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THE DECLINE IN BLACK TEENAGE EMPLOYMENT:
1950-1970

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The Decline in Black Teenage Employment: 1950-1970

ABSTRACT

This paper examines the causes of the decline in black male teenage employment from 1950 to 1970. During this period, the employment-to-population ratio of black youth (age 16-19) declined from 46.8 percent to 27 percent. The white teenage employment ratio, in contrast, remained constant. The primary source of the decline is traced to the virtual demise of the market for low-skilled agricultural labor. All of the black teenage employment decline during this period occurs in the South. The employment ratio among those living outside the South actually increases. Within the South, the entire decline in employment is accounted for by a reduction in agricultural employment.

This study argues that technological progress is the principal cause of the agricultural employment decline among black youths. Spurred by the rapid advance and adoption of labor-saving technology, southern agricultural production was transformed from a relatively labor intensive process to a highly capital intensive one. As a result, the demand for low-skilled agricultural labor plummeted. By 1970, a formerly important source of black youth employment virtually ceased to exist.

Black teenagers who were displaced from agricultural work were not absorbed by the nonagricultural sector. An additional finding of this paper is that the federal minimum wage acted as an important barrier to nonagricultural employment in the South. The raw data reveal significant reductions in black teenage employment growth in precisely those industries where coverage of the minimum wage was increased: retail trade, construction, and the service sector. Regression estimates indicate a quantitatively large minimum wage effect.

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Introduction

In 1950, more than one out of every two black male teenagers (age 16-19) was employed. By 1970 one out of three was employed. And by 1978, only one out of every four was employed. Many hypotheses have been offered to explain this precipitous decline. Among those often advanced are that the expanding coverage of the federal minimum wage law has operated as an increased barrier to employment; that black teenagers have become increasingly concentrated in central cities where employment opportunities have been decaying; that the growth in the size of the black teenage cohort has outstripped the demand for their labor; and that the growth in the quality of education has induced a substitution away from market work and toward school.

Recent empirical analysis suggests that each of these factors plays only a minor role. For example, work by Mincer (1976) and Ragan (1978) indicates that although the minimum wage has reduced black teenage employment, it accounts for only a small portion of the total decline. Likewise, Wescott (1976) demonstrates that the decaying employment opportunities in central cities contributes little to the overall decline. Finally, Wachter and Kim (1979) find little empirical support for the baby-boom hypothesis. Despite a large amount of analysis, the post-World War II decline in black teenage employment remains, as yet, a largely unexplained phenomenon.

This paper examines the decline in black male teenage employment during the period 1950-70. The point of departure of this work from earlier research is that census data are used to analyze the causes of the fall in employment. Most earlier research has relied on Current Population Survey (CPS) data. The relatively small number of black youths sampled by the CPS allows analysis only of time series trends. Census data, because of its

large sample size, permits analysis to be undertaken at the region or state level. As will be seen, this level of disaggregation is crucial to understanding the causes of the decline in employment.

The principal finding of this research is that the primary source of the decline in black teenage employment is the virtual demise of the market for low-skilled agricultural labor. Except for the work of Cotterman (1979), the importance of this market for black teenage labor has gone unrecognized in the literature. In 1950, agricultural work constituted their primary source of employment. Over 45 percent of all working black teenagers were in agriculture, and in the South over one-half were so employed. Between 1950 and 1970 agricultural production underwent a dramatic transformation. Farming became mechanized. Use of machines and mechanical power rose by almost 20 percent, while employment declined by almost 56 percent. In the South, the change was even larger. Total employment fell by 65 percent. By 1970, the market for low-skilled agricultural labor ceased to be an important source of employment for black youth. The effect of the mechanization of agriculture on black teenage employment is profound. Virtually all of the reduction in the aggregate black teenage employment-to-population ratio between 1950 and 1970 can be attributed to the decline in their agricultural employment.

Black teenagers who were displaced from agricultural work were not absorbed into nonagricultural employment in the South. This paper examines the possible role that the federal minimum wage law played. Evidence is found that the extension of minimum coverage in retail trade, construction, and the service industries substantially impeded the flow of black teenagers into nonagricultural employment.

The outline of this paper is as follows: Section II documents intra-regional changes in black teenage employment between 1950 and 1970. These intra-regional variations provide the key to uncovering the crucial role of the market for agricultural labor. They also provide evidence which rejects the declining central-city hypothesis and casts doubt on the growing cohort size argument. Section III describes changes in the nature of agricultural production during the 1950-70 period and examines their impact upon black teenage employment. Section IV analyzes changes in the industrial composition of nonagricultural employment among black teenagers. These changes provide evidence of minimum wage effects. In Section V, regression estimates of the effects of technological progress in agriculture and the growth in minimum wage coverage are presented, and some concluding remarks are made.

II. Trends in Teenage Employment: 1950-1978

Figure 1 depicts the time series pattern of employment-to-population ratios of black and white youths for the period 1950-1978.¹ This figure illustrates both the dramatic decline in the black teenage employment ratio and the growing gap in employment between the races that has taken place since the end of World War II. In 1950 more than one out of every two black teenagers was employed. By 1978 only slightly over one out of four was employed. The massive reduction in employment among blacks is in marked contrast to the U-shaped employment pattern among whites. White teenage employment, after declining through the 1950s, began to grow in the middle 1960s. Its growth continued during the 1970s despite setbacks in the recessions of 1971 and 1975-76. These differential employment trends have produced a remarkable divergence in employment ratios between the races. In 1950 the proportion of black teenagers who were employed was marginally above that of white teenagers. By 1978 the employment ratio of blacks had fallen to one-half that of whites. This divergence is even more striking when it is contrasted with the absence of any comparable divergence in employment ratios of black and white prime-age males (age 25-54). Between

¹ Throughout this paper, the terms youth and teenagers refer to the 16-19 year old male population. The data for the period 1954-78 are annual averages taken from the Manpower Report of the President, 1975 and recent issues of Employment and Earnings. Prior to 1954 counts of numbers employed by race are unavailable. The employment ratios for these years were constructed as follows. Labor force participation and unemployment rates by race and age are available back to 1948. Using these rates permits computing the employment-to-civilian population ratio by race for 16-17 and 18-19 year old age groups. The Current Population Report Series P-25 contains estimates of the civilian and total population for these age groups by race as of July 1 for the years 1950-1959. The employment-to-population ratio for 16-19 year olds was computed by taking a weighted average of the 16-17 and 18-19 year old employment-to-civilian population ratios using the ratio of the civilian population in the two-year age groups to the average total population of the 16-17 and 18-19 year old groups as the weights.

