focus on the differences in term length between white and black schools. I use data on average term length by race, state of birth, and birth cohort to convert years of completed

schooling into likely days spent in the classroom (Card and Krueger, 1992). I replace year-based education categories with day-based equivalents according to an 180 day school term. For example, the lowest education group becomes 900 or fewer days of likely school attendance, rather than five or fewer years of educational attainment.

The first panel of Table 5 re-estimates the main results using these adjusted skill groups. As before, black wages fall with an increase in black labor supply but are unaffected by changes in white labor supply. White wages are now sensitive only to white labor supply. However, the magnitude of the point estimates falls by two-thirds in this setting. The implied elasticity of substitution by race within skill cells is high ($23.8 = 1/.042$), but remains significantly different from zero. One interpretation of this estimate is that the low elasticity of substitution by race in the previous specification may actually be picking up systematic racial differences in true skill within years-of-schooling-based skill categories. With more accurate measures of skill, blacks and whites in the same skill group appear to be closer – *though still not perfect* – substitutes in production. Alternatively, the lower point estimates may simply be due to measurement error. If term length is *not* closely associated with skill, this procedure would be adding noise to an otherwise reasonable assignment to skill groups. In the counterfactual exercise, I will consider the effect of black migration on northern wage convergence for a range of elasticity estimates.

C. Robustness Checks

In the mid-twentieth century, on-the-job training may have contributed as much to productive skill as did formal education. I construct alternative skill groups by experience level and occupation (rather than education), which classify occupations into six composite one-digit categories: professional/managerial; clerical/sales; crafts; operatives; unskilled labor; and

service. The second panel of Table 5 conducts a parallel analysis by occupation-experience group. The point estimates are very similar in magnitude to the education-experience results in Table 3. Increasing the relative black labor supply in a skill group reduces the ratio of black to white wages, with an implied elasticity of substitution by race of 11.1 ($= 1/0.090$).

Table 6 considers a series of additional robustness exercises. Each row reports a coefficient from an OLS regression, the dependent variable of which is the black-white wage ratio. Reading down the rows of Panel A, the new specifications add women to the labor supply counts; run an unweighted regression restricted to cells with 25 or more northern-born blacks; add men with 40-50 years of labor market experience; and redefine education categories.¹⁸ In these four supplementary regressions, the implied elasticities of substitution within skill groups by race range from 5.5 to 12.5. The parameter estimate from the preferred specification in Table 3 ($\sigma = 8.3$) falls around the midpoint of this interval. With the exception of the specification that adds older men, the point estimates are all significant at least at the 10 percent level.

The second panel of Table 6 re-estimates the preferred specification for sub-samples of interest. The limited sample size (156 skill cells) precludes testing for changes in the elasticity of substitution over time or between education groups. More modestly, I am able to show that the results are not being driven by the lowest or highest education groups (Panel B, rows 1 and 2). Finally, I restrict the wage data for white men to either native-born northerners (row 3) or the foreign-born living in the North (row 4). In both cases, the counts used to construct the relative labor supply ratio continue to include all southern-born whites and blacks in the northern workforce. Interestingly, foreign-born whites appear to be much more substitutable with black

¹⁸ The original education groups were intended to reflect typical school categories: elementary (0-5 years), middle school (6-9 years), high school (10-11 years, 12 years) and college. However, some elementary schools run through the 6th grade and some high schools begin in the 9th grade. The new education measure contains five alternate categories: 0-6, 7-8, 9-10, 11-12 and 13+ years of schooling.

workers in their skill group than are native-born whites. The estimated elasticity by race for the foreign-born is 16.4 ($=1/.061$) and we cannot reject the possibility of perfect substitutability in this case. In contrast, the elasticity of 7.9 ($=1/.126$) between native-born whites and blacks is at the low end of the estimate range.

