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DO MINIMUM WAGES FIGHT POVERTY?

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ABSTRACT

The primary goal of a national minimum wage floor is to raise the incomes of poor or near-poor families with members in the work force. However, estimates of employment effects of minimum wages tell us relatively little about whether minimum wages are likely to achieve this goal; even if the disemployment effects of minimum wages are modest, minimum wage increases could result in net income losses for poor families.

In this paper, we present evidence on the effects of minimum wages on family incomes from matched March CPS surveys, focusing in particular on the effectiveness of minimum wages in reducing poverty. The results indicate that over a one-to-two year period, minimum wages increase both the probability that poor families escape poverty and the probability that previously non-poor families fall into poverty. The estimated increase in the number of non-poor families that fall into poverty is larger than the estimated increase in the number of poor families that escape poverty, although this difference is not statistically significant. We also find that minimum wages tend to boost the incomes of poor families that remain below the poverty line.

The combined evidence indicates that in the wake of minimum wage increases, some families gain and others lose. On net, the various tradeoffs created by minimum wage increases more closely resemble income redistribution among low-income families than income redistribution from high- to low-income families. Given these findings, it is difficult to make a distributional or equity argument for minimum wages.

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I. Introduction

One of the most compelling rationales for a national minimum wage floor is to raise the incomes of poor or near-poor families with members in the work force. This general point, however, is often missed in the debates over the merits of a higher minimum wage. In contrast to these oft-stated distributional goals, much of the focus in such debates has been on the employment effects of minimum wages--especially among the teenage population. In large part, this focus is probably attributable to the extensive body of economic research on the effects of minimum wages on employment of low-skilled workers. However, while negative employment effects represent a cost of minimum wages, such costs do not necessarily imply that minimum wages constitute bad social policy. In particular, the employment losses associated with a higher minimum wage may be more than offset by positive effects on low-income families, especially if minimum wages are a significant factor in helping to move families out of poverty.[1]

This is not to argue that research on employment effects of minimum wages is irrelevant. But such research may be more important as a test of the theory of labor demand and as a method of learning how employers and individuals adjust to exogenous wage increases, than as a method of assessing the wisdom of the policy. In addition, we do not mean to suggest that the short-run effects of minimum wages on the incomes of poor families should be the sole criterion for evaluating such policies. Other studies have found evidence suggesting, for example, that minimum wage increases reduce school enrollment rates and training (Neumark and Wascher, 1996a; Hashimoto, 1982), factors that may affect longer-run earnings or earnings growth; these

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[1]As Gramlich (1976) puts it: "Minimum wages do, of course, distort relative prices, and hence compromise economic efficiency, but so do all other attempts to redistribute income through the tax-and-transfer system. The important question is not whether minimum wages distort, but whether the benefits of any income redistribution they bring about are in some political sense sufficient to outweigh the efficiency costs" (p. 410).

deleterious longer-run effects might offset the benefits of shorter-run effects of minimum wages on family incomes. Nonetheless, our perception is that potential increases in the incomes of poor families provide the main motivation for raising the minimum wage, making it important to assess the evidence on whether minimum wage increases achieve this goal.

In this regard, there are two questions that must be addressed to assess the influence of minimum wages on family incomes generally, and on poverty in particular. First, there is the question of the effects of minimum wages on low-wage workers--that is, do the wage gains received by employed workers more than offset the lost earnings suffered by those who lose or cannot find jobs?[2] Second, there is the question of how minimum wages affect workers in different parts of the family income distribution. Because many (roughly speaking, a large minority of) minimum wage workers are in relatively affluent families (Gramlich, 1976; Card and Krueger, 1995; Burkhauser, et al., 1996), which workers gain and which workers lose will have an important influence on the effects of minimum wages on the distribution of family incomes.

In this paper, we present evidence on the effects of minimum wages on family incomes, focusing in particular--but not solely--on the effectiveness of minimum wages in reducing poverty. Using matched March CPS surveys, we estimate the effects of minimum wages on the probabilities of various transitions in the family income distribution, such as transitions into and out of poverty. Given that federal changes in minimum wages may be confounded with other aggregate-level shocks influencing family income, we rely heavily on state-level changes in minimum wages to identify minimum wage effects. In a nutshell, our empirical strategy is to compare rates of transition through the family income distribution in states in which minimum wages do and do not

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[2]DiNardo, et al. (1996) examine the effects of minimum wages on the distribution of wages of employed workers, although they say nothing about overall effects on the earnings or income of low-wage workers.

increase. For example, if poor families are more likely to escape from poverty when minimum wages increase in their states of residence, we would infer that minimum wage hikes help families move out of poverty. On the other hand, if transitions into poverty are more common when minimum wages increase, we would infer that the disemployment effects of minimum wages play a dominant role among the low-income population.

The results indicate that over a one-to-two year period, minimum wages increase both the probability that poor families escape poverty and the probability that previously non-poor families fall into poverty. The estimated increase in the number of non-poor families that fall into poverty is larger than the increase in the number of poor families that escape poverty, although this difference not statistically significant. We also find that minimum wages tend to boost the incomes of poor families that remain below the poverty line. The combined evidence indicates that in the wake of minimum wage increases, some low-income families gain and other low-income families lose. Overall, we do not regard the evidence as making a compelling case that minimum wages have the intended beneficial effects on the family income distribution.

II. Minimum Wage Effects on the Family Income Distribution

As noted above, if minimum wages are to raise incomes of poor families, a necessary condition is that minimum wages redistribute labor earnings toward low-wage *workers*. In this regard, estimated employment elasticities from minimum wage studies in the -0.1 to -0.2 range are often interpreted as supporting the conclusion that minimum wage increases raise the income of low-wage workers, using the following logic: An elasticity of -0.1 indicates that a ten-percent increase in the minimum wage reduces the employment rate of teenagers by 1 percent, meaning that 99 percent of low-wage teenagers receive a ten-percent raise, while one percent of them lose

their job.[3] Someone making this calculation would then conclude that the higher minimum wage leads to an 8.9 percent increase in income for this particular group of low-wage workers (99×.1 - 1). If it is further assumed that roughly similar magnitudes apply to other low-wage workers, then the implication is that minimum wages raise the incomes of low-wage workers. Indeed, Freeman (1996) asserts that since the estimated elasticity for minimum wage workers is far smaller than -1, it would appear that "at some level little of the cost of the minimum is borne by low-wage workers" (p. 642).

The logic underlying the conclusion that minimum wages substantially redistribute income towards low-wage workers--based on existing estimates of the employment effects of minimum wages--is flawed for two reasons. First, the -0.1 to -0.2 elasticities used to reach this conclusion are taken from studies of the employment effects of minimum wages for entire age groups and are not equivalent to--as some have asserted--the elasticity of demand for minimum wage workers. An estimate of the effect of a minimum wage increase on total employment in any particular age group is really the effect on the low-wage individuals in the group for whom the new minimum wage raises wages, averaged over all workers in this age category; as high-wage workers are for the most part unaffected by changes in the minimum wage, the aggregate elasticity will understate the employment effect on low-wage workers. Second, the calculation overstates the income gain that low-wage workers are likely to get from a minimum wage increase, because not all workers affected by the minimum wage change receive the full amount of the increase (in particular, those who were earning between the old and new minimum wage). Thus, the more relevant measure for

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[3]Of course, if one's view of the evidence on employment effects is that minimum wages have no disemployment effects, then minimum wages almost certainly raise the incomes of the poor. For reviews of the competing evidence, see Card and Krueger (1995) and Neumark and Wascher (1996b).

assessing the effect of the minimum wage on the earnings of low-wage workers is the ratio of the employment decline among low-wage workers to the wage increase among this group, a ratio requiring an adjustment to both the numerator and the denominator of the conventional employment elasticity.