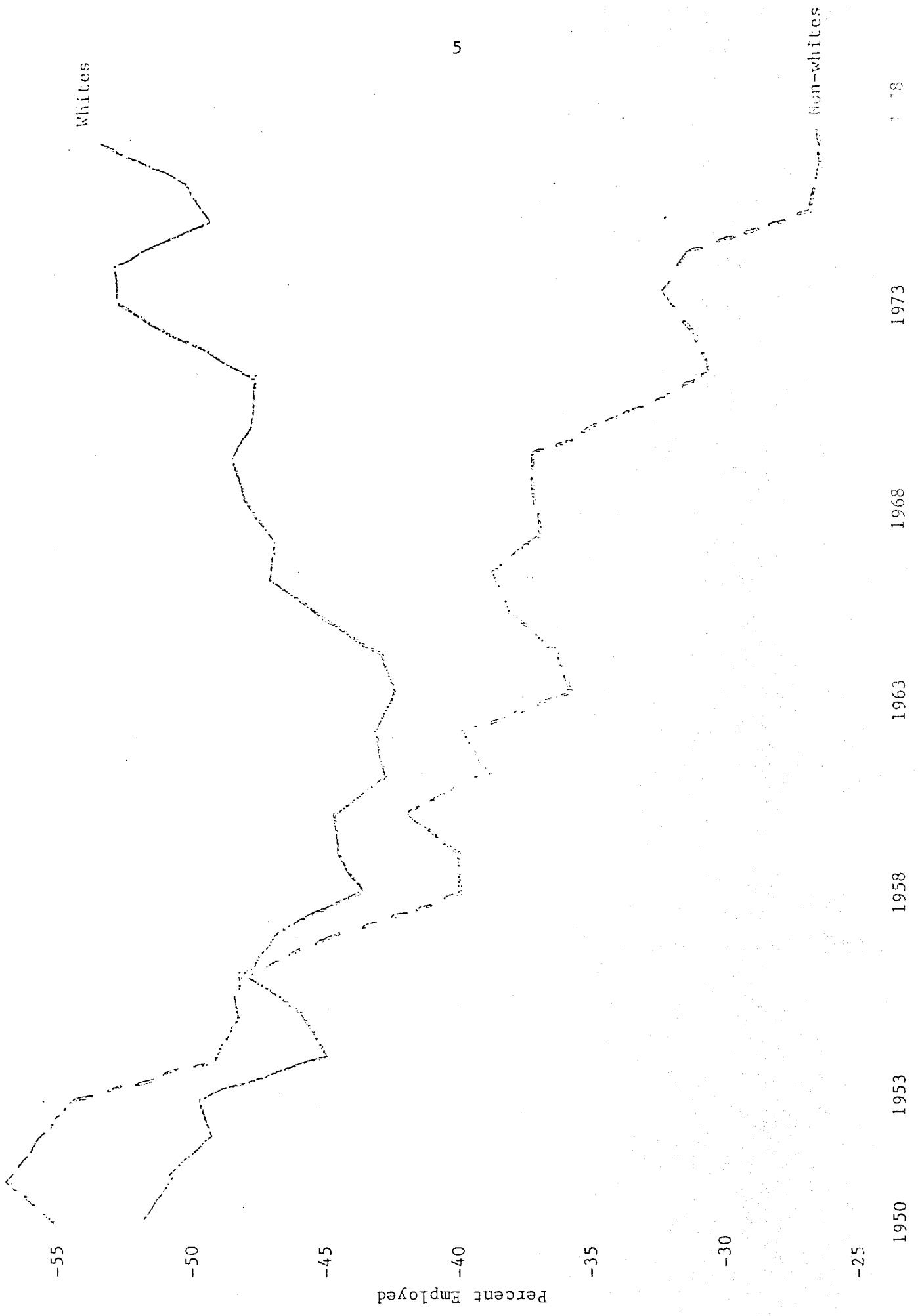


Figure 1. Employment-to-Total Population Ratios: 16-19 Year Old Males.

1954 and 1970 the gap between employment ratios of white and black prime-age males remained constant at roughly 6.5 percentage points. The gap grew to 10 percentage points by 1978.

A more informative look at changes in youth employment is provided in Table 1, which presents region specific teenage employment-to-population ratios for black and whites in 1950 and 1970.¹ For reference, the regional teenage population distribution for each year is provided in parentheses beneath the employment ratios. The regional breakdown of employment ratios indicates that aggregate trends in teenage employment, especially those of blacks, mask important differences in intra-regional patterns. As is evident from the table, virtually all the decline in the aggregate black teenage employment ratio is a result of a sharp decrease in employment in the South. Between 1950 and 1970 the Southern black teenage employment ratio halved itself, with two-thirds of the decline occurring during the 1950s. Among

¹It should be noted that teenage employment ratios computed from Census data are considerably different than those computed from either the March or April Current Population Surveys (CPS) in each of the Census years. Among all teenagers, the April 1950 CPS employment ratio exceeds the Census employment ratio by 6.5 percentage points. In 1960 and 1970, the April CPS employment ratio exceeds the Census employment ratio by about 4 percentage points. Data for 1970 indicate that the discrepancy between the two surveys is larger for blacks than for whites. Among blacks the April 1970 CPS employment ratio is 34.1 percent while the Census employment ratio is only 27.4 percent. I have been unable to obtain CPS data on blacks in earlier Census years. Why such differentials should exist is at present an open question. The "survey week" for the CPS data is two weeks after the Census survey week. The question used to obtain employment information and the definition of employment is the same in both surveys. In both surveys the respondent is not necessarily the teenager; it could be his parent or the head of his household. One possible reason is in sampling design. The design of the CPS includes a sample rotation feature. Under this feature a household is ideally in the sample for 4 consecutive months, is out of the sample for 8 months, and then returns to the sample for a final 4 months. This introduces a potential problem of attrition bias that is present in the CPS and not present in the Census. If individuals with low probabilities of employment leave the sample, then this would explain the discrepancy between the surveys. It would also explain the finding of Freeman and Medoff (1978) that employment ratios in longitudinal surveys exceed those of the CPS.

whites, the Southern employment ratio also fell, but its decline is considerably less than that of blacks and is offset by employment growth in the Northeast and West regions of the country.

The importance of the decline in Southern black employment can be further quantified by decomposing the decline in the aggregate black teenage employment ratio into a change due to intra-regional employment variations and a change due to the shift in population out of the traditionally high employment South to the traditionally low employment North. Using the 1950 population distributions to weight the intra-regional employment variations implies that 100 percent of the decline in the aggregate black teenage employment ratio is due to the decline in the Southern black teenage employment ratio. Using the 1970 population distributions implies that almost 80 percent of the decline in the aggregate employment ratio is due to the decline in the Southern employment ratio.

TABLE 1
MALE YOUTH EMPLOYMENT-TO-POPULATION RATIOS
BY REGION: 1950 AND 1970¹

	Blacks		Whites	
	1950	1970	1950	1970
United States	46.6	27.0	40.4	40.5
Northeast	23.5 (10.9)	26.1 (16.2)	33.2 (25.4)	39.6 (23.5)
Northcentral	28.1 (11.9)	27.8 (19.0)	46.7 (29.8)	45.0 (29.6)
South	54.8 (71.5)	27.4 (53.7)	42.5 (31.5)	37.7 (29.0)
West	23.3 (5.7)	24.6 (11.2)	33.8 (13.3)	39.0 (17.9)

SOURCE: 1950 data are taken from 1950 Census of Population: Detailed Characteristics, U.S. Summary. The 1970 data are derived from 1970 Census of Population: Detailed Characteristics, State Summaries, and exclude Alaska and Hawaii.

¹The employment data are percentages of the 16-19 year old male population employed during the Census survey week. The numbers in parentheses are the percentage of the race group living in the region.

It is clear from the preceding that the source of much, if not all, of the post-World War II decline in black teenage employment lies in the South. The data in Table 1 also indicate that the absence of a growth in the aggregate white teenage employment ratio stems from a decline in employment in the South and Northcentral regions, which offsets a growth in the Northeast and West regions. An inspection of geographical division level data within the Northcentral region reveals that white teenage employment in the relatively rural West Northcentral division declined by almost 5 percentage points while it rose in the relatively urban East Northcentral division by almost a percentage point. These observations provide the first clue to the importance of the agricultural labor market in determining changes in teenage employment between 1950 and 1970. But, before turning to this story, the data provided in Table 1 reveal several other interesting facts that deserve consideration.

Between 1950 and 1970 black teenage employment ratios outside the South did not decline.¹ This fact, when combined with the growth in the black teenage population, has important implications for the nature of teenage labor demand outside the South. As a consequence of the low fertility rates in the depression of the 1930s and the post-World War II baby boom, the size of the 16-19 year old black population increased considerably between 1950 and 1970. During this period, the aggregate number of black teenagers rose by 89 percent, while the entire U.S. population grew by only 40 percent. At the same time there occurred a pronounced geographical shift in the black population out of the South and into the Northern regions

¹There were important differences in employment variation in the Northeast region between the 1950s and 1960s. In the Northeast, the nonwhite teenage employment ratio grew by 8 percentage points between 1950 and 1960, and declined by 5.5 percentage points between 1960 and 1970. Employment ratios in the Northcentral and Western states, on the other hand, remained relatively constant between 1950 and 1960.

(see Table 1). The combination of the growth and shift in the population produced a marked increase in the number of black teenagers residing in the North. In the relatively short span of 20 years the number of black teenagers living in the North increased by 215 percent. More than 90 percent of these teenagers took up residence in urban areas (SMSAs). The fact that employment ratios in the Northern industrial centers of the U.S. did not decline in the face of such an enormous growth in supply is indicative of either a substantial growth in the demand for labor, or a fixed but very elastic demand schedule in these urban centers. Indeed, the ability of Northern urban labor markets to absorb such a massive influx of black teenagers without corresponding reductions in their employment-to-population ratios is both surprising and impressive. The widely held view that the root of the black teenage employment problem is in the decay of Northern central cities is flatly rejected by the data, at least for the period 1950 to 1970.

