# The Minimum Wage and Youth Unemployment

By Steven P. Zell

Of all of the factors involved in the problem of youth unemployment, none has been more extensively debated than the effects of the minimum wage. Governed by the Fair Labor Standards Act of 1938 and periodic amendments to it, the level of the minimum wage and its coverage are once again an important issue. The 1977 amendments raised the minimum wage from the previous $2.30 per hour to $2.65, effective January 1, 1978, and future scheduled increases will raise the level to $3.35 by 1981. Table 1 presents a history of the statutory changes in the minimum wage from 1938 to date.

The changes in the minimum wage are receiving special attention at this time because of the high level of unemployment in the economy, especially for minority teenagers. In recent years, economists have conducted scores of econometric studies to try to ascertain the effects of changes in the minimum wage on the labor market. For the most part, the studies have focused on teenagers, with most of the emphasis on the unemployment impact. Some other studies, however, have examined the effect on employment, and at least two have looked at the impact of the minimum wage on the distribution of income.

Given all of this research, a consensus might reasonably have been expected to emerge that a given percentage change in the minimum wage would result, on average, in a certain percentage change in unemployment or employment. Unfortunately, this is not the case. Although the majority of the sophisticated models do find significant disemployment effects for the minimum wage (that is, a reduction in employment in response to an increase in the minimum wage), other valid approaches yield inconclusive results. Furthermore, of those studies yielding the theoretically expected negative impact of the minimum wage, the range of estimated effects is sufficiently large as to make the estimates of uncertain policy value.

This article analyzes the reasons for this lack of consensus. The article begins with the development of two alternative models of the labor market, which are used to analyze the theoretical impact of the minimum wage on employment and unemployment. The theoretical approach is then contrasted with the problems involved in the empirical estimation of the minimum wage impact. Finally, in light of these findings, the article concludes with

a discussion of some of the important new evidence about minimum wage issues?

## WHAT'S WRONG WITH THE MINIMUM WAGE (AND WHY IS IT SO HARD TO PROVE?)

When viewed abstractly, the minimum wage might appear to be a reasonably good tool for protecting poor workers from unconscionably low wages, helping to relieve poverty, and maintaining purchasing power in the economy? Economic analysis reveals, however, that because of a number of unintended effects of the minimum wage, these benefits do not necessarily result.

### The Theoretical Model

The theoretical impact of the minimum wage is fairly simple and straightforward. If there were no imperfections in the labor market, if wages could move both up and down, and if all adjustments were instantaneous, the situation would be approximated by the supply curve, SS, and the demand curve, DD, as shown in Figure 1. The supply curve shows the number of workers who would be willing to work at any given wage, the demand curve shows the number who would be demanded by employers at any wage, and their intersection represents an equilibrium where the number of workers actually hired, given by distance $ON_O$, would receive the market wage, $OW_O$.

Suppose now that a minimum wage, $OW_m$, which is greater than the equilibrium wage, $OW_O$, is imposed on the labor market. Since at the higher minimum wage, the number of workers

**Table 1**
**MINIMUM WAGE RATE CHANGES**

| | Nonfarm Workers | | |
|---|---|---|---|
| | Covered | Newly Covered | Farm Workers* |
| October 24, 1938 | $0.25 | $ – | $ – |
| October 24, 1939 | 0.30 | – | – |
| October 24, 1945 | 0.40 | – | – |
| January 25, 1950 | 0.75 | – | – |
| March 1, 1956 | 1.00 | – | – |
| September 3, 1961 | 1.15 | 1.00 | – |
| September 3, 1963 | 1.25 | – | – |
| September 3, 1964 | – | 1.15 | – |
| September 3, 1965 | – | 1.25† | – |
| February 1, 1967 | 1.40† | 1.00 | 1.00 |
| February 1, 1968 | 1.60 | 1.15 | 1.15 |
| February 1, 1969 | – | 1.30 | 1.30 |
| February 1, 1970 | – | 1.45 | – |
| February 1, 1971 | – | 1.60 | – |
| May 1, 1974 | 2.00 | 1.90 | 1.60 |
| January 1, 1975 | 2.10 | 2.00 | 1.80 |
| January 1, 1976 | 2.30 | 2.20 | 2.00 |
| January 1, 1977 | – | 2.30 | 2.20 |
| January 1, 1978 | 2.65 | 2.65 | 2.65 |
| January 1, 1979 | 2.90 | 2.90 | 2.90 |
| January 1, 1980 | 3.10 | 3.10 | 3.10 |
| January 1, 1981 | 3.35 | 3.35 | 3.35 |