V. Counterfactual Rates of Black-White Wage Convergence

Section III illustrates how an influx of black workers could affect northern wages. Black migration would increase the black-white wage gap if black and white workers occupy different portions of the skill distribution or if the elasticity of substitution within skill groups by race is low. In this section, I calculate counterfactual levels of wage convergence in the North within this framework. If there had been no new black migration to the North after 1940, would northern black wages have increased at a faster rate? Would blacks have gained relative to whites?

Equations 10 and 11 detail how the wages of white and black workers change following a percentage change in black labor supply. The magnitude of these changes depend on the size of the labor supply shift due to black migration ($\Delta L_{\text{exb}}/L_{\text{exb}}$); income shares for black workers by skill group (s_{exb}); and three elasticity estimates (δ , η , and σ). The first two components can be calculated from the 1940 and 1970 IPUMS. The elasticity of substitution by race within skill group (σ) was estimated in the previous section. Estimates of δ and η can be obtained by aggregating the workforce into education-experience groups or education categories alone and estimating the wage response to an increase in own-group labor supply over time. The resulting coefficients, which are based on data from 1940 to 1970, are 0.192 (s.e. = 0.044) and 0.266 (s.e. = 0.138). The elasticity of substitution implied by these coefficients is 5.20 across experience

levels and 3.75 across education groups. Comparing these results with Borjas' (2003) more recent estimates of 3.47 and 1.35 suggests that there was a greater scope for substitution across skill categories in the mid-twentieth century.¹⁹

In the counterfactual scenario, the northern black labor force is only allowed to grow through natural increase. The black migration flow into every skill group is set to zero. The percentage increase or decrease in average wages under this scenario (relative to their actual levels) are reported in Table 7. Wage effects are aggregated into averages for five education categories by race.²⁰ A positive sign indicates that wages would have been *higher* if not for the black migration flow.

The wage effects in the first two columns are calculated using the OLS and IV estimates of σ respectively (Table 3). In both cases, limiting southern black migration would have had large positive effects on black wages, particularly for blacks with 10 or more years of education. Southern migration had little impact on black labor supply at lower education levels relative to the pre-existing stock (Table 2). As a result, for low-skilled workers, the dominant effect of the migration was to increase complementary factors, thus increasing wages slightly (by around one percent). However, the negative effects of southern migration on middle- and high-skilled black workers are large enough to more than offset these small positive effects. If not for the ongoing southern migration, average black wages in the North would have been 7.2 to 9.6 percent higher by 1970.

The second panel of Table 7 demonstrates that black migration had essentially no effect on white wages. Black migration simply did not represent a large enough increase in total

¹⁹ I conduct the counterfactual wage calculations using both sets of parameter estimates, and the results are almost entirely unchanged (not shown).

²⁰ Averages are calculated by weighting the contributions of each skill group by their share of the total (race-specific) wage bill.

northern labor supply to greatly influence white wages. In the average skill cell, migration resulted in an 102 percent increase in black labor supply but only a 4.5 percent increase in the total labor supply.

Taken together, we can conclude that, absent migration, black workers would have experienced an additional 7.5 to 10.2 percent increase in wages relative to white workers. The foregone wage convergence in the North due to migration is large relative to actual wage convergence. In 1940, northern blacks earned 45 percent less than northern whites (Table 1). Over the next thirty years, this gap declined by 15 log points. A 10.2 percent increase in black wages absent migration would have translated into an additional 7 point reduction in the black-white wage gap, or a 50 percent increase in the rate of convergence in the North.²¹

The no-migration counterfactual reverses the North-South comparison in rates of racial convergence. In actual data, the black-white wage gap declined by 17.2 log points in the South and only 13.9 log points in the North from 1940 to 1970. Absent migration, the regional gap would have reversed, with the pace of convergence faster in the North than the South (21.0 log points). This revised regional comparison is conservative, ignoring the likely effect of the reallocation of black labor supply on the South.