The data are also inconsistent with the view that the growth in welfare participation among blacks is at the heart of their employment decline. During the 1960s, welfare participation rates grew more than three times faster in the North than in the South.¹ Finally, the data also suggest the lack of importance of the growth in the number of black teenagers as the central cause of the decline in their employment ratios. The decline in black teenage employment is a purely regional phenomenon, occurring only in the South.

¹Between 1960 and 1970, AFDC participation rates in the North doubled while the rate in the South increased by less than 50 percent (U.S. Department of Health, Education and Welfare, 1961, 1971).

Comparisons of employment-to-population ratios between blacks and whites in regions outside the South reveal another interesting fact. The large gap in aggregate teenage employment ratios between the races that emerges by 1970 existed outside the South as early as 1950. In 1970 the aggregate white teenage employment ratio exceeded the aggregate black teenage employment ratio by 13 percentage points. This is precisely the magnitude of the racial employment differential outside the South in 1950. In short, large racial differences in teenage employment in the North have existed since at least 1950.¹ That these differentials existed prior to the growth in welfare participation and benefit levels and prior to the supposed deterioration of employment opportunities in Northern central cities is further evidence that these factors were not the primary causes of the decline in black teenage employment. Nor were they primary causes of the divergence in employment ratios between the races.

In summary, the picture portrayed by the region specific employment ratios is clear: The primary source of the decline in black teenage employment during the period 1950-70, both in absolute terms and relative to white teenagers, lies almost exclusively in the South. Contrary to popular belief, Northern industrial labor markets showed a remarkable ability to absorb the large influx of black teenagers.

¹ Similar calculations for 1940 reveal a difference in employment ratios between the races of 9.5 percentage points in non-Southern regions of the country.

III. Teenage Employment and the Market for Agricultural Labor

The Setting: 1950

If the agricultural labor market is to have played a major role in the decline in black teenage employment between 1950 and 1970, it must have been an important source of their employment in 1950. Indeed it was. Agricultural labor was by far the most dominant single form of their employment. In 1950, 46 percent of all employed black teenagers worked as agricultural laborers (Census Bureau, 1950d).¹ Agricultural labor was even more important in the South, where over 50 percent of employed black teenagers worked as agricultural laborers and over one-half of these were classified as unpaid family laborers (Census Bureau, 1950d).²

In contrast, agricultural employment among white teenagers, though important, was a less prevalent form of work than it was among blacks. About 26 percent of all employed white teenagers in the U.S. were agricultural workers. There were also important differences in the geographical distribution of agricultural work between the races. Among black teenagers, agricultural work was almost exclusively a Southern phenomenon. Over 90 percent lived in the South. Among whites, agricultural work was considerably more dispersed. Forty-four percent lived in the South and 37 percent lived in the Northcentral region. The remaining 18 percent were equally divided between the West and Northeast (Census Bureau, 1950c).

¹Agricultural employment is computed from occupation rather than industry data. Industrial distributions of employment for the 16-19 year old age group by race and sex in 1950 are not available.

²In order to be so classified, an individual must have reported working at least 15 hours during the survey week without pay on a farm.

The critical role of the agricultural sector in accounting for regional levels of black teenage employment is illustrated in Table 2. This table decomposes regional black teenage employment ratios into the percent of the population employed in agricultural work and nonagricultural work, respectively. Differences in agricultural employment among blacks between the North and South account for virtually all the differences in employment ratios between the North and South. Furthermore, in an accounting sense, the high level of employment in the South among black teenagers can be attributed entirely to the high level of agricultural employment in the South.¹

TABLE 2
AGRICULTURAL AND NONAGRICULTURAL TEENAGE EMPLOYMENT
RATIOS BY REGION: 1950

	Blacks	
	Agriculture	Nonagriculture
United States	21.5	25.1
Northeast	1.0	22.6
Northcentral	1.3	27.0
South	28.6	26.3
West	7.8	15.5

SOURCE: Data for the U.S. and for the South are taken from 1950 Census of Population, Special Reports, Education. Data for regions other than the South are taken from 1950 U.S. Census of Population, Detailed Characteristics, State Summaries. The data include all nonwhites and are based upon occupational characteristics.

¹ Among whites, the evidence is much the same, although the role of agricultural employment, in accounting for regional differences in employment ratios, is less striking. Agricultural employment in the South accounts for virtually all the difference between employment ratios in the South and those in the Northeast and West. Agricultural employment in the Midwest accounts for 70 percent of the employment differential between the Northcentral and Northeast regions.

Changes in the Market for Agricultural Labor: 1950-1970

The decades of the 1950s and 1960s were a period of revolutionary changes in the nature of agricultural production. The extent and type of these changes for this period have been extensively documented and analyzed by agricultural economists.¹ Only a brief discussion of the dimensions of these changes is presented here.

Within the relatively short span of 20 years, U.S. agricultural production was transformed from a relatively labor-intensive process to a highly capital-intensive process. This transformation was fueled, in part, by a growing demand for nonfarm labor. This raised the cost of farm labor relative to capital equipment and induced a substitution of machines for men. It was also spurred by the rapid adoption of labor-saving technological innovations, which may or may not have been induced by the rising cost of farm labor. The adoption of technological innovations induced further substitution of capital equipment for labor at existing relative prices. Although there is considerable disagreement over the relative importance of each, their combined impact was dramatic. The capital-labor ratio almost tripled during this 20-year period (USDA, 1977). Output per man-hour grew at an average rate of over 11 percent per year, producing a cumulative increase of 238 percent between 1950 and 1970 (USDA, 1977). The combination of these forces and the fact that farm output registered only a modest

¹The list of studies dealing with this issue is far too long to include them all. Particularly useful descriptions of the important changes are contained in Schertz (1975), Cochrane, Wilcox and Herdt (1973), Tweeten (1970), and Peterson and Hayami (1977). Analyses of the impact of these changes on farm labor are provided by Gisser (1967), Tyrchniewicz and Schuh (1969), and Rosine and Helmberger (1976).

increase of 36 percent resulted in a dramatic reduction in farm employment. Total hours of farm work declined by almost 60 percent (USDA, 1977).¹

The changes in the nature of farm production between 1950 and 1970 represented a marked increase over previous trends. The percentage increase in output per man-hour between 1950 and 1970 far exceeded the percentage increase that occurred during the entire first half of the 20th century (USDA, 1977). The decline in total hours of farm work between 1950 and 1970 was more than 50 percent larger than the decline in hours of farm work that took place during the first half of the 20th century (USDA, 1977).

The considerable degree of regional specialization of agricultural production by product, combined with the differential rates of decline in man-hours of work across agricultural products, produced significantly different rates of decline in farm employment among the regions of the country. Hardest hit was the South where farm employment declined by 65 percent between 1950 and 1970 (USDA, 1951, 1971). Reductions in farm employment in other regions of the country, though far less dramatic than in the South, were still quite large. In the relatively urbanized Northeast, farm employment fell by 63 percent. In the Northcentral and West, farm employment fell by 48 percent and 28 percent, respectively.

Within the South, cotton production was the most important type of farming among blacks. In 1959, for example, cotton sales alone accounted for 56 percent of the value of all farm products sold by black-operated

¹Within the 20-year period 1950-1970, the changes in agricultural production which occurred during the 1950s were somewhat larger than those which occurred in the 1960s. The growth rate in the capital-labor ratio in the 1950s, for example, exceeded that of the 1960s by 12 percent. Similarly, the rate of growth in output per man-hour in the 1950s exceeded that of the 1960s by 5 percent (USDA, 1977). Fifty-eight percent of the decline in hours of farm work which occurred during the 20-year period took place in the 1950s (USDA, 1977).

farms (USDA, 1959).¹ It was in cotton production where the largest changes in technology occurred. The most important change was in widespread adoption of the mechanical cotton picker. Although first introduced as early as 1943, rapid adoption of the mechanical cotton picker in the South did not begin until the late 1950s and 1960s. In 1950 less than 1 percent of all cotton in the South was harvested by machine. By 1962, it had risen to 55 percent and by 1970 most all cotton was mechanically harvested.² The adoption of the mechanical cotton picker, along with developments which enabled chemical and oil herbicides to be applied mechanically, reduced labor utilization in cotton significantly. During the period 1950-54 an average of 107 man-hours of labor were used to produce a bale of cotton. By 1970-74 only an average of 23 man-hours were so used (U.S. Department of Commerce, 1978). The combination of this reduction and the nearly zero growth in cotton production between 1950 and 1970 resulted in an 80 percent reduction in man-hours used in cotton during the 20-year period.