To illustrate this point, consider the full implementation of the 1996-1997 minimum wage increase to $5.15 per hour, a 21.2 percent increase in the minimum wage. As shown in Table 1, data from the 1995 CPS indicate that 6.2 percent of workers aged 16 to 24 were paid exactly the old minimum wage in that year and another 15.1 percent were paid between the old and new minimums, so that a total of 21.3 percent of the youth work force is directly affected by the minimum wage increase. Assuming that everyone in these categories who retains a job sees their new wage rise to exactly $5.15 per hour as a result of the increase in the minimum, the average wage increase received by a worker in this affected group will be 10.8 percent. Suppose further that all of the job loss resulting from the minimum wage increase occurs among these affected workers. Then using an elasticity of -0.1 for the age group as a whole, we can calculate the demand elasticity for young minimum wage workers as:

$$(-.1/.213)/(10.8/21.2) = -.92 \ .$$

Dividing -.1 by .213 can be interpreted as adjusting the numerator of the conventional elasticity to obtain the percentage employment decline among affected workers. Dividing by (10.8/21.2) corrects the percentage wage increase in the denominator of the conventional elasticity to reflect the fact that the average wage increase for affected workers is smaller than the minimum wage increase itself.

If we instead use this elasticity, the calculation of the distributive effects of an increase in the minimum wage yields a quite different answer--a ten-percent increase in the minimum wage

results in a decline in income for low-wage young workers of 0.1 percent (90.8 × .1 - 9.2 × 1). Thus, when we adjust the estimates obtained from studies of the employment effects of minimum wages to get closer to the elasticity of demand for minimum wage workers, it is not out of the question that the latter elasticity is in fact near -1. We emphasize, though, that we raise this as a possibility rather than as an empirical claim. The calculation just described is based on the assumptions that all of the job loss occurs among minimum wage workers and that the only effects on wages are to top off workers to the new minimum wage; these assumptions make the contrast between our calculation and the -0.1 "elasticity" especially strong.[4] Nonetheless, as long as the job loss is concentrated among low-wage workers, or the average wage increase resulting from a minimum wage hike is smaller than the minimum wage hike itself, the standard elasticity of employment with respect to the minimum wage will overstate the income gains that low-wage workers would receive as a consequence of a minimum wage hike. If minimum wage increases also lead to hours reductions among low-wage workers (see, e.g., Hungerford, 1996), then such increases would also reduce incomes of low-wage workers in ways not reflected in estimated employment effects of minimum wages. On the other hand, workers with wages above the new minimum could also see their wages rise in response to a minimum wage increase, reflecting, for example, shifts in demand toward workers initially earning above the new minimum, or

[4]For example, if we assume that only 80 percent of the job loss occurs among minimum wage workers, then a ten-percent increase in the minimum results in a 1.9 percent increase in income for low-wage workers (versus an 8.9 percent increase according to the conventional calculation). On the other hand, if we use a larger disemployment effect (e.g., an "elasticity" of -0.2, which we regard as a plausible estimate), we obtain stronger negative effects on incomes of low-wage workers; continuing with the calculation in this footnote, a 6.2 percent decrease in income would occur in response to a ten-percent increase in the minimum wage.

maintenance of wage differentials between workers (Grossman, 1983).[5]

The second issue that needs to be addressed in assessing the effects of minimum wages on family incomes is the relationship between low-wage workers and low-income *families*. That is, even if minimum wages increase the incomes of low-wage workers generally, the effects of minimum wages on the family income distribution are more ambiguous, simply because many minimum wage workers are not in low-income families. Burkhauser, et al. (1996) report, for example, that while one-third of workers affected by the 1990 increase in the federal minimum wage were in poor or near-poor families (defined as those with family incomes up to 1.5 times the poverty line based on their family's size), roughly another one-third were in families with incomes exceeding three times the poverty line. Similarly, the impact of minimum wage increases on family incomes will be influenced by the location in the family income distribution of those minimum wage workers who get the largest raises, and--more importantly perhaps--the location of those who become disemployed.

In addition, there may be other factors that influence--in either direction--the impact of the minimum wage on family incomes. As noted by Addison and Blackburn (1996), changes in the minimum wage may induce labor supply responses by other family members or may lead to changes in family living arrangements, both of which could affect family income. Alternatively, some workers who become disemployed because of minimum wage increases may become eligible for government transfers, which could mitigate the negative effects of minimum wages on the total income of some families.

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[5]In addition, we have assumed that the wages of workers earning below the new minimum are unaffected. If these are waiters and waitresses reporting hourly wages, their wages might be expected to rise unless (as with the most recent federal minimum wage legislation) the tip credit is expanded. On the other hand, if these are workers in the uncovered sector, their wages would probably fall.

Because of all of these factors, it is an open question whether minimum wages reduce poverty or more generally raise incomes of low-income families. Indeed, even if minimum wages result in an increase in the *share* of income going toward low-income families, the effects on real incomes of the poor could be negative if minimum wages lower total national income. As a consequence, we examine changes in family income relative to an absolute standard such as the poverty line, rather than examining changes in families' relative positions in the income distribution, or examining changes in income inequality.

III. Comparisons with Previous Research

The analysis in this paper has many parallels to recent research by Addison and Blackburn (1996), who also identify the effects of minimum wages on the family income distribution as a central policy issue regarding minimum wages.[6] However, our research differs substantively in the outcomes studied, by providing a richer and more detailed picture of the effects of minimum wages on poverty and low-income families. In particular, Addison and Blackburn focus on state-level poverty rates, and therefore estimate the *net* effects of minimum wages on poverty.[7] Although this summary measure is likely to be of interest to policy makers, the extent to which the relatively small net effects they estimate mask larger transitions into and out of poverty is also of significant

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[6]Other research on the effects of minimum wages on the income distribution focuses solely on identifying the position in the family income distribution of workers likely to be affected by minimum wage increases (Gramlich, 1976; Horrigan and Mincy, 1993), without directly estimating the actual consequences of minimum wage increases.

[7]These net effects are generally in the direction of reducing poverty, although the estimates are insignificant, with t-statistics well below one. Card and Krueger (1995) carry out a similar analysis, reporting somewhat larger effects in the direction of reducing poverty, which are marginally significant in some specifications. However, their data set includes only one observation per state (changes defined over the 1989-1991 period), which provides a small sample and precludes controlling for aggregate year effects that may be related to economic activity or other policies affecting poverty. In contrast, the data set used by Addison and Blackburn covers the 1983-1991 period, with eight times as many observations.

interest, both in terms of understanding how minimum wages affect family incomes and in evaluating the policy. For example, a minimum wage increase that generates a net reduction in poverty might be viewed as more desirable if the gross effects are smaller, so that the net reduction in poverty is not accompanied by large gross flows into poverty. We therefore provide more information on the avenues by which minimum wages affect the poverty rate (if they do so), by estimating the effects of minimum wages on transitions into and out of poverty at the family level. For example, minimum wages could reduce poverty by raising the escape rate from poverty, or by reducing the rate at which non-poor families fall into poverty. In addition, we go inside the "black box" of minimum wage effects on poverty, estimating minimum wage effects on the number of workers and earnings per worker in families, both to better understand the effects of minimum wages, and to validate the estimated "reduced form" effects of minimum wages.

