Raising the Floor

The Effects of the Minimum Wage on Low-Wage Workers

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Executive Summary

The minimum wage, often dismissed by policy makers and economists as the social safety net of teenagers and part-time workers, is in fact a key determinant of wages for a significant segment of the U.S. workforce—high-school-educated workers starting out in the job market. When the minimum wage rises, the starting wages for nearly three out of five of these workers, regardless of whether their jobs actually pay the minimum wage, rise with it. When the wage stays where it is—and thus falls in real terms—it holds their wages down.

As the real value of the minimum wage declines, firms shift their work focus away from higher-paying, skilled jobs and toward low-wage, less-productive positions.

Furthermore, as the real value of the minimum wage declines, firms shift their work focus away from higher-paying, skilled jobs and toward low-wage, less-productive positions. Thus, high-school-educated workers are hit from two directions: their starting wages are lower, and their choice of jobs is increasingly limited to low-wage occupations.

The recent history of the minimum wage has compounded these effects. Raised 12 times between 1950 and 1981, the wage went through a unique dry spell during the 1980s. As prices rose during the decade by over 30%, Congress held the wage constant at $3.35. Increases in 1990 (to $3.80) and 1991 (to $4.25) returned about half of that lost purchasing power, not enough to raise the value of the minimum wage to its level of the 1960s or '70s. Minimum-wage earners have been hit directly: a full-time worker heading a family of three and earning the minimum—a likely possibility since most minimum-wage earners are adults, not teenagers—fell $2,300 below the poverty line in 1992. That same worker would have been above the poverty line in 1979. But the minimum wage affects many more workers than those who actually earn it. The 59% of high-school-educated workers whose wages are tied to the minimum have experienced a similar decline in living standards.

Particularly hard hit by a fall in the value of the minimum wage are rural workers, who are almost twice as likely as workers in metropolitan areas to have wages at or below the minimum. By 1991 in nonmetropolitan areas, three-fifths of high school graduates in the job market 1-10 years earned a wage that, on a full-time basis, could not support a family of four above the poverty level. The proportion in 1979 was two-fifths.

Those critical of raising the minimum wage argue that such a man-

dated increase in labor costs induces firms to reduce employment levels, among other deleterious economic effects. Yet the findings reported here from a survey of restaurants in Jackson, Miss., and Greensboro, N.C., confirm recent research by other analysts:

- Increases in the minimum wage produce no significant changes in employment, either up or down, among low-wage firms.
- Rather than merely raising the wages of workers who had been earning less than the new minimum, firms respond to a mandated increase in the minimum wage by raising the wages of all workers. In other words, firms maintain their internal wage structures.
- Firms do not resort to nonwage remedies, such as reducing employee benefits or raising prices, in response to changes in the minimum wage.

Increases in the minimum wage produce no significant changes in employment, either up or down.

While these results suggest that costs involved in raising the minimum wage may be minimal, there is a price to be paid for holding it to a low level. Adults supporting families on minimum-wage jobs are pulled below the poverty line, thus placing increasing burdens on a strapped social welfare system. And young adult workers face diminished opportunities in both jobs and wages as a result of this misguided policy.

Introduction

In 1938, Congress passed the Fair Labor Standards Act (FLSA), which established federal mandates for minimum wages and the regulation of working hours. Its original minimum-wage standards excluded many categories of workers, including farm workers and household domestic workers, thus creating a two-tiered system of coverage. In general, workers in urban settings were more likely to be covered than rural workers, so the effect of the minimum wage varied between urban and rural communities.

The real value of the minimum wage declined sharply in the 1980s, from $5.22 in 1981 to $3.78 in 1989.

The minimum wage does not, of course, rise automatically with other wages or with prices: increases in the wage, as well as extension of the standards to additional categories of workers, can be accomplished only by amendments to the FLSA. Congress approved 14 increases between 1950 and 1991; the increase in April 1990 to $3.80 an hour, effected by the 1989 amendments, was the first increase in nine years, since January 1981. Before that, the longest periods without an increase were for six years, from 1950 to 1956 and from 1968 to 1974. But during the 1968-74 period, coverage was extended to some workers, including farm workers, who had not been covered previously. Thus, the 1980s represent a unique dry spell for any increase in or broadening of the minimum wage.

The inflation-adjusted value of the minimum wage, in 1992 dollars, declined sharply in the 1980s, from $5.22 in 1981 to $3.78 in 1989. Increases in the minimum wage since 1989 still left its value in 1993 well below the levels of the 1960s and 1970s (**Table 1.1**).

Because of the decline in the purchasing power of the minimum wage, a worker earning the minimum in 1992 in a full-time, full-year job would fall $606 below the poverty line for a family of two, $2,300 below the poverty line for a family of three, and $5,364 below the poverty line for family of four. By contrast, in 1979, the earnings for a full-time, full-year minimum-wage worker in a two- or three-person family were *above* the poverty line.

Many policy analysts predicted that the 1990 and 1991 changes in the minimum wage would have disastrous effects (Bartlett 1987; Kibbe 1988; Testa-Ortiz 1987; McKenzie and Simon 1987), but economists studying these changes have not found the expected negative trade-off between employment levels and increases in the minimum. In particular, research-

TABLE 1.1
Value of Minimum Wage, Selected Years

Year	Minimum Wage Current Dollars	Minimum Wage Constant 1992 Dollars
1956[1]	$1.00	$4.74
1963[2]	1.25	5.74
1967[3]	1.40	5.41
1973	1.60	4.76
1979	2.90	5.50
1981	3.35	5.22
1989	3.35	3.78
1990[4]	3.80	4.08
1991[4]	4.25	4.38
1992	4.25	4.25
Period Averages		
1950s	$0.85	$4.05
1960s	1.29	5.19
1970s	2.07	5.26
1980s	3.33	4.52
1990-1992	4.10	4.24

[1] Changed March 1. [2] Changed September 3. [3] Changed February 1. [4] Changed April 1.

Source: EPI calculations based on historical data from Shapiro, Isaac, "No Escape: The Minimum Wage and Poverty," Washington, D.C.: Center on Budget and Policy Priorities, 1987, p.19, and on legislated increases in 1990 and 1991.

The 1980s represent a unique dry spell for any increase in or broadening of the minimum wage.

ers David Card (1992a, 1992b), Card and Alan Krueger (1993), Lawrence Katz and Krueger (1992), and Alison Wellington (1989) used different data sets and methodologies to analyze this relationship yet reached the same conclusion: increases in the minimum wage do not have a statistically significant effect on employment **(Table 1.2)**.[1]

While these results contradict the conventional wisdom, they are not really surprising: empirical studies of the minimum wage have never shown conclusively that it has significant negative effects on employment. Furthermore, of the many competing theories that explain the relationship between employment and wages, the two that appear to be most consistent with real-world data—efficiency wage theory and monopsony—do not predict that minimum-wage laws are necessarily economically inefficient or produce unemployment.[2] Efficiency wage theory argues that firms set wages in relation to social norms in order to encourage work effort. Thus,

TABLE 1.2
Recent Research on the Minimum Wage

Researcher	Data Set	Conclusions
David Card Princeton University	18,511 teenagers in the outgoing rotation group of the Current Population Survey, aggregated by state, April-December 1989 --April-December 1990	1. The responsiveness of teenage employment to the 1990 minimum-wage change was not statistically significant. 2. The minimum-wage change raised average teenage wages by as much or slightly more than the increases predicted by assuming that individuals earning less than the new minimum would be raised only to that level.
David Card Princeton University Alan Krueger Princeton University	321 fast-food restaurants in New Jersey with a control group of 78 in eastern Pennsylvania, surveyed February-March--November-December 1992	1. Found no evidence that the rise in New Jersey's minimum wage reduced employment at fast-food restaurants. 2. Within the New Jersey sample, found no evidence that prices increased more in stores that were most affected by the minimum-wage rise.
Lawrence Katz U.S. Dept. of Labor and Harvard University Alan Krueger Princeton University	100 fast-food restaurants in Texas, surveyed December 1990--August 1991	1. Employment increased significantly in firms with larger mandated wage increases. 2. There were small but insignificant declines in prices at the firms with the larger mandated wage increases.
Alison Wellington Davidson College	Quarterly data 1954-1986, aggregate time series	1. A 10% increase in the minimum wage reduces the employment-to-population ratio of teenagers by less than 1%. 2. There is no significant employment effect for young adults aged 20-24 resulting from changes in the minimum wage.

Empirical studies of the minimum wage have never shown conclusively that it has significant negative effects on employment.

raising the minimum wage would result in an increase in wages not only in minimum-wage jobs but in other jobs for which employers use the minimum wage as a reference point. The monopsony approach argues that firms in some industries behave as if they were a single employer. They may arbitrarily set starting wages at the minimum, but that level may be economically inefficient and result in employment levels that are too low. Raising the minimum wage, then, would attract workers and increase employment.

This study finds that, while the minimum wage may not be important in affecting employment levels, it plays a significant role in determining the wages of America's workforce, particularly those members with only a high school education and those living in rural areas.

The first section looks at the issues involved in identifying and counting workers who are paid the minimum wage. Estimates of the number of minimum-wage workers vary according to the methods researchers use to compute wages, and whether they separate the incidence of earning the minimum wage from the period in which it is earned.

There is a group of jobs in which wage increases are much more closely linked to increases in the minimum wage than to increases in average wages.

The second section looks at the effects of minimum-wage changes on the operation of individual firms. A sample of restaurants was surveyed before the April 1, 1991 increase in the minimum wage and again afterwards. The major finding is that the increase in the minimum wage did not lead to a decrease in employment. It did, however, produce an increase in wages above the mandated change.

The third section, which looks at the distribution of the wages of high-school-educated workers, shows how that distribution changed from 1973 to 1991 in relation to the minimum wage. Because the data show such a dramatic increase in the share of high-school-educated workers earning less than the *purchasing power* of the minimum wage at its 1979 level, the section investigates how the wages of workers earning above the nominal minimum wage relate to the minimum. It finds that there is a group of jobs in which wage increases are much more closely linked to increases in the minimum wage than to increases in average wages. When the minimum wage does not change, these workers' wages tend to stagnate, and their real wages fall.

The final section discusses the relationship of the minimum wage in both urban and rural settings to wages of starting workers with less than a college education. A much larger share of rural than urban workers, regardless of race or gender, enter the workforce with poverty-level wages, and a larger share of starting jobs for rural workers have wages tied to the minimum.

Identifying and Counting Minimum-Wage Workers

Two assumptions ground our analysis: (1) The minimum wage is society's standard of the lowest acceptable wage; and (2) the minimum wage sends a signal to low-skilled earners (or potential earners) and their

employers about the wages they can expect now and for the near future. It is also necessary to state two important facts: (1) most minimum wage workers are adults over 19 years of age; among full-time workers who earn the minimum, over 80% are adults; and (2) more than one in five minimum-wage workers lives in a family below the official poverty line; this ratio is about the same for teenage and adult minimum-wage workers.

The method of counting minimum-wage workers in the U.S. economy has been subject to question. For many years, the Bureau of Labor Statistics (BLS) has released data on minimum-wage workers who are paid by the hour, but although these data have gained acceptance over the years as the accurate count of minimum-wage workers, they severely underestimate the true number. This undercount, as first described in Klein (1990), exists because the widely accepted number excludes nonhourly workers, that is, those whose rate of pay is by the week, month, or year or by the piece. These nonhourly workers are (most likely) the vast majority of minimum-wage workers, and the minimum-wage law covers them to the same degree that it does their hourly paid counterparts.

Contrary to conventional wisdom, most minimum wage workers are adults over 19 years of age.

The acceptance of a minimum-wage count that excludes nonhourly workers, both for policymaking and as a basis for analysis, has caused a misunderstanding about the size of the minimum-wage group and, especially, the proportion who are poor. Among minimum-wage hourly workers, fewer than one-fifth are below the poverty line, but when nonhourly workers are added to the count that proportion rises to almost one-fourth. The proportion of adult men earning the minimum wage who are poor doubles—from 20% to 40%—when nonhourly workers are included. Of minimum-wage earners who are poor, 65% are the sole breadwinners in their families, signaling a more serious problem of working poverty than was previously believed to exist.

The counts in the tables that follow were derived in a manner similar to the estimates described by Klein (1992). We believe they represent a more accurate representation of the number of workers who earn the minimum wage or below. These starting points are important to understanding the key point of this paper: the minimum wage, rather than being marginal to economic activity, is key to determining wages for broad categories of workers, not just those who are directly affected by it.

The data for the 1980s give a misleading picture. During that period,

the value of the minimum wage and the number of workers earning the minimum wage declined, but these trends do not mean that there was a shift from low-wage to high-wage jobs. Two further issues must be considered.

First, while average wages about doubled in current-dollar terms during the 1980s, the minimum wage increased only once, from $2.90 in 1979 to $3.35 in 1981, and it remained at that level until 1990. In order for the minimum wage to retain its purchasing power between 1979 and 1989, it would need to have risen to $4.83 by 1989. Thus, workers whose wage rose from $3.35 in 1981 to $4.00 in 1989 would no longer be classified as minimum-wage workers, even though they were poorer in 1989 than they had been in 1981.

Workers whose nominal wage rose from $3.35 in 1981 to $4.00 in 1989 would no longer be classified as minimum-wage workers, even though they were poorer.

Using data from the 1984 and 1985 panels of the Survey of Income and Program Participation (SIPP), Ralph Smith and Bruce Vavrichek (1992) show that, among those in their sample of minimum-wage workers who remained employed for a year, 38% earned the minimum-wage (or less) for a full year. Of the remaining 62%, the increase they received was small: 70% of hourly workers still earned less than $4.00 an hour, less than the minimum in real terms. This undercounting has policy implications, since discussions on the importance of the minimum wage often turn on perceptions of how many workers it affects and who those workers are.

Second, economists who study unemployment recognize that estimating unemployment involves taking snapshots of a flow variable. So, it is common for research on unemployment to be sensitive to issues not only of unemployment incidence but also of duration. Counting the incidence of unemployment tells how many people experience unemployment and how often they become unemployed over the period (usually) of a year. Duration is the length of time people spend looking for work when they become unemployed. The two—incidence and duration—combine to create our picture of unemployment, and they are important for counting the number of minimum-wage workers. The work of Smith and Vavrichek (1992) shows that we need to be concerned about the flow of workers into and out of minimum-wage work.

The share of workers earning the minimum wage serves as a barometer of how binding that wage is. But the proportion of workers who report earning the minimum wage at any one point (see Haugen and Mellor 1990 as an example) is different than the probability that a particular worker will earn the minimum wage at some point during the year. The share of

minimum-wage workers can change if the probability of earning the minimum wage changes, if the proportion of the year the average worker stays at the minimum wage changes, or if the proportion of the year that the average worker is not employed (unemployed or not in the labor force) changes. These differences can vary across time and across different subpopulations (e.g., teenagers versus adults.)[3]

The Smith and Vavrichek research suggests that a snapshot of the wage distribution hides the relationship between minimum-wage workers and other low-wage workers by ignoring the distinction between the duration and incidence of being paid the minimum wage. Workers who are given a raise in wages from the minimum wage have a new wage that thus depends on the level of the minimum, and other workers may have had starting wages that were set specifically to create a premium above the minimum. (A subsequent section of this paper examines the starting wages of workers with less than a college education to see if there is a relationship between other wages and the minimum wage.)

The number and the share of workers earning the minimum wage declined from 1979 to 1989.

Table 2.1, a snapshot of the number of minimum-wage workers in 1979 and 1989, shows that both the number and the share of workers earning the minimum wage, on an hourly basis or otherwise,[4] declined during those 10 years. That decline could be the result of a lowering of the chances that a worker would earn the minimum wage during the year, or perhaps the probability of earning the minimum wage stayed the same while the amount of time a worker spent at the minimum-wage level declined. It could also reflect a drop in the average amount of time spent not working.[5]

Decline in Low-Wage Jobs in Manufacturing

From 1979 to 1989, the number of minimum-wage jobs in durable goods fell 64%, from 1,062,000 to 385,000, and in nondurable goods from 1,234,000 to 531,000, a drop of 57% (Table 2.1). In all, the number of minimum-wage jobs in manufacturing declined 60%. Of course, as described above, some of this large fall is the result of holding the minimum wage at the 1981 rate of $3.35 an hour as other hourly wages rose in current-dollar terms. In the meantime, a shrinking manufacturing sector reduced the opportunity for workers at the bottom to move into higher-paying semi-skilled jobs. The frustration experienced by these low-skilled workers has been the subject of many popular and academic articles (see, for example, O'Reilly 1992).

TABLE 2.1
Characteristics of Minimum-Wage Workers
(thousands of workers)

Characteristic	1979	1989
Minimum-wage workers		
Among workers paid hourly	3,973	2,456
Among all workers	20,256	12,499
Minimum-wage workers who are poor	3,426	2,750
Percent poor	16.9%	22.0%
Value of the minimum wage		
Minimum wage (current dollars)	$2.90	$3.35
1979 minimum wage (constant $1979)	$2.90	$4.86
Minimum-wage workers by industry (Numbers and percent of column total)		
Durable goods	1,062 (7.0%)	385 (4.3%)
Nondurable goods	1,234 (8.1%)	531 (5.9%)
Business and repair services	532 (3.5%)	561 (6.3%)
Retail trade	4,452 (29.3%)	2,948 (33.0%)
Professional and related services	3,269 (21.5%)	1,690 (18.9%)
All other	4,641 (30.6%)	2,826 (31.6%)
Nonminimum-wage workers by industry (Numbers and percent of column total)		
Durable goods	13,160 (16.4%)	12,490 (12.1%)
Nondurable goods	8,113 (10.1%)	8,479 (8.2%)
Business and repair services	2,681 (3.3%)	5,678 (5.5%)
Retail trade	10,710 (13.4%)	15,600 (15.2%)
Professional and related services	17,000 (21.3%)	22,250 (21.9%)
All other	28,516 (35.5%)	38,203 (37.1%)
Race & ethnicity of minimum-wage workers (18-64 years of age)		
White, non-Hispanic	11,390 (75.0%)	6,252 (69.9%)
African Americans, non-Hispanic	2,385 (15.7%)	1,536 (17.2%)
Hispanic, any race	1,098 (7.2%)	911 (10.2%)
Asian, Native American, others	317 (2.1%)	241 (2.7%)

Source: Authors' analysis of BLS data.

Following the general pattern of job gains in the economy, the number of minimum-wage jobs grew in the service sector.

Gains in Services and Retail Trade

Following the general pattern of job gains in the economy, the number of minimum-wage jobs grew in the service sector, which includes business and repair services, retail trade, and professional and related services (Table 2.1). Much of the gain was concentrated in business and repair services, which includes persons on cleaning crews and temporary office, health care, and factory workers. These types of jobs not only pay low wages, but often lack benefits such as health insurance, vacation, and sick pay.

Race and Ethnicity of Minimum-Wage Workers

Nonwhites accounted for a disproportionate share of minimum-wage workers in 1979 (Table 2.1), and two trends exacerbated that situation during the 1980s. First, since the real value of the minimum declined, minimum-wage workers fell into an even lower-paid group, and, since relative to whites nonwhites tend to have lower wage rates (even lower than in 1979), a still larger proportion tended to occupy the low-wage ranks. Second, since the 1980s were a time of rapid growth in the Hispanic labor force, the proportion of Hispanics increased in all wage categories, including the minimum-wage segment.

High School Graduates and the Minimum Wage

Among high school graduates who were 1-10 years out of school, a much larger proportion were low-wage workers in 1989 than 10 years earlier, and many more fell below the poverty level for a family of four (**Table 2.2**.). The hourly wage equivalent of this poverty level in 1989 was $6.58,[6] almost twice the minimum-wage level, and in 1989 40.3% of white high school graduates had wages below this level. For African Americans and Hispanics, over half of recent high school graduates had wages below this level.

Among high school graduates 1-10 years out of school, a much larger proportion were low-wage workers in 1989 than 10 years earlier.

TABLE 2.2
Wages of High School Graduates (no college) 1-10 Years Out of School
(constant 1991 dollars, percentages for each race)

Characteristic	1979	1989	1991
Earn 1989 minimum wage ($3.35) or below			
White, non-Hispanic	2.1%	5.0%	3.4%
African American, non-Hispanic	2.0	6.8	3.3
Hispanic, any race	1.8	6.8	4.0
Earn 1991 minimum wage ($4.25) or below			
White, non-Hispanic	2.6	9.8	10.9
African American, non-Hispanic	2.3	16.6	17.3
Hispanic, any race	2.3	11.8	14.5
Earn poverty wage for a family of Four or below (2 adults 2 children, $6.58)			
White, non-Hispanic	29.0	40.3	47.0
African American, non-Hispanic	38.1	57.1	64.8
Hispanic, any race	36.0	52.5	54.0

Source: Authors' analysis of BLS data.

This growth of low-wage work among recent high school gra has disastrous consequences for family formation and stability (these p lems in the marriage market among African Americans have been disc by William J. Wilson [1989] and others), and the trend has continue the 1990s. In 1991, the condition worsened somewhat for all grou recent graduates, but especially for African Americans, almost two-t of whom (64.8%) earned below the poverty line.

Average real family income for poor families fell slightly during the 1980s, and would have fallen significantly without the contribution of the wife's earnings.

An examination of real earnings for married-couple families children provides a broader view of resources available to families th hourly wage data alone. Overall, average real family income for families (**Table 2.3**) fell slightly during the 1980s, and would have f significantly without the contribution of the wife's earnings.

TABLE 2.3
Average Earnings of the Bottom Fifth Income Class of Married-Couple Families With Children (in constant 1989 dollars)

Characteristic	1979	198
Total family income	$16,071	$15
Net of wife's earnings	$14,040	$12

Source: Unpublished tabulation by Lucy Gorham, Joint Economic Committee.