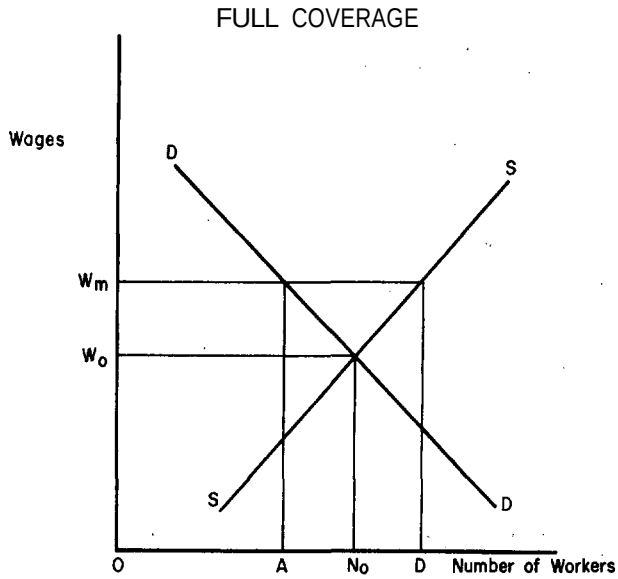
*Not all farm workers are covered by the minimum wage.
†All job categories covered prior to the 1966 amendments were raised to $1.40 per hour in February 1967.
**SOURCE: 1938-1971**: Bureau of Labor Statistics, **Youth Unemployment and Minimum Wages,** Bulletin **1657,** Washington, D.C., GPO, **1970,** p. 11, Table **1.5, 1974-1977:** U.S. Department of Labor, Employment Standards Administration, **Minimum Wage and Maximum Hours Standards Under the Fair Labor Standards Act,** an Economic Effects Study submitted to Congress **1977,** p. 3.

[1] The best evaluation of minimum wage research through **1974** is Robert S. Goldfarb, "The Policy Content of Quantitative Minimum Wage Research," **Proceedings of the 27th Annual Meeting of the industrial Relations Research Association, 1974,** pp. **261-68.** See also **Minimum Wage and Maximum Hours Standards Under the Fair Labor Standards Act,** Employment Standards Administration, U.S. Department of Labor, October **1977,** pp. **41-54;** and **The Problem of Teenage Unemployment,** Alan A. Fisher, unpublished **Ph.D.** dissertation, University of California, Berkeley, August **1973,** Chapter 3.

[2] See Clara F. Schloss, "Closing the Minimum Wage Gap," **AFL-CIO American Federationist,** January **1976.**

**Figure 1**

**One Sector Labor Market**




who wish to work, OD, exceeds the number of workers that will be demanded by business, OA, some workers, AD, will be without jobs. If all of these unemployed workers stay in the labor market, the unemployment rate—the number of unemployed workers divided by the number in the labor market—will be ADIOD, an involuntary unemployment caused by the imposition of the minimum wage.

A somewhat more realistic picture is presented in Figures 2a and 2b by relaxing some of the previous assumptions. Here assume that the economy consists of two sectors: a covered sector, in which workers receive the minimum wage (Figure 2a); and an uncovered sector, in which wages are set by supply and demand (Figure 2b). Assume also that people have the option of working (or seeking work) in either sector, that those not working may be either unemployed or out of the labor force, and that adjustments to outside influences (as the imposition or increase of a minimum wage) take time?

Initially, in the absence of a minimum wage, there is no unemployment (both markets clear), and those employed in the covered market, $ON_O$, receive the covered market wage, $OW_O$. When a minimum wage is imposed in the covered sector, demand first reacts along D ***short run.*** Some firms cut back on their labor immediately, but others adjust only slowly. However, because the demand curve has a negative slope, fewer workers, only OB, are hired at the minimum wage, leaving a number, BD, involuntarily unemployed, and raising the unemployment rate, from zero to BDIOD. Over time, the adjustment proceeds further. Some unskilled labor is replaced by higher skilled labor and capital, and the relevant demand curve is D ***long run.***