The final two columns in Table 7 examine the impact of black migration on northern wages under two alternative sets of assumptions. Column 3 recalculates the wage effects under the assumption that black and white workers are perfect substitutes within skill groups ($\beta = 0$ or $\sigma = \infty$). Black migration could still have had a larger effect on existing black workers if the skill distribution of black workers more closely matched that of black migrants. I do not find this to be the case. Instead, ending black migration would have increased the wages of high school

²¹ The average black wage was 70 percent of the average white wage in 1970. If the average black wage had grown by an additional 10.2 percent, it would have been 77.1 ($= 70 \cdot 0.102$) of the average white wage.

attendees and graduates of *both* races by around one percent and decreased the wages of less-educated men by an equivalent amount. These two effects would have been offsetting, and so I find no effect of black migration on average wages of either race in this scenario.

The final column of Table 7 relaxes the assumption that capital will adjust perfectly to the expansion of the northern labor force. In this case, the capital-labor ratio would fall with immigration, reducing wages in all skill groups. This channel is reflected by an additional term in the black and white wage equations (equations 10 and 11): $-(1-\alpha) \sum_i \sum_j (s_{ijb} \Delta L_{ijb} / L_{ijb})$ where α is share of income earned by the labor aggregate. For $\alpha = 0.7$, the 4.5 percent increase in the total northern labor supply due to black migration would result in an additional 1.3 percent decline in wages for all groups. This scenario is represented in column 4, where black wages fall by 8.5 percent (rather than 7.2 percent) and white wages fall by 1.0 percent. One's preferred estimate depends on how responsive one believes capital to be.²² However, the choice between a fixed or perfectly elastic capital stock has no effect on the *wage convergence* results because slow capital adjustment would have an equal effect on black and white wages.

VI. Conclusion

Writing in the 1920s, W.E.B. Du Bois warned that migration of the “great reservoir of [southern black] labor” to the North would have negative consequences for the existing black community in the form of competition in the labor and housing markets. Prompted by the war-time boom in northern industry, the 1940s ushered in an era of inter-regional migration at levels that Du Bois could hardly have foreseen. Southern migrants more than doubled the black labor supply above the Mason-Dixon line between 1940 and 1970.

²² Ottaviano and Peri (2006) present evidence from the past three decades showing that capital is very responsive to immigrant arrivals.

Because of the imperfect substitutability between black and white workers, new black arrivals reduced the wages of existing black workers in the North but had no effect on average white wages. In this paper, I show that northern black wages would have grown by an additional eight to ten percent in the absence of southern migration. This relative black wage growth would have increased the pace of racial wage convergence in the North by 50 percent. This finding modifies the current view of the Great Black Migration as a general avenue for black economic advancement. While migration was an important step in the alleviation of black rural poverty, it was also impediment to economic assimilation in the urban North. If not for the influx of southern migrants, northern blacks might have experienced a pattern of economic assimilation in line with that of white European ethnics, who – ironically – may have benefited from the immigration quotas of the 1920s.

This paper has concentrated on the labor market effects of the Great Black Migration on the North. Equally interesting is the potential impact of black migration on the political economy of northern cities and the capital investment decisions of northern firms. Economic historians have investigated such long-run effects of the migration on the South. Margo (1991), for example, argues that the considerable loss of black labor supply in the South put pressure on southern towns and school districts to retain black workers by providing public services, while Grove and Heinicke (2003) engage a long literature on the role of the migration in generating incentives for the development and diffusion of the mechanical cotton picker. The broader impacts of the black migration on the northern economy provides a fruitful area for future research.