The Effect on Individual Firms of Changes in the Federal Minimum Wage

How do changes in the minimum wage affect the overall wage lev individual firms? And what is the impact on employment and pricing

In a research project that closely replicates Katz and Krueger's search on fast-food restaurants in Texas, restaurants in Jackson, Miss Greensboro, N.C., were surveyed by telephone during March 1991, month before the increase in the federal minimum wage, and again in April 1991, soon after the increase.[7] Taken with the findings of Katz Krueger as well as Card and Krueger, some striking new conclu emerge from this analysis:

- Firms try to maintain their wage hierarchy, that is, the wage differences among their workers. Overall, wages increased

by more than what was mandated by the change in the minimum wage, and workers who were between the old and the new minimum wage received wage increases that placed them *above* the new minimum wage, not just *at* the new minimum. These increases were most pronounced among firms with the largest number of workers required by law to receive a raise.

- There was no significant decline in employment levels because of increases in wages. Instead, employment *increased* in some firms, particularly those with the highest turnover rates.

- While prices increased with wages for some restaurants in Jackson, they did not do so in Greensboro nor in the sample as a whole. (Katz and Krueger found weak evidence that prices *fell* as wages increased.) Thus, conclusions about how minimum-wage changes affect prices must remain tentative.

Overall, it would appear that too much has been made of the minimum wage's negative effects.

Overall, it would appear that too much has been made of the minimum wage's negative effects. Perhaps this overemphasis is already known by those hiring minimum-wage workers with the greatest frequency—food-service managers. Allowed by law to pay a subminimum wage, extremely few in this sample chose to do so: in fact, none of the firms in the April survey paid the subminimum wage to teenagers. Further, if the wage mattered for employment levels, then firms accustomed to high turnover should have been more likely to reduce employment by not replacing lost workers with higher wage new workers. Instead, they significantly increased employment.

The following parts of this section give background on the wage distribution of workers in the food-service industry nationally and of the general workforce in Mississippi and North Carolina; show how the wage structure of the restaurants surveyed in Jackson and Greensboro changed when the minimum wage changed; show how employment levels at the restaurants changed and how labor turnover rates—not wages—significantly affected employment changes; discuss the significance of labor

experience level—rests on this key rate. Differences in wages from the key wage serve to reflect the hierarchy of job tasks and seniority in the firm.

For food-service occupations, the minimum wage is the key wage. Thus, this study is not of an average labor market but of low-wage occupations in a low-wage industry in low-wage states. The effects of changes in the minimum wage may be more noticeable in this study than they would be for the average American firm or worker.

The two states chosen for this study have a generally low-wage structure for production workers; hence, the minimum wage relative to the prevailing wage of other production workers is greater in these two states than it is nationally. In 1989, the last full year before the minimum-wage change, average hourly earnings for manufacturing production workers in October was $9.08 in Jackson, $9.20 in Greensboro. The national average, excluding overtime pay, according to BLS data for 1990, was $10.08. Mississippi had the second-lowest average wage for any state, and North Carolina was third. (South Dakota was lowest.)

As a group, food-service workers are more likely to be affected by changes in the minimum wage than are most other types of workers.

Yet in 1989, among all workers paid hourly, only 5.16% of workers in North Carolina were paid at or below the minimum wage, not much different than the national percentage of 5.06%. However, Mississippi is different: the percentage of hourly workers paid at or below the minimum is approximately double the national average.[8]

As a group, food-service workers are more likely to be affected by changes in the minimum wage than are most other types of workers. Nationally, among hourly paid workers in food-service occupations, roughly one-fourth (25.37%) were paid at or below the minimum wage in 1989, making them five times more likely to be paid at or below the minimum wage than the average worker nationally. In comparison, among workers in retail and personal sales occupations, roughly 8.32% were paid at or below the minimum, according to BLS data. Wages at or below the minimum wage are, however, less common for food-service workers than for private household and farm workers.

Greensboro is located in North Carolina's "Piedmont Triad," a region that includes the cities of Winston-Salem and High Point and seven counties. This metropolitan statistical area (MSA) has a population of 931,000. Of Greensboro's 196,000 population, 8% are full-time college students.[9] In April 1991, the Greensboro-Winston-Salem-High Point MSA had an un-

employment rate of 4.8%, according to the BLS. Surveyors co
Greensboro restaurants, of which 76 provided information that
this analysis.[10]

Jackson, population 196,600, is located in central Mississip
state capital, has a diversified economy, and serves as a state a
center. It is the main city in the Jackson standard metropolita
area (SMSA), which has a total population of 395,400. In Apr
Jackson SMSA had an unemployment rate of 5.8%. Hence, the
labor market was slightly tighter than Jackson's.

It is customary to assume that workers above the new minimum would not be affected by an increase, but that was not the case in this study.

The sample in Jackson included all restaurants listed in
Pages. A total of 282 restaurants were identified and, of
provided information for the March and April surveys.[11]

Changes in the Minimum Wage and Firm-Specific Wage St

In simulations of the effect of changes in the minimum
customary to assume, first, that increasing the minimum wa
workers who were previously below the new minimum up t
minimum and no further, and, second, that workers above the
mum would not be affected.[12] These assumptions suggest that t
wage structure of a firm can be easily changed; they are also cons
a "human capital" view of wage setting, which says that cha
minimum wage does not, in itself, change the productivity of w
their human capital) and therefore has a very limited influence o
structure. This part, which examines whether firms maintain t
structures following a change in the minimum wage, is a fir
understanding how changing the minimum wage matters.[13] The
reported here confirms our expectation that, despite changes in
mum wage, firms maintain their wage differentials. Contrary to t
tion of the human capital view, we do not find that there is
flattening of the lower portion.

In March, before the minimum-wage change, the average ho
at Jackson and Greensboro restaurants (weighted by the number o
ees) was $4.30,[14] slightly above the new minimum of $4.25 (T
The variance from the average wage was $5.947 between firms a
within each firm. If the change in the minimum wage affects only
below the new minimum, then the weighted average wage wo

TABLE 3.1
Wage Structure of Restaurants Before and After Change in Minimum Wage

	Average Wage	Variation: Between Firms	Variation: Within Firms
March	$4.30	5.947	0.188
Scenario 1 (raise to $4.25 only)	$4.49	4.140	0.149
Scenario 2 (across-the-board $0.45 raise)	$4.75	5.947	0.188
Scenario 3 (across-the-board 11.84% raise)	$4.80	6.439	0.199
April	$4.63	2.503	0.191

Source: Authors' surveys and analysis.

The evidence confirms our expectation that, despite changes in the minimum wage, firms maintain their wage differentials.

increased to $4.49 (as shown as Scenario 1). Such an occurrence would flatten the wage distribution at the bottom and therefore reduce the variation in the wage distribution both within firms (from $0.188 to $0.149) and between firms (from $5.947 to $4.140).

There are two alternate routes that firms could take to maintain their internal wage structures. Jean Grossman (1983), in much the same way as Eichner, has put forth the argument that the minimum wage can serve as a key wage, and that firms will seek to maintain their wage structures relative to this wage because such differentials affect work effort. In Scenario 2 (Table 3.1), firms maintain their internal wage structures in terms of absolute wage gaps by giving all workers a $0.45 increase—equal to the amount given to those workers going from the old minimum to the new. In Scenario 3, firms maintain the internal wage structure in terms of the percentage gap in wages by giving all workers an 11.84% increase—equal to the percentage given to those workers going from the old to the new minimum. In the first case (Scenario 2), the average wage for workers would become $4.75, and the variance would remain the same. In the latter case (Scenario 3), the average wage would increase to $4.80, the variance of wages between firms would increase to $6.439, and the variance within firms would increase to $0.199.

Our survey shows that, in April, the actual average wage increased to $4.63, the between-firm variance decreased to $2.503, and the within-firm variance rose slightly to $0.191. The slight increase in the within-firm variance is consistent with firms maintaining their wage structures by giving a percentage increase (Scenario 3), as opposed to a flat increase

(Scenario 2). But the new average wage is closer to the flat raise than to the percentage increase, suggesting that workers above the new minimum received raises and those between the old and the new minimum were pushed above the new minimum.

Because the between-firm variance decreased by much more than any of the scenarios projected, it would appear that high-wage firms did not adjust their wages as much as did low-wage firms, and thus low-wage firms brought their wage structures closer to those of high-wage firms. This is consistent with the findings of Katz and Krueger (1991b) that increases in the minimum wage decreased the variation in the starting wages of firms.

Workers above the new minimum received raises and those between the old and the new minimum were pushed above the new minimum.

The data suggest that all firms did not respond to the increase in the minimum wage in precisely the same way. Some firms were already paying well above the new minimum, while some had many workers below it. Some firms had very low turnover, while others replaced almost their entire workforce in a month. Those differences let some firms make wage decisions for new workers who were likely to leave, while other firms had to make wage decisions for existing workers who were likely to stay. It was necessary, then, to use statistical methods to control for these differences among the firms. Comparisons that ignore these differences make the mistake of combining management decisions influenced by the minimum wage with those that would have been made for other reasons. (See Appendix A, Tables A1 and A2; for a complete analysis, see Spriggs, forthcoming.)

Increases in the proportion of workers who had to have their wages raised are associated with increases (statistically different from zero[15]) in the extent to which the firm maintained its wage structure by giving workers not directly affected by the change in the minimum wage an increase.

The size of the gap at a particular restaurant between the new minimum wage and the wages of workers below the new minimum was not significant in predicting the extent to which that restaurant would try to maintain its wage structure. That the wage gap was not significant, but that the proportion of workers getting an increase was, suggests that firms take the wage differentials as fixed. The difference in the significance between the number of workers affected and the size of the wage gap also may mean that firms believe the share of workers receiving wage increases influences

worker morale more than the size of the increase.[16]

A greater variance of wages within the restaurant reduced (by an amount statistically different from zero[17]) the extent to which the wage structure would be maintained. Such a relationship seems reasonable, since greater wage dispersion may suggest there are jobs in the firm for which the minimum wage is not the key wage. Some positions in the restaurant may be on a different wage contour, that is, part of a different wage structure. A chef at a five-star restaurant would most likely be on a different wage contour than a dishwasher, while a cook in a fast-food restaurant is likely to be on the same wage contour as a member of the clean-up crew. In general, then, the difference in wages may have made it less necessary to increase all workers' wages to maintain worker morale.

None of the major chains differed significantly from the non-major chains in the extent to which they made across-the-board wage increases.

The turnover rate is not significant in explaining the maintenance of the wage structure.[18] According to one view, the higher turnover rate in food-service occupations should make the maintenance of a wage structure unnecessary—firms could simply change their wage structures as new workers came in. Another view is that firms may use dismissals, and not wages, as a way of maintaining work effort (Rebitzer and Taylor 1991).

None of the major chains differed significantly from the non-major chains in the extent to which they made across-the-board wage increases.[19] This finding would follow Eichner's contention that the internal wage structure of different firms in the same industry should be similar. Still, firms in Greensboro were significantly[20] less likely to grant across-the-board wage increases (see Appendix A), suggesting that Greensboro firms were less likely than Jackson firms to maintain their wage structures. Katz and Krueger also found local effects to be important,[21] but the difference was slight.

The significant effect of the change in the minimum wage on non-minimum-wage workers remains even after dividing the sample into different subsamples and using different measures of maintaining the wage structure. In four of the six different subsamples we examined, the proportion of workers at a firm affected by the change was statistically significant in predicting the extent to which firms maintained their wage structures.[22]

In conducting the survey, we counted the number of workers who where visible and, of those, the number who were African American or female. For some restaurants this method might have included all workers

worker morale more than the size of the increase.[16]

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In conducting the survey, we counted the number of workers who where visible and, of those, the number who were African American or female. For some restaurants this method might have included all workers

on a particular shift, while for others it may have counted only those not in the kitchen. Counting was not possible for all restaurants; some, like Pizza Hut delivery kitchens, have no readily visible workers.

When the subsample for which there is information on the race and sex composition of the labor force is examined, the findings show that having a high proportion of African American workers significantly[23] reduced the extent to which firms made across-the-board raises. (See Appendix A, Table A3.)[24] There is also evidence, although weaker, that the proportion of females in the workforce has the same effect.[25]

Having a high proportion of African American workers significantly reduced the extent to which firms made across-the-board raises.

It is possible that these data show a type of discrimination. Firms with large proportions of African Americans or women may think that maintaining their wage structures is not important, and may use the threat of dismissal rather than the incentive effect of relative wages to encourage work effort. The higher unemployment rates among African Americans and the lower wages earned by women may make pursuing such a strategy easier than it would be for firms with a high proportion of white males in their workforces. The discrimination could also be more direct: women and African Americans may be in a separate wage structure in the firm, so that changes in the minimum wage may affect their wage structure without affecting that of already higher-paid whites or males.

Yet, if firms are more likely to use dismissal than wages to encourage work effort when large proportions of their workforces are African American or female, then an increase in the minimum wage could have the positive effect of changing a firm's behavior toward African American and female employees. To the extent that lower-paid African American or female workers are part of a different wage structure from that of whites or males, increasing the minimum wage will serve to close the earnings gap.

Changes in Employment

Here, we look at changes in employment levels at firms following changes in the minimum wage. The conventional wisdom is that increasing the minimum wage reduces employment, and this view has become the main argument against minimum-wage increases. Policymakers have been influenced by this argument.

Some economists (Rebitzer and Taylor 1991) have argued that if firms use dismissal to increase work effort, and the supervisory resources of the

firm are fixed, then raising the minimum wage will have the effect of lowering the marginal cost of labor because, from the worker's perspective, it is more costly to be dismissed at the higher wage. It is possible, then, that workers will increase their work effort with less intense supervision, thereby reducing the costs of supervision, raising productivity, and allowing the firm to hire more workers even though the average wage has increased. Thus, raising the minimum wage could *increase* employment in firms with high turnover.[26]

This part gives the results of testing both propositions: (1) that an increase in the minimum wage decreases employment, and (2) that an increase in the minimum wage increases employment (in firms with high turnover). The results show that higher labor turnover relates significantly to increases in employment after the minimum wage changes, but that the increase in the minimum wage does not have a significant effect overall on employment.

Higher labor turnover relates significantly to increases in employment after the minimum wage changes.

The change in employment at the firms is measured as the difference in the natural logarithm of employment in April (or May) 1991 compared to March 1991. This section will use two different ways to assess the effect of the change in the minimum wage. One looks only at the effect of the mandated change for those workers earning less than the new minimum. The other looks at both mandated and unmandated changes in wages.

Estimating the effect of wage changes is not a simple matter. As the last part showed, some firms granted wage increases that were not mandated, while others appear to have granted only those increases mandated by law. Again, statistical controls will be necessary to isolate the changes in employment that corresponded to changes in wages at the firm level.

The Effect of Mandated Wage Changes

In the first measure, following Katz and Krueger, the gap between the new minimum wage and the current earnings of affected workers is measured by the natural logarithm of the ratio of $4.25 times the number of employees earning below the minimum to the actual wages of those who were earning below the new minimum in March.[27] If the number of workers below the new minimum is small, then the wages paid by the firm may increase only slightly. A second measure, which encompasses the entire workforce, is the natural logarithm of the ratio of the average wage of the

firm—calculated by giving all workers their March wage except those workers below $4.25, who are given the new minimum wage—to the actual average wage of the firm in March. In calculating the average wage post-change, it is assumed that only those workers who earned below $4.25 would receive a wage increase, and that they would be raised only to $4.25.[28]

Besides the key independent variable—the change in the minimum wage—variables measuring the wage structure of the firm and its turnover rate are used to control for firm-specific characteristics. Among these other independent variables is the natural logarithm of the March turnover rate.[29] A high turnover rate may show a management style that emphasizes the use of dismissal to encourage work effort. Raising the minimum wage could lead to an increase in employment by lowering the cost of supervision or increasing the intensity of work effort (Rebitzer and Taylor 1991). In addition, firms with high turnover can adjust to the higher minimum wage through attrition and thereby avoid firing workers who are unproductive.

The average percentage change in employment for the firms was positive, but statistically insignificant.

Of the firms in the sample, 170 provided information on employment levels in March and April. The average percentage change in employment for the firms was positive, but virtually zero (0.03%). (Appendix B gives a detailed examination of how the change in wages affected employment.)

The two measures of the wage gap do not give a consistent picture of the effect of the mandated wage changes on employment. In the first measure, looking only at those workers who were below the new minimum (**Table 3.2**), restaurants with median to large wage gaps experienced, on average, a decline in employment, but those restaurants with the largest

TABLE 3.2
Average Change in Employment by the Size of the Gap Between the New Minimum Wage and the Wages of Workers Below the New Minimum Wage*

Relative Size of Wage Gap	Avg. Change in Employment	Sample Size
Smaller	-1.7%	29
Small	6.0	26
Median	-16.1	34
Large	-22.3	20
Larger	16.2	38

*Measured as the log of the ratio of the new minimum wage to the average wage of the workers below the new minimum wage in March.

Source: Authors' surveys and analysis.

wage gaps—the firms that were most affected by the mandated increase—experienced, on average, a large increase in employment, and firms that were least affected by this measure had a slight decrease in employment. The lack of a discernable pattern between the size of the mandated wage increase and the change in employment shows that this measure is not statistically significant. Overall (as detailed in Appendix B), this first measure has the negative effect the conventional wisdom predicts, but it is not statistically significant.

In the second measure, looking at the firm's entire workforce (**Table 3.3**) the firms that were least affected, on average, experienced job losses, while firms at the median, on average, experienced job gains. The restaurants that were forced to raise their average wage the most, on average, increased their employment by 10.1%. Again, there is no strong pattern, but overall (as detailed in Appendix B) the measure shows a positive, although not statistically significant, effect. (Using a slightly different measure of the wage gap, Katz and Krueger [1991b] found the mandated increase in wages to have a significant, positive effect on employment.)

The restaurants that were forced to raise their average wage the most, on average, increased their employment by 10.1%.

This lack of an employment response to the increase in the minimum wage is not necessarily surprising. Economists are concerned with changes in *real* variables, but the minimum wage is set in nominal terms. In real terms, the minimum wage declined by 40.5% between 1979 and March 1991 (using the CPI-UX1[30] as a price deflator), and the increase in the

TABLE 3.3
Average Change in Employment by the Size of the Gap Between the Mandated Change in Wages and the Wages of Workers in March*

Relative Size of Wage Gap	Avg. Change in Employment	Sample Size
Smaller	-8.7%	33
Small	-10.6	34
Median	8.6	36
Large	-15.0	35
Larger	10.1	31

*Measured as the log of the ratio of the average wage of the workers, if only those below the new minimum wage are given a wage increase (and that increase is only to $4.25), to the average wage of workers at the restaurants in March.
There is a larger sample size in this table than in the previous table because some firms did not have any workers below the new minimum wage.

Source: Authors' surveys and analysis.

minimum wage from March to April still left the real value of the minimum wage 25.6% below its 1979 level. In real terms, then, the 1991 increase may not have been a meaningful change, yet firms changed their behavior in a statistically significant way after the increase.

There is a significant, direct relationship between the March labor turnover rate and the change in employment (see Appendix B and **Table 3.4**). The effect remains significant whether alternative measures of the labor turnover rate or the wage effect are used (see Appendix C.)

In real terms, the 1991 increase may not have been a meaningful change, yet firms changed their behavior in a statistically significant way after the increase.

The firms with lowest turnover rates, on average, had a decline in employment, and as the March turnover rate increased, so did the average percentage change in employment.

TABLE 3.4
Average Percentage Change in Employment by the Level of Labor Turnover in March*

Relative Level of Turnover	Avg. Change in Employment	Sample Size
Lower	-19.7%	27
Low	- 8.7	33
Median	- 2.6	19
High	6.6	32
Higher	22.6	27

*Measured as the log of the ratio of the sum of workers who quit or were fired and new job hires to the number of workers in March.

Source: Authors' surveys and analysis.

The Effect of Both Mandated and Unmandated Wage Changes

Since firms tend to maintain their wage structures (as was shown earlier), the full effect of a change in the minimum wage is not captured by looking only at the consequences of the mandated change in wages. But estimating the effect of the total change in wages (both mandated and voluntary) on employment is more complex than measuring the effect of just the mandated wage changes, because the changes in wages and in employment are determined at the same time.

Controlling for the simultaneity of firms' wage and employment-level decisions finds that the effect of the change in wages on employment is positive but not significantly different from zero (Appendix B, Table B2). However, the effect of the March labor turnover rate is significant and of

about the same magnitude as before, providing support for the Rebitzer and Taylor argument. (For a discussion on why the labor turnover rate matters, see Appendix C.)[31]

These data do not support the conventional wisdom. Controlling for labor turnover rates, the April 1991 increase in the minimum wage did not significantly affect employment levels at the restaurants in our sample. The importance of the turnover rate, and the lack of significance of the mandated wage changes, give support to the Rebitzer and Taylor theory that firms use dismissal as a way of eliciting work effort.

Ninety-one percent of firms changed neither the time to the first wage increase nor the amount of the first wage increase.

Nonwage Responses to Changes in the Minimum Wage

The change in the minimum wage may have induced firms to change other aspects of employment, besides employment levels, including nonwage forms of compensation or working conditions.[32] Most firms did not change major employment practices. Ninety-one percent changed neither the time to the first wage increase nor the amount of the first wage increase, 2% changed the amount but not the timing, and 2.5% changed the timing but not the amount. The remaining firms changed both.

Some firms with a higher pay scale changed the implicit contract under which their workers labored, although fewer changes were made by those firms where the minimum wage was binding. For instance, 18.52% of the high-wage firms and none of the low-wage firms changed the amount of the first raise. Similarly, the time to the first raise changed in 8.07% of the high wage establishments but in only 2.78% of the low-wage restaurants. (Neither of these differences is statistically significant, however.) Roughly 2% of the high-wage firms reported reducing fringe benefits, as opposed to none of the low-wage firms (a statistically significant difference).[33]

Another response could be to reorganize work by decreasing the number of workers per shift (making employees work harder) or decreasing the number of shifts per day (making employees work longer.) Most firms—98%—changed neither. One percent decreased the number of employees per shift but did not change the number of shifts per day. The remaining 1% decreased both.

Among the high-wage firms, 1.84% reported reducing the number of employees per shift, as opposed to 2.70% of the low-wage firms. Almost 1% of the high-wage restaurants and about 3% of the low-wage firms said

about the same magnitude as before, providing support for the Rebitzer and Taylor argument. (For a discussion on why the labor turnover rate matters, see Appendix C.)[31]

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they reduced the number of shifts per day. Neither of these differences was statistically significant.

Thus, it would appear that changes in wages did not significantly change a firm's employment policies or practices.