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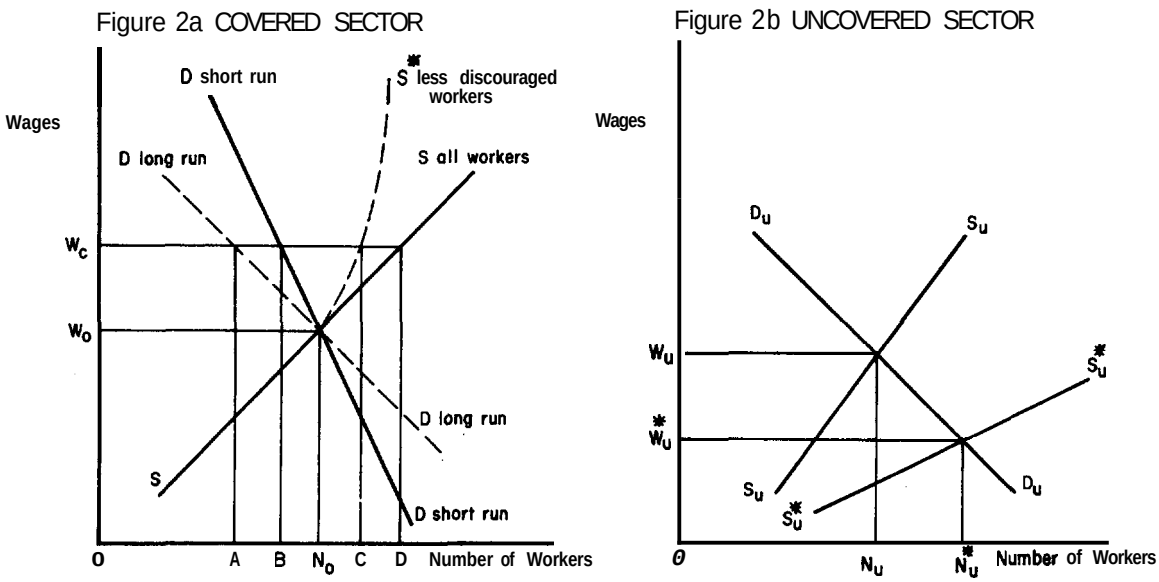
3 **Figure 2a is taken from Fisher, p. 53.**

## Figure 2

**Two Sector Labor Market**




If supply were not affected, unemployment would rise, to AD, the unemployment rate would also climb, to ADIOD, and employment would fall further, to OA.

However, supply effects are also likely, and these can work in two directions. The higher posted wage in the covered sector could lure some workers from the uncovered to the covered sector. On the other hand, because the probability of finding employment has fallen, workers will tend to leave the covered sector and either drop out of the labor force or enter the uncovered sector. The most likely net effect is a fall in supply, shown by a leftward shift in the supply curve to $S^*$, yielding a lower level of unemployment, AC, and a lower unemployment rate, ACIOC, than before the supply shift. Covered employment, OA, is not further changed by the supply shift, and remains below the equilibrium level. However, the imposition of the minimum wage adversely affects an additional number of workers, CD, by forcing them out of the higher wage covered sector.

. The uncovered sector is also affected by the minimum wage, though indirectly. Generally viewed as consisting of small, low-wage firms, the uncovered sector may be pictured as in Figure 2b, with an equilibrium wage, $OW_u$, lower than the covered equilibrium wage, $OW_o$. If the net effect of the minimum wage is a shift of workers into the uncovered sector, this results in an increase in the supply of workers or a rightward shift in the uncovered supply curve to $S^*_u$. Since the new uncovered equilibrium is given by the intersection of the demand curve with the new supply curve, total uncovered employment increases, but the new wage rate is lower for all uncovered workers. In general, the final effect of the minimum wage imposition (or increase) will be

lower covered employment, greater covered unemployment, higher uncovered employment (though not enough to absorb all the covered loss), and a lower uncovered wage rate?

### Problems of Estimation

Given this scenario, why is it so difficult to estimate the actual effects of the minimum wage? Primarily, the difficulty arises because the labor market is far more complex than can be exactly modeled by a pair of diagrams or even the most sophisticated set of equations. In particular, an analysis of the type in diagrams 2a and 2b implicitly assumes that the labor market can be readily divided into a single covered and a single uncovered sector, each of which contains a homogeneous type of labor receiving its respective wage rate. The real world, of course, is much more complicated, consisting of many different types of labor and many different equilibrium wage rates. Nevertheless, in order to estimate the impact of the imposition or increase in the minimum wage, a researcher must separate and model that part of the labor market in which workers are essentially homogeneous and in which the statutory minimum wage, $W_C$ in Figure 2a, exceeds $W_O$, the market clearing wage, thereby setting an effective floor on wages once it is imposed. Rather than being an identifiable part of the economy, however, such a sector consists of parts of some industries and occupations, and includes some teenagers (but not all) and some adults as well. In fact, although a greater percentage of teenagers than adults are low-wage recipients, adults are a much larger group, and by far the greatest number of those receiving low wages are adults.[5]

The difficulty in identifying the appropriate covered sector highlights the fact that, in an economically meaningful sense, there is probably no such thing as a homogeneous "teenage labor market." From a theoretical standpoint, it would be preferable to consider the covered sector as consisting of a low productivity labor market in which the minimum wage sets an effective wage floor (and where, incidentally, teenagers are concentrated) and a high productivity, high-wage labor market?

All studies which, nevertheless, attempt to estimate the impact of a minimum wage change on "the teenage labor market," implicitly assume that an economically meaningful "teenage labor market" actually exists. The market so estimated, however, is both too narrow and too broad: too narrow in that the more theoretically appropriate low-productivity labor market includes many nonteenagers who also compete for the low-wage jobs, and too broad because many of the teenagers included, especially those 18-19 years of age, are actually able to find high-wage

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4 Using a general equilibrium analysis, James F. Ragan, Jr., points out that, theoretically, the change in relative wage costs in the two sectors can result in a shift in product and derived labor demand so as to result in a net increase in total employment. Among other things, this result assumes that most of the discouraged covered workers would be willing to shift to the uncovered sector. See Ragan, "The Theoretical Ambiguity of a Minimum Wage," Atlantic Economic Journal, March 1977.