The impact of the changes in the nature of agricultural production on employment of black teenagers is strikingly evident from the data reported in Table 3. The table compares changes in the black teenage total employment-to-population ratio to changes in the agricultural employment-to-population ratio. As is evident, all of the decline in the black teenage employment ratio, both in the U.S. as a whole and in the South, is accounted for by a decline in agricultural employment. Likewise, the decline in

¹Tobacco production was the other major type of farming, accounting for an additional 26 percent of the value of all farm products sold by black-operated farms.

²The data for 1950 and 1962 are taken from Beale (1966) and exclude Texas and Oklahoma.

agricultural employment accounts for most of the narrowing of the North-South differential in black teenage employment ratios that was documented in Table 1.¹

Within the South, it appears that mechanization of cotton production played a critical role. In 12 cotton-producing Southern states the simple correlation between cotton's share of total farm receipts in 1950 and the change in the black teenage employment ratio between 1950 and 1970 is $-.57$.²

TABLE 3
CHANGES IN BLACK TEENAGE EMPLOYMENT RATIOS AND AGRICULTURAL
EMPLOYMENT RATIOS BY REGIONS: 1950-1970

	Blacks	
	Total Employment	Agricultural Employment
United States	-19.6	-20.2
Northeast	2.6	-.8
Northcentral	-.3	-1.0
South	-27.0	-26.4
West	1.3	-8.7

SOURCE: The 1950 data on total employment and populations in all regions are taken and agricultural employment for the U.S. and the South are taken from the 1950 Census of Population, Special Reports, Education. The 1970 data on total employment-to-population ratios are taken from the 1970 Census of Population, State Summaries. Alaska and Hawaii are excluded. Data on blacks includes non-whites. Agricultural employment-to-population ratios for 1970 are also derived from the state summaries. But, because data on all nonwhites are not provided, these ratios are based solely on the black population.

¹ Among white teenagers, the decline in agricultural employment also appears to play a significant role. The total employment-to-population ratio among white teenagers declined in only two of the four regions of the country between 1950 and 1970: the South (5 percentage points) and the Northcentral (1.7 percentage points). In the South the fraction of white teenagers employed in agriculture declined by 13 percentage points and the Northcentral declined by 10 percentage points.

² Cotton production data could only be obtained for 13 of 16 Southern states. These states are Mississippi, Arkansas, Alabama, South Carolina, Louisiana, Texas, Tennessee, Georgia, Oklahoma North Carolina, Florida, and Virginia (USDA, 1952). In these states the average (unweighted) decline in the employment ratio was 26.4 percentage points. The reduction among these cotton-producing states, when compared to the employment reduction in the remaining three non-cotton-producing Southern states, Kentucky, Maryland, and West Virginia, and the District of Columbia, provides even more compelling evidence of the impact of mechanization in cotton. In these three non-cotton states and the District of Columbia, the average (unweighted) employment ratio declined by only 6.7 percentage points.

In data not reported in Table 3, the decline in black teenage agricultural employment appears equally important in accounting for the decline in total black teenage employment during the 1950s and 1960s taken separately, as it does for the entire 20-year period taken as a whole. Two-thirds of the decline in the Southern agricultural employment-to-population ratio between 1950 and 1970 occurred during the first 10 years. Similarly, two-thirds of the 1950-1970 decline in the black teenage total employment-to-population ratio also occurred during the 1950s.

Agricultural economists have long debated the issue of whether the decline in agricultural employment was a result of a growing demand for nonfarm labor or an exogenous growth in labor-saving production technologies. Although a complete treatment of this issue is beyond the scope of this paper, the data suggest that the forces driving the mechanization of agriculture were exogenous to the black teenage labor market. First, if the decline in agricultural employment was due to a growth in the demand for nonfarm labor, one would have expected a growth in the fraction of black teenagers working in nonagricultural jobs. As a comparison between the columns of Table 3 reveals, there is virtually no increase in the fraction of black teenagers working in nonagricultural occupations between 1950 and 1970. Second, available measures indicate that the growth in nonagricultural industries was substantially larger in the South than in the North between 1950 and 1970. The growth rate of value added in manufacturing, for example, was 50 percent higher in the South than in the North between 1950 and 1970. Similarly, between 1948 and 1967 annual receipts of retail trade establishments increased 30 percent faster in the South than in the North. If there was no simultaneous downward shift in the demand curve for black teenage agricultural workers, one would have expected a Southward migration of black teenagers. Precisely the opposite occurred, as black teenagers migrated northward in substantial numbers.

If the rapid advance of labor-saving agricultural technologies is the driving force behind the decline in black teenage employment, then it is still only half of the story. There still remains the issue of why black teenagers who were, in effect, displaced from agricultural employment did not find employment in nonagricultural work, especially in the South.¹ One possible explanation is that they faced an important barrier to non-agricultural employment. The federal minimum wage is a likely candidate for this barrier. At the same time agricultural work was drying up as a source of employment, coverage of the federal minimum wage was being extended to include workers in retail trade and the service industry; and the level of the minimum wage was being increased relative to the wage of low-skilled workers in other industries. The next section is devoted to an examination of the possible role of the minimum wage.

¹Black teenagers appear to be somewhat unique in this respect. Older black males, such as those age 25-34, in 1950 were absorbed into the non-agricultural sector. Their employment ratio remained constant between 1950 and 1970 (Census Bureau, 1950, 1970). White teenagers were partially absorbed. See footnote 1 on page 16.

IV. Minimum Wage Legislation and Black Teenage Employment

Minimum Wage Legislation

The impact of the federal minimum wage on black teenage employment has been the subject of extensive empirical analysis during the last decade.¹ The prevailing conclusion reached by this research seems to be that its impact is small relative to the total decline in their employment-to-population ratio. Despite this rather impressive body of evidence, the fact that black teenagers who were displaced from agriculture did not find employment in the nonagricultural work in the South suggests that another look at the possible role of minimum wages is warranted.

In 1950 coverage of the federal minimum wage law was limited primarily to employees engaged in production for interstate commerce. Employees in retail trade and service industry establishments engaged in intrastate commerce were specifically exempted from coverage. As a result, coverage rates (the fraction of employees in firms covered by the law) differed considerably across industries. In some industries, coverage was nearly universal. For example, the coverage rate in mining was 99 percent, in manufacturing 95 percent, and in transportation and public utilities it was 98 percent (Welch, 1978). In other industries, coverage was small or non-existent. For example, the coverage rate in retail trade was only 13 percent, in the service industry 19 percent, and agricultural workers were completely exempt from coverage (Welch, 1978). Individual state minimum wage laws covering minors and women employed in retail trade and the service industry were in effect in 1950, but their existence was confined almost exclusively to Northern and Western states. In the South, only Kentucky and the

¹The list of such studies is far too long to include them all. Two of the most widely cited studies includes Mincer (1976) and Ragan (1978).

District of Columbia had minimum wage laws covering teenagers (Women's Bureau, 1958).

Between 1950 and 1960, there was no extension in coverage under the federal minimum wage. The level of the minimum, however, was increased in April 1956 from 756 cents per hour to \$1.00 per hour. Also, during this period there were only minor changes in state minimum wage laws. In the South, North Carolina was the only state to adopt a state minimum wage for teenagers. It did so in 1960.

The decade of the 1960s, on the other hand, was one of rather substantial increases in coverage of the minimum wage. Federal legislation enacted in 1961 and 1966 extended coverage significantly in retail trade, construction, and the service industries.¹ By 1970, 59 percent of all employees in retail trade, 98 percent of all construction workers, and 71 percent of all service industry workers were covered. The 1966 legislation also extended coverage to agricultural workers on large farms.