Table 3.5 presents the results of a set of questions put to firms about compensation and working conditions. Firms are divided between those for whom the old minimum wage was not binding (that is, all workers were already above $3.80), and those that were paying any worker $3.80 in March.

Changes in wages did not significantly change a firm's employment policies or practices.

TABLE 3.5
Non-Wage Employment Responses
by Sample Restaurants to Changes in the Minimum Wage

	All workers above $3.80		*Some workers at $3.80*	
Question:	Pct. Yes	Sample Size	Pct. Yes	Sample Size
Did amount of first raise change?	18.52% (0.113)	162	0.00% 0.000	36
Did time to first raise change?	8.07% (0.022)	161	2.78% (0.028)	36
Did you reduce fringe benefits?	1.84% (0.011)	163	0.00% 0.000	37
Did you decrease employees per shift?	1.84% (0.011)	163	2.70% (0.027)	37
Did you decrease shifts per day?	0.61% (0.006)	164	2.70% (0.027)	37

Standard errors of the sample *proportions* are given in parentheses.

Source: Authors' surveys and analysis.

Price Responses to Changes in the Minimum Wage

If employers do not respond to changes in the minimum wage by reducing employment levels, then conventional wisdom would suggest they would respond by raising prices. The March and April surveys included a price survey of eight items for each restaurant. Generally, the items were chosen to cover the spectrum of the restaurant's menu.

Just as for the effect of wages on employment, decisions on wages and prices are made simultaneously, and statistical controls are needed to correct for the bias that would result from a simple comparison (see Appendix D for the statistical results).

Using the entire sample, the only effect that is statistically significant[34] is the number of days between the March and April surveys, suggesting that changes in price were general movements along a trend and not reflective of changes in the minimum wage. The price trend was negative, but the decline was independent of the change in the minimum wage. The Jackson subsample taken alone showed a similar drop, but the Greensboro subsample showed no significant trend in prices.

Restaurants in Jackson and Greensboro had different price responses from March to April. Still, in neither city, nor in the combined data, was the effect of the change in average wages statistically significant. We conclude, then, that the minimum-wage change did not significantly alter prices, and the downward trend was independent of the change.

The minimum-wage change did not significantly alter prices.

The Use of the Youth Subminimum

The purported negative effect of the minimum wage on teenage employment led to a compromise in the most recent legislation that allows teenagers to be paid a wage below the minimum. Use of this subminimum gives a direct test of whether the minimum wage—as the key wage for food-service workers—is also the wage norm, for if firms accept the minimum wage as a norm, then they could not pay one set of workers a lower starting wage for performing the same tasks as the minimum-wage workers. To do so would imply maintaining a dual wage structure.

Tables 3.6, 3.7, and 3.8 show the results of three questions—the same used by Katz and Krueger—put to restaurants in Jackson and Greensboro. (Katz and Krueger [1991b; 1992] found very little use of the subminimum by fast-food restaurants in Texas, although they did find that use of the subminimum increased from 1990 to 1991.)

The April subminimum was lower in absolute and relative terms than the minimum in March, but surprisingly, in this survey, use of the subminimum wage declined after April 1, 1991 (Table 3.6). There was a great degree of consistency in firms' explanations of why they did not use the subminimum: two-fifths of firms in the matched sample gave the same answer in both April and March (Table 3.7).

However, Table 3.7 also shows that there appears to have been a learning- curve effect. The number of firms that reported they thought the subminimum wage law was too difficult to apply increased from three in

In this survey, use of the subminimum wage declined after the minimum-wage increase.

TABLE 3.6
"Did you pay any workers the training wage?"
Greensboro, N.C., and Jackson, Miss., Restaurants

March Answers *(read across)*	April Answers *(read down)* Yes	No	March Totals
Yes	0	5	5 2.5%
No	0	194	194 97.5%
April Totals	0 0.0%	199 100.0%	

Note: The total from each row (read left to right) tells how many people gave that answer (yes or no) in March; each figure in the row tells the answer these same respondents subsequently gave in April. For example, of the 5 respondents who answered "yes" in March (0+5) all 5 answered "no" in April.

Source: Authors' surveys and analysis.

Table 3.7
"If You Did Not Pay Any Workers the Training Wage, Why Not?"
Greensboro, N.C., and Jackson, Miss., Restaurants

March Answers (read across)	April Answers (read down) (A)	(B)	(C)	(D)	(E)	March Totals
(A) Did not know about the law	15	3	7	2	7	34 23.1%
(B) Too difficult to apply the law	0	1	1	1	0	3 2.0%
(C) Believe it unfair to pay different wages	3	1	20	3	7	34 23.1%
(D) Do not employ teenagers	6	0	4	4	3	17 11.6%
(E) Other	6	5	24	2	22	59 40.1%
April Totals	30 20.4%	10 6.8%	56 38.1%	12 8.2%	39 26.5%	

Note: The total from each row (read left to right) tells how many people gave that answer in March; each figure in the row tells the answer those same respondents subsequently gave in April. For example, of the 34 respondents who answered "Did not know about the law" (A) in March (15+3+7+2+7), 15 gave the same answer (A) in April.

Source: Author's surveys and analysis.

TABLE 3.8
"Can qualified teens be found at the subminimum wage?"
Greensboro, N.C., and Jackson, Miss., Restaurants

March Answers *(read across)*	April Answers *(read down)* Yes	No	March Totals
Yes	13	29	42 27.6%
No	19	91	110 72.4%
April Totals	32 21.0%	120 79.0%	

Note: The total from each row (read left to right) tells how many people gave that answer (yes or no) in March; each figure in the row tells the answer these same respondents subsequently gave in April. For example, of the 42 respondents who answered "yes" in March (13+29) 29 answered "no" in April.

Source: Authors' surveys and analysis.

After the increase, fewer managers thought they could attract qualified teenage workers at the subminimum.

March to 10 in April; eight of the 10 firms that, in April, thought the law was too difficult to apply either did not know about the law in March or gave an unspecified answer. There was a big decline (from 59 firms in March to 39 in April) that gave unspecified reasons for not using the subminimum wage; 24 of the firms that gave that answer in March said, in April, that it was unfair to pay different wages. The number of managers who said that they did not use the subminimum because they did not know about the law remained almost constant in both March (34) and April (30), a finding similar to Katz and Krueger's.

With the rise in the minimum, one view would have had firms substituting newly attracted experienced workers for younger, less productive workers, or perhaps substituting subminimum-wage teenagers for minimum-wage adults. Neither position is consistent with these findings: the number of restaurants that did not use the subminimum because they did not hire teenagers decreased from March to April. Also in April, fewer managers thought they could attract qualified teenage workers at the subminimum. In March, 42 firms thought they could find qualified teenage workers at the subminimum wage, compared to only 32 in April (Table 3.8). This pattern of change in managers' attitudes is consistent with the view that there is an internal wage structure that cannot be changed easily.

Is There a Minimum-Wage-Job Contour?

A consensus is now building that the economic fortunes of all Americans did not rise with the tide during the 1980s. David Cutler and Lawrence Katz (1991), McKinley Blackburn, David Bloom, and Richard Freeman (1989; 1991), Lawrence Katz and Alan Krueger (1991a), David Howell (1991), Lawrence Mishel and David Frankel (1990), Lawrence Mishel and Jared Bernstein (1992), and John Bound and Richard Freeman (1992) have documented declines in earnings for one group relative to another, such as African American males relative to white males, high-school-educated workers relative to college-educated workers, and high-school- educated private-sector workers relative to high-school-educated public-sector workers.

Former Secretary of Labor John Dunlop coined the phrase 'wage contour' in 1957. He argued that jobs in a given wage contour share, among other things, a 'common wage-making characteristic.'

In this section, we examine whether there may be a minimum-wage job "contour." Former Secretary of Labor John Dunlop coined the phrase "wage contour" in 1957. He argued that jobs in a given wage contour share, among other things, a "common wage-making characteristic" (Dunlop 1979, 66). Wages within the contour are not necessarily equal, but "changes in compensation are highly interrelated." (See also Galbraith and Calmon 1992 and Eichner 1987). The previous section of this paper showed how the wages of workers within the restaurant industry responded to changes in the minimum wage. But many of those workers are already paid the minimum wage. Are there other industries or occupations that respond to the minimum wage, but whose workers are paid above it? We argue here that there are, and that the rapid increase in the number of workers earning below the purchasing power of the 1979 minimum wage is the result of that relationship.

This analysis departs from the studies of declining earnings mentioned above in some important respects. First, while most of those studies concentrated on the decline in wages for men, this study looks at both men and women. Second, we concentrate on the *starting* wages of workers, and look specifically at how the minimum wage relates to the wages of high-school-educated workers, by far the largest sector of the American workforce. (For a discussion of data sources and methodology, see Appendix E.)

Wage Distribution of Recent High School Graduates, 1979-91

Tables 4.1-4.4 show the wage distribution of all high school graduates, with no additional formal education, 1-10 years out of high school and

TABLE 4.1
Wage Distribution (in Constant 1991 Dollars) of Black (Non-Hispanic) Females, With High School Education, 1-10 Years Experience

Full-Time, Full-Year Equivalent Purchasing Power of Wage	Cumulative Percentages 1979	1989	1991
Below 1989 minimum wage	2.5	8.2	4.0
To below 1991 1st qtr. minimum wage	2.5	9.9	4.8
To below two adult no child poverty level	2.5	14.9	8.0
To below 1991 2nd-4th qtr. minimum wage	3.0	21.5	20.5
To below one adult one child poverty level	3.0	22.0	23.2
To below two adult one child poverty level	4.3	32.4	31.1
To below one adult two children poverty level	7.5	42.6	45.1
To below 1979 minimum wage	18.5	45.1	49.2
To below two adult two children poverty level	50.7	65.6	70.4
To 1.25 poverty level	71.9	83.7	86.4
To 2.00 poverty level	95.7	97.7	98.6
Above 2.00 poverty level	100.0	100.0	100.0

Source: Authors' analysis of BLS data.

For white females, the share earning below the value of the 1979 minimum wage rose 23.9 percentage points; for African American females, it rose 30.7 percentage points.

Table 4.2
Wage Distribution (in Constant 1991 Dollars) of White (Non-Hispanic) Females, With High School Education, 1-10 Years Experience

Full-Time, Full-Year Equivalent Purchasing Power of Wage	Cumulative Percentages 1979	1989	1991
Below 1989 minimum wage	3.6	7.6	5.5
To below 1991 1st qtr. minimum wage	3.7	8.3	6.3
To below two adult no child poverty level	3.9	11.4	8.7
To below 1991 2nd-4th qtr. minimum wage	4.2	14.9	15.4
To below one adult one child poverty level	4.4	15.4	16.9
To below two adult one child poverty level	5.5	22.2	22.3
To below one adult two children poverty level	7.5	30.8	34.2
To below 1979 minimum wage	12.9	33.1	36.8
To below two adult two children poverty level	44.7	53.0	56.4
To 1.25 poverty level	68.6	74.6	77.1
To 2.00 poverty level	95.0	96.0	97.1
Above 2.00 poverty level	100.0	100.0	100.0

Source: Authors' analysis of BLS data.

For African American males, the proportion earning a wage that could place them above twice the poverty level fell from 18.2% to 5.7%

TABLE 4.3
Wage Distribution (in Constant 1991 Dollars) of Black (Non-Hispanic) Males, With High School Education, 1-10 Years Experience

Full-Time, Full-Year Equivalent Purchasing Power of Wage	Cumulative Percentages 1979	1989	1991
Below 1989 minimum wage	1.4	6.4	2.7
To below 1991 1st qtr. minimum wage	1.4	6.7	4.1
To below two adult no child poverty level	1.7	9.8	7.5
To below 1991 2nd-4th qtr. minimum wage	1.7	12.2	14.7
To below one adult one child poverty level	1.7	12.4	15.9
To below two adult one child poverty level	3.0	20.4	20.4
To below one adult two children poverty level	4.5	26.9	35.3
To below 1979 minimum wage	10.0	29.5	39.1
To below two adult two children poverty level	27.4	49.6	60.2
To 1.25 poverty level	45.7	71.5	76.2
To 2.00 poverty level	81.8	94.3	95.0
Above 2.00 poverty level	100.0	100.0	100.0

Source: Authors' analysis of BLS data.

TABLE 4.4
Wage Distribution (in Constant 1991 Dollars) of White (Non-Hispanic) Males, With High School Education, 1-10 Years Experience

Full-Time, Full-Year Equivalent Purchasing Power of Wage	Cumulative Percentages 1979	1989	1991
Below 1989 minimum wage	0.9	3.2	1.6
To below 1991 1st qtr. minimum wage	0.9	3.4	1.9
To below two adult no child poverty level	1.1	4.5	3.3
To below 1991 2nd-4th qtr. minimum wage	1.2	6.3	7.0
To below one adult one child poverty level	1.3	6.5	7.8
To below two adult one child poverty level	1.9	10.2	11.4
To below one adult two children poverty level	2.5	15.0	19.9
To below 1979 minimum wage	4.2	16.0	21.7
To below two adult two children poverty level	16.7	30.4	39.0
To 1.25 poverty level	31.8	51.8	59.2
To 2.00 poverty level	75.3	87.0	91.1
Above 2.00 poverty level	100.0	100.0	100.0

Source: Authors' analysis of BLS data.

working in the private sector. Separate tables are presented for white males and females and for African American males and females.

To illustrate the relationship between the wages reported and other economic standards, Tables 4.1-4.4 divide workers into wage intervals based on various poverty and federal minimum-wage levels. The wage levels increase from the top of the table to the bottom. Using the poverty levels gives an indication of the living standard implicit in various wages when they are earned on a full-time, full-year basis, but does not reflect the actual poverty status of a worker.

Some wage intervals shown in Tables 4.1-4.4 are more narrow than others. For instance, the gap between the purchasing power of the minimum wage in 1989 and in the first quarter of 1991 (both held constant in 1991 dollars) is the difference between $3.68 in 1989 and $3.80 in 1991, while the gap between the purchasing power of the minimum wage in 1989 and in 1979 (in 1991 dollars) is the difference between $5.34 in 1979 and $3.68 in 1989.

Perhaps the most striking finding is the dramatic rise in the percentage of workers below the real value of the 1979 minimum wage.

The most commonly reported poverty level is for a family of two adults and two children (corresponding to a wage of $6.58 an hour in 1991 dollars, earned full-time, full-year), and the references to 1.25 ($8.23 an hour) and twice the poverty level ($13.16 an hour) are to that amount. The benchmark of 1.25 of the poverty level is used because there seems to be a very low probability of falling back into poverty among individuals with incomes above one and one-quarter of the poverty level.[35]

Perhaps the most striking finding shown in the tables—for both races and both sexes—is the dramatic rise in the percentage of workers below the real value of the 1979 minimum wage. For white males (Table 4.4), the proportion earning below the 1979 minimum wage rose from 4.2% in 1979 to 16.0% in 1989, almost a four-fold increase.

For African American males (Table 4.3), the proportion earning a wage that could place them above twice the poverty level fell from 18.2% (100 - 81.8) to 5.7% (100 - 94.3). In 1979, 68.2% (100 - 31.8) of white men (Table 4.4) with 1-10 years of experience earned a wage that could place them above 1.25 of the poverty line; by 1989 that percentage had fallen to 48.2. For African American men, slightly over half—54.3%—earned above 1.25 of poverty in 1979, but by 1989 that proportion had dropped to less than one quarter.

These shifts in the wage distribution are important in understanding declines in average and median wages reported by other researchers. The average wage can be expressed as a weighted average of the wage intervals shown in Tables 4.1-4.4, so as the distribution shifts from 1979 to 1989 we observe the changes in the weights that are used to construct the average. For African American males, the share of workers earning below the real value of the 1979 minimum wage increased 29.1 percentage points from 1979 to 1991. There is also a decrease during that period of 13.2 percentage points in the share who earned over twice the poverty level for a family of four. For white and black females, most of the change in the average wage must come from the dramatic increase in the share of workers earning below the real value of the 1979 minimum wage. Because a very small percentage of women held high-wage jobs in 1979, a shrinkage in that category would not lower the average wage as much as would the increase in the share of women earning below the real value of the 1979 minimum wage. For white females (Table 4.2), the share earning below the value of the 1979 minimum wage rose 23.9 percentage points between 1979 and 1991; for African American females (Table 4.1), it rose 30.7 percentage points.

For males as well as females, whites as well as African Americans, a large contribution to the absolute decline in wages is the fall in the real value of the minimum wage.

The increasing shares of workers below the real value of the 1979 minimum wage and the decline in the share of workers above the twice-annualized value of the poverty-level wage show that the average wage of high-school-educated workers is declining. For males as well as females, whites as well as African Americans, a large contribution to the absolute decline in wages is the fall in the real value of the minimum wage.

Causes of the Decline in Wages

Table 4.5 shows the outcome of a statistical analysis explaining the change in wages for high-school-educated workers (no college) 1-10 years out of school. The results break down the effects of occupation, industry, geographic region (the South is singled out because of persistent lower wages and differences in employment law between that region and others), sex, race, and education (see Appendix F for details). The percentages in the table show the effect of each change in the employment or demographic makeup of those workers (holding other characteristics constant) on the annual percentage change in wages.[36]

TABLE 4.5
Partial Effects of Changes in Average Wages from Changes in the Share of High-School-Educated Workers with 1-10 Years Potential Experience, 1975-79 Compared to 1982-89

Shift from Shares of Workers by	Partial Effect Measured as Annual Percentage Change	
	1975-79	*1982-89*
Total change in wages	2.5%	-1.4%
Region (share in the South)*	1.0	0.3
Region (wage differences from South)*	0.5	-0.1
Education (mean years of schooling)	-1.1	0.3
Education (wage differences)	-1.1	0.5
Public sector (share in public sector)	0.3	0.5
Public sector (wage differences)	0.3	0.5
Sex (share of female workers)	0.5	-0.3
Sex (wage differences)	-0.0	-0.0
Race (share of non-white workers)	-0.6	0.1
Race (wage differences)	-0.5	0.0
Industry (share of workers by industry)	3.8	-0.4
Industry (industry wage differentials)	2.4	-0.5
Occupation (share of workers by occupation)	-0.0	4.7
Occupation (occupation wage differentials)	-0.8	5.0

* The South is singled out because it tends to be a consistently low-wage area.

Source: Authors' analysis of BLS data.

Real wages for those with no college education rose 2.5% a year in the economic expansion of the 1970s, but fell 1.4% a year during the economic expansion of the 1980s.

The two periods cover two different economic recoveries. In March 1975, the economy reached the trough of a recession that began in November 1973; the economy then continued to expand until January 1980. In November 1982, the economy reached the trough of a recession that began in July 1981, then continued to expand until July 1990. Thus, the two periods shown in Table 4.5 include the depths of a recession and continue until just before the economy peaked. Overall, real wages for those with no college education and up to 10 years of potential experience rose 2.5% a year in the economic expansion of the 1970s, but fell 1.4% a year during the economic expansion of the 1980s.

Each of the recoveries studied in this section followed severe recessions. From November 1973 to March 1975, production jobs in manufacturing declined from 15.158 million to 12.722 million. During the recovery of the 1970s, however, most of those jobs returned: in 1979, monthly manufacturing employment averaged 15.068 million. By July 1981, production jobs in manufacturing were at 14.044 million and fell to 12.224 million by Novem-

ber 1982, a smaller drop than in the 1970 recession. During the recovery of the 1980s, though, most of those jobs did not return: monthly manufacturing employment averaged 13.257 million in 1989.

Given the depth of the 1981-82 recession, it is not surprising that researchers find a dramatic drop in wages when they compare the 1979 peak to the 1983 trough. (The work of David Howell and Maury Gittleman [forthcoming] has been very important in documenting that shift.) The question here is, why did starting wages for less-than-college-educated workers increase when the economy recovered from the 1973-75 recession, but fall as the economy recovered from the 1981-82 recession? One explanation could be different structural changes—like the number of manufacturing jobs—during the two economic expansions.

In the recovery of the 1980s, non-college-educated workers shifted to lower-wage industries.

The shifts that occurred in the employment and demographic makeup of high-school-educated workers (as shown in Table 4.5) had offsetting effects in the two periods. In the 1970s, shifts in the racial and gender makeup of the workforce worked in opposite directions than they did in the 1980s, but the effect of race and gender worked in opposite directions from one another within the two periods. While shifts in the mean educational attainment of those with less than a college education tended to lower wages in the 1970s, the shifts in the 1980s tended to raise wages.

The employment shifts that took place in the economic expansion of the 1970s favored those industries with higher wages. If all other factors were held constant, then the change in the type of industries where non-college-educated workers were employed would have raised their real wages at the rate of 3.8% a year. Holding the mix of industries as they stood in 1979 and all other factors constant, the wages within the industries employing non-college-educated workers would have risen at the rate of 2.4% a year. But in the recovery of the 1980s, non-college-educated workers shifted to lower-wage industries. The shift in the industry mix of the 1980s recovery would have lowered wages at the rate of 0.4% a year (holding other factors constant).

The increase in wages that, according to this analysis, would have resulted from the shift in the industrial mix of jobs for non-college-educated workers in the 1970s was offset by the decline in wages that would have resulted from the shift in the mix of occupations and the wages paid to the type of occupations that non-college-educated workers held in 1979.

Similarly, the decline in wages from shifts in the industrial mix of jobs

for non-college-educated workers in the 1980s was offset by an increase in wages that would have resulted from a shift in the mix of occupations and the wages paid to the type of occupations that non-college-educated workers held in 1989.

Thus, from Table 4.5 it is clear that industry and occupational shifts that took place in both periods were more important than changes in the demographic makeup of the workforce. While changes in industrial structure helped wages in the 1970s, changes in occupational structure helped in the 1980s. It appears unlikely, then, that the difference in the growth of average wages for non-college-educated workers between the 1970s and 1980s can be easily explained by changes in employment structure. Something else must explain the lower level of wage growth in the 1980s.

If young high-school-educated workers had started at the 1979 real minimum wage, the distribution of their earnings would be higher.

What the Wage Distribution Means

Tables 4.1-4.5 combine to paint a bleak picture for recent high school graduates new to the workforce. For white males 1-10 years out of high school, almost two in five earn a wage that would make it difficult to earn sufficient yearly income to support a family of four. For African American males the chances are almost three in five.