5 See Edward M. Gramlich, "The Impact of the Minimum Wage on Other Wages, Employment, and Family Incomes," Brookings Papers on Economic Activity, 1878: 2, Tables 2 and 3, and Fisher, pp. 116-18 and Tables 2.7-2.9.

6 My thanks to James F. Ragan, Jr., for his helpful comments on this point. The low productivity sector would correspond to diagram 2a. The high productivity sector has no counterpart in the two diagrams.

employment and thus are not directly affected by the minimum wage?

However, though theoretically superior, the concept of a low-productivity labor market is almost impossible to work with. Given available data, there is simply no way to identify those persons who should be included in the low-wage population over which the model is to be estimated. On empirical grounds, then, the researcher is largely forced to work with some measure of a teenage labor market. In so doing, however, he commits potentially serious econometric errors. These errors arise because the data used in the estimation procedure are not strictly appropriate to explain the minimum wage impact on the employment of teenagers. For example, if a teenage wage variable were available and used as one of the explanatory variables, it would be misspecified because it would be an average of wages received by both high- and low-wage teenagers. Furthermore, since teenage employment depends upon the wage rate in both high- and low-wage sectors, including only one wage variable means that a variable has been omitted from the model. Both of these specification errors tend to bias the estimated results. A similar problem arises from not considering the impact on teenage employment of the wage distribution of low-wage adults who compete with low-wage teenagers for low-productivity jobs[8]

In general, however, researchers have been forced to ignore these problems. Instead, the format that most models finally take is to try to explain, through regression analysis, some variant of teenage employment or unemployment (the dependent variable) by several labor market factors such as the minimum wage, a measure of economic activity, and some other independent variables. Using time series data, the model is generally of the form:

$$Z_t = f(AD, MW, X_1, \ldots, X_n)$$

$Z_t$ is either the teenage unemployment rate or the ratio of teenage unemployment or employment to the teenage population for a specific age-sex-color group.

AD is a measure of aggregate demand, like the gap between real and potential GNP, or a measure of labor market tightness, like the adult male unemployment rate.

MW is a measure of the minimum wage.

$X_1, \ldots, X_n$ are other independent variables such as a time trend, a coverage variable for the minimum wage, or the supply of teenagers.

f indicates the functional form, generally linear or log-linear.

The fundamental difficulty involved in specifying this model for estimation, however, is that the available data are of extremely poor quality. Economic theory has far surpassed the state of the data. As a result, extremely sophisticated models, including all of the "right" variables can be elaborated but cannot be estimated as originally presented. Instead, serious compromises must be made in which some desired variables are omitted, proxies are used for other variables for which data do not exist, or

7 Fisher, p. 115.

8 Fisher, pp. 115-16.

data series are generated through extremely complicated, but often questionable, processes.

**The Case of the Minimum Wage Variable**

The most striking example of this data problem concerns the choice of MW, the minimum wage variable. If an estimate is to be made, using time series data, of the effect of the minimum wage on teenage employment, the minimum wage data series must first have the influence of inflation removed from it. Clearly, a $2.30 minimum wage would affect employment very differently in 1938 than in 1977. The correct deflation factor, however, is probably not a series like the consumer price index. Instead, according to the earlier theoretical discussion, the proper choice is the market clearing wage for teenagers ($W_O$ in Figure 2a). The reason is that, given the covered labor market's supply and demand curves, the level of unemployment induced by the minimum wage is determined by the relationship between the minimum wage and the market clearing wage that would have existed in its absence. Unfortunately, the market clearing wage series for teenagers is unknown. Other price series may be used as the deflator in its place only if their movements over time tend to parallel those of the market wage.

The method most researchers use to deflate their minimum wage variables is to divide the statutory minimum wage, MW*, by the average hourly earnings of nonsupervisory employees in either manufacturing or the private nonfarm economy (AHE), thus yielding the variable MW in the model described earlier. The principal attractiveness of AHE is that it is a reasonably accurate, readily available time series estimate of wages. But it is not likely that AHE moves, over time, like the hypothetical and unknown market-clearing wage for teenagers. Nor is it likely that AHE is an equally good approximation for the various market wages that exist in the many industries or occupations that employ teenagers. Because its denominator has no necessary relationship to the teenage labor market, the inflation-adjusted minimum wage variable will tend to have attributed to it a biased estimate of its influence on the employment of teenagers.