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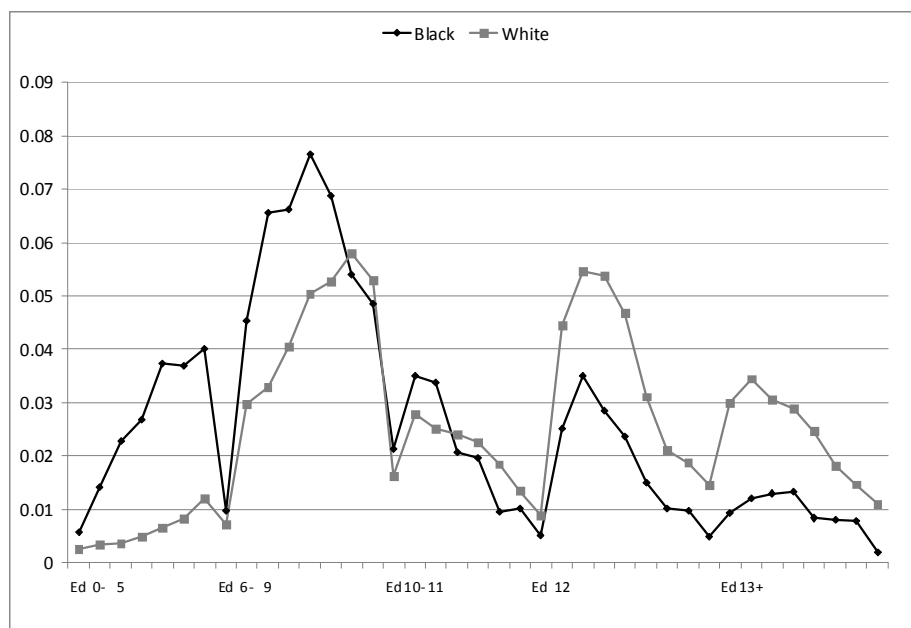
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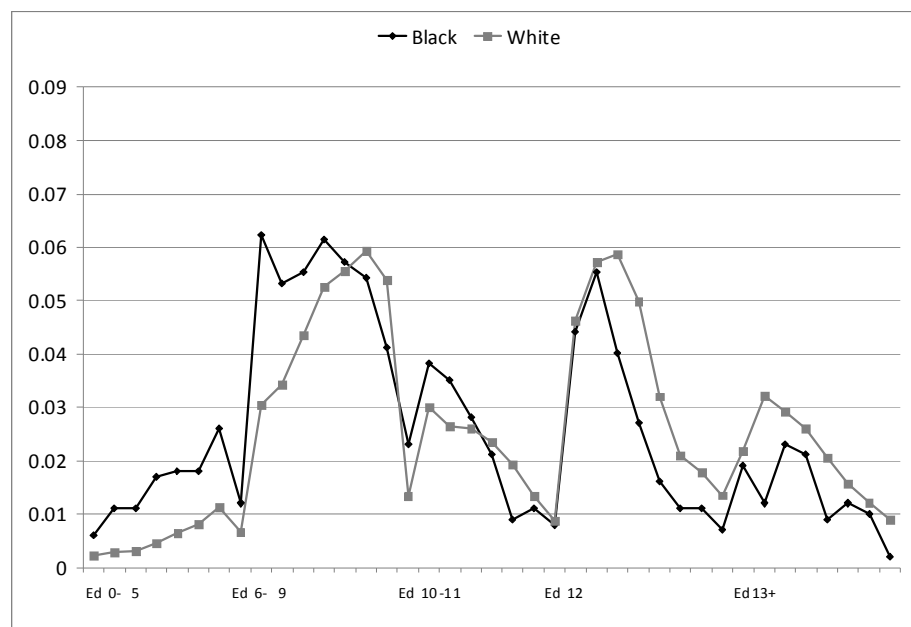
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Figure 1: Skill distribution of men in the northern labor force in 1950 by race and birth place