Because in the African American community most workers are female, the decline in their status is troubling. In 1979, 97% of African American women with high school educations and less than 10 years experience earned a wage high enough to support a family of one adult and one child above the poverty level. By 1989, that number fell to 78%. This moves African American females from a near certainty that finishing high school could assure them the opportunity to support a family of two above the poverty level to a significant chance that they could not escape poverty.

It is disturbing that the current cohorts of young high-school-educated workers cannot support a family. The data suggest that if these workers had started at the 1979 real minimum wage, the distribution of their earnings would be higher. Furthermore, given current wages, there is a high probability that their wages can fall below the poverty level. These low starting wages for non-college-educated workers—wages that provide a purchasing power lower than would have been legal in the 1970s—might help to explain the decline in real wages during the 1980s. To what extent are the starting wages of non-college-educated workers tied to the federal minimum wage?

The Wage Contour of High-School-Educated Workers

The data on the restaurant industry presented in the earlier section suggested that changes in the minimum wage result in changes in wages for workers above the minimum. **Table 4.6** provides additional evidence of this possibility. The data are for the first quarter of 1990, when the minimum wage in current dollars was at its 1981 level of $3.35, and for the last three quarters of 1991, after the minimum wage increased to its present current dollar value of $4.25. Tables 4.1-4.4 showed the increase in the share of entry-level high school graduates who earned wages below the purchasing power of the 1979 minimum wage; this table shows that the share earning

The shift of 3.6 percentage points for all workers to above the 1991 minimum suggests that workers between the old and the new minimum wage were given raises above the new minimum, not just raises to the new minimum.

Table 4.6
Cumulative Distribution of Workers by Earnings* Before and After Minimum Wage Increases, 1990-91

Proportion of Workers Earning...	All		Teens (16-19)		Adults (20+)	
	First Qtr. 1990	Second to Fourth Qtr. 1991	First Qtr. 1990	Second to Fourth Qtr. 1991	First Qtr.1990	Second to Fourth Qtr. 1991
Less than 1990 minimum	5.1%	2.2%	21.1%	6.1%	4.5%	2.0%
Less than 1991 minimum	10.2	6.6	44.0	28.1	8.9	5.8
Less than 1979 minimum	21.3	16.8	74.7	66.3	19.1	15.0
Above 1979 minimum	78.7	83.2	25.3	33.7	80.9	85.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Percent of workers shifted above new 1991 minimum**	3.6%		15.9%		3.1%	

*Measured in inflation-adjusted wages, so the distribution changes because of the minimum-wage change or the (very unlikely) chance that low-wage-worker wage gains exceeded inflation.

**Difference between the share of the workforce below the new 1991 minimum in the last nine months of 1991 versus the first three months of 1990.

Source: Authors' analysis of BLS data.

below that level declined after the minimum wage increased. For all workers, the shift was from 21.3% (at or below the real value of the 1979 minimum wage in the first quarter of 1990) to 16.8%. Also shown is the share of workers pushed above the purchasing power of the 1991 minimum wage. The shift of 3.6 percentage points for all workers suggests that workers between the old and the new minimum wage were given raises above the new minimum, not just raises to the new minimum.

There is also some evidence that firms think about entry-level wages in relation to the minimum wage. Since 1977, the basic agreement of labor contracts by the Amalgamated Clothing and Textile Workers Union (ACTWU) and the tailoring and clothing apparel industry requires that the industry minimum wage will be no lower than $0.25 above the federal (or state) minimum wage. The wages of experienced workers are set by the agreement. And though few, if any, union members among starting workers in plants organized by ACTWU receive such a low wage, this case shows how the minimum serves as a reference wage.

There is some evidence that firms think about entry-level wages in relation to the minimum wage.

Generally, economists looking at wage contours have tried to identify groups of industries with similar wages (see Eckstein and Wilson 1962; Eckstein 1968; Doeringer and Piore 1971; Galbraith and Calmon 1992). Those studies have identified groups of manufacturing industries that have common wage movements, but here the emphasis will focus on industry and occupation groups.

Again, unlike previous studies, the concern here is not with the average wage of all workers but with their starting wage. To isolate the starting wage, only workers who were one to five years out of school were chosen. The average starting wage within each occupation and industry grouping was then compared to the minimum wage and to the average wage of nonsupervisory and production workers. We did not adjust wages for inflation, because it is the movement of the money (as opposed to real wages) in relation to each job that defines the wage contour.

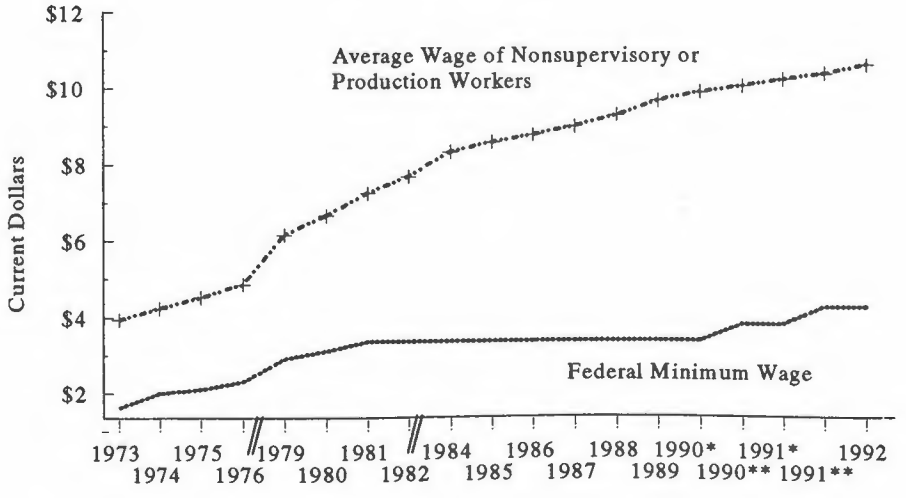
As with the previous section, the data for this analysis comes from the Current Population Survey, the nation's labor-force survey. The data include information from the period 1973-92, except for 1977, 1978, and 1983.[37] For 1990 and 1991, because the minimum wage changed on April 1, 1990, and April 1, 1991, the data have been broken into two periods: January to March and April to December.

Table 4.7 shows occupations by industry groups. Through the use of cluster analysis (see Appendix G) we can see that there are two distinct wage clusters. One includes the average wage of nonsupervisory workers, and the other includes the minimum wage. "Avg" indicates that movements in the starting wages of workers identified by that cell correspond more closely to movements in the average wage of production and nonsupervisory workers; "Min" indicates that movements in starting wages correspond more closely to movements in the minimum wage. There are several cells for which there were incomplete data for one or more years, but those cells with identified clusters represent almost 95% of all new high-school-educated workers in any given year.[38] Many of those cells with missing values are for the professional specialists occupation group, which is unlikely to include many high-school-educated workers. (Examples of occupations in this group are engineers and architects, computer scientists, doctors, lawyers, teachers, and artists.) For the cells with complete data, 46 are marked with "Avg" and move in tandem with the average wage, and 43 are marked with "Min" and move with the minimum wage.

Wages that cluster with the minimum wage moved with it through two different regimes, the '70s and the '80s.

Figure 4a shows the movement of both the federal minimum wage and the average wage for the 20-year period studied. During that time the

FIGURE 4a
Current Dollar Values of Average Wage and Minimum Wage 1973-92



* First quarter ** Third quarter

Source: Authors' analysis of BLS data.

TABLE 4.7
Wage Clusters of Recent High-School-Educated Workers, by Major Occupation, Major Industry

Major Occupation	Major Industry 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Exec., admin., managers					Avg	Avg	Avg	**Min**	Avg	Avg	**Min**	**Min**	Avg	
Professional specialists					Avg								**Min**	
Technicians			Avg	Avg	Avg	Avg		**Min**		Avg				
Sales					**Min**	Avg	Avg	**Min**	Avg	**Min**				
Administrative support	**Min**		Avg	Avg	Avg	Avg	Avg	**Min**	Avg	**Min**	**Min**	**Min**	**Min**	Avg
Protective services										**Min**			**Min**	Avg
Other service				**Min**	**Min**	Avg		**Min**	**Min**	**Min**	**Min**	**Min**	**Min**	**Min**
Craft & repair		Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg		**Min**	**Min**	Avg
Operators & assemblers			Avg	Avg	**Min**	Avg	**Min**	**Min**		**Min**	**Min**		**Min**	
Transportation		Avg	Avg	Avg	Avg	Avg	Avg	**Min**		**Min**	**Min**		**Min**	
Handlers			Avg	Avg	**Min**	Avg	**Min**	**Min**		**Min**	**Min**			**Min**

Min's represent occupation-by-industry groups whose high-school-educated starting wage clusters with the federal minimum wage. **Avg**'s represent those that cluster with the average nonsupervisory wage. A blank square indicates an occupation-by-industry group with incomplete observations for the period.
Major industry groups are: **1.** Agriculture; **2.** Mining; **3.** Construction; **4.** Durable Goods Manufactures; **5.** Nondurable Goods Manufactures; **6.** Transportation, Communications, and Public Utilities; **7.** Wholesale Trade; **8.** Retail Trade; **9.** Finance, Insurance, and Real Estate; **10.** Business and Repair Services; **11.** Personal Services; **12.** Entertainment and Recreation Services; **13.** Professional and Related Services; **14.** Public Administration.

Source: Authors' analysis of BLS data.

federal minimum wage increased on nine occasions: May 1, 1974; January 1, 1975; January 1, 1976; January 1, 1978; January 1, 1979; January 1, 1980; January 1, 1981; April 1, 1990; and April 1, 1991. Thus, the period includes the 1970s, when the minimum wage changed almost every year, and the 1980s, when the minimum wage remained constant for nine years. Wages that cluster with the minimum wage thus moved with it through two different regimes.

By 1989, 58% of workers on the minimum-wage-contour were in retail trade, up from 49% in 1979.

Table 4.8 gives the distribution of workers with starting wages tied to the minimum wage by major industry. The percentages are based on *all* high-school-educated workers. (Table 4.11 provides percentage figures within each industry). **Table 4.9** provides this information by major occupation. The numbers show the significance of the minimum-wage contour in the industries and occupations shown. For example, as Table 4.8 shows, in the period 1973-74 23.19% of high-school-educated workers were in the retail trade industry *and* had their starting wage tied to the minimum-wage. These workers accounted for almost half of the total percentage of high-school-educated workers (49.72%) who had starting

TABLE 4.8
Percentage of All High-School-Educated Workers With Starting Wages Tied to the Minimum Wage by Major Industry, Selected Years

Major Industry	1973-74	1979	1989
Agriculture	0.02%	0.11%	0.09%
Mining	0.00	0.00	0.00
Construction	0.00	0.00	0.00
Durable goods manufactures	0.18	0.30	0.17
Nondurable goods manufactures	6.55	5.76	4.23
Transportation, communications, and public utilities	0.00	0.00	0.00
Wholesale trade	0.75	0.96	0.80
Retail trade	23.19	23.00	34.05
Finance, insurance, and real estate	0.19	0.28	0.19
Business and repair services	2.56	2.84	4.90
Personal services	2.23	2.39	3.22
Entertainment and recreation services	0.65	0.78	0.92
Professional services	13.15	10.10	10.23
Public administration	0.25	0.44	0.18
Totals	49.72	46.96	58.98

Source: Authors' analysis of BLS data.

TABLE 4.9
Percentage of All High-School-Educated Workers With Starting Wages Tied to the Minimum Wage, by Major Occupation, Selected Years

Major Occupation	1973-74	1979	1989
Exec., admin., managers	1.57%	2.36%	1.60%
Professional specialists	1.49	1.06	0.94
Technicians	0.09	0.02	0.12
Sales	5.22	5.14	15.27
Administrative support	12.51	11.45	8.91
Protective services	0.16	0.29	0.68
Other service	14.26	13.35	18.76
Craft & repair	0.23	0.24	0.28
Operators & assemblers	9.11	7.58	4.23
Transportation	1.07	1.09	1.60
Handlers	4.01	4.38	6.59
Totals	49.72	46.96	58.98

Source: Authors' analysis of BLS data.

Sales jobs show the biggest increase in importance among occupations along the minimum-wage contour.

wages tied to the minimum during that period. During the 1980s, the share of workers on the minimum-wage contour that were also in retail trade increased to 34.05%. By 1989, 58% of workers on the minimum-wage-contour were in retail trade, an increase in that industry's share of minimum-wage jobs of 11 percentage points from the 1973-74 period.

Other industries that have a noticeable share of minimum-wage-contour workers are nondurable-goods manufacturing, business and repair services, and professional services. Together with the retail trade industry, those industries accounted for about 90% of minimum-wage-contour jobs in 1989. The relative importance of those industries has shifted: nondurable-goods manufacturing has become less important, while the business and repair services industry has become a more important source of jobs with starting wages tied to the minimum.

Public administration, an industry more narrow than the public sector, has a very small share of non-college-educated workers on the minimum-wage contour. This relatively small proportion may help explain the increase found by Katz and Krueger (1991a) in the gap in wages between high-school-educated workers in the public sector and in the private sector. Because only a tiny share of high-school-educated workers are on the minimum-wage contour in public administration, the wages of high-school-

educated workers in this industry did not stagnate as did the wages of those who increasingly found themselves in jobs with wages tied to the minimum.

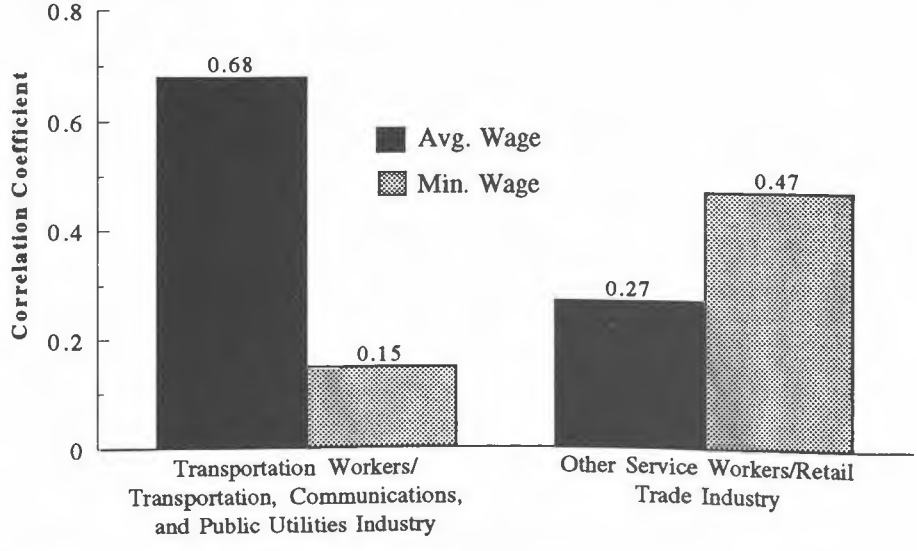
The occupations with the largest share of minimum-wage-contour workers (Table 4.9) are the "other service" category, sales, administrative support personnel, and operators and assemblers. Sales jobs show the biggest increase in importance among occupations along the minimum-wage contour, while the proportion of administrative support jobs along the contour declined. This is an example of the unusual shifts that occurred during the 1980s: in one occupation, the importance of the low-wage contour grows, while in another occupation the importance of the higher-wage contour grows.

Gaining employment in management positions does not always land non-college-educated workers high-wage work.

While few non-college-educated workers were in managerial positions *and* on the minimum-wage contour, gaining employment in management positions does not always land non-college-educated workers high-wage work. Management positions in the retail industry (which would include restaurants), personal services, and entertainment and recreation services (which would include movie houses) are paid wages tied to the minimum.

Figure 4b shows the partial correlation[39] between wage contours—both the minimum and the average wage of nonsupervisory and production workers—and two occupation-by-industry groups. This comparison helps

FIGURE 4b
Correlation With Average Wages of Wage Contours for Selected Occupation-by-Industry Groups, 1973-92



Source: Authors' analysis of BLS data.

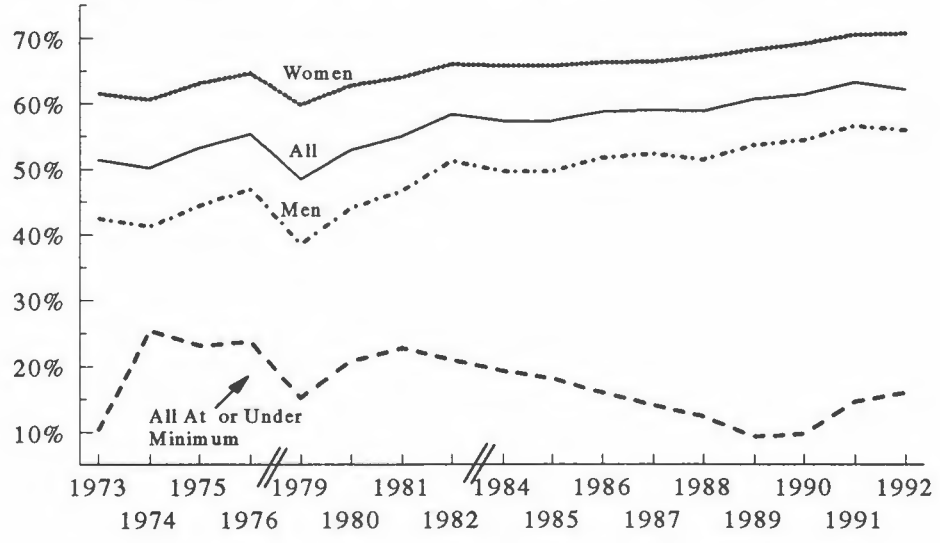
illustrate the difference between being on the average-wage or the minimum-wage contour. One group, transportation workers in the transportation, communications, and public utilities industry, was found to be on the average-wage contour; the other group, other service workers in the retail trade industry, was found to be on the minimum- wage contour.

Wages on the minimum-wage contour change with the minimum wage, but conventional measures would not count workers earning these wages as minimum-wage workers. While most of these workers earn above the minimum, their real wages can easily fall if the minimum wage does not keep pace with inflation. Thus, the minimum wage affects many more workers than is suggested simply by the number actually earning the minimum wage.

During the 1970s, around half of starting jobs for high-school-educated workers had wages tied to the minimum. That share increased during the 1980s to around 60%.

Figure 4c shows the share of all new high-school-educated workers who had jobs in the minimum-wage cluster and the share by gender. During the 1970s, around half of starting jobs for high-school-educated workers had wages tied to the minimum. That share increased during the 1980s, by about equal proportions for men and women, to around 60%. In 1992, almost 56% of men and 71% of women with no more than a high school education started work in a job tied to the minimum wage.

FIGURE 4c
Share of Workers, by Gender, Tied to the Minimum Wage and Share at or Below Minimum



Note: Workers are entry-level high school graduates.

Source: Authors' analysis of BLS data.

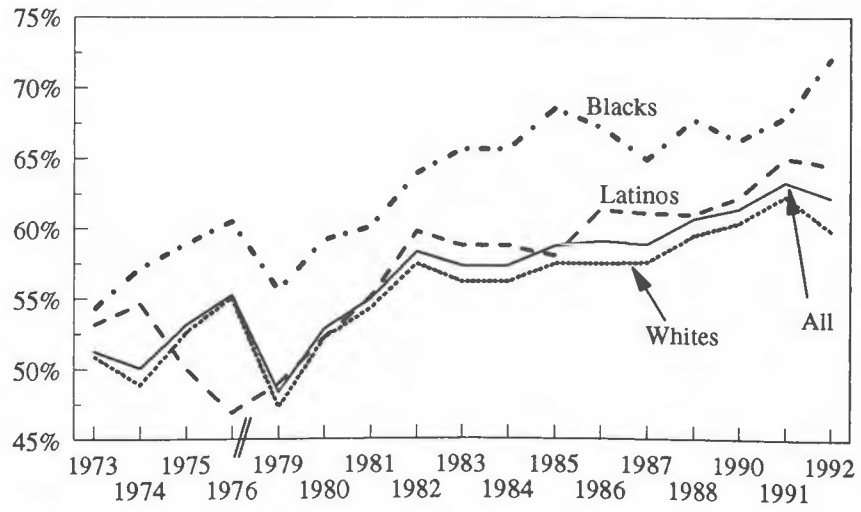
Figure 4d shows the share of workers with jobs in the minimum-wage cluster by race and ethnicity. (The groups shown are mutually exclusive, i.e., whites and African Americans are both non-Hispanic.) The trends for all three groups are similar, although a much larger share of African Americans are in the minimum-wage cluster: by 1992, 72% of starting jobs for high-school-educated African Americans had wages tied to the minimum, compared to almost 60% for whites and almost 65% for Latinos.

By 1992, 72% of starting jobs for high-school-educated African Americans had wages tied to the minimum.

These figures show that part of the rapid increase in the share of workers earning below the inflation-adjusted value of the minimum wage in 1979 is the result of the increase in the share of workers tied to the minimum wage. This relationship was true for both sexes and across racial and ethnic lines.

Table 4.10 shows how the shift to workers with wages tied to the minimum wage looked within one industry. The nondurable-goods manufacturing industry was shown in Table 4.7 to be an industry with one of the larger shares of minimum-wage-contour jobs. Though this industry became less important as a source of such jobs, a trend of increasing demand for average-wage-contour jobs within this industry was reversed by the end of the 1970s.

FIGURE 4d
Share of Workers, by Race, Tied to the Minimum Wage, Based on Wage After High School



Source: Authors' analysis of BLS data.

Table 4.10
Percentage of High-School-Educated Workers in Nondurable Manufacturing, with Starting Wages Tied to the Minimum Wage, by Major Occupation, Selected Years

Major Occupation	Contour	1973-74	1979	1989
Exec, admin., managers	Avg	0.97	1.46	2.92
Professional specialists	Avg	0.20	0.38	1.83
Technicians	Avg	2.64	1.90	1.01
Sales	Min	1.20	1.48	3.35
Administrative support	Avg	18.04	16.04	18.02
Other service	Min	1.42	1.92	1.02
Craft & repair	Avg	9.62	13.51	8.81
Operators & assemblers	Min	53.77	49.12	43.16
Transportation	Avg	4.27	5.28	4.81
Handlers	Min	7.86	8.51	14.66
Others and missing occupation		0.01	0.40	0.41
Totals		100.00	100.00	100.00
Minimum-wage-contour share		64.25	61.03	62.19
Average-wage-contour share		35.74	38.57	37.40

Source: Authors' analysis of BLS data.