We also go beyond the narrow focus on poverty to examine the effects of minimum wages throughout the distribution of family incomes relative to needs. This is potentially important because some of the beneficial effects of minimum wages may be for families that have low incomes but are above the poverty line. Alternatively, such families may bear costs of minimum wage increases that are masked in analyses of changes in poverty rates, or transitions into and out of poverty. Finally, minimum wages may raise incomes of poor families without lifting them out of poverty.

In addition to these differences in the outcomes studied, we also include a richer set of control variables, including changes in welfare programs, and changes in the wage distribution at levels above those that should be directly influenced by the minimum wage, but that may be influenced by changes in the industrial composition of employment in the state or changes in factor demands. Because these changes may affect transitions into and out of poverty, but may also be

correlated with minimum wage changes, it is necessary to control for them to isolate the effects of minimum wages. Finally, Addison and Blackburn do not focus on the overall distribution of family income, but instead study the poverty rate among individuals who are likely to be affected by minimum wages--young workers and those with very little education. Because low-wage workers are distributed throughout the family income distribution (Burkhauser, et al., 1996), we think that a policy evaluation of the effects of minimum wages on family incomes should consider all or most families.

IV. The Data

The data we use come primarily from matched March CPS annual demographic files from 1986 through 1995. Matching the files provides two years of data on matched families, which allows us to observe transitions into and out of poverty, or between other parts of the income distribution.[8] For each family, we extracted information on the amount and composition of family income, family size, and the family's state of residence. In addition, we extracted information on the labor market status of each family member 16 years of age and older. In all cases, the income and labor market data refer to the previous calendar year; although the state of residence is contemporaneous, the matching process ensures that only families living at the same address two years in a row are included in the data.[9] Given the family income data, each family is classified as being above or below the poverty line for its family size, and is further classified in terms of its income-to-needs ratio (the ratio of total family income to the poverty line).

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[8]Welch (1993) discusses matching observations across CPS surveys.

[9]The matching procedure may generate sample selection bias. In earlier work (Neumark and Wascher, 1996a) we suggested that the effect of this selection rule is probably to drop those most adversely affected by minimum wage increases, thus if anything biasing upward estimates of the beneficial effects of minimum wages on income.

For weighting purposes, we also retained the family-specific sampling weight. We then adjusted this weight to reflect the possibility that certain types of families have a lower probability of being in the survey in consecutive years and thus are less likely to be included in our matched sample. In particular, although overall match rates were above 80 percent, families with younger heads and lower income-to-needs ratios were significantly less likely to be successfully matched. Using a logistic regression, we estimated the probability of a successful match for each family, and divided the sampling weight for successfully matched families by this estimated match rate.[10] The resulting adjusted weight is then an estimate of the inverse of the probability of being in our matched sample of families.

We appended to each family-year record the minimum wage level that prevailed in the state in May of the year in which family income is measured, as well as the previous year. Because a state minimum wage law cannot exempt employers of workers covered by the federal law from the federal minimum wage, and because coverage by the federal law is nearly complete, we use the higher of the federal minimum wage and the state minimum wage for each state and year.

In addition, we included estimated unemployment rates for prime-age males in each state and year, to help control for business cycle conditions. Because changes in the wage distribution for reasons other than minimum wage changes may influence family income, we also constructed the (weighted) 25th and 50th centiles of the distribution in each state, reasoning that these centiles are likely to be largely insensitive to minimum wage changes, but may still have some influence on incomes of relatively low-income families (especially the 25th centile). Previous research indicates that numerous factors other than minimum wages have affected relative wages over this period,

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[10]The age of head and income-to-needs ratio variables were introduced as categorical variables in this regression. The race of the family head was also used as a regressor, but did not have a significant effect on the probability of a match.

including the increased relative demand for skilled workers, declining unionization, and the changing industrial composition of employment. The wage distribution controls are meant to capture these effects. Both the wage centiles and the prime-age male unemployment rates are estimated from the full March CPS samples.

Finally, we appended data on changes in welfare policy, which may also influence low-income families. We included the maximum level of AFDC benefits (in real terms) for a family of three, and a variable capturing recent experimentation with welfare policy at the state level--in particular, a variable measuring the fraction of months in a year for which a state had a waiver from federal AFDC requirements. These data are taken from a study of the impact of these waivers by the Council of Economic Advisers (1997); the form of the variable used is the same as in that study. The welfare, unemployment, and wage distribution control variables are always defined as of the first year for which income is measured for each family.

V. Results

Simple Comparisons

We begin by presenting some simple descriptive statistics that illustrate the question and the empirical strategy in a straightforward manner. Because they confound minimum wage effects with other changes that potentially affect the transitions of families into and out of poverty (e.g., business cycle conditions), these statistics are not the best estimates of the impact of minimum wages on transitions into and out of poverty. They do, however, provide a useful look at the raw data and some simple correlations between minimum wage changes and poverty flows.

In Panel A of Table 2, we divide the sample of matched families into those observations in states and years for which the effective nominal minimum wage rose between the first year for which income is measured (year 1) and the second year (year 2), and those for which the minimum

wage was unchanged. To avoid the influence of trivial increases in minimum wages, we discarded observations in which nominal minimum wages rose by ten cents or less.[11] We also divide each subsample into those families that are below or above the poverty line in year 1. For each of these four subsamples, we then report the proportion poor in year 2. For example, in states and years in which the minimum wage rose, .647 of those families in poverty in year 1 were also in poverty in year 2, compared with .636 in states and years in which the minimum wage did not rise. The difference between these (.011) is reported under the heading "Difference," and is a crude estimate of the effect of the minimum wage. In this case, the positive difference--which is significant at the ten-percent level--suggests that minimum wages increase the likelihood that poor families remain poor.

We also report estimates for those families non-poor in year 1. The estimates in Panel A suggest that minimum wage increases lower the probability that a non-poor family will slip into poverty by .003, an estimate that is significantly different from zero.[12]

As documented in Neumark and Wascher (1992) and Baker, et al. (1995), there is substantial evidence that the detrimental employment effects of minimum wages may take at least a year to run their course. In light of this evidence, Panel B divides up the sample based on whether minimum wages rose in the year prior to year 1, to estimate the lagged effects of minimum wage increases. The estimated effects of lagged minimum wage increases, reported in the fifth and sixth

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[11]As we show in Table 1 of Neumark and Wascher (1992), there are a few states with small increases like these. In that table, many of the small increases are for Washington, D.C., for which we used a weighted average of industry- and occupation-specific minimum wages. Because of the possibility of noise in these data, observations on D.C. are excluded from our analysis in this paper.

[12]When not specified, statements regarding statistical significance refer to the five-percent level.

columns, are larger, and suggest that lagged minimum wage increases significantly raise both the likelihood that poor families remain poor (by .022) and the probability that non-poor families become poor (by .004). Note also that the larger lagged effects (and the sign reversal for the probability of falling into poverty) are consistent with the lagged effects of minimum wages being concentrated more on the employment side, reflecting both job losses (which may generate transitions into poverty) and slower job growth (which may prevent families from escaping poverty).