The minimum wage variable used by many studies has a further complication. Since the minimum wage was first introduced in 1938, two types of changes have been taking place: hourly wages have been rising, and the size of the uncovered sector has been falling as new industries are covered, and industries previously covered in part experience expanded coverage. Furthermore, when workers become newly covered, they generally enter coverage at a lower minimum wage, and through larger or more frequent increases, gradually achieve the regular schedule (Table 1).

Because changes in coverage clearly affect the impact of the minimum wage, these changes must be taken into account in the model. The way this has generally been done is to define a new, weighted minimum wage variable, which may be called MWAGE.[9]

If there were only one industry and all of the jobs in it had been covered by the minimum wage for many years, the variable MWAGE would correspond to the variable MW discussed earlier. However, this is not the case. The variable MWAGE, instead, incorporates the fact that the total effect of the minimum wage on employment is the weighted sum of the different effects on employment by industry. The weights used recognize that not only do some industries have partial coverage, but that industries also vary as to the percentage of workers in job

categories that have been covered for many years and the percentage newly covered by recent amendments. Because the **MWAGE** variable incorporates this weighting scheme as well as the adjustment for inflation, it is referred to as the "effective minimum wage." Though representing a major conceptual improvement over earlier methodologies that excluded a coverage variable, this composite variable also has serious problems that greatly complicate the interpretation and accuracy of the estimated equation.

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$$MWAGE = \Sigma_i \left[ \frac{E_i}{E_t} \left[ \left\{ \frac{MB_i}{AHE_i} \cdot CB_i \right\} + \left\{ \frac{MN_i}{AHE_i} \cdot CN_i \right\} \right] \right]$$

where
- i = major industry division.
- t = total nonfarm economy.
- E = payroll employment.
- AHE = average hourly earnings of nonsupervisory employees.
- MB = basic minimum wage for long-time covered workers.
- MN = minimum for newly covered workers.
- CB = proportion of nonsupervisory employees covered by the basic minimum for long-time covered workers.
- CN = proportion of nonsupervisory workers covered by the most recent minimum wage amendment.

This method was developed by the U.S. Bureau of Labor Statistics, Youth Unemployment and Minimum Wages, Bulletin 1657, Washington, D.C., Government Printing Office, 1970, p. 12. Essentially, what this variable does is to define an effective minimum wage as a double weighted average (MWAGE). Within each industry, denoted by i, the respective minimum wage rates of the long-time covered (MB) and newly covered (MN) workers are deflated by the level of average hourly earnings (AHE), and weighted by the proportion of nonsupervisory workers either long-time (CB) or newly covered (CN) in that industry. These two products are summed, and weighted in turn by the proportion of all payroll employment represented by that industry ($E_i/E_t$).

The difficulties engendered by the combined minimum wage/coverage variable (MWAGE) are basically of two kinds. First, the combined variable implicitly assumes that a given percentage change in coverage has exactly the same effect on the dependent variable as does the same percentage change in the wage level. There is, however, no theoretical basis for believing this to be the case.[10] The second type of problem with this combined variable involves the weighting procedure used to apportion coverage and minimum wage changes among industries. Like the problems involved in the proper choice of a deflated wage variable—problems that still remain here—similar complications also arise from the use of coverage weights in **MWAGE** which are totally unrelated to the hypothetical teenage labor market. The important point is that, in order to explain changes in the dependent variable—for example, teenage employment—movements in independent variables like **MWAGE** must lead to (theoretically, should cause) movements in the dependent variable. If changes in minimum wage coverage are to affect teenage employment, therefore, the coverage changes included in the **MWAGE** variable must either be changes in the coverage of teenagers or, if this is

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10 Furthermore, in a model developed to estimate the responsiveness of employment to minimum wage changes (the wage elasticity of employment), Gramlich has shown that the coverage variable and the basic minimum wage term should enter the equation with different coefficients and in different mathematical forms. Ignoring this fact, he concludes, probably biases downward the total estimated elasticity for the minimum wage and coverage changes. Gramlich, pp. 415 and 433. On the other hand, Michael C. Lovell, in "The Minimum Wage Reconsidered," Western Economic Journal, December 1973, reports that his particular model was not especially sensitive to his minimum wage variable's specification.

unknown, proxies for these changes. But the distribution of teenagers *among* industries, and the .occupational distribution of teenagers *within* industries, differs greatly from that for "all "nonsupervisory employees," the group to which the coverage weights (CB and CN in footnote 9) in MWAGE actually apply. Because of this, the coverage weights used to apportion the minimum wage effect would all surely be different if they could be defined for the teenage labor force. Incorrect specification of both the weights and hourly earnings series in the MWAGE variable casts doubt on the conclusion that the estimated coefficients are capturing the true effect of the minimum wage on the youth labor market.