By 1970 the federal minimum wage for workers in firms that were subject to coverage prior to the 1966 legislation reached \$1.60 per hour. Employees in firms that were covered for the first time by the 1966 legislation reached \$1.45 per hour in 1970. State minimum wage levels rose less rapidly than the federal minimum wage during the 1960s. As a result, by 1970 most state minima were lower than the federal minimum wage (Welch, 1978).²

¹The mechanism by which this was accomplished was to lower the volume of sales exemption for establishments in these industries.

²State minimum wage levels in Alaska, California, New York, and the District of Columbia exceeded the federal minimum wage in 1970.

Evidence on Employment Effects of Minimum Wages — The Raw Data

Given the disparity in coverage rates across industries and differences in wage distributions across industries, a natural place to look for possible minimum wage effects on black teenage employment is in changing patterns of industrial employment. Unfortunately, census employment data by industry are not available in published documents for 16-17 year old black teenagers in 1950. It is, however, available for the 18-19 year old age group. As a result, data on 18-19 year olds are used. Comparisons of changes in total employment and agricultural employment between the two age groups reveal virtually identical changes. Hence, explanations that apply to the 18-19 year old group should apply equally to the 16-19 year old age group. Also, data on the industrial composition of black teenage employment by region or state are not available in published statistics from the 1950 Census. Nevertheless, a clear picture of the changing industrial employment patterns of Southern black teenagers during the 1950s can be painted by examining changes in aggregate black teenage industrial employment distributions, and supplementary information derived from other sources.

Table 4 provides the nonagricultural employment distribution of 18-19 year old black males in 1950 and the percentage change in their employment by industry during the 1950s and 1960s. For comparison, percentage changes in total employment by industry, and changes in minimum wage coverage rates, are also provided. As column 1 reveals, the service sector, retail trade, and the durable goods manufacturing industry accounted for two-thirds of all black teenage nonagricultural employment in 1950. Employment in durable goods was heavily concentrated in the Southern woodmills. In fact, the Southern woodmills constituted a principal source of nonagricultural employment among Southern black teenagers. Almost one in every five Southern

TABLE 4

CHANGES IN NONAGRICULTURAL EMPLOYMENT BY INDUSTRY¹

	1950 - 1960		1960 - 1970	
	Share of Black Teenage Employment 1950	Percentage Change in Black Teenage Employment	Change in Coverage Rate of Minimum Wage	Percentage Change in Black Teenage Employment
Retail Trade	22.73	48.59	56	32.89
Construction	10.67	- 4.22	55	7.86
Services	22.92	28.84	52	55.53
Manufacturing				
Durable Goods	21.38	-31.97	2	142.32
Non-Durable Goods	10.60	23.20		117.06
Other ²	11.09	- 7.13	5	156.22
				24.48
				26.93
				20.29
				51.96
				20.70
				6.04

SOURCE: Employment data are from the U.S. Census of Population, Industrial Characteristics, 1950, 1960, and 1970.

¹The data on teenagers include all nonwhite males age 18-19. The data on total employment includes all individuals age 14 and older.

²Other includes mining, transportation, communications, public utilities, wholesale trade, finance, insurance, and real estate.

black teenagers employed in nonagricultural work was working in the woodmills.¹

The percentage changes in employment in these industries provide some indication of an important minimum wage effect in the 1950s. The decline in black teenage employment in the durable goods manufacturing (32 percent) was entirely a result of a collapse of the Southern woodmills as a source of employment. Outside the woodmills black teenage employment in durable goods industries actually rose by 11 percent. Two BLS wage and employment surveys of the Southern woodmills taken in 1955 and 1957 (DOL, 1959) provide rather convincing evidence that at least part of this employment reduction resulted from an increase in the federal minimum wage. In April of 1956 the minimum was raised from 75 cents per hour to \$1.00 per hour. According to the first survey, conducted during the last quarter of 1955, the average wage paid to all production workers in late 1955 was 91 cents per hour, almost 10 percent below the April 1956 minimum wage. Perhaps more importantly, 74 percent of all production workers in late 1955 were earning below the April 1956 minimum wage. The second industry survey, conducted in April 1957, suggests that the 1956 minimum wage increase swept away the lower tail of the wage distribution, and along with it a substantial number of workers. In April of 1957 less than 3 percent of all production workers were earning below the minimum wage, but total employment in the industry had fallen 15 percent, since the last quarter of 1955. This employment decline, occurring in the relatively short span of five quarters, constituted 33 percent of the decline

¹Data on woodmill employment is taken from Census Bureau, 1950e and includes employment of 18-19 year olds in sawmills and logging for the U.S. as a whole. Over 97 percent of all black males age 14 and older employed in sawmills and logging were employed in the South. Total nonagricultural employment in the South is taken from Census Bureau, 1950d.

in the industry's employment during the period 1953-1962. Black teenage employment in the industry declined by 74 percent between 1950 and 1960. Just how much of this was due to the increase in the minimum wage, however, is at present unclear.¹

As the data in column 2 of Table 4 indicate, employment of black teenagers in retail trade and the service industry grew rapidly during the 1950s. Black teenagers who found employment during this decade found jobs almost entirely in these two industries. In fact, employment in retail trade alone accounted for 91 percent of the entire growth in black teenagers in nonagricultural employment during the 1950s. The employment increase in these industries is not surprising since they were major growth industries in this period. It is also perhaps significant that these industries were, for the most part, not covered by the federal minimum wage law. Although the Bureau of Labor Statistics estimates the coverage rate in the service sector at 19 percent during the period, most low-skilled service jobs such as personal service workers, hotel, restaurant, recreation, hospital workers, and gasoline station attendants, were not covered.

As a comparison between columns 2 and 5 of Table 4 indicates, the industrial growth rates of black teenage employment in the 1960s were radically different from those of the 1950s. The most striking differences between the decades are in retail trade, manufacturing, and the "other" category, in which transportation and communications accounted for most of the 1960-70 growth.

¹Data on integrated and nonintegrated woodmills provide supporting evidence of a substantial minimum wage effect. Integrated woodmills are mills that are engaged in both logging and millwork. Workers in such mills employing 12 or fewer employees were exempt from minimum wage coverage in 1949. Between 1949 and 1957, employment in nonexempt woodmills declined by 48 percent while employment in the integrated mills declined by only 13 percent.

During the 1960s, growth of black teenage employment in retail trade was only two-thirds as large as it was during the 1950s. This occurred despite the fact that total employment in the industry grew twice as rapidly during the 1960s as it did during the 1950s, and despite the fact that the percentage increase in the size of the black teenage population in the 1960s (age 18-19) was over five times larger than it was during the 1950s.¹

The growth in black teenage manufacturing employment, on the other hand, was much larger in the 1960s than in the 1950s. Most of the growth occurred in textile mills (22 percent), metal industries (22 percent), and the automotive industry (12 percent). However, there are several pieces of evidence which suggest that the slow growth in retail trade's employment of black teenagers resulted from something other than competition from the growing manufacturing sector. First, the annual growth rate of total employment in retail trade during the 1960s was two and one-half times that of manufacturing employment. Raw data on employment and population changes from the Census of Population provide a second piece of evidence. The black teenage population (ages 18-19) increased by almost 150,000 individuals during the 1960s. The decline in agriculture employment during this period released an additional 16,000 black teenagers, leaving over 166,000 to be absorbed into employment in the nonagricultural sector. Of these, about 57,000 found employment in nonagricultural work outside of retail trade. Black teenage employment in retail trade increased by 8,500, or only about 8 percent of the increase in those not employed elsewhere. Fourth, if the

¹The growth of black teenage retail-trade employment during the 1960s was much slower in the South than outside the South. Between 1960 and 1970, Southern black teenage employment in the industry rose by only 14 percent.

demand for black teenage labor in manufacturing and retail trade both increased, one would have expected a large increase in their nonagricultural employment-to-population ratio. It rose, but only by 3 percentage points.

A close inspection of retail trade employment data reveals that the lack of employment growth among black teenagers during the 1960s was a relatively uniform occurrence among all types of retail trade jobs. It was not the case that growth in some sectors was offset by reductions in others. Also, output per worker in retail trade shows no appreciable increase relative to the aggregate nonfarm sector or to manufacturing (BLS, 1978). Thus, there appears to be no evidence of any important technical advances of labor-saving type in retail trade relative to these sectors. Finally, the fraction of trade workers that were in unions did increase, but only by two and one-half percentage points (BLS, 1978). Moreover, in 1970 only 10 percent of trade workers were covered by collective bargaining agreements. Hence, it appears that growth in unionization of employees in the industry was not an important factor in slowing the growth of black teenage employment in the industry.