The relative cost of workers on the minimum-wage contour declined with respect to workers on the average-wage contour, and so firms increased their hiring of minimum-wage-contour workers.

During that decade, when the real wage of workers on the minimum-wage contour was increasing both in absolute terms and relative to the wages of workers on the higher average-wage contour, the share of jobs on the minimum-wage contour within nondurable-goods manufacturing declined from 64.25 to 61.03%. Mostly, this reduction was the result of a shift from operators and assemblers, who tend to fall along the minimum-wage contour, to craft and repair workers, who tend to fall along the average-wage contour. That is, there was an upward shift in skills. But in the 1980s, when the real wage of workers on the minimum-wage contour was declining, the share of craft and repair workers declined and the share of handlers, who are along the minimum-wage contour, increased. That is a downward shift in skills, but corresponds to economic theory. The relative cost of workers on the minimum-wage contour declined with respect to workers on the average-wage contour, and so firms increased their hiring of minimum-wage-contour workers relative to average-wage-contour workers.

Table 4.11 looks at the movement of jobs on the minimum-wage contour within major industry categories. Except for professional services,

TABLE 4.11
Percentage of High-School-Educated Workers With Starting Wages Tied to the Minimum Wage, Within Each Major Industry, Selected Years

Major Industry	1973-74	1979	1989
Agriculture	1.0%	4.7%	4.1%
Mining	0.0	0.0	0.0
Construction	0.0	0.0	0.0
Durable-goods manufactures	1.2	1.9	2.2
Nondurable-goods manufactures	64.3	61.0	62.2
Transportation, communications, and public utilities	0.0	0.0	0.0
Wholesale trade	20.6	24.9	25.0
Retail trade	92.5	91.8	95.1
Finance, insurance, and real estate	3.0	4.0	3.2
Business and repair services	74.4	65.6	74.6
Personal services	64.5	79.4	84.1
Entertainment and recreation services	65.7	67.8	48.9
Professional services	95.0	94.2	88.3
Public administration	8.6	15.0	9.2
Overall average	49.7	47.0	59.0

Source: Authors' analysis of BLS data.

The most pronounced departure from the trend of rising use of minimum-wage workers was in the entertainment and recreation-services industry.

among the four major industries that accounted for almost nine-tenths of minimum-wage-contour jobs during the study period (the others were nondurable-goods manufacturing, business and repair services, and retail trade), there was an increase in the 1980s in the shares of their workforce that were along the minimum-wage-job contour. Shifting away from minimum-wage-contour jobs during the 1980s, along with professional services, were finance, real estate, and insurance; agriculture; entertainment and recreation; and public administration. Those industries accounted for almost 20% of workers along the minimum wage contour in 1989 (Table 4.8). The most pronounced departure from the trend of rising use of minimum-wage workers was in the entertainment and recreation-services industry.

The decline in the share of minimum-wage-contour jobs in entertainment and recreation services and in professional services resulted from an increase in those industries' share of the overall labor force. Table 4.8 showed that both industries increased their share of the minimum-wage-contour workforce between 1979 and 1989. (Professional services increased from 10.10% to 10.23% for all workers, and entertainment and

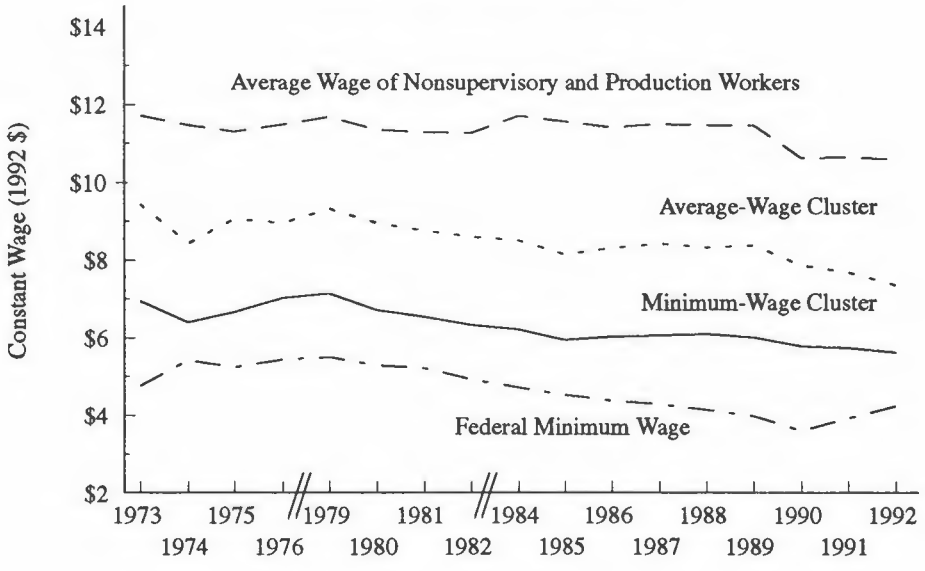
recreation services grew from 0.78% to 0.92%.) Thus, the decline in the share of minimum-wage workers within their industries shows that both industries were increasing average-wage-contour workers at a faster rate.

Figure 4e shows the real wages of workers along the minimum-wage contour and the average-wage contour, as well as the average real wage for nonsupervisory or production workers and the effects of inflation on the federal minimum wage. It shows how the real wage of workers on the minimum-wage contour increased during the latter half of the 1970s, and then declined during the 1980s. The real average wage (in constant 1992 dollars) of workers on the minimum-wage contour fell from $7.14 in 1979 to $5.78 in 1990, not much higher than the $5.50 constant-dollar value of the 1979 minimum wage.

The real average wage of workers on the minimum-wage contour fell from $7.14 in 1979 to $5.78 in 1990.

Though the wages of the average-wage-contour workers are tied more closely to the average wage of nonsupervisory and production workers, the real starting wage of workers on that contour fell during the early 1980s almost at the rate the minimum wage fell. During the economic expansion of the latter half of the 1980s, however, the wages of these workers again resembled the movement of the average wage of nonsupervisory and production workers.

FIGURE 4e
Average Wage of Starting-Wage Clusters 1973-92 (in Constant 1992 Dollars)



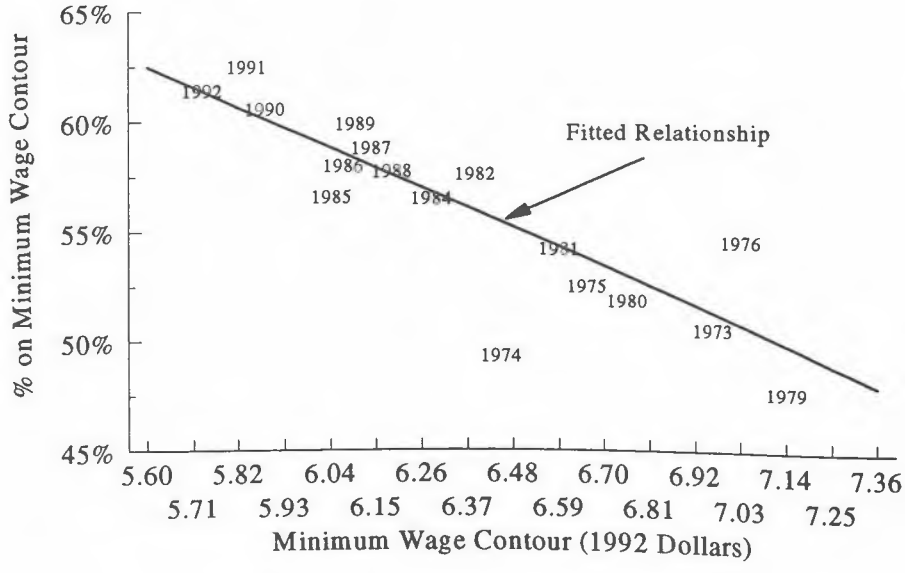
Source: Authors' analysis of BLS data.

Figure 4f shows the relationship between the real average wage of minimum-wage-contour workers and the share of all high-school-educated workers with jobs that have starting wages on the minimum-wage-job contour. This is the demand curve that should be the center of the policy debate on the minimum wage. As the real wage on the minimum-wage contour decreases, firms increase the share of workers that are hired on that contour.

Thus, the demand curve that should be the focus of attention is not the unproven relationship between the minimum wage and total employment, but rather the relationship shown here between the minimum wage and the *composition* of labor demand. The earlier section showed that increasing the minimum wage had no significant impact on total employment at the level of the firm. This analysis suggests that firms switch their work focus toward more productive average-wage-contour jobs as the real value of the minimum wage increases, and expand low-wage and less productive jobs as it declines. Put simply, lowering the real value of the minimum wage does not encourage job growth; rather, it encourages the substitution of low-wage for high-wage work.

Lowering the real value of the minimum wage does not encourage job growth; rather, it encourages the substitution of low-wage for high-wage work.

FIGURE 4f
Wage Level on Minimum-Wage Contour and Share of Workers on Contour



Source: Authors' analysis of BLS data.

A decline in the real value of the minimum wage hits high-school-educated workers from two directions. First, it hits their starting wages: controlling for the growth of the economy (measured as the percentage growth in real gross domestic product) and the unemployment rate of 20-24 year-olds (the approximate age group of those new high-school-educated workers studied here), a $1.00 decrease in the real value of the minimum wage decreases the real average wage of workers on the minimum wage contour by $0.69.[40] From 1979 to 1990, the real value of the minimum wage (in constant 1992 dollars) declined from $5.50 to $3.60, a drop of $1.90. The real average wage of workers on the minimum-wage contour declined from $7.14 to $5.78, a drop of $1.36.

A decline in the real value of the minimum wage hits high-school-educated workers from two directions: First, it hits their starting wages; second, it hits their choice of jobs.

Second, it hits their choice of jobs. Because the relative cost of minimum- wage workers is declining, firms are increasing their demand for low-wage occupations relative to the high-wage occupations. Controlling for the growth of the economy and the unemployment rate for 20-24-year-olds, a $1.00 drop in the real average wage of workers on the minimum-wage contour leads to an increase of 8.6 percentage points in the share of workers on that contour. Between 1979 and 1990, when the real average wage (in constant 1992 dollars) on the minimum wage contour declined by $1.36, the share of workers on that contour increased from 48.4 to 61.4%, or 13 percentage points.

During the 1970s, firms increased their share of jobs on the average-wage contour as a result of the relatively higher cost of minimum-wage-contour jobs. But in the 1980s, firms reduced their share of jobs on the average-wage contour as a result of the lower cost of minimum-wage-contour jobs. The low real value of the minimum wage meant that firms using the minimum wage as a reference for their starting wage were paying an average starting wage in 1992 of $5.78, not much higher than the real value of the 1979 minimum wage, $5.50.

Some may argue that increased demand for manufacturing workers, which absorbed the supply of high-school-educated workers, reduced the pressure in the 1970s to lower real wages, while in the 1980s the falling demand for manufacturing workers let loose a supply of high-school-educated workers into low-wage occupations. Table 4.5 showed that the shifts that took place during the economic recovery of the 1980s in the distribution of less-than-college-educated workers exerted pressures on

their wages. Those shifts, particularly the shift toward low-wage industries, no doubt played a role in lowering the wages of less-than-college-educated workers. But Table 4.5 also showed that similar shifts took place during the economic expansion of the 1970s.

It could be argued as well that the pressures of the 1970s to lower real wages were stymied because the federal minimum wage was constantly increased, while in the 1980s the pressures to lower real wages were accommodated by a falling real value in the minimum wage.

Firms are always trying to offer the lowest real wage they can, and when the minimum wage increases, as it did in the 1970s, those firms are limited in how much they can lower their real starting wages.

It is not easy to differentiate between that view—that wages are pushed down—and the one presented here—that wages are pulled down. We argue that firms use the minimum wage as a reference wage for certain occupations in certain industries. Firms are always trying to offer the lowest real wage they can, and when the minimum wage increases, as it did in the 1970s, those firms are limited in how much they can lower their real starting wages. When the minimum wage does not increase, as was the case in the 1980s, those firms can lower the real value of their starting wage. But this move changes the relative cost of jobs that firms consider to be tied to the minimum wage and jobs that firms consider to be tied to another—and higher—wage structure. It also changes the relative labor costs of industries that have many workers with wages tied to the minimum wage and industries that have few workers with wages tied to the minimum. In the 1970s those relative costs narrowed slightly, but grew apart during the 1980s.

It is possible, at the macroeconomic level, that factors other than the relative cost of minimum-wage workers were at play. Such factors could include technological changes that lowered the demand for higher-wage workers relative to lower-wage workers, or increased competition that forced lower prices in product markets for goods produced by higher-wage workers. Table 4.11 showed that there was an inconsistent pattern within industries for the proportion of workers on the minimum-wage contour; some industries showed a decrease in the proportion during the 1970s and an increase during the 1980s, while some showed a constant increase in the use of minimum-wage-contour workers and others showed a constant decrease. In any case, Table 4.11 showed that, at the macroeconomic level, the shifts in the share of workers on the minimum-wage contour followed the path of their relative cost.

Whether or not one believes that a new business regime started in the 1980s, the findings reported here suggest that the falling real value of the minimum wage is an important part of any explanation for the dramatic increase in the share of workers earning less than the purchasing power of the 1979 minimum wage.

Rural Workers: The Minimum Wage in Low-Wage Areas

Nonmetropolitan areas are generally lower-wage areas, and the effect of the minimum wage on wage structure may be different in areas where the overall wage structure is lower.

Lucy Gorham and Bennett Harrison (1990) have noted that, during the 1980s, there was a greater increase in metropolitan than in nonmetropolitan areas in the share of workers with low wages. While data from the U.S. Department of Labor report the incidence of minimum wages by various categories, they present no data comparing metropolitan and nonmetropolitan areas. This section focuses specifically on the minimum wage in nonmetropolitan areas because, in comparison to metropolitan regions, these are generally lower-wage areas, and the effect of the minimum wage on wage structure may be different in areas where the overall structure is lower.

The minimum wage may also distinctly affect rural wages because of the peculiarities of its coverage. All agricultural workers were exempted from federal minimum-wage coverage until the 1966 amendments to the Fair Labor Standards Act. Still, in 1988, of 1.7 million civilian workers engaged in agriculture as wage or salary workers, only 628,000 were covered by the FLSA's minimum-wage provisions (U.S. Department of Labor, Employment Standards Administration 1990). Other exemptions that may disproportionately affect rural areas depend on the size of the business and, prior to 1990, on the type of business (Kalet 1990). For example, gasoline stations and retail service establishments are exempt, depending on their annual sales, as are newspapers with circulations under 4,000 and telephone exchanges owned by a telephone company with fewer than 750 phone stations. Since 1990 an enterprise (which may be spread over more than one establishment or corporate or other organizational unit) is exempt if it has annual gross sales less then $500,000, regardless of the type of business (Kalet 1990, 18-21). Because businesses in nonmetropolitan areas tend to be smaller than in urban areas, exemptions like these suggest

that more workers in nonmetropolitan areas may be more likely to fall below the minimum wage than are workers in metropolitan areas. Increases in the minimum wage may thus affect nonmetropolitan areas differently, because a rise in the minimum could pull some workers out of the covered sector and into the exempt sector. This section also will explore the likelihood of that scenario.

Minimum-Wage Effects on Nonmetropolitan Labor Markets

Between 1979 and 1989, workers in areas that remained classified as nonmetropolitan became increasingly likely to earn the minimum wage.

As of 1990, there were 284 metropolitan areas in the United States, encompassing 77.5% of the total U.S. population. Farms, small cities, towns, villages, and other places outside of these large population centers are classified as nonmetropolitan. It has been known for a long time that labor-market conditions differ by the size of the labor market, and places with larger population concentrations have, in general, larger and more varied labor markets. Wages in more populated areas tend to be higher, since there is usually a larger proportion of high-paying jobs, while there is usually a disproportionate number of low-wage jobs in nonmetropolitan areas. This section focuses on low-wage workers in these nonmetropolitan areas during the period 1979-91. All trends for workers earning the minimum wage during this period reflect, in part, its falling real value.

Characteristics of Minimum Wage Workers by Metropolitan Status

Between 1979 and 1989, as more areas became urbanized, workers in areas that remained classified as nonmetropolitan became increasingly likely to earn the minimum wage. In 1979, nonmetropolitan workers were 50% more likely to be minimum-wage earners (24.7% versus 16.7%), but by 1989 they were twice as likely to have wages at or below the minimum (16.2% versus 8.3%). These trends affected workers of all ages, including prime-age workers.

Table 5.1 shows that, while 70.1% of all workers lived in metropolitan areas in 1979, those regions accounted for only 61.3% of minimum-wage earners. By 1989, 75.2% of workers lived inside metro areas, a 5 percentage point increase, but the regions accounted for only 60.8% of minimum-wage earners.

TABLE 5.1
Percent of Workers by Area and Wage Status in 1979 and 1989

Worker Category	1979	1989
All workers	100.0	100.0
Metropolitan	70.1	75.2
Nonmetropolitan	29.8	24.8
Minimum-wage workers	100.0	100.0
Metropolitan	61.3	60.8
Nonmetropolitan	38.7	39.2

Source: Authors' analysis of BLS data.

By 1989, 75.2% of workers lived inside metro areas, but the regions accounted for only 60.8% of minimum-wage earners.

Wage Trends Among Metropolitan and Nonmetropolitan High-School-Educated Workers

Among high school graduates with 1-10 years of experience, two major trends emerge when comparing workers in metropolitan and nonmetropolitan areas. First, between 1979 and 1991, nonmetropolitan areas had a higher proportion of workers earning low-level wages; second, the proportion of workers in nonmetropolitan areas earning low-level wages increased during that period (**Table 5.2**).

Although the proportion of all high-school-educated workers at or below the minimum wage was small in both nonmetro and metro areas, the proportion in nonmetropolitan areas was consistently higher in 1979, 1989,

TABLE 5.2
Percent of High-School-Educated Workers With Less than 10 Years of Potential Work Experience at Different Wage Levels Living Within and Outside Metropolitan Areas in 1979, 1989, and 1991

Percent of Workers at or Below: (Constant 1991 Dollars)	1979	1989	1991
1989 minimum wage			
Metropolitan	2.0	4.9	3.7
Nonmetropolitan	3.1	9.7	4.9
1991 minimum wage			
Metropolitan	2.4	9.9	12.1
Nonmetropolitan	3.8	18.9	18.5
Poverty wage (two adults, two children)			
Metropolitan	29.5	42.1	48.9
Nonmetropolitan	40.0	55.7	60.3

Source: Authors' analysis of BLS data.

and 1991. Although wages deteriorated somewhat more rapidly between 1979 and 1991 for metropolitan workers—a trend that narrowed the regional gap between wages—a larger share of nonmetropolitan workers were represented at each low-wage level during all three years. By 1991, fully three-fifths of nonmetro high-school-educated workers earned a wage that, on a full-time, full-year equivalent basis, could not support a family of four above the official poverty level. In 1979, this proportion was only two-fifths.

By 1991, fully three-fifths of nonmetro high-school-educated workers earned a wage that could not support a family of four above the official poverty level.

Table 5.3 shows the earnings distribution of newly graduated high-school-educated workers by race and ethnicity in metropolitan and nonmetropolitan areas. The numbers for nonmetropolitan-area workers are startling: slightly over three-fourths of high-school-educated African Ameri-

TABLE 5.3
Wages of High School Graduates (No College) by Race and Ethnicity, 1-10 Years Out of School, Metro vs. Nonmetro Areas (constant 1991 dollars, percentages for each race)

Characteristic	1979		1989		1991	
	Metro	Nonmetro	Metro	Nonmetro	Metro	Nonmetro
Earn 1989 Minimum Wage ($3.35) or Below						
White, non-Hispanic	2.1%	2.8%	4.5%	8.9%	3.5%	4.9%
African American, non-Hispanic	1.4	4.5	5.7	16.3	3.3	5.0*
Hispanic, any race	1.6	3.5	5.8	12.9	4.4	5.4*
Earn 1991 Minimum Wage ($4.25) or Below						
White, non-Hispanic	2.5	3.6	9.1	17.4	10.6	17.3
African American, non-Hispanic	1.8	5.2	13.9	30.6	14.6	27.5
Hispanic, any race	2.1	4.6	10.1	21.7	16.1	24.1
Earn Poverty Wage for a Family of Four or Below (2 Adults, 2 Children, $6.58)						
White, non-Hispanic	37.5	27.3	37.9	53.7	44.9	58.1
African American, non-Hispanic	35.3	57.5	53.5	69.1	58.1	74.6
Hispanic, any race	39.9	50.1	51.1	66.9	57.6	75.5

*Small sample size for this wage category; represents fewer than 1% of all workers (metro and nonmetro) in this racial group.

Source: Authors' analysis of BLS data.

can and Hispanic workers in rural areas earn a wage that could not support a family of four above poverty. Because the annualized earnings of a worker making the 1991 minimum wage would not lift a family of two out of poverty, it also is disturbing that by 1991, in rural areas, about 25% of African American and Hispanic workers earned the 1991 minimum wage or less.

Table 5.4 shows the earnings distribution of newly graduated high-school-educated workers by gender. As with race and ethnicity, workers of either sex in nonmetropolitan areas are more likely to have low earnings than are metro-area workers. And as with race and ethnicity, the numbers have disturbing implications. Almost three-fourths of women in rural areas earn a wage that cannot support a family of four above the poverty level. About one in four could not support a family of two.

By 1991, in rural areas, about 25% of African American and Hispanic workers earned the minimum wage or less.