## Other Problems of Estimation

The minimum wage variable is not the only variable that suffers from poor data or problems in specification. The dependent variable, for example, has at least two such difficulties. First, as hinted at earlier, using the employment of "all teenagers" as a dependent variable biases the estimated disemployment effect of the minimum wage downward because the group is too inclusive. Many teenagers earn higher than minimum wages and thus are essentially unaffected by changes in the minimum. Furthermore, raising the minimum might result in employers hiring some previously part-time, unemployed, or nonparticipating high-productivity workers as a substitute for the now over-priced, low-productivity workers. In both cases, the inclusion of high-wage teenagers in the labor market being modeled would result in an underestimate of the decline in employment due to a change in the minimum wage.[11] Second, labor market data by race, especially unemployment statistics for minorities, are of very uneven quality. For this reason, the minimum wage effect estimated for minority groups tends to be much less reliable than that for whites or for the population as a whole.

Further. difficulties also arise in the proper choice of the other independent variables, which are included in the equation to account for external conditions that might affect the estimated influence of the minimum wage. For example, if some variable serving as a proxy for labor market tightness were not included, movements in teenage employment due to changing, economic conditions might be mistakenly attributed to minimum wage changes.[12] On the other hand, data simply don't exist in usable form for variables such as family income and educational attainment, which almost certainly affect the supply of labor, and for variables like changing labor quality, which would be expected to affect demand. Instead, variables like these tend to be omitted from the equations that are estimated and their effects are incorrectly attributed to other variables in the model.

One specific controversy in the literature highlights the problems of appropriate variable choice. One group of studies finds evidence of significant unemployment effects of the minimum wage, while a second group finds little such evidence. While many differences exist in the two sets of studies, Michael C. Lovell has shown that the fundamental

**11 Gramlich, p. 432.**

**12 Note, however, that. a variable such as the often-used unemployment rate of adult males may be a very imperfect control for labor market tightness as it. pertains to teenage employment. The teenage industrial and occupational distributions are very different from that for adult workers. Because of this, shifts in demand for teenage workers may not correspond to overall demand shifts in the economy.**

cause of the conflicting conclusions is that those studies which find no significant unemployment effect include as. one of their independent variables a variable to capture the rapid population growth of teenagers. Only when this growth variable is omitted is a significant unemployment effect found for the minimum wage. The argument for including the population variable is that it reflects the rapid increase in the supply of teenage workers which has tended to increase teenage unemployment. The arguments against including this variable are first, that the increasing supply of teenagers affects their unemployment only because the minimum wage keeps market wages from falling and thereby clearing the market, and second, that serious econometric problems arise if both population and minimum wage variables are included in the model. The question then is, should such a growth variable be included? As the case for both sides is strong, this important issue is still unresolved.[13]

## SOME IMPORTANT NEW EVIDENCE

Largely because of shortcomings in the data, the final word on the impact of the minimum wage is clearly not yet in. Nevertheless, the quality of the studies examining this question has been improving as more refined estimation techniques are applied and new data sources are utilized. Two such recent studies by Ragan and Gramlich provide added insight into this important issue.[14]

### Ragan's Analysis

Using a two equation model, James F. Ragan, Jr., examines the effect of minimum wages on the youth labor market. His two dependent variables are the fraction of the teenage population employed and the fraction of the teenage population in the labor force. Using results from these two equations, he is able to construct estimates of unemployment rate elasticities, that is, the percentage response of unemployment rates to given percentage changes in the minimum wage. The minimum wage variable he uses is similar to the combined minimum wage/coverage variable discussed earlier (MWAGE), but has the additional refinement of weighting each industry by its share of youth employment rather than its share of total employment. In addition, through use of previously unexploited data, he is able to estimate separate equations for 16 population groups delineated by student and nonstudent status, age (16-17 and 18-19 years old), sex, and race.

Partly because of better data, Ragan's findings are more conclusive for men than for women and for whites than for blacks. His results, nevertheless, are broadly consistent, and point to a major disemployment effect for the minimum wage. For example, Ragan calculates the employment loss in 1972 from the 1966 minimum wage amendment which increased coverage and raised both the long-time covered minimum from $1.25 to $1.60, and the newly covered rate from $1.00 to $1.60. Ragan's model reveals that, had the amendment not been

13 Articles by Fisher, and Douglas K. Adie and Lowell Galiaway conclude no: articles by Hyman Kaitz and Lovell say yes. For a summary of the controversy, see Goldfarb. See also Fisher, "The Minimum Wage and Teenage Unemployment: A Comment on the Literature;" Adie and Gallaway, "The Minimum Wage and Teenage Unemployment: A Comment;" and Lovell, "The Minimum Wage Reconsidered," all in The Western Economic Journal, December 1973. Also see Kaltz, "Experience of the Past: The National Minimum" in Youth Unemployment and Minimum Wages, Bulletin 1657, Bureau of Labor Statistics, 1970, pp. 30-54.