Wage distributions in retail trade derived from BLS surveys indicate a potentially important role for minimum wage increases in explaining the relatively slow growth of black teenage employment in the industry, especially in the South. The 1961 and 1966 minimum wage laws established two minimum wages--one for workers in firms covered by prior legislation and one for workers in firms covered for the first time by the 1961 minimum wage law. The 1961 minimum wage was set at \$1.15 per hour for previously covered workers, and \$1.00 per hour for newly covered workers. The 1966 legislation set the wage floor at \$1.40 per hour for previously covered workers, and \$1.00 for newly covered workers. In June of 1961, seven

months prior to the effective date of the new minimum wage law, 14 percent of all nonsupervisory retail trade employees in the U.S. earned below the lower wage floor, and 31 percent received a wage below the higher wage floor. But in the South, wages in retail trade were much lower than in the rest of the country. As a result, 31 percent earned below the lower minimum wage and 51 percent earned below the higher minimum wage (DOL, 1962). In June of 1966, seven months prior to the effective date of the 1966 minimum wage, only 3 percent of all retail trade employees in the U.S. and 8 percent of all retail trade employees in the South earned a wage below the lower wage floor. However, 33 percent of all retail trade employees in the U.S. and 49 percent of retail trade employees in the South earned a wage below the higher wage floor (DOL, 1967).¹

Unfortunately, data on wages of black teenagers relative to those of all employees in retail trade are not available for the years of interest. Without such data it is not possible to tell precisely what fraction of black teenage workers were earning wages below the minimum wages set by the 1961 and 1966 legislation. Nevertheless, it would not be unreasonable to suppose that well over one-half, if not three-fourths, of all black teenage workers in retail trade in the South were earning wages below the minimum wage in the year prior to the new levels set by the 1961 and 1966 legislation. If so, the minimum wage would be expected to have an impact on their employment in the industry. Some estimates of the magnitude of its effect are presented in the next section.

¹The 1966 legislation specified increases in the minimum wage through 1971. These increases were large. The minimum for workers on previously covered firms increased to \$1.60 in 1968 and remained constant through 1971. The minimum for workers in firms covered by the law for the first time in 1966 increased by 15 cents per year to \$1.60 in 1971.

V. Estimates of Partial Effects

The Data and Regression Specification

This section presents reduced form estimates of the partial effects of technological progress in agriculture, the increased coverage and level of the minimum wage, and other factors on the employment of black teenagers between 1950 and 1970. Reduced form rather than structural parameters are estimated because the absence of reliable wage data on black teenagers precludes estimation of a complete structural model.

The data are state aggregates taken from the 1950, 1960, and 1970 Census of Population. State level data on black teenage employment are only available for 30 states and the District of Columbia in 1950,¹ but in each year these 31 observations account for over 90 percent of the entire black teenage population. The sample used to estimate the reduced form parameters is, therefore, limited to these observations.

Two equations characterize the system to be estimated. The first expresses the change in the state's black teenage employment-to-population ratio between 1950 and 1960 as a function of changes in regressors during these two years. The specification of the second equation is identical to the first, except all variables are defined as changes between 1960 and 1970. The observations are weighted by the average size of the state's black teenage population over the three Census years.² The equation system

¹The excluded states, for the most part, lie in the Midwest, Rocky Mountain, and New England divisions of the country. They are North Dakota, South Dakota, Minnesota, Nebraska, Iowa, Montana, Nevada, Idaho, Utah, Colorado, Wyoming, Maine, Rhode Island, New Hampshire, Vermont, Oregon, Wisconsin, Delaware, Alaska, and Hawaii.

²Residuals from unweighted regressions were heteroscedastic. Weighting provided residuals that appeared homoscedastic, although no tests were performed. Alternative weighting schemes, such as the square root of the average population, yielded results that are virtually identical to those presented in the text.

is estimated with generalized least squares to account for correlation between the residuals in the two equations.

Explanatory Variables

In order to empirically measure the change in the demand for agricultural labor that results from technological progress, one must, at minimum, specify an empirical agricultural production function and characterize the nature of the technological advance in terms of measurable changes in the production function. In general, the approach taken here is to assume a production function for each state, and assume that the technological progress maintains the form of the production function, but alters its parameters. Under these assumptions, the change in the demand for agricultural labor in the i^{th} state, due to technological advance, can be written as:

$$(1) \quad \Delta L_i = g(\Delta \theta_i, \bar{P}_i, \bar{\gamma})$$

where θ is a vector of production function parameters, \bar{P} is a vector of initial input prices, and $\bar{\gamma}$ is a vector of parameters of the demand function for agricultural output.

Specifically, the assumed form of the production function is a constant returns to scale Cobb-Douglas function with two inputs: labor and an aggregate of all other inputs.¹ The computational details of constructing the

¹ Assuming a Cobb-Douglas function of the form $AL^\alpha K^{1-\alpha}$ and a constant elasticity demand function for agricultural output, the change in the demand for labor resulting from a technological advance occurring between two periods, τ and $\tau-1$, is

[see equation (4), page 39]

where * denotes the natural logarithm of the variable, $-1/n$ is the elasticity of demand for agricultural products, and W and P are the prices of labor and the aggregate input.

change in the demand for labor are related to Appendix I and only the essential ingredients and assumptions are presented here.

Assuming a Cobb-Douglas production function, calculating the change in the demand for labor that results from technological progress requires data on labor's share of total production costs, the wage rate paid to farm labor relative to price of the aggregate of all other inputs, and the elasticity of demand for agricultural products. Labor's share of total costs is empirically defined as the product of the annual average wage paid to hired farm labor and annual hours of farm work, divided by current operating expenses. The farm wage rate is the annual average wage rate paid to hired farm labor in the state. The price of the aggregate of all other inputs is assumed to be constant across states and is taken from data reported by Rosine and Helmberger (1978). The elasticity of demand for agricultural products is also assumed to be constant across states, and is set equal to $-.1$.

There are obvious potential problems with this approach. The assumption of a particular production and the specification of technological progress are arbitrary and need not necessarily reflect the true state of technological progress. Moreover, in the Cobb-Douglas function changes in labor's share of total cost are assumed to result solely from changes in technology. If the elasticity of substitution between inputs is not unity, changes in labor's shares will result from variations in relative prices of inputs and, hence, may reflect a growth in demand for nonfarm labor rather than technology. Finally, the assumption of a single production function may not be correct if production functions among specific agricultural products differ. If commodity-specific production functions differ, differences in labor's share across states and time will reflect differences in agricultural

product mix and changes in product mix rather than technological advance. Nevertheless, if one is interested in the effect of changes in agricultural production technology on black teenage employment, then some assumptions about the underlying production function and how the technological advance alters this function must be made. The Cobb-Douglas function provides a simple characterization of the technological change and enables this change to be calculated from readily available data.

The variable used to measure the change in the coverage and the level of the federal minimum wage is analogous to the measure commonly used in time-series analysis of minimum wage effects (Mincer, 1976 and Ragan, 1978). The variable is the weighted change between census years in the federal minimum wage relative to the average manufacturing wage in the state. The weight is percentage of nonagricultural employment of all black males in the state covered by the federal minimum wage law. To be precise, let C_i denote the coverage rate in the i^{th} industry and F_{ij} denote the percentage of black nonagricultural employment employed in the i^{th} industry in the j^{th} state. Define the minimum wage relative to the j^{th} state's average manufacturing wage as \bar{W}_j . The change in the federal minimum wage between two periods of time, say t and $t+1$, is

$$(2) \quad \Delta MW_j = \sum_{i=1}^n C_{it+1} F_{ijt+1} \bar{W}_{jt+1} - \sum_{i=1}^n C_{it} F_{ijt} \bar{W}_{jt+1} .^1$$

¹Coverage rates by industry for 1950 and 1960 were taken from Welch (1978) and the 1970 coverage rate was obtained indirectly from BLS through Kim Cunningham. Employment by industry is for all black males age 14 and older, and it is taken from the 1950, 1960, and 1970 Census of Population, State Summaries. The source for the average manufacturing wage is BLS, 1978. Alternative definitions of the minimum wage were also considered. These are discussed later in this section.