A. All men



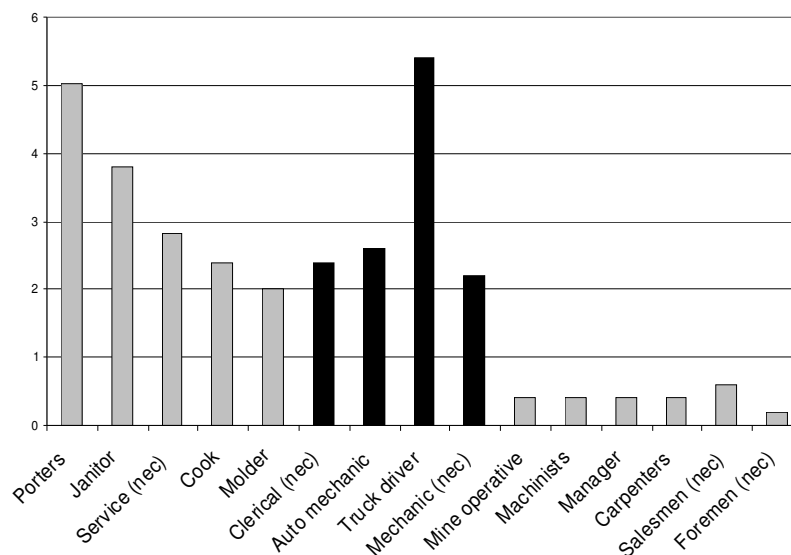
B. Northern-born men



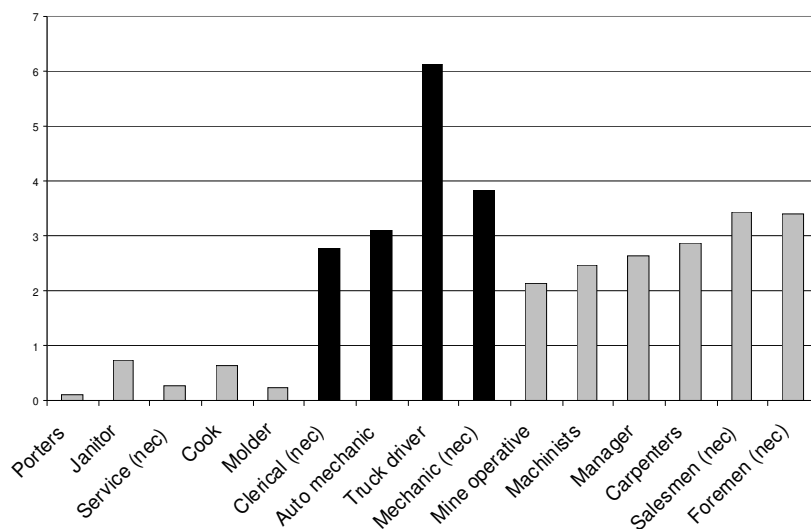
Notes: Skill groups are defined by five education categories and eight experience intervals, each representing five years of potential labor market experience, within each education category. The hash marks after each education label on the X-axis indicate these experience intervals.

Figure 2: Common occupations for northern-born men with exactly eight years of education by race, 1950

A. Black men



B. White men



Notes: Graphs report the ten most common occupations held by either black or white men. Occupations that employ at least two percent of men of both race are shaded in black. I omit two commonly held occupation categories – laborer and operatives, not elsewhere classified – which are too broad to be easily interpreted. 26.1 percent of blacks and 10.8 percent of whites are classified as “laborers,” 15.8 percent of blacks and 17.8 percent of whites are classified as “operatives.” The remaining 15 categories employ 31.0 percent of blacks and 34.8 percent of whites.

Table 1: Regional differences in black-white wage convergence, 1940-1970

	All men				Non-migrants			
	1940	50-40	60-50	70-60	1940	50-40	60-50	70-60
North total	0.455	-0.139	0.042	-0.059	0.455	-0.089	0.003	-0.053
Northeast	0.466	-0.119	0.038	-0.047	0.460	-0.104	0.017	-0.029
Midwest	0.436	-0.162	0.045	-0.069	0.459	-0.092	-0.025	-0.073
West	0.428	-0.137	0.034	-0.042	0.355	-0.069	-0.001	0.011
South total	0.689	-0.110	0.024	-0.089	0.653	-0.101	0.017	-0.088
North - South	0.234	0.029	-0.018	-0.030	0.198	-0.012	0.014	-0.035