Finally, Panel C reports the sum of the contemporaneous and lagged estimates. These estimates indicate that minimum wages significantly increase the probability of remaining poor (by .033), but have no significant effect on the probability of becoming poor.[13]

Table 3 takes a more detailed look at the raw numbers, by focusing not just on transitions into and out of poverty, but between more narrowly-defined income-to-needs categories. The left-hand matrix shows the contemporaneous effects, the center matrix shows the lagged effects, and the right-hand matrix shows the combined effects. Looking at the right-hand matrix of the combined effects, the top row contains only positive entries, indicating that more families move from the 1-to-1.5, 1.5-to-2, or greater than two income-to-needs category into poverty in states and years in which minimum wages rise, and that more poor families remain in poverty in these states; only this latter effect is statistically significant. In addition to all of the elements in the first row, all of the above-diagonal elements in this matrix are positive, suggesting that minimum wages increase the likelihood that families fall into lower income-to-needs categories; among these other above-

[13]The standard error used to evaluate the statistical significance of this estimate is an upper bound, as it is calculated by assuming the maximum covariance between the estimated contemporaneous and lagged effects. The estimates that follow in Tables 4-8 provide accurate statistical tests of the significance of minimum wage effects.

diagonal elements, only the effect on the probability of moving from the 1.5-2 category to the 1-1.5 category is significant. Similarly, almost all of the below-diagonal elements (the exception is the 1-1.5 to 1.5-2 transition) are negative, indicating that minimum wages tend to reduce the probability that families move from a lower to a higher income-to-needs category.

Thus, Table 3 suggests that the results in Table 2, which indicated that minimum wage increases tend to increase poverty, are not countered by more beneficial changes in the family income distribution that occur above the poverty line. For example, if we consider families that are initially in the near-poor category (with an income-to-needs ratio between 1.0 and 1.5), the probability that they move to a higher income-to-needs category is reduced by .010 (.018 - .028) following a minimum wage increase. Similarly, among families initially in the 1.5-2 income-to-needs category, the probability that they move to the ≥2 income-to-needs category is lowered by .055 when the minimum wage increases, while the probability that they move to the 1-1.5 category is raised by .031. Throughout the income distribution above the poverty line, then, minimum wage increases appear to be associated with increases in the number of low-income families.

Multivariate Analysis

As noted above, the results in Tables 2 and 3 are subject to the caveat that other potential effects on family income are ignored. Perhaps most importantly, the effect of the federal minimum wage increases in 1990 and 1991 coincided with an economic recession. If low-income families are more likely to fall into poverty (or have a more difficult time escaping poverty) in recessions, then what is identified as a minimum wage effect may instead reflect the effects of the business cycle. Tables 2 and 3 also take no account of reductions in the effective minimum wage that stem from increases in the price level, which should have roughly symmetric (opposite signed) effects to increases in the real value of the minimum wage stemming from legislation. In addition, changes

in welfare policy and changes in the distribution of wages, which have independent effects on family income, may be correlated with minimum wage changes.

To incorporate information on these other potential influences on family income, we employ a multivariate analysis that follows closely the empirical strategy used in Tables 2 and 3. In particular, for the poverty/non-poverty analysis, we estimate separate logit models for those families initially poor and initially non-poor in year 1, where the dependent variable is whether or not the family is poor in year 2. The specifications take the form

$$(1) \qquad Prob(P_{ijt} = 1) = \frac{\exp^{(MW_{jt}/\Pi_t)\gamma + X_{jt}\beta + S_j\theta + Y_t\delta}}{1 + \exp^{(MW_{jt}/\Pi_t)\gamma + X_{jt}\beta + S_j\theta + Y_t\delta}},$$

where i indexes families, j states, and t years. P is a dummy variable indicating the poverty status of the family in year 2, MW is the higher of the state or federal minimum wage in state j in year t, Π is the price level (measured by the CPI-U) in year t, and X is a vector of control variables including the prime-age male unemployment rate and welfare policies that vary by both state and year. S is a vector of state dummy variables; the inclusion of these variables--which allows for state-specific differences in transition probabilities--means that the effects of minimum wage changes are identified from within-state variation in the (real) minimum wage.

In contrast to employment studies, where it is common to divide the minimum wage level by some average wage measure in order to capture the effect of the minimum wage on the relative price of low-skilled labor, we instead divide by the price level.[14] This is because we are primarily interested in the effects of the minimum wage on the level of family income relative to the poverty

[14]The issue of dividing the minimum wage by an average wage measure in employment studies is discussed at length in Neumark and Wascher (1994).

line, which is set nationally and indexed to the price level.

In addition to the control variables mentioned above, we also estimate specifications including fixed year effects (Y_t). Including the year effects controls for other aggregate influences that are not reflected in unemployment rates but that affect transitions into and out of poverty. However, including the year effects also removes much of the influence of the federal minimum wage increases on the estimates.[15]

For all of the specifications reported below, we transform the estimates into the partial derivatives of the probability of being poor in year 2 with respect to the real minimum wage variable. This derivative shows the estimated effect of a $1 real increase in the minimum wage (measured in 1982-1984 dollars), which translates into an increase of about 30 percent in the nominal minimum wage at its level of $4.25 in 1995.[16]

Results for Transitions Into and Out of Poverty

We begin by estimating equation (1) for the separate samples of families that are poor and non-poor in year 1, including only state effects. The substantive differences in this statistical "experiment," compared with Table 2, are the use of the nominal level of minimum wages (as opposed to a simple indicator of whether or not the minimum wage rose), the variation in the price level used to determine the real value of the minimum wage, and the inclusion of the state dummy variables, which capture average state-specific differences in the probabilities of transitions into or out of poverty. The results are reported in Panel A of Table 4A. For those initially poor (in year

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[15]Some influence persists because some states in 1989 already had minimum wages as high as (or closer to) the level to which the federal minimum rose in 1990. This is the type of variation exploited by Card (1992).

[16]The price level rose approximately thirty percent between 1983 and 1996, so that a $1 real increase in 1982-1984 dollars is a nominal increase of about $1.30 in current dollars.

1), both the contemporaneous and lagged effects of the minimum wage reduce the probability that a family remains poor in year 2, although the combined effect (-.012) is not statistically significant.[17] For those families initially non-poor, both the contemporaneous and lagged effects are in the direction of increasing the probability that such families are poor in year 2, with the lagged effect (.017) as well as the combined effect (.020) statistically significant. Thus, the qualitative conclusions are somewhat different from those in Table 2, although still no more positive with respect to the ability of minimum wages to fight poverty.

In Panel B, we add a control for the prime-age male unemployment rate in the state and year, to account for the effects of changes in the level of economic activity on transitions into and out of poverty. The variable is entered in levels, but because we include state dummy variables, the effects are identified off of within-state changes. The estimated minimum wage effect on the probability that a poor family remains poor is now stronger, indicating that minimum wages increase the probability that poor families escape poverty, although again the estimated effect (.044) is not significant. The change in the estimated effect on poor families is accompanied by a positive effect of the prime-age male unemployment rate on the probability that a poor family remains poor, suggesting that the results in Panel A were driven partly by the fact that observations with rising unemployment rates tend to be associated with minimum wage increases in our sample. Turning to the subsample of families that are initially non-poor, the estimated minimum wage effect on the probability of being poor in year 2 falls slightly once we control for the unemployment rate (to .017), but remains positive and statistically significant.