Table 5.4
Wages of High School Graduates (No College) by Gender, 1-10 Years Out of School, Metro vs. Nonmetro Areas (constant 1991 dollars, percentages for each sex)

Characteristic	1979		1989		1991	
	Metro	Nonmetro	Metro	Monmetro	Metro	Nonmetro
Earn 1989 Minimum Wage ($3.35) or Below						
Males	0.8%	1.9%	3.8%	7.4%	2.6%	3.3%
Females	3.4	4.7	6.2	12.7	5.0	7.0
Earn 1991 Minimum Wage ($4.25) or Below						
Males	1.1	2.5	8.1	12.9	10.2	12.1
Females	3.9	5.7	12.2	26.4	14.3	26.6
Earn Poverty Wage for a Family of Four or Below (2 Adults, 2 Children, $6.58)						
Males	20.3	26.6	37.0	43.0	45.4	49.9
Females	40.6	59.6	48.7	70.5	53.3	73.4

Source: Authors' analysis of BLS data.

Patterns of Entry-Level Wages for New High School Graduates

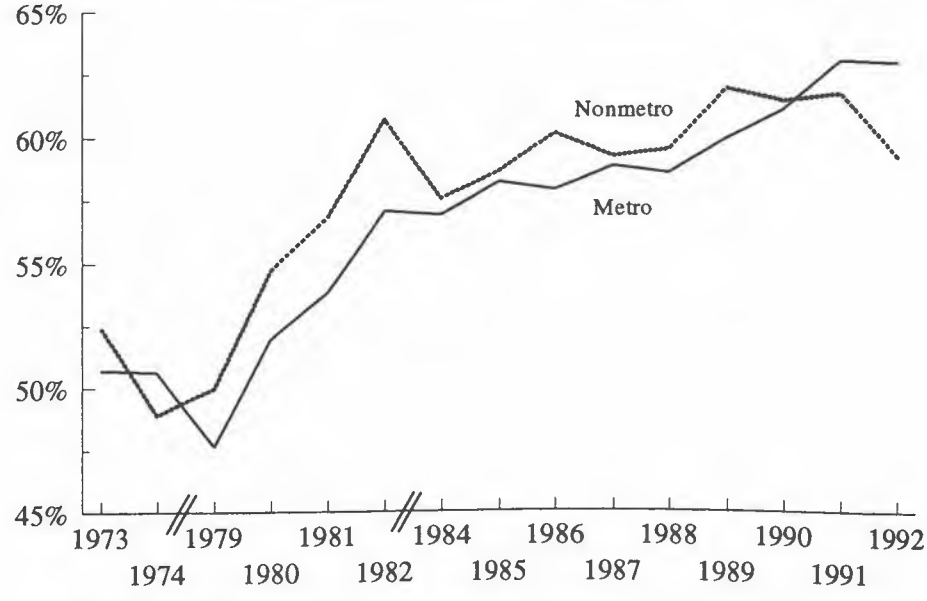
Past trends for new high school graduates in the workforce show the effects of the business cycle. During the period 1979-82, which includes the start of a long-term slide in manufacturing employment and the recessions of the early 1980s, the share of workers tied to the minimum wage in both metro and nonmetro locations grew, but the share in nonmetro areas was consistently greater (**Figure 5**).

It is possible that the recent increase in the minimum wage helped push firms in rural areas to bring workers into higher-wage occupations.

During the prolonged expansion between 1982 and 1989, the shares of both nonmetro and metro workers tied to the minimum mostly flattened out and, during most of those years, were almost equal. Any upward movement was most likely influenced by two factors: first, as the expansion continued, job expansion slowed, so wage levels were kept down; second, the real value of the minimum wage declined further in real terms, a trend that tended to raise the proportion of employees with lower wages.

During the period of minimum-wage increases and the recession of the early 1990s, the proportion of metropolitan-area high-school-educated entrants with wages tied to the minimum grew and then flattened out, while the nonmetropolitan-area share was flat and then dropped. Although still

FIGURE 5
Share of Workers Tied to the Minimum Wage by Metro and Nonmetro Location



Note: Workers are entry-level high school graduates.

Source: Authors' analysis of BLS data.

too early to definitively identify these movements, it appears that the recession and wage jump helped tie metro workers to the minimum, while wages of rural workers were somewhat dislodged from the minimum and floated up toward the level of average wages.

It is possible that, since even high-wage workers in rural areas make relatively low wages, the recent increase in the minimum wage helped push firms in rural areas to bring workers into higher-wage occupations. In metropolitan areas, however, because the increases in 1990 and 1991 were not large enough to return the minimum wage to its historic relationship with the average wage of production workers, urban firms continued to hire on the minimum-wage contour.

The 1989 amendments to the FLSA increased the minimum wage, but they also removed classes of workers from coverage.

Workers Below the Minimum Wage: The Issue of Noncoverage

The 1989 amendments to the FLSA increased the minimum wage, but they also removed classes of workers from coverage by expanding the enterprise exclusion to cover more businesses, increasing the amount firms can assume workers receive in tips (to offset being paid less than the minimum), and providing a training wage for teenage workers. Efforts to determine the impact of the minimum-wage increase on employment levels thus could be confounded, since it might produce no change in total employment but encourage a shift of workers from the covered to the uncovered sector.

It is not possible to determine whether individual workers in the BLS earnings file are exempt from minimum-wage coverage, but it is possible to identify workers who were in industries or had occupations to which exemptions applied. Furthermore, it is not possible to determine if a worker paid below the minimum wage is exempt or is being paid an illegally low wage. Still, by establishing limits on the effect of coverage and assuming that workers are being paid according to the law, some conclusions can be reached by looking at those workers who are paid at or below the minimum wage.

Table 5.5 shows the distribution of all workers by metropolitan and nonmetropolitan areas. Workers are grouped by whether they report an hourly wage that is below the federal minimum, at the minimum, or above it. For all of both years covered—1989 and 1992—the federal minimum wage was constant ($3.35 and $4.25, respectively).

TABLE 5.5
The Percentage of Workers in Wage Groups Below, At, and Above the Minimum, Metro vs. Nonmetro Areas

Wage Group	1989 Metro	1989 Nonmetro	1992 Metro	1992 Nonmetro
Below the minimum	1.7%	3.0%	2.3%	4.0%
At the minimum	0.8	2.4	1.1	2.9
Above the minimum	97.5	94.5	96.5	93.1
Totals	100.0	100.0	100.0	100.0
Percentage of workers at or below the minimum that are below the minimum	68.0	55.4	67.6	57.4

Source: Authors' analysis of BLS data.

For rural workers, the share below the minimum increased from 55.4% in 1989 to 57.4% in 1992, suggesting that some workers shifted from the covered to the noncovered sector.

Among metro workers, the share below the minimum (among those who are paid the minimum wage or less) remained almost constant in both years—68.0% in 1989 and 67.6 in 1992—suggesting that there was no shift from the covered to the noncovered sector among these workers. There was only a small increase in the share of workers paid the minimum wage or less.

For rural workers, the share below the minimum (among those paid the minimum wage or less) increased from 55.4% in 1989 to 57.4% in 1992, suggesting that, among minimum-wage-type workers in rural areas, some shifted from the covered to the noncovered sector. There was also a small increase in the total share of workers paid the minimum wage or less.

The possibility that the increase in the minimum wage and the change in coverage may have mattered is examined in **Table 5.6**, which divides workers into three groups: those below the minimum, at the minimum, and above the minimum. Within each of those wage groups, the table gives the percentage of workers who, by virtue of their occupation, industry, or age group, could have been exempt from minimum-wage coverage in 1989, prior to the 1989 amendments to the FLSA.[41]

Occupation, industry, or age might thus explain why 62.3% of the metro workers and 60.2% of the nonmetro workers earning below the minimum wage in 1989 were paid that low rate. The 1989 amendments extended the exemption based on size of business enterprise from the retail industry to all industries, and they increased the threshold of the exemption from annual

TABLE 5.6
Percentage of Workers Below, At, and Above the Minimum Who Are Potentially Exempt from Minimum-Wage Coverage (by Pre-1989 Amendments to FLSA), Metro vs. Nonmetro Areas

Wage Group	1989		1992	
	Metro	Nonmetro	Metro	Nonmetro
Below the minimum	62.3%	60.2%	50.6%	51.2%
At the minimum	56.9	53.3	33.9	45.9
Above the minimum	24.0	23.6	21.0	18.8
All workers	25.0	25.4	21.8	21.0

Source: Authors' analysis of BLS data.

sales of $362,500 to $500,000. However, Table 5.6 does identify workers by the size of the business enterprise they work for.[42] Thus, it is not surprising that in 1992, after the 1989 amendments, which created broader possibilities for exemptions based on business size, the explanatory power of occupation, industry, and age declined for urban and rural workers. In 1992, the share of workers who might have been exempt under the prior rules and were paid below the minimum declined to 50.6% for metro-area workers and 51.0% for nonmetro-area workers.

The decrease in the share of workers making less than the minimum who were possibly exempt under the prior standards of the FLSA gives further evidence that perhaps a small share of workers in the rural sector moved from the covered to the uncovered sector. While this may mitigate any employment effect of the minimum wage, it could exacerbate the wage effect.

Because workers in rural areas are disproportionately affected by the minimum wage regardless of race, gender, or age, policy makers must be aware of the extent to which the minimum wage affects the wage structure in nonmetropolitan areas.

Because workers in rural areas are disproportionately affected by the minimum wage, policy makers must be aware of the extent to which the minimum wage affects the wage structure in nonmetropolitan areas.

Conclusion

During the 1980s, as the U.S. economy experienced the longest peacetime expansion of the 20th century, average wages stagnated in real terms, the number of low-wage workers increased, and, from the first year of the decade to the last, the federal minimum wage remained at $3.35.

The minimum wage serves as society's standard of the lowest acceptable wage and influences the starting wages of workers with less-than-college educations. These are wages of adult workers, not just teenagers, and thus the minimum affects the lives of families and helps determine whether they live above or below the poverty line.

Many issues are involved in counting how many people are paid the minimum wage and who they are. The Bureau of Labor Statistics releases data on minimum-wage workers paid by the hour. Although this data has gained acceptance over the years as the accurate count of minimum-wage workers, it is a severe underestimate, and has led to a misunderstanding about the size of the minimum-wage group and, especially, the proportion who are poor. Among minimum-wage hourly workers, the poverty rate is below one-fifth, but when nonhourly workers are added to the count the poverty rate rises to around one-fourth. The composition of the low-wage workforce is disproportionately nonwhite, female, and rural, but the proportion of adult men who are poor minimum-wage workers doubles—from 20% to 40%—when nonhourly poor workers are added to the count. Many of these poor adult men are primary breadwinners in families. In fact, 65% of poor minimum-wage workers are the only worker in their families. The large proportion of adult males and sole breadwinners among this group signals a more serious problem of working poverty than has previously been believed to exist.

The large proportion of adult males and sole breadwinners among the group of poor minimum-wage workers signals a more serious problem of working poverty than has previously been believed to exist.

The minimum wage increased only once between 1979 and 1990, from $2.90 to $3.35 in 1981. In order for the minimum wage to retain its purchasing power (adjusting for inflation) between 1979 and 1989, it would need to have risen to $4.83. Workers whose wages rose from $3.35 in 1981 to, say, $4.00 in 1989 would no longer be classified as minimum-wage workers even though they were poorer, in real terms, in 1989 than they had been in 1981.

For many occupations and industries, the starting wages of high-school-educated workers appear tied to the minimum wage. Much research has focused on the decline in wages and earnings of high-school-educated workers in relation to college-trained workers, but few studies have highlighted the absolute drop in well-being among less-than-college-educated workers. The most striking thing about the wage distribution of high school graduates during the last 20 years—for all races and both

sexes—is that there was a dramatic rise in the percentage of workers below the real value of the 1979 minimum wage. For white males, that percentage rose from 4.2% in 1979 to 16.0% in 1989, almost a four-fold increase. For African American males, there was an increase of 29.1 percentage points in the share of workers earning below the real value of the 1979 minimum wage.

Because a very low percentage of women held high-wage jobs in 1979, the decline in their share of those jobs would not lower the average wage as much as would the increase in the share of workers below the real value of the 1979 minimum wage. This represents a shift of 23.7 percentage points for white females and 30.7 percentage points for African American females.

During the 1970s, around half the starting jobs for high-school-educated workers were jobs that had wages tied to the minimum. That share increased during the 1980s to 60%.

The trends of increasing shares of workers below the 1979 real minimum and the decline in the share of workers above the twice-annualized value of the poverty-level wage show that the average wage, and thus the well-being, of high-school-educated workers is declining. Regardless of race or gender, a large part of this absolute decline is the fall in the real value of the minimum wage.

Wage contours show a common wage-making system. The analysis performed here revealed that there are two distinct wage clusters: one includes the average wage of nonsupervisory workers, and the other includes the minimum wage. Forty-six occupation-by-industry groups were linked with the average wage, and 43 with the minimum wage.

During the 1970s, around half the starting jobs for high-school-educated workers were jobs that had wages tied to the minimum. That share increased during the 1980s to 60%. The real wage of workers on that cluster increased during the latter half of the 1970s and then declined during the 1980s. The real average wage (in constant 1992 dollars) of workers on the minimum-wage contour fell from $7.14 in 1979 to $5.78 in 1990, not much higher than the $5.50 constant-dollar value of the 1979 minimum wage. Hence, it is not surprising that by 1991 such a large share of recent high-school-educated workers earned below the constant dollar value of the 1979 minimum wage.

While the minimum wage was not indexed to automatically increase as inflation lowered its purchasing power in the 1970s, constant increases in the minimum wage had the effect of indexation. During the 1970s,

although changes in the labor market were great, the wages of low-wage workers did not suffer. In the 1980's the minimum wage declined to historically low levels of purchasing power, and low-wage workers paid the price.

There is a cost to maintaining a low value for the minimum wage. The diminished opportunities for the young adult workers of the 1980s are a result of that misguided policy. Those who thought that a higher minimum wage would cost job opportunities do not understand the higher cost of favoring the growth of low-wage jobs.

Appendix A

The extent to which the firm maintained its wage structure is measured as the natural logarithm of the ratio of the variance of wages within the firm in April to the variance of wages within the firm in March.[43] This variable serves as the dependent variable in the analysis. Included among the independent variables are two measures of how many workers are affected: (1) the natural logarithm of the proportion of workers who earned below $4.25 in March, and (2) the natural logarithm of the increase in wages necessary to raise all workers to at least $4.25 an hour. The other independent variables are the natural logarithm of the number of workers in March, the natural logarithm of the turnover rate of workers in March, the natural logarithm of the proportion of

TABLE A1
Ordinary Least Squares Results Explaining Wage Structure Maintenance

Means*(Standard Errors) Dependent 0.973 (0.005)	Dependent Variable (in log Form): Explanatory Variables	April Wage/ Uniform 12% Wage Increase (Standard Errors in Parentheses)	
	Intercept	-0.048	-0.034
		(0.030)	(0.035)
	Continuous variables (in log form):		
0.714	Proportion of workers affected	0.050	
(0.026)		(0.012)	
1.071	Wage gap of workers below $4.25		-0.041
(0.002)			(0.244)
20.757	Number of March workers	0.020	0.008
(1.159)		(0.011)	(0.012)
0.106	Within-firm variance of March wages	-0.003	-0.005
(0.022)		(0.001)	(0.001)
0.280	March labor turnover rate	0.008	0.005
(0.026)		(0.009)	(0.009)
Proportions	*Dichotomous variables:*		
0.028	McDonald's restaurant	-0.035	-0.014
		(0.029)	(0.031)
0.056	Wendy's restaurant	-0.024	-0.009
		(0.023)	(0.025)
0.044	Kentucky Fried Chicken restaurant	-0.022	0.000
		(0.026)	(0.027)
0.033	Arby's restaurant	0.017	-0.005
		(0.034)	(0.037)
0.033	Pizza Hut restaurant	-0.043	-0.038
		(0.027)	(0.029)
0.044	Hardees restaurant	0.013	0.048
		(0.029)	(0.031)
0.402	Greensboro, N.C.	-0.036	-0.064
		(0.015)	(0.015)
	R^2	0.403	0.296
	Root mean square error	0.057	0.062
189	Number of observations	103	103

*These are means of the variables, not the means of their logarithms.

Source: Authors' analysis.

visible workers who were African American or female, and dummy variables for the major chains surveyed and for Greensboro. The excluded category of restaurants includes all chain restaurants not specified (like Burger King) and all independent restaurants. Worker turnover is measured as the natural logarithm of the ratio of the number of new hires plus job leavers in the four weeks prior to the March survey to the number of workers at the restaurant at the time of the March survey.

Table A1 gives the results of modeling the firms' response.[44] Two different models look at explaining the maintenance of the wage structure—by granting an across-the-board percentage wage increase of 12%[45]—using the natural logarithm of the proportion of workers who earned below $4.25 in March (column 1) and the natural logarithm of the increase in wages necessary to raise all workers to at least $4.25 an hour (column 2.)[46]

There is little difference in the results of the two models, except that wage increases at firms were significantly affected by the proportion of workers earning less than the new minimum wage but not by the actual size of the wage gap.

Table A2 shows the robustness of the relationship between the proportion of affected workers and the wage structure.[47] Here the dependent variable is taken to be the maintenance of the wage structure as measured by the change in average wages and as measured by the change in the variance of wages within the firms. The independent variables included in the models shown in Table A2 are the same as those listed in Table A1. But when the measure of wage structure is the ratio of the variance of wages within the firm in April to the variance of wages within the firm in March, the within-firm variance of wages in March is deleted from the independent variables.

The sample is changed to reflect only those firms from Jackson and those firms whose

TABLE A2
Ordinary Least Squares Results
Showing Effect of the Proportion of Workers
Affected by Change in Minimum Wage on Wage Structure

Dependent Variable (in log Form):	Proportion of workers affected Coeff.	Std. Error	Prob. Value	R^2	Root Mean Square Error	N
*April wage/ Uniform 12% wage increase**						
Full sample	0.050	0.012	0.0001	0.403	0.057	102
Jackson only	0.023	0.024	0.3419	0.241	0.50	68
Wage increase less than 12%	0.022	0.10	0.0320	0.543	0.041	70
*April wage variance/ March variance***						
Full sample	2.718	1.014	0.009	0.138	4.672	93
Jackson only	2.014	0.743	0.009	0.146	1.646	65
Wage increase less than 12%	0.086	0.359	0.813	0.092	1.433	62

Note: The probability value is for a two-tailed t-test of the hypothesis that the coefficient is zero.
*Other independent variables are those shown in Table A1.
**Other independent variables are those shown in Table A1, except that the within-firm variance of March wages is deleted.

Source: Authors' analysis.

average wage increased by less than 12%. The Jackson sample is chosen because of the difference in the response rate between Jackson and Greensboro. Because firms were less likely to respond to the survey in Greensboro, the Jackson-only sample helps show whether potential selectivity bias among the Greensboro firms is driving the results. Firms that increased their average wage less than 12% are singled out to control for firms that granted wage increases by more than what was mandated by law. Those firms may have granted larger increases for reasons having nothing to do with the change in the minimum wage. In that sense, this practice would make those firms potential outliers. Thus, changes in the wage structure of those firms may be different.

TABLE A3
Ordinary Least Squares Results Explaining Wage Structure Maintenance With Race and Gender Composition of the Workforce

Dependent Variable (in log Form): Explanatory Variables	April Wage/ Uniform 12% Wage Increase (Standard Errors in Parentheses)	
Intercept	-0.077	-0.093
	(0.051)	(0.062)
Continuous variables (in log form):		
Proportion of Workers Affected	0.046	
	(0.013)	
Wage gap of workers below $4.25		0.118
		(0.296)
Number of March workers	0.016	0.006
	(0.015)	(0.016)
Within-firm variance of March wages	-0.006	-0.012
	(0.006)	(0.006)
March labor turnover rate	0.008	0.000
	(0.009)	(0.010)
Proportion African-American workers	-0.029	-0.020
	(0.011)	(0.012)
Proportion female workers	-0.028	-0.025
	(0.015)	(0.017)
Dichotomous variables:		
McDonald's restaurant	-0.034	-0.023
	(0.026)	(0.028)
Wendy's restaurant	-0.012	-0.002
	(0.019)	(0.021)
Kentucky Fried Chicken restaurant	-0.018	-0.003
	(0.022)	(0.024)
Arby's restaurant	0.031	0.006
	(0.028)	(0.031)
Pizza Hut restaurant	-0.034	-0.031
	(0.022)	0.024
Hardees restaurant	-0.001	0.034
	(0.025)	(0.026)
Greensboro, N.C.	-0.031	-0.050
	(0.017)	(0.021)
R^2	0.531	0.420
Root mean square error	0.044	0.049
number of observations	71	71

Source: Authors' analysis.

Appendix B

Table B1 shows the results of the ordinary least squares model for estimating the mandated wage-change effects on employment. **Table B2** shows the results of a two-stage least squares

TABLE B1
Ordinary Least Squares Results—Mandated Wage Changes on Employment Levels

Dependent Variable (in log Form): Change in Employment (March to April)					
Intercept	0.080	0.065	0.075	0.071	0.071
	(0.117)	(0.129)	(0.119)	(0.128)	(0.121)
Wage gap of workers below $4.25	-0.367		-0.418		-0.414
	(1.273)		(1.287)		(1.287)
Change in mean wage (raise only to those below $4.25)		0.412		0.062	
		(1.491)		(1.498)	
Within firm variance of March Wages			-0.003	-0.009	
			(0.007)	(0.006)	
Coefficient of variation of March wages					-0.002
					(0.007)
March labor turnover rate	0.113	0.142	0.113	0.155	0.113
	(0.046)	(0.048)	(0.046)	(0.048)	(0.046)
McDonald's restaurant	0.137	0.131	0.135	0.128	0.135
	(0.541)	(0.172)	(0.155)	(0.171)	(0.155)
Wendy's restaurant	0.051	0.014	0.052	0.018	0.052
	(0.125)	(0.131)	(0.126)	(0.130)	(0.126)
Kentucky Fried Chicken restaurant	-0.059	-0.071	-0.057	-0.063	-0.057
	(0.142)	(0.159)	(0.143)	(0.158)	(0.143)
Arby's restaurant	0.191	0.353	0.193	0.359	0.193
	(0.195)	(0.171)	(0.197)	(0.170)	(0.197)
Pizza Hut restaurant	-0.028	-0.028	-0.025	-0.015	-0.025
	(0.153)	(0.170)	(0.154)	(0.169)	(0.154)
Hardees restaurant	-0.042	0.004	-0.042	-0.029	-0.015
	(0.161)	(0.160)	(0.162)	(0.161)	(0.162)
Greensboro, N.C.	0.130	0.127	0.129	0.102	0.129
	(0.077)	(0.092)	(0.077)	(0.093)	(0.077)
R^2	0.097	0.130	0.098	0.150	0.098
Root mean square error	0.328	0.365	0.330	0.363	0.330
Number of observations	103	111	103	111	103

Source: Authors' analysis.

estimation of the change in employment using the natural logarithm of the change in the average wage (weighted by workers, not by hours worked) of workers from March to April, measured as the natural logarithm of the ratio of the average wage in April to March. Additional instrumental variables included the size of the labor force in March and the variation of wages in March. In the first equation shown, the coefficient on March labor turnover rate is significant and on the same order as in the previous regressions.