Notes: The first column in each panel presents the log wage gap between black and white men in 1940. Subsequent columns show changes in this gap over the following three decades. The sample under consideration includes men aged 18-64 who are not in group quarters, the armed forces, or the farm sector, and report a current occupation. All states in the southern Census region are assigned to the South, with the exception of Delaware, the District of Columbia and Maryland. The Northeast contains the New England and Mid-Atlantic Census divisions (as well as Delaware, DC, and Maryland). The Midwest encompasses the East and West North Central Census divisions and the West includes the Mountain and Pacific divisions.

Table 2. Share of the northern male labor force born in the South, 1940-1970

	All southern born	Black, southern born	White, southern born
All North			
1940	0.063	0.024	0.038
1950	0.088	0.035	0.053
1960	0.099	0.037	0.063
1970	0.094	0.033	0.061
0-5 years of education			
1940	0.134	0.092	0.041
1950	0.239	0.160	0.079
1960	0.338	0.195	0.143
1970	0.235	0.106	0.129
8-10 years of education			
1940	0.052	0.015	0.037
1950	0.082	0.030	0.052
1960	0.102	0.041	0.062
1970	0.117	0.052	0.064
13+ years of education			
1940	0.051	0.009	0.042
1950	0.059	0.010	0.049
1960	0.065	0.014	0.051
1970	0.069	0.015	0.054

Notes: Sample restrictions and regional definitions are included in the notes to Table 1.

Table 3: Relative black labor supply and the black-white wage gap in the North, 1940-1970

Labor supply	Wages		
	ln(black/white)	ln(black)	ln(white)
OLS			
ln(black/white)	-0.120 (0.048)	-0.137 (0.049)	-0.017 (0.017)
ln(black)	-0.124 (0.052)	-0.146 (0.051)	-0.022 (0.014)
ln(white)	0.083 (0.057)	0.052 (0.060)	-0.031 (0.019)
IV			
ln(black/white)	-0.090 (0.068)	-0.119 (0.069)	-0.029 (0.021)
ln(black)	-0.088 (0.069)	-0.114 (0.068)	-0.027 (0.017)
ln(white)	0.061 (0.101)	0.058 (0.105)	-0.002 (0.029)

Notes: N = 156. Standard errors are presented in parentheses and are clustered by skill group. Skill groups are defined by five education categories and eight experience intervals. Observations are weighted by the size of the underlying northern-born sample used to calculate mean annual earnings. In panel B, the instrument for black (white) migrant flow is the stock of southern-born men by race living either in the North or the South. First stage results are reported in Table 4.

Table 4: First stage results, Predicting the flow of new southern migrants to the North using the stock of southern-born men within skill cells, 1940-1970

Stock of southern born	Migrant flow		
	ln(black/white)	ln(black)	ln(white)
ln(black)	1.052 (0.091)	0.950 (0.092)	-0.101 (0.080)
ln(white)	-0.857 (0.126)	0.104 (0.128)	0.961 (0.111)

Notes: N = 156. Standard errors are presented in parentheses and are clustered by skill group. Skill groups are defined by five education categories and eight experience intervals. Observations are weighted by the size of the underlying northern-born sample used to calculate mean annual earnings.

Table 5: Relative black labor supply and the black-white wage gap in the North under alternate partitions of the labor force, 1940-1970

Relative labor supply	ln(black/white)	Wages ln(black)	ln(white)
Adjusted for term length			
ln(black/ white)	-0.042 (0.025)	-0.031 (0.030)	0.010 (0.006)
ln(black)	-0.041 (0.025)	-0.028 (0.028)	0.013 (0.005)
ln(white)	0.035 (0.067)	-0.009 (0.080)	-0.049 (0.017)
By occupation			
ln(black/ white)	-0.090 (0.046)	-0.096 (0.052)	-0.005 (0.025)
ln(black)	-0.108 (0.049)	-0.109 (0.054)	-0.000 (0.023)
ln(white)	0.044 (0.080)	0.062 (0.080)	0.017 (0.039)

Standard errors are presented in parentheses and are clustered by skill group.