The specification reported in Panel C of Table 4 adds the other control variables, including

[17]Note that to obtain the effects on the probabilities of being non-poor in year 2, the signs of the partial derivatives in the table simply need to be reversed, with the standard errors unchanged.

maximum AFDC benefits, the AFDC waiver variable, the 25th and 50th centiles of the wage distribution, and the year dummy variables. The inclusion of the full set of controls leads to one substantive change in the results; the contemporaneous effect of a minimum wage increase is to lower the probability that a poor family remains poor (by .094), an effect that is statistically significant. However, the lagged effect, while insignificant, is in the opposite direction, and the combined effect is sizable (-.056) but insignificant. Note that the contemporaneous effect of reducing poverty and the lagged effect of increasing poverty line up the way we would expect if the immediate effect of the minimum wage is to raise wages, while the longer-run effect is to reduce employment for a subset of the affected workers. Because the estimated lagged effect on families that are initially poor is insignificant, we re-estimated the model for this sample omitting the lagged effect; the resulting estimate was -.081 with a standard error of .034, indicating a significant effect of the minimum wage in helping poor families escape poverty.

In contrast, adding the full set of control variables has relatively little impact on the estimated effect of minimum wage increases on the probability that non-poor families become poor. The estimates indicate that a $1 real increase in the minimum raises the probability that a non-poor family becomes poor by .02, and the estimated effect is statistically significant. Again, the contemporaneous and lagged effects line up the way we expect, with the increased effect on becoming poor coming from the lagged effect; presumably, the source of income decline is job loss, reduced hours of work, or a lower probability of obtaining a job, none of which is likely to be an immediate effect.

Table 4B reports the estimated coefficients of some of the control variables for this specification. Many of the estimates are consistent with expectations. A higher unemployment rate is estimated to increase the probability that a poor family remains poor; for example, a two

percentage point increase in this rate increases the probability that a poor family remains poor by .009 (.02 × .433). The effect on the probability that a non-poor family becomes poor is negative, contrary to expectations, but not significant. Higher AFDC benefits are estimated to reduce the probability that a poor family remains poor and that a non-poor family becomes poor, although only the latter effect is statistically significant. The estimated effects of AFDC waivers are in the direction of reducing the probability of either remaining poor or becoming poor, although neither estimate is statistically significant. An increase in the 25th centile of the wage distribution is associated with a statistically significant and sizable reduction in the probability that a poor family remains poor. Curiously, however, the same type of increase is estimated to increase the probability that a non-poor family becomes poor. This latter effect could arise if supply shifts or non-market forces--rather than demand shifts--generate the variation in the 25th centile of the wage distribution, in which case employment declines could be associated with wage increases; even so, it is not clear why this would predominate for families initially non-poor, but not for those initially poor. Other than this last result, though, the overall consistency of the findings in Table 4B with a priori expectations suggests that these data are meaningfully measuring influences on family income.

There are two conclusions that we can draw from the estimates in Table 4. First, the estimates match what we regard as, qualitatively, the expected effects of minimum wages. For families that are initially poor, there is an immediate effect that lifts some families out of poverty; it also appears that even after a year, the net effect is to help poor families escape poverty. For families that are initially non-poor, there may be an immediate effect (although we do not detect it in the data) that increases the incomes of some of these families, as they no doubt contain some

minimum wage workers.[18] But the longer-term, dominant effect is in the direction of pushing some of these families into poverty.

Second, the estimates in Panel C of Table 4 suggest that minimum wage increases have no net beneficial effect on poverty rates. Although the estimated minimum wage effect on families escaping poverty is nearly three times as large as the estimated effect on families falling into poverty, the proportion of families that is initially poor is only 16.1 percent of the sample (weighted). Thus, the weighted average of the effects is $-.056 \times .161 + .020 \times .839 = .008$, or a net .8 percentage point increase in the proportion of families that are poor. However, the standard error of this estimated net effect is .009, so that the estimated net effect is not statistically significant.[19] Moreover, if we instead use the estimated effect on the probability of escaping poverty that we obtain when we exclude the insignificant lagged minimum wage effect (-.081, discussed above), we obtain a net effect on the poverty rate of only .004. Thus, while the point estimates suggest that there is a net deleterious effect of the minimum wage, one might reasonably interpret our results as indicating that minimum wages have little effect on poverty rates.

Panels D and E present a specification check of the model used so far, by presenting separate estimates for families based on whether or not they have at least one employed person in year 1. Because of turnover in the labor market, minimum wage effects might still arise for families without workers in year 1. But we would expect minimum wage effects that push families into poverty--which seem most likely to result from job loss--to appear largely for families with at

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[18]The absence of a positive contemporaneous effect on income suggests that there may be a contemporaneous employment effect for some families that roughly offsets the initial boost to earnings in families where the minimum wage worker remains employed.

[19]The standard error is estimated by treating the weighted proportions used in calculating the net effect as known and the estimates from the two samples (based on poverty status in year 1) as independent.

least one worker in year 1.[20] The estimates in Panels D and E indicate that this is the case, as the combined contemporaneous and lagged minimum wage effects are larger for those families with at least one person working in year 1, and, in the case of families that are initially non-poor, are significant only for families with at least one worker.[21] These estimates therefore suggest that we are, by and large, detecting real effects of minimum wages.

Results for Other Transitions in the Family Income Distribution

Paralleling our earlier discussion of changes in family incomes above the poverty line, we next report estimates from a set of multinomial logit models for separate samples of families that are initially (i.e., in year 1) in each of the income-to-needs categories used in Table 3. These specifications are of the form

$$(2) \qquad Prob(INR_{ijt} = k) = \frac{\exp^{(MW_{jt}/\Pi_t)\gamma_k + X_{jt}\beta_k + S_j\theta_k + Y_t\delta_k}}{1 + \sum_{k=1}^{K}[\exp^{(MW_{jt}/\Pi_t)\gamma_k + X_{jt}\beta_k + S_j\theta_k + Y_t\delta_k}]}, \quad k=1,...,K \quad ,$$

where INR is the income-to-needs ratio of the family in year 2, and k indexes income-to-needs categories. We report only specifications corresponding to those in Panel C of Table 4, including the full set of control variables along with the minimum wage variables.[22]

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[20]We could also focus on families with minimum wage workers. However, most poor families with at least one person working are likely to have one or more wage earners at or near the minimum wage.

[21]The estimated contemporaneous effect of minimum wages on the probability that poor families remain poor is nearly as big for the families without a worker in year 1, and is significant for both types of families. This is consistent with relatively high turnover among low-wage workers.

[22]We estimate multinomial logit models rather than ordered logit models (or, indeed, regressions with income-to-needs as the dependent variable) because minimum wage effects might differ substantially across the distribution of family income-to-needs. The ordered logit model identifies a minimum wage effect that is the same throughout the distribution of income-

Turning first to transitions into and out of poverty--although now from and into different income-to-needs categories--the results reported in Table 5 echo the earlier, more aggregated results. The upper left-hand entry in the matrix of contemporaneous effects indicates that the immediate effect of minimum wage increases on families that are initially poor is to increase their incomes (relative to needs), reducing the probability that they remain poor. In addition, as can be seen in the remaining entries in the first column, a higher minimum wage increases the probability that poor families move into the 1-1.5 or ≥2 income-to-needs category; these latter effects are significant at the five- or ten-percent levels.[23] Also as in the more aggregated analysis, the lagged effects reported in the center matrix are in the opposite direction, but are not significant. Finally, looking at the combined effects in the right-hand matrix, the estimated beneficial effects on poor families are generally positive, but not significant.