14 Ragan, "Minimum Wages and the Youth Labor Market," The Review of Economics and Statistics, May 1977; and Gramlich.

enacted, total youth employment in 1972 would have been higher by 225,000, or 3.3 per cent; nonwhite employment 13.8 per cent higher, and white employment 2.4 per cent higher. Similarly, because of the amendment, the teenage unemployment rate rose 3.8 percentage points by 1972. This consisted of an increase for males of 4.5 percentage points; for females, 2.9 points; for whites, 3.9 points; and for nonwhites, 3.0 points above the level that would have existed had the amendment not been enacted.[15]

Ragan's research also contributes to the debate over whether it is appropriate to include an independent variable which captures the effect of teenage population growth on employment. On the hypothesis that the relative supply of teenagers affects their employment and participation, Ragan includes a teenage labor supply variable in both his equations in the form of the ratio of a teenage group's population to the total population 16 years of age and older. Unlike earlier studies, which used the unemployment rate as the dependent variable, Ragan's model with the relative supply variable shows the significant minimum wage disemployment effects reported above. Further disaggregating his sample, however, Ragan shows that it is only for nonwhite youth that their increased relative population has resulted in serious disemployment; white teenagers show no such effect.

### Gramlich: The Impact of Minimum Wages on Employment and Income

The study by Edward M. Gramlich is perhaps the most comprehensive in the minimum wage literature—treating not only the disemployment question (how much employment falls in response to an increase in the minimum wage), but also issues such as compliance, coverage, the reaction of other wages to the changing minimum, and the inflationary impact of the minimum wage. Gramlich's central point is that whatever else the minimum wage is intended to do, it is basically an attempt to alter the distribution of income in favor of low-income families. The question is whether it effectively accomplishes that goal. Gramlich's approach is both innovative and extremely complex. Working from two theoretical models of the labor market, he derives criteria for assessing the conditions under which low-wage workers, as a group, would be made better off by increases in either the minimum wage level or its coverage.

Gramlich estimates separately the actual disemployment effect of the minimum wage for low-wage groups of teenagers, adult men, and adult women. He then calculates whether this disemployment is sufficiently large that each group of low-wage workers, taken as a whole, would perceive itself as worse off after the minimum wage change according to the criteria derived from his theoretical models. Using this method, Gramlich obtains somewhat ambiguous results. First of all, he finds disemployment effects for teenagers and adult men, but none for adult women. Nevertheless, he concludes that none of the groups are made worse off by a higher minimum wage because the disemployment effects do not outweigh the greater income received by those continuing to be employed at the higher minimum?'

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15 Ragan explains the greater unemployment effect for whites than for nonwhites by another finding which shows that the higher minimum wage tends to slightly encourage white labor force participation, while it slightly discourages participation among nonwhites.

16 Gramlich estimates that a 10 per cent increase in the minimum wage would yield a 0.9 per cent fall in the employment of teenagers. His estimates

Gramlich, however, goes on to show that the conclusion of no overall harm is quite deceiving for the teenage group. It turns out that, when each population group is considered in terms of the effect of the minimum wage on full-time and part-time employment, a striking result is obtained. As Gramlich observes:

> "What is happening . . . is that high minimum wages reduce full-time employment of teenagers substantially, forcing many of them into part-time employment. The net result is the relatively slight overall disemployment effect typically found in other studies. If this is why disemployment is so slight, the most reasonable verdict is that teenagers have more to lose than to gain from higher minimum wages: they appear to be forced out of the better jobs, denied full-time work, and paid lower hourly wage rates; and all of these developments are probably detrimental to their income prospects in both the short and the long run."[17]

A similar analysis for adult men also shows a noticeable increase in part-time employment due to the minimum wage, though this is hypothesized to affect mainly 20-25 year olds and those over 65. Results for adult females, on the other hand, show no such response. On the contrary, Gramlich concludes, a reasonable explanation of what is happening is that the higher minimum wage mainly benefits adult females who are attracted from the part-time into the full-time labor force, forcing low-wage teenagers into part-time employment.

## The Minimum Wage, Inflation, and the Distribution of Income

In his study, Gramlich also examined the impact of the minimum wage on inflation and the distribution of income. An increase in the minimum wage tends to raise the rate of inflation in two ways. First, because wages in the covered sector rise relative to the uncovered sector, minimum wage increases encourage unemployed workers to refuse uncovered employment while waiting for a job in the covered sector. As a result, the unemployment rate rises and the trade-off between unemployment and inflation tends to worsen?' Second, the higher minimum wage tends to raise the total wage bill in the economy, both directly—because covered low-wage workers get higher wages—and indirectly—because other wages tend to rise when the minimum increases. For example, the 25 per cent increase in the

are generally lower than those obtained in other studies of teenagers, which calculate approximately a 2 per cent fall in teenage employment following a 10 per cent increase in the minimum wage. Gramlich's conclusions on this point, however, depend crucially upon the plausibility of his model, upon the many assumptions he had to make regarding parameter values, and upon the generally poor quality of the data. Sharply different estimates of the disemployment elasticities and welfare loss might have been obtained using different, equally plausible, assumptions. See Robert J. Flanagan and Michael L. Wachter, "Comments and Discussion," BPEA, 2:1976, pp. 452-61.