Change in the mean wage was treated as endogenous. Additional instrumental variables included the size of the labor force in March and the within-firm variance of March wages.

TABLE B2
Two-Stage Least Squares Results
Wage Changes on Employment

Dependent Variable (in log form): Change in Employment (March to April)		
Intercept	-0.186	-0.407
	(0.215)	(0.212)
Log (change in mean wage, March to April)	2.383	2.708
	(1.782)	(1.871)
March labor turnover rate	0.133	
	(0.045)	
McDonald's restaurant	0.148	0.168
	(0.161)	(0.169)
Wendy's restaurant	0.035	0.046
	(0.123)	(0.129)
Kentucky Fried Chicken restaurant	-0.052	0.028
	(0.148)	(0.153)
Arby's restaurant	0.406	0.419
	(0.163)	(0.171)
Pizza Hut restaurant	0.097	0.170
	(0.179)	(0.187)
Hardees restaurant	-0.048	-0.011
	(0.159)	(0.167)
Greensboro, N.C.	0.243	0.223
	(0.137)	(0.144)
R^2	0.169	0.072
Root mean square error	0.059	0.060
Number of observations	110	110

Change in the mean wage was treated as endogenous. Additional instrumental variables included the size of the labor force in March and the within-firm variance of March wages. Standard errors in parentheses.

Sources: Authors' analysis.

Appendix C

High turnover rates may imply that firms use dismissal as a way of eliciting work effort, as in the Rebitzer and Taylor model. Another possibility is that after the minimum wage increased, resignations declined. Firms with higher turnover rates may have continued to hire workers at a rate set for higher resignation rates. Thus, those firms would appear to have greater employment growth until they adjusted to the lower resignation rates. But statistically controlling for that possibility does not change the basic conclusions reached so far—that the mandated minimum wage is not significant. The mandated wage increase is not statistically significant in predicting either the change in the hiring rate or the resignation rate.

Table C1 presents the results of using the same variables used to model employment growth to explain changes in resignation and new-hire rates. Employment growth is now broken down into its separate elements—the change in new hires and the change in resignations,[48] with each estimated separately. The dependent variables are the change in the natural logarithms of the new-hire rate (new hires divided by existing workers) from March to April and the change in the natural logarithms of resignation rates (resignations divided by existing workers.)

The March turnover rate, however, is significant in predicting both the change in the new-hire rate and in the resignation rate (Table C1). Firms with high turnover rates lowered the rate at which they hired new workers after the change in the minimum wage (probability value of the coefficient is 0.0001). A 10% higher March labor turnover rate lowered the change in the new-hire rate by 8.6%. In a separate breakdown of the turnover rate, the March new-hire rate significantly predicts (probability value of 0.0001) the change in the new-hire rate from March to April, but the March resignation rate does not. Firms with a higher turnover rate in March also tended to have lower changes in their quit rates from March to April (probability value of the coefficient is 0.0003). A 10% higher March labor turnover rate lowered the change in the resignation rate by 9.1%. In a separate breakdown of the turnover rate, the March resignation rate significantly predicts (probability value 0.0001) the change in the resignation rate from March to April, but the March new-hire rate does not.

These data leave two possibilities. The first is that firms that used dismissals as a motivating factor before the increase in the minimum wage changed behaviors. Because firms with higher March turnover rates significantly lowered their new-hiring rate, it does not appear that their net increase in employment was an accident.

The second possibility is that breaking down the individual components amounts to predicting current turnover rates using lagged turnover rates. This possibility arises because the individual components of the turnover rate are significant in predicting the separate components of employment growth. But this second possibility appears the least likely explanation. The March resignation rate is not a significant predictor of the April resignation rate (probability value 0.25) or the April new-hire rate (probability value 0.91), nor is the March new-hire rate a significant predictor of the April new-hire rate (probability value 0.66).

It may also be the case that the way turnover is measured drives the results. The turnover rate includes a measure of new hires and resignations, and if resignations are low, then this equation would predict the change in April employment based on lagged employment growth in March. To control for this possibility, the models were re-estimated with the turnover measured as the natural logarithm of new hires divided by March employment and the natural logarithm of resignations divided by March employment. The results are in **Table C2**. In those models, as one would expect, the measure for new hires was significant (probability value of 0.003) and positive

TABLE C1
Ordinary Least Squares Estimates of Resignations

Dependent Variable	Change in Log New Hires	Change in Log Quits
Intercept	-1.106	-0.827
	(0.758)	(0.871)
Wage gap of workers below $4.25	1.800	0.137
	(4.558)	(5.237)
March labor turnover rate	-0.855	-0.909
	(0.200)	(0.230)
Coefficient of variation of March wages	0.007	0.045
	(0.109)	(0.125)
McDonald's restaurant	-1.272	0.241
	(0.468)	(0.537)
Wendy's restaurant	-0.233	0.087
	(0.374)	(0.430)
Kentucky Fried Chicken restaurant	-0.230	-0.463
	(0.463)	(0.532)
Arby's restaurant	-1.431	-0.351
	(0.595)	(0.683)
Pizza Hut restaurant	-0.256	0.044
	(0.477)	(0.548)
Hardees restaurant	-0.359	0.447
	(0.437)	(0.503)
Greensboro, N.C.	0.318	0.321
	(0.353)	(0.406)
R^2	0.428	0.338
Root mean square error	0.758	0.871
Number of observations	52	52

Source: Authors' analysis.

(coefficients ranging from 0.204 to 0.209). The coefficient on resignations was also positive (a coefficient of 0.06), but not significant (probability value of 0.3). Yet, a test of the hypothesis that the coefficients on resignations and new hires are equal could not be rejected for any of the models (probability values of 0.16 to 0.17.) The predicted size of the change in employment that would result from a change in new hires is bigger than the predicted change resulting from the turnover rate. This is not unexpected, since the new-hire measure, as opposed to the turnover rate, ignores resignations. Still, a test of the hypothesis that the average value of the new-hire and resignation coefficients equals the coefficient on turnovers, for the respective model, could not be rejected for any of the models (probability values of 0.57 to 0.60).

There is a high correlation between resignations and hires: their multicollinearity could mean that including both in the same equation will reduce the significance of one of them. When the model is estimated with the resignation measure, excluding the new-hire measure, resignations are positive (coefficients ranging from 0.118 to 0.121) and significant (probability value of 0.02).

The change in employment predicted by this coefficient is on the same order of magnitude as the turnover rate measure. Coefficients of the other variables essentially remain unchanged, except for the dummy variable for Greensboro, which becomes statistically insignificant. Thus, it would appear that the effects of the turnover rate measure reported in Tables B1 and B2 are not an artifact of its construction's inclusion of new hires.

TABLE C2
Test of Equivalence of Measuring Labor Turnover as Resignations, Hires, or a Combination

Dependent Variable (in log form): Change in Employment (March to April)					
Intercept	0.442 (0.172)	0.414 (0.170)	0.441 (0.173)	0.421 (0.173)	0.438 (0.175)
Wage gap of workers below $4.25	-0.796 (1.608)		-0.835 (1.630)		-0.830 (1.629)
Change in mean wage (raise only to those below $4.25)		-0.397 (1.665)		-0.595 (1.833)	
Within-firm variance of March wages			-0.002 (0.010)	-0.003 (0.011)	
Coefficient of variation of March wages					-0.002 (0.011)
Proportion of March workers who were new	0.204 (0.067)	0.207 (0.067)	0.204 (0.067)	0.209 (0.068)	0.204 (0.067)
Proportion of March workers who quit	0.056 (0.055)	0.057 (0.055)	0.058 (0.055)	0.058 (0.056)	0.057 (0.055)
F-test that coefficient on resignations=new hires	1.998	2.058	1.963	2.049	1.964
Probability value	0.16	0.16	0.17	0.16	0.17
F-test that average of coefficients on resignations + new hires=coefficient on turnover	0.284	0.311	0.309	0.318	0.306
Probability value	0.60	0.58	0.58	0.57	0.58
Significance of restaurant dummies	No	No	No	No	No
Significance for Greensboro, N.C., dummy	No	No	No	No	No
R2	0.228	0.226	0.229	0.227	0.229
Root mean square error	0.331	0.332	0.334	0.334	0.334
Number of observations	81	81	81	81	81

Standard errors are in parentheses.

Source: Authors' analysis.

Appendix D

The relationship between wage changes (as well as other variables used to control for differences in the restaurants) and price changes were estimated using the complete sample and several subsamples. The use of the subsamples was to find how strong, or robust, the findings were. **Table D** shows the results of estimating the change in price levels. Included were all those restaurants for which complete price and labor data were available.

Some initial price surveys by the students at Jackson State were taken after April 1. Estimates of the effect of the wage change on these restaurants are listed in a separate regression labeled "Late" and by a dummy variable indicating late data. Not surprisingly, the price change for the late data is lower than for the timely data, yet the difference is not statistically significant.

The estimates in Table D were made using two-stage least squares. The change in the average wage of workers at each firm was considered endogenous. Additional instrumental variables included the natural logarithm of the proportion of workers below the minimum and the natural logarithm of the wage gap of those workers (as defined earlier.) Five separate regressions were run: one for the subsample where price data were collected after the increase in the minimum, one for the subsample of timely data, one for the subsample of firms in Jackson, one for the Greensboro subsample, and one for the complete sample. Two Chow tests were performed to determine whether there were significant differences between the late and timely samples and between the Jackson and Greensboro sample. For the two cities, the Chow test rejects that the two samples yield the same regression results.

For the entire sample, the estimated effect of the change in the firm's wage on price is negative, though it was far from significant. Looking at each city's sample separately, the effect of wages was positive, but not significant.

In both the Jackson and Greensboro subsamples, the effect of the March turnover rate was significant (probability values of 0.07 and 0.05.), though the direction of the effect was opposite. In Greensboro, firms with high labor turnover increased their prices slightly: a 1% increase in labor turnover led to a 0.05% increase in prices. In Jackson, a 1% increase in labor turnover led to a 0.09% decrease in prices. The Jackson data are consistent with the theory that increases in the wage will lead to decreased marginal costs for supervision. Differences in the two labor markets may account for differences in the cost of turnover. In a market with high unemployment or underemployment, a high turnover rate is less costly (because the cost of searching for new employees is lower) than it is in a tight market. Thus, the difference here may reflect the lower unemployment rate in Greensboro.

In the pooled regression, the only coefficient that is statistically significant is the one for the number of days between the two surveys (probability value of 0.05.) This suggests that changes in price were general price movements along a trend, not price changes reflective of changes in the minimum wage. The rate of fall is dramatic. A 1% increase in the number of days leads to a 0.15% decrease in price. The same coefficient was negative in all the regressions, except for the Greensboro subsample. For the late surveys and the subsample for Jackson, the coefficient was negative and significant (probability value of 0.07 for both.)

In the pooled regression, however, the coefficient on the change in the average of the firm's wage is negative, though it was far from significant. The coefficient was positive and significant (probability value of 0.10) among the 22 firms in Jackson, where the price data were gathered after the increase in the minimum wage. The sign and the magnitude are as conventional theory would suggest: a 1% increase in wages led to a 2.5%% increase in prices. The coefficient is not

TABLE D
Two-Stage Least Squares Results
Estimating Price Changes

Dependent Variable (in log form): Change in Total Price of Eight Items

	Late	Timely	Jackson	Greensboro	Pooled
Intercept	2.392	2.094	0.722	-0.432	0.703
	(5.134)	(1.948)	(2.567)	(4.345)	(1.348)
Change in mean wage	2.526	-0.554	1.697	0.188	-0.279
(March to April)	(1.341)	(0.744)	(1.344)	(0.742)	(0.839)
Number of workers (in March)	0.094	-0.047	-0.012	-0.049	0.014
	(0.175)	(0.042)	(0.073)	(0.035)	(0.035)
Within-firm variance	0.041	-0.004	0.073	0.001	-0.001
of March wages	(0.071)	(0.006)	(0.031)	(0.004)	(0.006)
March labor turnover rate	-0.026	0.033	-0.086	0.050	0.002
	(0.075)	(0.031)	(0.045)	(0.024)	(0.028)
Days between March and	-0.304	-0.035	-0.169	0.390	-0.150
April survey	(0.145)	(0.142)	(0.090)	(0.466)	(0.075)
Day of March visit	-0.565	-0.552	-0.006	-0.288	-0.061
	(1.587)	(0.484)	(0.775)	(0.784)	(0.370)
Time of day of March visit	0.007	-0.002	-0.013	0.028	-0.005
	(0.029)	(0.007)	(0.007)	(0.009)	(0.006)
Time of day of April visit	0.006	0.006	0.008	-0.017	0.004
	(0.017)	(0.007)	(0.008)	(0.009)	(0.006)
Late data			-0.057		-0.027
			(0.162)		(0.087)
McDonald's restaurant	-0.128	0.071	0.005		0.000
	(0.442)	(0.096)	(0.110)		(0.006)
Wendy's restaurant	-0.111	0.178	0.029		0.051
	(0.140)	(0.077)	(0.075)		(0.061)
Kentucky Fried Chicken	-0.181	-0.010	-0.112		-0.107
restaurant	(0.125)	(0.151)	(0.091)		(0.082)
Arby's restaurant		-0.016		-0.021	0.043
		(0.143)		(0.092)	(0.149)
Pizza Hut restaurant	0.087	-0.051	-0.043	-0.011	-0.015
	(0.222)	(0.086)	(0.098)	(0.100)	(0.073)
Hardees restaurant	-0.135	0.059	-0.094	-0.027	0.045
	(0.179)	(0.105)	(0.158)	(0.116)	(0.096)
Greensboro, N.C.		-0.068			-0.027
		(0.076)			(0.087)
R^2	0.690	0.182	0.311	0.681	0.120
Root mean square error	0.140	0.127	0.144	0.068	0.138
Number of observations	22	53	49	26	75
Chow Test $F\text{-Statistic}_{(14,45)\|(10,48)}$		1.605		2.048	
Probability Value		0.119		0.048	

Estimated using two-stage least squares. Change in the mean wage was treated as endogenous. Additional instrumental variables included the log of the proportion of workers below the new minimum and the log of the wage gap of those workers (defined as before). Standard errors are in parentheses.

Source: Authors' analysis.

statistically different from 1, so it is not possible to reject the hypothesis that an increase in wages leads to a proportionate increase in prices. However, for the 53 firms where the data on prices were collected before and after the change in the minimum wage, the coefficient on the change in wages is negative, though not significant. In the subsamples for Jackson and Greensboro, the coefficient on wages is positive, though not significant.

The number of workers in March was used to control for the size of restaurant. The within-firm variance in March wages was used to control for differences in employee skills and as a way to measure differences in types of restaurants. The coefficient on the size of the firm, measured by the number of workers, was not significant in any of the regressions, although the within-firm variance in wages was positive and significant in the Jackson sample (probability value of 0.02): a 1% increase in the variance of the firm's wages led to a 0.07% increase in prices. These coefficients appear to have captured all the differences in the restaurants. Only the coefficient on Wendy's, in the regression for the subsample of timely price surveys, was statistically significant (probability value of 0.02). Among restaurants with timely surveys, Wendy's restaurants increased prices 19.5% relative to the non-chain restaurants.

The time of day of the visit was included to control for whether the restaurant might change prices between breakfast and lunch or lunch and dinner. In both the Jackson and Greensboro regressions, the coefficient on the time of day that the March survey was conducted was statistically significant (probability values of 0.08 and 0.05). The signs, however, were reversed. In Greensboro, the coefficient on the time of the April visit was significant (probability value of 0.08), though in Jackson it was not. In the pooled regression the sign on neither coefficient was significant.

Appendix E

In examining how the minimum wage level affects non-minimum-wage jobs, we look at the distribution of hourly wages for recent high school graduates (i.e., those 1-10 years out of school). The data on wages and earnings are from the U.S. Census Bureau's monthly Current Population Survey, which includes hourly and salaried workers for each month during the year. In this section, only workers who reported either an hourly wage or weekly pay and hours for the survey reference week are included. Weekly pay was converted to an hourly wage using the reported hours worked. Included are data for 1979, 1989, and 1991. Minimum wages are shown in constant 1991 dollars, using the CPI-UX1 as a price index to adjust for inflation. Poverty levels related to wage levels are 1979-based levels inflated to 1991 dollars using the CPI-UX1 price index.

Hourly wages are only one element used in describing the conditions of the labor market: supply or demand constraints on hours in the labor market are also important. The distribution of hourly wages shows the price of labor, while data on annual earnings show both labor price and supply.

Focusing on wages only can be misleading, especially with respect to labor- market outcomes for women and African Americans. For example, the unemployment experiences for whites and African Americans are very different (Spriggs 1992; Badgett 1991; Wilson, Tienda, and Wu 1991). Furthermore, discrimination in the labor market against African Americans and women can take the form of discrimination in the hiring process, where it may be easier to discriminate than in the conditions of employment. (Research by Mincy [1991] and Siegelman and Heckman [1991] provides strong evidence of such discrimination.)

The evidence provided in either recent studies has concentrated on measures of central tendencies in the wage distribution—averages, conditional averages (controlling for differences in

occupation, industry, geographic location, etc.), and medians. These may change over time because of shifts in the top of a distribution, or in the bottom, or both, but concentrating on those measures alone will not show whether wages changed more at the top or the bottom. A richer picture comes from looking at wage trends for new job entrants in the 1980s (Tables 4.1-4.4).

The years 1979 and 1989 were chosen because they represent peaks in the labor market. (The business cycle peaked in 1979 and in 1990. The trough in the most recent business cycle occurred in March 1991, but the labor market continued to deteriorate.) To take into account wage increases due to the rise in the minimum wage, we use 1991 as a third point. For reasons of sample size, the tables in this section present data for white non-Hispanics and black non-Hispanics only. Over 45% of new job entrants have completed 12 years of schooling (which is assumed to be equivalent to a high school education) and have no additional formal education beyond high school.

Appendix F

The breakdown in Table 4.5 is accomplished in the following way. First, a regression model of the natural logarithm of the hourly wage was fit using race, sex, central city residence, geographic region, experience (years out of high school computed as age minus years of schooling minus six), major industry (two-digit level) and major occupation (two-digit level). The data set included individual observations pooled together from both years in the period (1975 and 1979 in the data set for the 1970s, 1984 and 1989 in the data set for the 1980s). A dummy variable was added for the year (the last year in the period is coded as a one), along with an interaction term for the year with the other variables. Then, successive models were estimated, each deleting a separate variable. The number reported in Table 4.5 is the difference between the coefficient on the year dummy variable in the two models.

The decomposition process is the following:

$$\ln(w) = \beta_0 + \beta_t \cdot YEAR + \sum_{i=1}^{4} B_i \cdot X_i + \sum_{i=1}^{4} B'_i \cdot YEAR \cdot X_i + \sum_{j=1}^{m} B_j \cdot I_j + \sum_{j=1}^{m} B'_j \cdot YEAR \cdot I_j$$
$$+ \sum_{k=1}^{n} B_k \cdot O_k + \sum_{k=1}^{n} B'_k \cdot YEAR \cdot O_k + \sum_{p=1}^{z} B_p \cdot R_p + \sum_{p=1}^{z} B'_p \cdot YEAR \cdot R_p$$

In this equation, $beta_t$ is the coefficient on the dummy variable for the year (1983 = 0, 1989 =1 for the 1980s model), the B_i are the coefficients on the independent variables (X_i) race, sex, central city status, and experience. B_j are a set of coefficients on the dummy variables for industry (I_j), B_k are a set of coefficients on the dummy variables for occupation (O_k), and B_p are a set of coefficients on the dummy variables for geographic region (R_p). The B_j give the effect of industry on wages, holding other characteristics constant. Similarly, the B_k and B_p give the effects for occupation and geographic region on wages. These coefficients show the effects of the share of workers in a given demographic group or industry or occupation. If held constant, they give the average effect for the two years studied. The interaction terms (YEAR * X_i, YEAR * I_j, YEAR * O_k ...) hold the distribution of workers constant (in 1989 for the 1980s). So, those coefficients are marked with a prime. They show the difference in the effect a variable had on wages between the two periods (1984 and 1989 for the 1980s).

The model is then estimated again, dropping one of the independent variables or a set of

dummy variables representing industry, occupation, or region. As an example, excluding the set of dummy variables for occupation would give the following model:

$$\ln(w) = \beta'_0 + \beta'_t \cdot YEAR + \sum_{i=1}^{4} B'_i \cdot X_i + \sum_{i=1}^{4} B''_i \cdot YEAR \cdot X_i + \sum_{j=1}^{m} B'_j \cdot I_j + \sum_{j=1}^{m} B''_j \cdot YEAR \cdot I_j$$
$$+ \sum_{p=1}^{z} B'_p \cdot R_p + \sum_{p=1}^{z} B''_p \cdot YEAR \cdot R_p$$

Because the estimate of the year effect will be different in the two models, beta$_t$-prime is used for the coefficient for the year dummy variable in this model.