Corresponding to the effect of the minimum wage in pushing non-poor families into poverty, the remaining entries in the first row of the right-hand matrix indicate that minimum wages tend to push families from all three income-to-needs categories into poverty, with the effects significant at the ten-percent level for those initially in the 1.5-2 or ≥2 category. For families initially in the 1-1.5 income to needs category, the immediate effect of minimum wage increases is a reduction (of .055) in the likelihood of slipping into poverty. However, the increase in the

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to-needs, whereas the multinomial logit models identifies effects on transitions between various income-to-needs categories.

[23]It may seem implausible that a minimum wage increase of approximately 30 percent could lift a family from poverty to more than twice the poverty line. Given evidence of net disemployment effects of minimum wages, the net effect of minimum wage increases cannot be to draw workers into the labor market. However, minimum wage effects may be heterogeneous, drawing into the labor market those individuals whose productivity exceeds the minimum wage and for whom wages are bid up when the minimum wage increases as employers substitute toward more-skilled workers. There is no reason such workers cannot be concentrated among poor families, especially given that they are not working initially.

probability associated with the lagged minimum wage increase dominates, and so the net effect is a .029 increase in the probability of becoming poor, although this net effect is not statistically significant. Again, for those initially in the 1-1.5 category, the pattern of the lagged and contemporaneous effects is consistent with minimum wages first raising incomes, presumably through wage increases, and only subsequently lowering incomes, presumably through scarcer jobs. These results are qualitatively similar to those we obtained for the more aggregate estimates of transitions into and out of poverty.

The estimates of minimum wage effects on transitions among income-to-needs categories above the poverty line appear in the matrices of transition effects striking out the first row and column. In general, there are no statistically significant effects other than a negative effect of lagged minimum wages on the probability of moving upward from the 1-1.5 to 1.5-2 income-to-needs category. We interpret these results as suggesting that minimum wages have little effect on income transitions above the poverty line, presumably because minimum wage employment accounts for a relatively small portion of total income for most families in these income-to-need categories.

To provide a summary measure of the net effects of minimum wages on the distribution of families across income-to-needs categories, we performed a calculation similar to that used to estimate the implied effects on the proportion in poverty, after the discussion of Table 4. In this case, we use the estimated proportions in the four income-to-needs categories in Table 5 to weight the implied effects of minimum wages on the probability of being in each category in year 2. The net effects are very small, with a .006 increase in the proportion in poverty, a .006 reduction in the proportion in the 1-1.5 category, a .004 reduction in the proportion in the 1.5-2 category, and a .004 increase in the proportion in the ≥ 2 category. Using the same assumptions as before, none of these

estimates approach statistical significance. Thus, Table 5 provides additional evidence that minimum wages induce some gross changes among income-to-needs categories, lifting some poor families up, and pushing other (often low-income) families down into poverty. However, the net effects are negligible, and there is no compelling evidence that minimum wages help poor or near-poor families.

Minimum Wage Effects on Income-to-Needs Ratios of Families Changing Income-to-Needs Categories

The estimates presented thus far document the effects of minimum wages in pushing families into or out of poverty and between other income-to-needs categories. Because these results pertain to specific thresholds, the effects of minimum wage increases on transitions among these categories only roughly capture minimum wage-induced changes in income-to-needs ratios experienced by these families. It is possible, for example, that the effect of the minimum wage in increasing income (relative to needs) of those who escape poverty exceeds or falls short of the effect of the minimum wage in reducing income (relative to needs) of those who fall into poverty. If so, then the results in Table 4 could understate or overstate the net benefits to the poor of a higher minimum wage.

Consequently, Table 6 reports estimates of minimum wage effects on income-to-needs ratios separately for families exiting and entering poverty. We estimate models for year 2 income-to-needs, including the same full set of control variables as in the previous table, as well as income-to-needs in year 1.[24] As before, we report both the contemporaneous and lagged effects of minimum wages, and the combined effect. These specifications estimate either the extra increment

[24]Conditioning on year 1 income-to-needs parallels conditioning on initial income-to-needs category in the logit and multinomial logit models.

to income-to-needs stemming from minimum wage increases (for families escaping poverty), or the incremental income losses associated with a higher minimum wage (for families falling into poverty).[25]

The estimates in the first column are for the subset of families that exit poverty between year 1 and year 2. For this group, the estimated contemporaneous effect of a $1 higher minimum wage is a .153 increase in the income-to-needs ratio, and the combined effect is .108, although neither estimate is statistically significant. The second column reports estimates for those families that fall into poverty. For this subsample, minimum wage increases are estimated to reduce the income-to-needs ratio by .08, an estimate that is statistically significant; in contrast to earlier findings this appears to be principally a contemporaneous effect. Interestingly, the estimated decline in income-to-needs associated with minimum wage increases among families moving into poverty is slightly smaller than the estimated increase in income-to-needs associated with minimum wage increases among those families moving out of poverty. One interpretation of this result is that families are able to mitigate some of the income losses associated with disemployment effects of minimum wages, perhaps through increased labor supply of other family members, employment in the uncovered sector, more hours of work, or public assistance. More generally, the fact that the income gains or losses are not very different for those moving into or out of poverty again implies that minimum wages provide no discernible net beneficial impact for low-income families.

[25]That is, the estimates must be interpreted conditionally on year 1 and year 2 income-to-needs categories.

Minimum Wage Effects on Income-to-Needs Ratios of Families Remaining in Income-to-Needs Categories

The results discussed so far focus on changes in family incomes (relative to needs) that push families over or under thresholds (such as the poverty line). In our view, the picture provided by these results is that minimum wages are of no net benefit in lifting families out of poverty; if anything, minimum wages may be detrimental to that goal. However, minimum wages may have other beneficial effects, by influencing family incomes of those families that do not undergo any of the transitions documented in the preceding tables. In particular, if minimum wages were associated with sizable increases in income-to-needs of poor families remaining in poverty, our evaluation of the effects of minimum wages on the poor would be more positive.

To study this question, Table 7 reports estimates of the effects of minimum wages on the income-to-needs ratio for families remaining in the same category in the two years for which we observe them. The only statistically significant finding is that minimum wages increase income-to-needs among poor families that remain poor. The estimated contemporaneous effect is a statistically significant increase of .072, which is a non-trivial increase (given that the maximum of this ratio is one for poor families). The combined lagged and contemporaneous effect is only .041 and is not statistically significant. Nonetheless, these estimates point to a potential benefit of minimum wages in raising incomes of poor families.[26]

The Employment and Earnings Effects of Minimum Wages

To this point, we have treated the relationship between minimum wages and the family income distribution as a "black box." Reduced-form effects of minimum wages on family poverty

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[26]For families in the <1 category in both years, when the insignificant lagged minimum wage variable is excluded, the estimated coefficient (standard error) of the contemporaneous effect is .057 (.027).

status or income-to-needs are reported without exploring the separate effects on earnings and employment that would both help clarify the main channels through which the minimum wage influences family incomes, and validate the estimates of the overall effects. Broadly speaking, the effects of minimum wages on family incomes should be captured in two "rectangles" under the labor demand curve. The first reflects the increase in earnings for those who remain employed (or for those families in which some individuals remain employed). The second captures the decrease in earnings for those families in which the number of employed workers falls. Obviously the more inelastic is the labor demand curve for affected workers, the larger is the first rectangle relative to the second.