Panel A: N = 156. Skill groups are defined by five education categories and eight experience intervals. Education categories are based on expected classroom days. Observations are weighted by the size of the underlying northern-born sample used to calculate mean annual earnings.

Panel B: N = 192. Skill groups are defined by six occupation categories and eight experience intervals. Observations are weighted by the size of the underlying northern-born used to calculate mean annual earnings.

Table 6: Exploring the robustness of the relationship between relative black labor supply and the black-white wage gap

A. Robustness		B. Sub-samples	
1. Add women to count	-0.103 (0.057)	1. 6+ years of schooling only N = 128	-0.171 (0.076)
2. Drop if <25 blacks in cell N = 104	-0.179 (0.103)	2. 0-12 yrs of schooling only N = 124	-0.140 (0.071)
3. Add 40-50 yrs experience N = 186	-0.090 (0.058)	3. Only native-born whites	-0.126 (0.049)
4. Redefine education categories	-0.080 (0.037)	4. Only foreign-born whites	-0.061 (0.075)

Notes: OLS regressions comparable to Table 3, Panel A (coeff. = -0.120, s.e. = 0.048). Standard errors are presented in parentheses and are clustered by skill group. Skill groups are defined by five education categories and eight experience intervals. Observations are weighted by the size of the underlying northern-born sample used to calculate mean annual earnings. Unless otherwise noted, N = 156.

Table 7: Counterfactual wage increase for black men under a “no southern migration” scenario,
By education category for 1940 through 1970

	Alternative estimates of σ			
	OLS	IV	Perfect substitution ($\sigma = \infty$)	Fixed capital stock (Using IV)
BLACK				
0-5 years	-0.011	-0.011	-0.011	0.001
6-9 years	-0.008	-0.009	-0.012	0.005
10-11 years	0.154	0.117	0.009	0.131
12 years	0.243	0.184	0.008	0.198
13+ years	0.162	0.121	0.002	0.135
Mean	0.096	0.072	-0.002	0.085
WHITE				
0-5 years	-0.011	-0.011	-0.011	0.001
6-9 years	-0.011	-0.012	-0.012	0.002
10-11 years	0.000	0.003	0.010	0.016
12 years	-0.001	0.001	0.008	0.015
13+ years	-0.007	-0.006	0.002	0.008
Mean	-0.005	-0.004	-0.000	0.010
DIFFERENCE	0.102	0.075	-0.002	0.075

Notes: Counterfactual wage growth calculated using equations 10 and 11. Estimates of δ and η reported in the text. Changes in labor supply due to black migration ($\Delta L_{\text{exb}}/L_{\text{exb}}$) and income shares for black workers by skill group (s_{exb}) from 1940 and 1970 IPUMS. Columns reflect different estimates of σ . Column 1 uses the OLS estimate in Panel A of Table 3. Column 2 uses the IV estimate from Panel B of Table 3. Column 3 is calculated under the assumption of perfect substitution by race within skill groups ($\sigma = \infty$). Average wage effects are constructed by weighting the contributions of each skill group by their share of the total (race-specific) wage bill.

Appendix Table 1: Summary Statistics, Men in the Northern Labor Force, 1940-1970

	Total labor supply	Southern-born labor supply	Wages
ln(black)	5.103 (1.127)	4.519 (1.170)	9.812 (0.424)
ln(white)	7.728 (1.174)	5.162 (1.053)	10.127 (0.419)
ln(black/white)	-2.863 (0.875)	-0.664 (0.669)	-0.319 (0.165)

Notes: Means within education-experience cells. Wages in 1999 dollars.