17 Gramlich, pp. 442-43. Whether the disemployment effects estimated in earlier studies are "slight" is, of course, a matter of opinion. Even Gramlich's small 0.09 estimated elasticity means that the 25 per cent minimum wage increase in 1974 lowered teenage employment by 2.3 per cent and raised the teenage unemployment rate by 2 percentage points (Gramlich, footnote 30). Note, also, that Gramlich's elasticity estimate for full-time teenageemployment is 0.50, almost six times as large.

18 Wachter, p. 459.

minimum to $2 in 1974 directly raised the wage bill by about 0.4 per cent, .and indirectly raised it another 0.4 per cent.[19] Such an increase in labor costs tends to be passed on by employers in the form of higher prices.

Gramlich's findings also reveal that the relationship between low-wage workers and low family income is very weak, and therefore, that the minimum wage has little positive effect upon the redistribution of income toward low-wage families. The results for teenagers were especially dramatic. Among families that contain teenagers who receive low wages, the median family income was $12,900, substantially higher than the median income of families containing high-wage teenagers. Furthermore, fully 40 per cent of low-wage teenagers were members of families whose reported income exceeded $15,000. From these and other data, Gramlich concludes, "The generally loose correlation between wages and family incomes implies that minimum wages will never have strong redistributive effects."[20]

## CONCLUSION

Analysis of the impact of minimum wage legislation on the labor market has been an extremely popular subject in the economic literature in recent years. The effect on youth unemployment has received particular attention for several reasons. First, young people are much more likely than adults to work in low-wage employment. Second, the youth unemployment rate, especially that for minority teenagers, has risen dramatically in recent years. Third, this tremendous unemployment increase has occurred just as a new minimum wage bill has been passed by Congress.

Among economists, the issue is not whether the minimum wage has good or bad effects. Economic theory and virtually all studies of the issue are in agreement that, at best, the minimum wage is a highly inefficient tool for redistributing income. At worst, it is also a major cause of economic dislocation, distortion, and unemployment. The question that the literature has generally addressed, then, is just how serious are the various effects on the economy. For a variety of reasons, however, this question has proven extremely difficult to answer.

A major factor in this difficulty is certainly the poor quality of the available data. Many of the major series needed for a thorough analysis simply do not exist. Other series are too recent to be useful in time-series analysis, while still other data are of such dubious quality that their use leads to very tenuous results. A second factor is the complexity of the real world, always a problem in research of this nature. Finally, even without these difficulties, there would probably remain among the model builders substantial disagreement as to the exact form of the "correct" model, and the proper variables to include.

Despite these complications, the great weight of evidence is on the side of those who stress the negative aspects of the minimum wage. Two recent studies, one by James F. Ragan, Jr., and one by Edward M. Gramlich, provide further support to this negative view. Using previously unexploited data and a new model specification, Ragan finds that the minimum wage has had a major disemployment effect on teenagers, especially on black youth. In addition, the

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19 Gramlich, pp. 426-30.

20 Gramlich, pp. 443-49. Low-wage workers were those who, in 1973, usually received less than $2 per hour. High-wage workers usually received more than $4 per hour.

participation rate of minority teenagers is reduced by the minimum wage, further worsening their economic predicament.

In a very complicated article, Gramlich examines a number of important issues involving not only teenagers, but adult males and adult females as well. Gramlich, too, finds a disemployment effect for teenagers, though of smaller magnitude than Ragan. He also finds such an effect for adult males, but not for females. Using these results and some guidelines derived from a series of complex theoretical models, Gramlich concludes that the low-wage sectors of these three groups may not be worse off, taken as a whole, because the disemployment effects do not outweigh the greater income received by those continuing to be employed at the higher minimum. However, because of the many assumptions involved in Gramlich's methodology, other economists have questioned the validity of this conclusion.

Other results, however, are striking. Gramlich finds, for example, that despite what he characterizes as "slight displacement" for teenagers as a whole, large numbers of previously full-time teenage workers have been pushed into involuntary part-time employment by the minimum wage. The income and training losses due to this displacement are probably quite severe. Gramlich also calculates a significant inflationary effect of the minimum wage, principally through its impact on the total wage bill. Finally, Gramlich shows clearly that the goal of redistributing income through the minimum wage, or lifting low-income families out of poverty by raising the minimum, is illusory. Especially for teenagers, but for adults as well, the relationship between low individual wages and low .family income is so slight that the minimum wage is very unlikely to have the hypothesized strong redistributive effects.