In Table 8, we report evidence on these two channels of influence. Panel A contains estimates of minimum wage effects on the number of workers per family, while Panel B shows minimum wage effects on real earnings per worker in families with at least one worker in each year.[27] The full set of control variables, corresponding to the specification in Panel C of Table 4, is included in both sets of analyses. The estimates in Panel A, which are first reported for all observations and then conditional on year 1 poverty status, are from a multinomial logit model with three outcomes: fewer workers than in year 1; the same number of workers as in year 1; and more workers than in year 1.[28] For the sample of all observations, minimum wages increase the probability that the number of workers in the family falls by .015, which is significant at the ten-percent level. The point estimates indicate that the offsetting reduction is mainly in the probability that the number of workers stays the same. When the data are disaggregated based on poverty

[27]We use the same deflator as for the minimum wage.

[28]In the raw data, about ten percent of families experience an increase in the number of workers, and about 12 percent experience a decrease.

status in year 1, we see that the reduction in the number of workers occurs among families that are initially non-poor; for these families, the probability of a reduction in workers per family increases by .021, significant at the five-percent level.[29] This, presumably, is the source of the estimated effect of the minimum wage in pushing families into poverty, reported in earlier tables.

Panel B reports estimated minimum wage effects on earnings per worker for the subset of families with at least one worker in each year. Logit specifications are estimated for the outcome of an increase in real earnings per worker, compared with a reduction (there were no observations with no change in real earnings per worker). Looking first at all observations, both the contemporaneous and lagged estimates of the minimum wage effect are positive, and the combined effect of .029 is statistically significant at the ten-percent level.[30] The point estimates in the last row of the table, although not statistically significant, suggest that the increase in earnings per worker is sharper among poor families; this is to be expected since such families are more likely to have low-wage workers. While the evidence regarding earnings per worker is not as strong, it is consistent with minimum wages boosting the earnings of workers who remain employed. This boost presumably is the source of the estimated effect of the minimum wage in lifting some

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[29]The finding in Table 8 that the reduction in the number of workers occurs contemporaneously, rather than with a lag, is not at all inconsistent with the finding in the earlier tables that the income reduction occurs primarily with a lag. We do not expect the lower employment caused by minimum wages to occur instantaneously. If much of the effect occurs in the latter part of the year in which the minimum wage increases, the income loss will not appear large until the following year, since the data refer to annual income. These findings do, however, differ from evidence of stronger lagged disemployment effects of minimum wages for young workers (e.g., Neumark and Wascher, 1992). Here, though, we are not studying young workers exclusively.

[30]The appearance of both a contemporaneous and lagged earnings effect--although each is small--is consistent with some non-employed individuals entering the labor market as a result of a minimum wage increase, as discussed earlier. That is, the gains from a higher minimum do not necessarily accrue solely to those already employed.

families out of poverty and in raising income-to-needs among those families that remain poor. Thus, the two effects that theory would lead us to expect--earnings increases for some families and job loss for others--both appear in the data and are consistent with the reduced-form effects of minimum wages we reported in the earlier tables.

VI. Conclusions

In this paper, we assess the effectiveness of the minimum wage in fighting poverty and more generally aiding low-income families. While this goal is, in our view, a principal aim of raising the minimum wage, the focus in the economics literature has been on estimating the employment effects of minimum wages, which is not sufficient to determine the impact of minimum wages on family incomes. In particular, the employment studies do not identify where job losses occur in the income distribution, or provide magnitudes of the average wage increases associated with legislated minimum wage hikes (or how they are distributed through the family income distribution); in addition, the employment effects reported in the literature are not estimates of elasticities of employment for minimum wage workers. As we demonstrate, even if the disemployment effects of minimum wages are modest, minimum wage increases could result in net income losses for poor families.

Using matched CPS surveys, we estimate the effects of minimum wages on transitions into and out of poverty. We find that over a one-to-two year period, minimum wages increase both the probability that poor families escape poverty and the probability that previously non-poor families become poor. These effects are consistent with minimum wages raising the incomes of some low-wage workers in poor families. But they also suggest that disemployment effects of minimum wages cause substantial reductions in income among a subset of families that are initially non-poor. On balance, minimum wages appear to slightly increase the proportion of families that are poor,

although this estimated net effect is insignificant. On the other hand, we also find that minimum wages tend to boost the incomes of poor families that remain below the poverty line.

The combined evidence clearly shows that a higher minimum wage generates tradeoffs with respect to the incomes of poor and low-income families. In the wake of minimum wage increases, some families gain and others lose. Specifically, as reflected in the data, minimum wages increase earnings per worker among families with workers both before and after the minimum wage increase. On the other hand, minimum wages cause the number of workers per family to decline; this effect is concentrated among the non-poor and results in some families falling into poverty.

On balance, we find no compelling evidence supporting the view that minimum wages help in the fight against poverty. Rather, because not only the wage gains but also the disemployment effects of minimum wage increases are concentrated among low-income families, the various tradeoffs created by minimum wage increases more closely resemble income redistribution among low-income families than income redistribution from high- to low-income families. Given these findings, it is difficult to make a distributional or equity argument for minimum wages.

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Table 1: Wages of 16-24 Year-Olds, 1995

Wage	Number (Thousands)	Percent	Average Percent Wage Change
< $4.25	817	4.3	0.0
$4.25	1161	6.2	21.2
$4.26-$5.14	2850	15.1	6.6
≥ $5.15	14034	74.4	0.0
Total	18862	100.0	2.3
Affected group	4011	21.3	10.8

Estimates are based on Outgoing Rotation Group files of 1995 CPS. The figures in the fourth column are based on the assumption that all workers between the old and the new minimum are topped off to the new minimum.

Table 2: Transitions Into and Out of Poverty, All Families, Total Income

A. Contemporaneous Effects of Minimum Wage Increases

	Increase in Minimum Wage (≥$.10)		No Increase in Minimum		Difference	
Yr. 1:	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Yr. 2						
Poor	.647	.060	.636	.064	.011*	-.003**
N	5759	42207	19004	129299		

B. Lagged Effects of Minimum Wage Increases

Yr 1:	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Yr. 2						
Poor	.655	.066	.634	.062	.022**	.004**
N	5022	42368	18741	129138		

C. Sum of Contemporaneous and Lagged Effects of Minimum Wage Increases

Yr 1:	Poor	Non-poor
Yr. 2		
Poor	.033**	.001

Estimates in this table are based on all income including government transfers. Observations with minimum wage increases less than $.10 were discarded. In Panel C, the standard error is calculated assuming the maximum covariance between the contemporaneous and lagged estimates. Differences significant at the ten-percent level are indicated with a '*', and those significant at the five-percent level are indicated with a '**'. All estimates are weighted, including an adjustment to the sample weights to account for non-matches. The data cover matched outgoing rotation groups from 1986-1987 to 1994-1995.