Federal coverage rates by industry are used rather than state coverage rates because the latter are unavailable. The primary sources of variation in the minimum wage variable are different between the two decades. Between 1950 and 1960 there was no change in industry-specific coverage rates. Hence, the only sources of variation during this decade are differences in industrial composition and growth rates of the federal minimum wage relative to average manufacturing wages across states. Between 1960 and 1970, as was noted earlier, there were important changes in coverage rates in three industries--retail trade, services, and construction. Changes in coverage rates in these industries combined with differences in their shares of non-agricultural employment working across states provide the primary source of variation during this decade.

The change in the state's real level of retail sales (expressed in 1950 dollars) is used to measure the growth in the demand for nonfarm labor. Data on retail sales by state is taken from the various censuses of business.¹ At the state level, the growth in retail sales matches quite closely the growth in receipts of the service industry. A correlation between changes in these variables across states is .93 during the 1950s and .94 during the 1960s. As a result, the retail sales variable is likely to also capture the effects of the service sector growth.

Three other explanatory variables were used. These were the change in the size of the black teenage population (age 16-19) in the state, a South

¹The Census of Business is not conducted in the same years as the Census of Population. To construct retail sales figures for the census years, I linearly interpolated between adjacent Census of Business years. For 1950, data from the 1948 and 1954 Censuses of Business were used. For 1970, data from the 1967 and 1972 Censuses of Business were used.

dummy variable, and measure of the change in the quantity of schooling in the state. The school variable deserves some comment.

Obviously, teenage employment and school enrollment are jointly determined by the same factors. Hence, inclusion of school enrollment in an equation determining employment is not justified on theoretical grounds. Moreover, because it is endogenous, it creates problems in interpreting other estimated parameters. The reason for its inclusion is to try to capture the effect of the growth in the quality dimension of black schooling. There is evidence that the 1950s, and especially the 1960s, were a period of rather significant increases in the quality of schooling. Quantifying this increase, however, is difficult. One possible set of measures are inputs to schooling, but state-level data on such variables are unavailable. For example, data on expenditures-per-pupil, although available for all elementary and secondary schools, are not available for schools attended by blacks except in some Southern states in 1950 and 1958.¹ In lieu of expenditure data on black schools, one might be tempted to use expenditure data on all schools. However, comparisons between expenditures on white and black schools in 1950 in states where they are separately tabulated, reveal rather large differences. Similar comparisons for 1958 reveal significant differences in expenditure growth rates on black and white schools. Use of school expenditure data on all students is, therefore, likely to systematically understate the growth in expenditures on black students. The same argument applies to other measurable inputs to school quality, such as teacher-pupil ratios and average teacher salaries. Given the potential importance of the

¹The 1950 Biennial Survey of Education provides the data for 17 Southern states in 1950 and the Southern Regional Education Service (1960) provides the data for eight Southern states as late as 1958.

growth in school quality, some control variable is desirable. Since the use of the change in school enrollment is likely to overstate the contribution of the quality of schooling to the decline in black teenage employment, the regressions are also estimated excluding it.

Table 5 reports the regression results both with and without the school enrollment rate variable in the regression. Equality constraints between parameters in the equations for the two decades have been imposed where appropriate. To determine which parameters to constrain, the equations were first estimated without imposing constraints with generalized least squares. These results are reported in Appendix II. Tests of equality between the estimated effects of the change in the demand for agricultural labor (AgProd), the change in retail sales, the change in the black teenage population, and the change in school enrollment rate in each decade were performed. These tests, on each pair of coefficients individually and on the entire set of equality constraints taken jointly, could not reject the hypothesis of equal effects between the decades. The effect of the change in the minimum wage was virtually zero and not statistically significant in the 1950-60 regression, and this was constrained to equal zero.¹

The estimated coefficients in the two regressions are similar, as are their standard errors. The only notable differences are in the estimated effect of population size and the coefficient on the South dummy. The effect of population size becomes not statistically different from zero in the regression that excludes the school enrollment rate. The coefficient on the South dummy increases in importance in the same regression.

¹This is discussed in more detail later in this section.

TABLE 5

BLACK TEENAGE EMPLOYMENT REGRESSIONS¹

	Estimated Coefficients (standard error)					
	1950-60	Constrained	1960-70	1950-60	Constrained	1960-70
Intercept	3.407 (1.900)		6.815 (5.017)	1.456 (1.743)		2.682 4.960
South	-8.469 (2.464)		.935 (2.726)	-10.130 (2.416)		1.850 (2.807)
AgProd		.210 (.034)			.228 (.035)	
Retail Sales		.542 (.177)			.316 (.016)	
Population		-.171 (.087)			.002 (.053)	
Minimum Wage			-.654 (.327)			-.592 (.343)
School Enrollment		-.268 (.107)			--	
Correlation between residuals ²		-.461			-.386	

¹The dependent variable is the change in the state's black teenage (age 16-19) employment-to-population ratio. All other variables are defined in the text.

²This correlation is computed from the unrestricted generalized least squares parameter estimates.

Taken together the regressors explain most of the decline in the black teenage employment ratio between 1950 and 1970. The regression specification that includes the school enrollment rate explains the entire decline, and the regression that excludes it explains 80 percent of the decline (see Table 6). In each specification, the regressors underpredict the employment decline during the 1950s and overpredict the decline somewhat in the 1960s.

Similarly, the regressors explain most of the narrowing of employment differences between the South and the rest of the country.

During the 1950s the difference in black teenage employment ratios between the South and the rest of the country declined by 20 percentage points. The coefficients on the South dummy in the two equations imply that between 8 and 10 percentage points remain unexplained. During the 1960s, the difference in employment ratios between the regions declined by 8 percentage points. Virtually all of this decline is accounted for by the regressors.

The regression coefficients per se are not informative as to the quantitative importance of each variable. But by multiplying each coefficient by the change in the value of its respective regressor, the partial contribution of each variable to the decline in employment can be computed. These partial contributions are provided in Table 6.

These accounting results assign the major cause of the decline in black teenage employment between 1950 and 1970 to two factors--technological progress in agriculture and the increased coverage of the minimum wage. Each of these factors accounts for about one-half of the employment decline. These accounting results are not particularly sensitive to the exclusion of the school enrollment rate variable. The accounting results assign relatively

TABLE 6

PREDICTED EFFECTS OF REGRESSORS ON THE
BLACK TEENAGE EMPLOYMENT RATIO: 1950-1970¹

	Predicted Effect (standard error)	Predicted Effect (standard error)
Actual Change	-19.6	-19.6
Predicted Change	-21.5	-15.7
Ag Prod	-10.21 (.86)	-11.10 (.61)
Retail Sales	7.95 (1.78)	4.63 (1.58)
Population	-3.44 (1.49)	.04 (.96)
Minimum Wage ²	-10.23 (5.12)	-9.25 (5.36)
School Enrollment	-5.54 (1.87)	--

¹The change in the value of each regressor is computed as the difference in the weighted state-level mean between 1950 and 1970, where the weights are the fraction of black teenagers living in the state in 1950 and 1970, respectively.

²Since the minimum wage effect between 1950 and 1960 is constrained to be zero, the predicted effect for the period 1950-70 is computed using the difference between 1960 and 1970 means.

minor roles to the growth in the size of the black teenage population and the growth in school enrollments.¹

The contribution of technological progress in agriculture is perhaps expected, given the rather pronounced importance of the agricultural sector in the raw data reported earlier. The contribution of the minimum wage is perhaps not expected, especially if one's prior view is based on the earlier results on minimum wages by Mincer (1976), Ragan (1978), and others. The large minimum wage effect, therefore, deserves some special consideration.