The partial effect reported in Table 4.5 uses estimates from equation 1 and equation 2, and is:

$$Partial\ effect = \beta'_t - \beta_t$$

This takes advantage of omitted variable bias to estimate the impact of changes in the occupational distribution from year to year. To see this, remember that in the less-than-full model that:

$$E(\beta'_t) = \beta_t + \sum_{k=1}^{n} B_k \cdot b_{kt,i\ldots j\ldots p}$$

So that

$$E(\beta'_t - \beta_t) = \sum_{k=1}^{n} B_k \cdot b_{kt,i\ldots j\ldots p}$$

Here the $b_{kt,\,i\,\ldots\,j\,\ldots\,p}$ are the ordinary least squares coefficients from estimating an equation with the occupations as the dependent variables and the year dummy variable as the independent variable, holding all the right-hand-side variables constant. Because the occupation and year are both dummy variables, this coefficient is the difference in the expected proportion of workers in a given occupation between 1983 and 1989. And, because the B_k are fixed, the decomposition in this example holds the price effect of the occupations fixed. So, the difference between the two estimates (equation 3) of the year effect (beta$_t$-prime and beta$_t$) is the effect of shifts in the proportion of workers among occupations between 1983 and 1989, holding the wages in those occupations constant at an average over the period.

The price effects are estimated using the addition of the interaction terms. The effect of the interaction term is to hold the distribution of occupations constant as they were in 1989 and show the difference between the average wage of the occupation over the period with where the wage was in 1989. So, to estimate the effect of a change in wages over the period to the same type of workers, the occupation dummy variables are first added back to the model. However, what is ignored is the change that occurs for the other interaction terms.

For sets of variables like region, occupation, and industry, this is the easiest way to estimate the affect on wages. Some shifts would have tended to increase wages, and so have positive partial effects. Other shifts would have tended to decrease wages, and so have negative partial effects.

The partial effects give the change in the natural logarithm of wages. To convert these effects to the annual percentage change effects on wages reported in Table 4.5, the formula is:

$$\textit{Percentage change in wages} = 100 \cdot (e^{\frac{x}{t}} - 1)$$

Where x is the partial efffect,

And t is the length of the economic expansion in years.

Appendix G

The statistical method used for deciding which occupation-by-industry group belonged to which wage group is called cluster analysis, the same statistical technique used by James Galbraith and Paulo DuPin Calmon (1992). It is a statistical procedure used to define groups, or clusters, of observations "found" in the data, not pre-defined by the researcher. (Discriminant, probit, and logit analysis require prior knowledge as to which group the observations belong.) The cluster analysis used followed Ward's minimum-variance method. It is one among a class of hierarchical clustering methods in which each observation starts as an individual cluster. Ward's method is to combine observations so that, at each level, the sum of squares within the clusters is minimized. This amounts to choosing the clusters to maximize the correlation among the observations within the clusters. This method is sensitive to outlier observations, so, from the initial set of occupation-by-industry groups, four were excluded as outliers.[49] They were executives, administrators, and managers in both the durable-goods manufacturing and public administration industries; administrative support personnel in the mining industry; and laborers in the finance, insurance, and real estate industry.

Observations for the cluster analysis were the occupation-by-industry groups. The variables used to cluster these were the average hourly wage of workers with 12 years or fewer of schooling who were not currently enrolled in school and who were one to five years out of school for each of the years given in the text. For 1992, the data is for people age 18-23 who were high school graduates and are not currently enrolled in school. The average wage of nonsupervisory and production workers (from published data by the Bureau of Labor Statistics) and the federal minimum wage were added as occupation-by- industry groups.

Though the average wage for some occupation-by-industry groups was based on larger sample sizes than others, the occupation-by-industry groups were not weighted because such disparity in sample size would not affect the choice of clusters. And because the clustering of the occupation-by-industry groups was based solely on the starting wage of the workers, the data were not rescaled.[50]

The minimum-wage cluster reported in the text is formed when there are four clusters. The steps from four to three and three to two involve the cluster reported as the average-wage contour. So, for the purposes of the argument in the text about the importance of the minimum-wage contour, the difference between having two, three, or four clusters is not important. However, the parsimony of the model presented is supported on statistical grounds.

The number of clusters reported in the text were chosen based on a test proposed by Richard Duda and Peter Hart (1973, 241-243). **Table G** gives the Duda-Hart test statistic and its critical value for the 0.007 level of significance. That level was chosen because, in an analysis of stopping rules for cluster analysis, Glenn Milligan and Martha Cooper (1985) found that significance level

TABLE G
Summary Statistics of Cluster Analysis, Ward's Minimum Variance Method

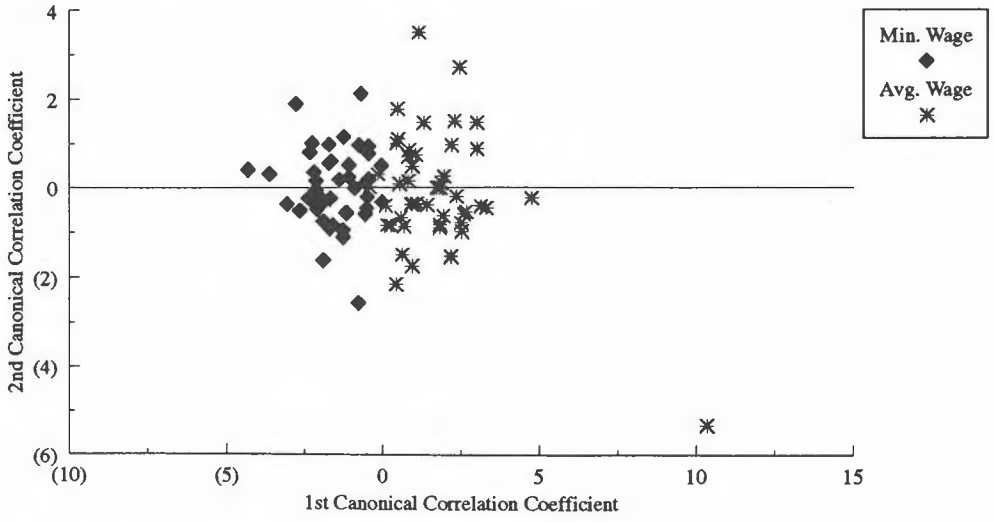
Number of Clusters	Semi-Partial R^2	R^2	Pseudo F	Pseudo t^2	Duda-Hart Test Statistic Je(2)/Je(1)
5	0.0378	0.672	44.7	6.5	0.6667
4	0.0575	0.615	46.9	21.2	0.6698
3	0.0654	0.549	54.3	20.1	0.5988
2	0.0840	0.466	78.5	13.7	0.7666
1	0.4658	0		78.5	0.5341
Critical value for test statistic (p=0.007)					0.8612

Source: Authors' analysis.

made the Duda-Hart test perform best. Milligan and Cooper propose, as a stopping rule, that the number of clusters be chosen when the Duda-Hart test is first rejected. The test statistic, shown in the last column of Table G, is the ratio of the sum of the squared errors when a cluster is partitioned into two clusters relative to the sum of squared errors for one cluster. The numerator will be smaller than the denominator. The critical value is chosen to figure out whether the reduction in error from partitioning the cluster is significant. The null hypothesis is that the cluster should not be partitioned. Thus, this is a one-tailed test, and is rejected when the test statistic is smaller than its critical value. Table G, which shows the Duda-Hart test statistic for one to five clusters, shows that at one cluster the test would be rejected, but at two clusters it would be accepted.

Figure G shows the first and second raw canonical discriminant function coefficients for each observation, along with a symbol for the wage contour cluster. This arrangement helps to show how well the clusters identify separate groups. The first canonical coefficient explains almost all the variation in the data. Along that coefficient, shown in the figure as the x-axis, the two-wage groups are perfectly separated.

FIGURE G
Discriminant Analysis for Wage Clusters, First and Second Canonical Correlation Coefficients



Source: Authors' analysis of BLS data.

Endnotes

1. This result has also been obtained for at least one foreign country by Stephen Bazen and John Martin (1991). Looking at the effect of the French minimum wage, they found no influence on adult employment and no robust estimate for youth.

2. See Brown 1988 for a review on economists' thinking.

3. Borrowing from the unemployment literature (see Mincer 1991 as an example; this passage follows that work), the share of workers observed earning the minimum wage during any given month can be identified as follows:

$$M = \frac{\sum_{i}^{L} \mu(m_i)}{\sum_{i}^{L} \mu(e_i)} = \frac{N_m}{L} \cdot \frac{\overline{\mu}(m)}{\overline{\mu}(e)} = \Pi(m) \cdot \frac{D_m}{1 - D_u} ;$$

$$where\ \Pi(m) = \frac{N_m}{L},\ D_m = \frac{\overline{\mu}(m)}{12},\ and\ D_u = \frac{\overline{\mu}(u)}{12}.$$

In this equation, mu(m_i) is the number of months that the *i*th worker earns the minimum wage, while mu(e_i) is the number of months that the *i*th worker is employed, and there are L workers employed during the year. M, the share of minimum-wage workers normally reported (see Haugen and Mellor 1990 as an example) is different from the probability of earning the minimum wage, expressed in Equation (1) as pi(m), the ratio of the number of all workers who during the year earn the minimum wage (N_m), relative to all wage earners in the year (L). D_m is the proportion of the year the average worker stays at the minimum wage. D_u is the proportion of the year that a worker is not employed (unemployed or not in the labor force.)

The share of minimum-wage workers, M, can change if pi(m) changes, if D_m changes, or if D_u changes. So, the difference between M and pi(m) can vary across time and across different subpopulations (e.g., teenagers versus adults.) Other work has already hypothesized that changes in the minimum wage can effect changes in the wage distribution as a whole (see Jones 1987 for a discussion of those works.) Because the minimum wage is set in nominal terms, when the minimum wage is not adjusted for price movements the real minimum wage may decline. So, the share of minimum-wage workers may shift as the wage distribution of other workers changes and affects the duration of time that workers remain at the minimum wage.

4. The lower share of workers making the minimum wage when all workers are included does not necessarily mean that the minimum wage is less binding when workers paid on other than an hourly basis are included. Many workers not paid on an hourly basis are salaried managerial personnel exempt from the FLSA. None of the calculations in Table 2.1 intentionally excludes workers not covered by the FLSA; rather, the data in the CPS do not allow such a determination.

5. To see why that is possible, assume that the minimum wage serves as a focal point in a match-wage-offer bidding game for workers in low-wage firms in a dual labor market. In this way, there is room for money illusion (i.e., firms react to changes in the nominal wage and ignore changes in the cost of living) in the starting wage. However, the wage for experienced workers will be

affected by real productivity. The rise in wages with experience would be the case assuming either a Mincer-like human-capital framework or an efficiency-wage model.

6. If earned for 40 hours a week, 50 weeks a year.

7. Students at Jackson State University and North Carolina Agricultural and Technical State University conducted the survey. Alan Krueger consulted on the development of the questionnaire to ensure that many of the same questions would be asked and to ensure the comparability of major findings between the Katz and Krueger research and this paper. However, this survey expanded on the work of Katz and Krueger by asking some additional questions about wage distribution and labor turnover. Thus, it was possible to investigate how changes in the minimum wage affected a firm's wage structure, and to control for changes in employment level, using a firm's labor turnover rate.

8. Using the full year of data from the outgoing rotation groups of the Current Population Survey (the wage and earning file) for 1989, the author's calculations for hourly workers are that 4.2% nationally and in North Carolina were paid the minimum wage or less, compared to 10.8% of Mississippi workers. The smaller sample size for Mississippi places a greater standard of error on that figure. The Bureau of Labor Statistics does not publish a number for Mississippi.

9. The colleges in Greensboro include Bennett, Greensboro, and Guilford, as well as the University of North Carolina-Greensboro and North Carolina Agricultural and Technical State University. Total full-time student population is 15,520.

10. The initial phase of the survey was conducted by telephone. All restaurants in Greensboro listed in the Greensboro Yellow Pages were used as the sample frame. The vast majority of the restaurants would not respond to the telephone survey.

11. Of the remaining 117 restaurants, 31 had disconnected telephone numbers; 40 were not interested in participating in the survey; 12 referred questions to their district office; and responses for 34 could not be completed in time.

12. See Mincy 1990 as an example.

13. Following Eichner, the wage structure of the firm can be expressed as:

$$\mathbf{W} = w_b + \mathbf{W}_\Delta$$

Where **W** is a column vector of wage rates—of length *m*— within the firm, and $\mathbf{W}_{delta}$ is a column vector of wage differentials corresponding to the *m* different job tasks and experience levels of the firms' hierarchies. The vector $\mathbf{W}_{delta}$ can be expressed as:

$$\mathbf{W}_\Delta = \{\Delta w_1 \ \Delta w_2 \ \Delta w_3 \ \ldots \ \Delta w_m\} .$$

In the human capital model, $\mathbf{W}_{delta}$ is not fixed. Assuming w_b is the minimum wage, the change in

the minimum wage would merely collapse the delta-w_i, so that:

$$If\ \Delta w_i + w_b^{old} \leq w_b^{new}\ then\ \Delta w_i = 0.$$

The difference in the Eichner-like wage-norm model and the human-capital model is whether $\mathbf{W}_{delta}$ is fixed or not. The variance of wages within the firm in the human-capital model would decline, while in the wage-norm model the variance of wages within the firm would remain constant.

14. Wages were recorded in intervals, and so the means and variances that are calculated use the midpoints of the wage intervals. For the upper wage interval, the midpoint was calculated as half of the upper wage limit and the highest reported wage at the establishment. Some of the establishments were restaurants with waiters. These workers are allowed to be paid below the minimum—with tips assumed to make up the difference. All workers below the minimum were therefore treated as if they earned the minimum.

15. The probability value that it is zero is 0.0001.

16. This difference may also occur because there is greater variance in the proportion of workers affected than in their wage differential with respect to $4.25.

17. The probability values range from 0.02 to 0.0006.

18. Though variation in the turnover rate is greater than for most of the variables in the model.

19. A test of the joint hypothesis of their statistical significance also confirms that the firms did not differ. The results reported for the other variables are not affected when the dummy variables for the major chains are deleted from the models.

20. The probability values range from 0.02 to 0.0001.

21. The ratio of the actual wages paid in April to those that would have been paid if an across-the-board increase were granted was 3-6% lower in Greensboro than in Jackson. In Table A2 the coefficients for Greensboro in models 1 and 2 are roughly -0.03, and in models 4 and 5 they are roughly -0.06. The effect is measured as [exp(beta) - 1]*100, where beta is the regression coefficient.

22. The two exceptions were as follows: (1) for the subsample of firms in Jackson, using the increase of the average wage as the measure of wage structure, the proportion of affected workers was not significant; and (2) using the change in the variance of wages within the firm as a measure of the wage structure, the proportion of affected workers was not significant among firms that granted less than a 12% increase in wages.

23. Probability values of 0.09 to 0.01.

24. This result also is robust across the various models and samples used to show the consistency

of the results for the proportion of affected workers in Table A2. Neither the reduction in sample size nor the inclusion of these variables changed the measured effect of the other variables, except that the wage dispersion within the firm is no longer significant (but neither is the natural logarithm of the variance in wages).

25. Probability value of 0.07. The impact of the race and gender composition of the workforce is roughly equal in all the models. A 10% increase in the proportion of African Americans or women in a firm's workforce decreased the measures of maintaining the wage structure by 0.3%. The variance in the proportion of a workforce that is African American is greater than the variance in the proportion that is female. This may explain why race is significant in both models.

26. Firms with high turnover rates have wages that do not make the Rebitzer and Taylor "no-shirking" constraint binding—the firms must still use dismissals to increase work effort. In this view, the turnover rate may be a better indicator than are wage changes of whether the minimum-wage constraint is higher than the Rebitzer and Taylor "no-shirking" constraint, since we do not observe the cost of worker supervision.

27. This is expressed as in note 46.

28. This is given as:

$$E = \frac{4.25 \cdot N_j + \left(\sum_{i=j+1}^{k} W_i^{March} \cdot n_i^{March} \right)}{\sum_{i=1}^{k} W_i^{March} \cdot n_i^{March}}$$

$$\text{Where } N_j \equiv \sum_{i=1}^{j} n_i^{March}$$

$$n_i^{March} = \text{the number of workers at wage } i \text{ in March}$$

$$W_i^{March} = \text{wage level } i \text{ in March}$$

$$\text{and } W_j = 4.25$$

Equations were also estimated using the proportion of workers who were below the minimum wage. Using this variable as a measure of the impact of the minimum wage did not change the results.

29. The others are the natural logarithm of the variance in wages in March and the natural logarithm of the coefficient of variation in March wages. The amount of wage dispersion measures the homogeneity of the workforce. Greater heterogeneity in the firm could mean that workers are not viewed as perfect substitutes for each other.

30. This is the consumer price index with a different weight.

31. Probability value of 0.01 in Appendix Table C1 and 0.004 in Appendix Table C2.

32. Another possibility is for firms to switch the composition of their workforce. The change could be from teenage to adult or to full time from part time. Unfortunately, the questionnaire design provides only anecdotal evidence on the teenage composition of the sample; this is discussed in the section on the use of the youth subminimum. We found little change in the mean percentage of part-time workers; for the average restaurant, the percentage of part-time workers changed from 68.4% in March to 69.4% in April. This small change leaves little to be explained, and attempts to model the change led to insignificant results.

33. Probability value of 0.08.

34. Probability value of 0.05.

35. Based on the complete 1985 Survey of Income and Program Participation (SIPP) panel, a special survey by the U.S. Bureau of the Census of the same individuals over several years, the probability of entering poverty a year following earning above one and one-quarter the poverty level for men is 0.017, for women 0.018, for whites 0.014, for African Americans 0.037, and for those with a high school education and no further formal education 0.018 (U.S. Bureau of the Census 1990). Those transition probabilities were not calculated for a fixed threshold but with reference to the individual's family. Still, with reference to the more commonly cited four-person family, this relationship would hold. The transition probability for a family of four is 0.01. Thus, this is a useful comparison for the most-often-used poverty level.

36. These effects ignore the interaction of the quantity shifts in one variable (occupations, for instance) on the wage effects of another variable (industry, for instance). That is, the shift in occupations may change the effect of industry on wages, but that interaction is not reported. See Appendix F.

37. Data for 1977, 1978, and 1983 were not available to the authors. For 1973-76 the data are from the May survey. In those years, questions on hourly wages were asked only in May. For 1979-82, 1984-89, and 1992 the data are from a subset of each month's survey for that year. Each month since 1979, one-fourth of households have been asked questions about wages in addition to other questions about labor-force participation.

38. The share of workers in the empty cells ranges from a low of 4.4% in 1973 to a high of 6.6% in 1992.

39. The partial correlation shows the correlation with the average wage controlling for the federal minimum wage, and with the federal minimum wage controlling for the average wage. The partial correlation is greater with the average wage for the transportation workers, while the partial correlation is greater with the minimum wage for the service workers.

40. The regression equation for the average wage on the minimum-wage contour yields the

following coefficients:

	Coefficients	Standard Error
Avg. wage* nonsupervisory & production workers	0.115	0.258
Unemployment rate (20-24-yr.-olds)	-0.051	0.038
GDP growth (annual pct. change)	0.035	0.074
Federal minimum wage*	0.679	0.146

*Real value.

N= 17 R2= 0.794

The average wage for nonsupervisory and production workers is not significantly related to the real value of the average wage on the minimum wage contour. The figure reported in the text is for the model shown above.

41. Identified as workers with census occupation codes 283, between 3 and 199, or between 253 and 257; workers with industry codes 10, 11, 30, 621, 761, 810, or between 580 and 691; or any worker age 15-19.

42. The definition of a business enterprise is broader than a business establishment, as explained earlier. The BLS earnings file does not have information on the business enterprise of individual workers. A separate BLS survey is taken of business establishments. Again, this is more narrow than the business enterprise definition, and it does not report individual wages, wages by age group, or wages by occupation (other than the broad category of nonsupervisory and production worker).

43. In models 1 and 2 the measure is:

$$E = \log\left(\frac{\left(\sum_{i=1}^{k} W_i^{April} \cdot n_i^{April} \right) / N^{April}}{\left[\sum_{i=1}^{k} \left(W_i^{March} \cdot 1.11842 \right) \cdot n_i^{March} \right] / N^{March}} \right)$$

The model was also estimated with an across-the-board $0.45 wage increase. The results do not change.

44. In Table A1, the means of the variables, not the means of their logarithms, are reported. The mean of the dependent variable is 0.973 (0.005). The regression results are from ordinary least squares.

45. The results are the same if the measure is a flat increase of $0.45 per worker. Table 3.1 showed that some mixture of the three scenarios was followed by the firms. The chose of scenario 2 or 3 is arbitrary.

46. This is equal to:

$$G = \frac{\sum_{i=1}^{j} 4.25 \cdot n_i^{March}}{\sum_{i=1}^{j} W_i^{March} \cdot n_i^{March}}$$
$$Where\ W_j = 4.25$$

47. The wage gap result was not significant, nor was it consistent in sign across the models shown in Table A2.

48. More accurately, these are not quits. These are workers who were dismissed or quit in the previous four weeks.

49. Estimation was done using the SAS computer statistical package's cluster procedure. An option within the package allows the researcher to exclude outliers. This is done by choosing a percentage of the observations to be excluded. The package chooses those observations that have the lowest estimated probability densities.

50. The choice of the actual wage levels implies a linear relationship in the wage structure. That is, this clustering assumes that workers receive wage increases equal to the amount of the increase in the minimum wage. The look at wage structure within the firm was not able to show whether firms maintained their internal wage structure by granting wage increases of equal amounts or equal percentages. Using the natural logarithm of wages would have implied that the wage structure was maintained in percentage intervals. Since some firms in the restaurant study appeared to have followed the absolute increase, while others granted percentage increases, the choice of the wage levels or their logarithms will exclude some and include other occupation-by-industry groups.

Using the logarithm of wages there are fewer occupation-by-industry groups tied to the minimum wage (26 as opposed to 44), and a third cluster of occupation-by-industry groups is created (consisting of seven groups). While most shifts are from the minimum-wage contour as measured in absolute levels to the average-wage contour, there are some noticeable shifts from the average-wage contour as measured in absolute levels to the minimum-wage contour when wages are measured on a logarithmic scale. The most noticeable shift is among transportation workers, who in both durable- and nondurable-goods manufacturing and wholesale trade move to the minimum-wage contour. Handlers and laborers shift from the minimum-wage contour to the average-wage contour when wages are measured on a logarithmic scale. This happens in nondurable-goods manufacturing, wholesale trade, retail trade, and personal services. These appear to be implausible shifts. For this reason, the body of the paper reports the results using the absolute levels of the wages and not wages on a logarithmic scale.

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