When the two components of the minimum wage variable--the change in coverage and the change in the level of the minimum wage relative to the average manufacturing wage--are entered separately in the regression, virtually all the minimum wage effect can be attributed to the increase in coverage. This is perhaps because the level of the minimum wage remained constant relative to the average manufacturing wage between 1950 and 1970. If so, it would also explain the absence of a minimum wage effect in the 1950-60 regression. During the 1950s, the level of the minimum wage relative to the average manufacturing wage remained constant and there was no increase in coverage rates.²

Several additional regressions were estimated in an attempt to check the robustness of the estimated minimum wage effect. The results of these

¹In regressions not reported the agriculture variable was replaced by a simpler and more direct measure of the decline in the demand for black agricultural employment: the change in the number of black agricultural workers age 20 and older. The results were virtually identical to those reported in the text.

²Actually, because of changes in the industrial composition of black male employment during the 1950s, the fraction of the nonagricultural black employment covered by the minimum wage declined slightly from 58 percent to 56 percent.

regressions are noteworthy. First, the minimum wage variable computed for the decade of the 1960s was included in the 1950-60 regression. Since there was no increase in coverage rates during the 1950s, a significant effect of this variable in the 1950-60 regression would serve as an indication that the minimum wage variable is capturing the effects of omitted variables common to employment changes during the two decades. The estimated effect in the 1950-60 regression was small, positive, and not statistically significant.

Second, to determine whether the minimum wage variable might be capturing omitted state-specific business cycle employment fluctuations between 1960 and 1970, the minimum wage variable was entered in a regression explaining employment-to-population ratios of all males age 20 and older.¹ Its coefficient was small and not statistically significant.

Third, the minimum wage variable itself was modified. One modification was to base the change in coverage on the 1960 industrial employment distribution of all black males. Another was to replace the black male industrial employment distribution with that of all individuals age 14 and older. The results obtained with the first modification raised the estimated minimum wage effect substantially, while the second did not alter the estimated impact.

¹Also included in this regression was the agricultural labor demand variable, the retail sales variable, the change in the age 20 and older male population, and a South dummy.

Conclusions

The paper has documented the role of the decline in the demand for low-skilled agricultural labor as the driving force behind the sizable reductions in aggregate black teenage employment during the period 1950-1970. Although commonly cited factors, such as the migration of firms out of the central cities of the North, the growth in welfare programs, and the rapid increase in the size of the black teenage population, may have contributed to the decline in employment, their importance seems negligible. Within the agricultural sector, this paper has attempted to measure the impact of the rapid advance of labor-saving technology on the decline in employment. The estimates imply that technological progress accounts for one-half of the decline in the aggregate black teenage employment ratio. But, because of the inherent difficulties in measuring technological change, this estimate should be regarded with caution.

Although the decline in the demand for agricultural labor has played a principal role, it does not explain why black teenagers who were displaced from agricultural work were not absorbed into the nonagricultural sector in the South. Increases in the level of the federal minimum wage during the 1950s, and in coverage rates during the 1960s, is offered as a potential explanation. The raw data (for the 1950s and 1960s) and the estimated regressions (for the 1960s alone) provide evidence that the minimum wage law acted as a substantial barrier to nonagricultural employment among Southern black teenagers. Although the analysis supports this explanation, the size of the disemployment effect is far larger than previous estimates and thus should be regarded with a certain amount of caution.

Appendix IDerivation of the Change in Demand
for Agricultural Labor Variable

The production function at time period t for the i^{th} state is assumed to be of the form

$$(1) \quad Q_{it} = A_{it} L_{it}^{\alpha_{it}} K_{it}^{1-\alpha_{it}}$$

where all terms are defined in the text.

The demand for agricultural output at time period t for the i^{th} state is assumed to be of the form

$$(2) \quad P_{Q_{it}} = \beta Q_{it}^{-n}$$

Hence, it is the same for all states.

The demand function for labor derived from equations (1) and (2) in log form is

$$(3) \quad L_{it}^* = -A_{it}^* + \frac{(\alpha_{it}-1)(n-1)}{n} \left[\left(\frac{W_{it}}{P} \right)^* + \left(\frac{1-\alpha_{it}}{\alpha_{it}} \right)^* \right] + 1/n \left[\beta^* + \alpha_{it}^* + A_{it}^* - W_{it}^* \right]$$

where the asterisk denotes the natural logarithm.

Assuming that technological progress between periods t and $t+1$ operates by changing A and α , the change in the demand for labor in log form is

$$(4) \quad L_{it+1}^* - L_{it}^* = \left(1 - \frac{1}{n}\right) \left(A_{it}^* - A_{it+1}^*\right) + \frac{(\alpha_{it} - 1)(n-1)}{n} \left[\left(\frac{W_{it}}{P_{it}}\right)^* + \left(\frac{1 - \alpha_{it+1}}{\alpha_{it+1}}\right)^* \right] - \frac{(\alpha_{it} - 1)(n-1)}{n} \left[\left(\frac{W_{it}}{P_{it}}\right)^* + \left(\frac{1 - \alpha_{it}}{\alpha_{it}}\right)^* \right] + \frac{1}{n} \left(\alpha_{it+1}^* - \alpha_t^*\right)$$

The empirical measures of the terms on the right-hand-side of equation (4) are obtained in the following manner. The farm wage rate (W_{it}) is the annual average wage paid to hired farm labor in the state. The source for wage data is USDA, Farm Income Statistics, 1951, 1961, 1971. Labor's share of total cost is empirically defined as the annual average wage times the total hours of farm work divided by current operating expenses. The elasticity of demand for farm output, $1/n$, is set equal to .1 and is constant for all states.

The price of all other inputs P_t is assumed to be constant across all states. The cost minimization conditions imply that the price of all other inputs can be written in log form as

$$(5) \quad P_t^* = W_t^* + \left(\frac{1 - \alpha_t}{\alpha_t}\right)^* - \frac{1}{\alpha - 1} \left(L_t^* - Q_t^* + A_t^*\right)$$

The data on W_t , α_t , L_t , Q_t , and A_t used to compute P_t are aggregate data taken from recent work by Rosine and Helmberger (1978). The values for these variables are

	1950	1960
W^*	- .578	- .201
Q^*	10.151	10.323
A^*	1.375	1.795
L^*	9.625	9.190
α	.347	.250

The change in the logarithm of the neutrality parameter, A_{it}^* can be expressed as

$$(6) \quad A_{it+1}^* - A_{it}^* = Q_{it+1}^* - Q_{it}^* + h_{it}^* - h_{it}^* + (\alpha_{it} - 1) \left[W_{it}^* - P_t^* + \left(\frac{1 - \alpha_{it}}{\alpha_{it}} \right)^* \right]$$

where h_{it}^* and h_{it+1}^* denote equilibrium quantities of labor.

The change in total farm receipts, expressed in constant dollars, is used to measure $Q_{it+1}^* - Q_{it}^*$. Total hours of farm work during the year by both hired and family farm workers is used to measure h_{it}^* and h_{it+1}^* .

To convert the left-hand-side of the change-in-demand-for-labor equation into a change-in-demand-for-black labor, it is assumed that the market for black agricultural workers was in equilibrium in 1950 and 1960. Under this assumption actual data on the number of blacks employed in agriculture at time period t (1950 for the 1950-1960 change and 1960 for the 1960-70 change) can be used to anchor the changes in the demand for labor. That is, defining N_{it} as the number of blacks age 14 and older working in agriculture in the i^{th} state at time period t , and Z as the solution to equation (4), the change in the demand for black agricultural labor resulting from technological progress is computed as

$$(7) \quad \text{AgProd} = N_{it} (e^Z - 1)$$

Appendix IIBlack Teenage Employment RegressionUnconstrained Estimates

	<u>1950-60</u>	<u>1960-70</u>	<u>1950-60</u>	<u>1960-70</u>
Intercept	- .165 (3.362)	8.997 (5.226)	- 3.285 (2.889)	6.468 (5.319)
South	-5.104 (3.325)	- .455 (2.995)	-5.910 (3.288)	- .600 (3.073)
AgProd	.218 (.063)	.216 (.079)	.259 (.059)	.172 (.076)
Retail Sales	1.323 (.442)	.280 (.229)	1.176 (.432)	.087 (.209)
Population	- .236 (.160)	- .136 (.094)	.004 (.083)	.001 (.065)
Minimum Wage	--	- .618 (.349)	--	- .651 (.358)
School Enrollment	- .308 (.171)	- .264 (.138)	--	--
R ² (OLS)	.833	.592	.828	.564
ρ		-.461	- .386	

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