Table 3: Minimum Wage Effects on Transitions Among Income-to-Needs Categories, All Families, Total Income

	Contemporaneous Effects, Increase - No Increase				Lagged Effects, Increase - No Increase				Sum of Contemporaneous and Lagged Effects Increase - No Increase			
Yr 1:	<1	1-1.5	1.5-2	≥2	<1	1-1.5	1.5-2	≥2	<1	1-1.5	1.5-2	≥2
Yr. 2												
< 1	.011*	-.006	.003	-.002**	.022**	.010*	.009**	.003**	.033**	.004	.013	.001
1-1.5	-.001	.004	.016**	-.001	-.006	.002	.015**	-.001	-.007	.006	.031**	-.002
1.5-2	-.008**	.011*	.004	.000	-.011**	.007	.008	.002*	-.019**	.018*	.012	.002
≥2	-.002	-.009	-.023**	.002	-.004	-.019**	-.031**	-.004**	-.006	-.028**	-.055**	-.002
# in category in yr. 1									24763	18953	18727	133826

See notes to Table 2.

Table 4A: Logit Estimates of Minimum Wages Effects on Changes in Poverty Status

A. Controls for State Effects, All Families

	Contemporaneous Effects		Lagged Effects		Total Effects	
Yr 1:	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Yr. 2						
Poor	-.009	.003	-.003	.017**	-.012	.020**
	(.026)	(.005)	(.026)	(.005)	(.027)	(.005)
Log-likelihood					-15958.2	-40140.8
# observations					24763	171506

B. Controls for State Effects and Prime-Age Male Unemployment Rate, All Families

Yr 1:	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Yr. 2						
Poor	-.011	.003	-.033	.015**	-.044	.017**
	(.026)	(.005)	(.027)	(.005)	(.029)	(.005)
Log-likelihood					-15952.3	-40139.1

C. Controls for Prime-Age Male Unemployment Rate, AFDC Benefits and Waivers, 25th and 50th Centiles of Wage Distribution, and State and Year Effects, All Families

Yr 1:	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Yr. 2						
Poor	-.094**	-.000	.038	.020**	-.056	.020**
	(.036)	(.007)	(.038)	(.006)	(.042)	(.007)
Log-likelihood					-15928.5	-40111.9

D. Controls for Prime-Age Male Unemployment Rate, AFDC Benefits and Waivers, 25th and 50th Centiles of Wage Distribution, and State and Year Effects, Families with At Least One Worker in Year 1

Yr 1:	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Yr. 2						
Poor	-.096**	.004	.011	.020**	-.085	.024**
	(.056)	(.007)	(.058)	(.006)	(.058)	(.007)
Log-likelihood					-7543.7	-28606.2
# observations					11214	139585

E. Controls for Prime-Age Male Unemployment Rate, AFDC Benefits and Waivers, 25th and 50th Centiles of Wage Distribution, and State and Year Effects, Families with No Workers in Year 1

Yr 1:	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Yr. 2						
Poor	-.081**	-.022	.060	.021	-.021	-.001
	(.045)	(.021)	(.048)	(.021)	(.052)	(.023)
Log-likelihood					-7872.3	-11286.4
# observations					13548	31921

Estimates come from logit models estimated separately for those initially poor, and those initially non-poor. Estimates reported are partial derivatives of the probabilities of being poor in year 2, with respect to real minimum wage (measured in 1982-1984 dollars). To obtain effects on the probabilities of being non-poor in year 2, simply reverse the sign in the corresponding column. Standard errors, which are estimated using linear approximations, are reported in parentheses. "AFDC benefits" refers to the maximum benefit for a family of three. "AFDC waivers" is the fraction of months during the year in question in which waivers for state experimentation were in effect. Sample sizes in Panels B and C are the same as in Panel A, and refer to the numbers in the first year. See notes to Table 2 for additional details.

Table 4B: Selected Estimates from Logit Models for Probability of Being Poor in Year 2, Specifications Corresponding to Panel C of Table 4A

	Subsample Poor in Year 1	Subsample Non-Poor in Year 1
Prime-age male unemployment rate	.433*	-.025
	(.234)	(.043)
Maximum AFDC benefits	-.031	-.009**
	(.026)	(.004)
AFDC waiver	-.020	-.001
	(.023)	(.004)
25th centile of wage distribution	-.040**	.007**
	(.017)	(.003)
50th centile of wage distribution	.008	-.003
	(.012)	(.002)

Estimates of partial derivatives of probability of being poor in year 2 are reported. See notes to Tables 2 and 4A for additional details.

Table 5: Multinomial Logit Estimates of Minimum Wages Effects on Transitions Among Income-to-Needs Categories, All Families, Total Income

	Contemporaneous Effects				Lagged Effects				Total Effects			
Yr 1:	<1	1-1.5	1.5-2	≥2	<1	1-1.5	1.5-2	≥2	<1	1-1.5	1.5-2	≥2
Yr. 2												
< 1	-.096*	-.055*	.022	.002	.039	.084**	.024	.010	-.057	.029	.046*	.012*
	(.049)	(.031)	(.022)	(.007)	(.054)	(.032)	(.024)	(.007)	(.061)	(.036)	(.027)	(.007)
1-1.5	.061*	-.014	-.036	.002	-.028	-.021	-.013	-.007	.033	-.034	-.049	-.005
	(.037)	(.051)	(.028)	(.007)	(.040)	(.053)	(.031)	(.007)	(.045)	(.060)	(.035)	(.007)
1.5-2	-.008	.043	.019	.013	.004	-.082**	-.045	-.009	-.004	-.038	-.026	.004
	(.016)	(.028)	(.040)	(.009)	(.017)	(.029)	(.044)	(.009)	(.019)	(.033)	(.050)	(.010)
≥2	.043**	.025	-.006	-.018	-.015	.018	.033	.006	.028	.043	.027	-.012
	(.020)	(.040)	(.061)	(.020)	(.022)	(.039)	(.065)	(.019)	(.024)	(.044)	(.075)	(.022)

Specifications also includes state effects, year effects, the prime-age male unemployment rate, the 25th and 50th centiles of the wage distribution, and the welfare policy variables; the specifications correspond to Panel C of Table 4A. Estimates come from multinomial logit models estimated separately for those initially in each income-to-needs category. Estimates reported are partial derivatives of the probabilities of being in each income-to-needs category poor in year 2, with respect to real minimum wage (measured in 1982-1984 dollars). Sample sizes are reported in Table 3. See notes to Tables 2 and 4A for additional details.

Table 6: Regression Estimates of Minimum Wage Effects on Income-to-Needs Ratios, All Families Moving Out Of or Into Poverty, Total Income

Yr. 1-Yr. 2 Transition:	Out of Poverty	Into Poverty
Contemporaneous minimum wage effect	.153	-.108**
	(.114)	(.041)
Lagged minimum wage effect	-.045	.028
	(.116)	(.038)
Total minimum wage effect	.108	-.080**
	(.122)	(.040)
Maximum AFDC benefits	.110	-.018
	(.077)	(.026)
AFDC waiver	.037	-.002
	(.069)	(.023)
25th centile of wage distribution	.012	-.004
	(.050)	(.017)
N	8819	9213

Dependent variable is year 2 income-to-needs ratio. Specifications are estimated for separate samples based on year 1 and year 2 poverty status, as indicated in the column headings. Families with reported incomes below zero were excluded, as were families with income-to-needs ratios exceeding five. In addition to the reported variables, all specifications include year 1 income-to-needs ratio, state effects, year effects, the prime-age male unemployment rate, and the 50th centile of the wage distribution. Standard errors are reported in parentheses.

Table 7: Regression Estimates of Minimum Wage Effects on Income-to-Needs Ratios, All Families Remaining in Year 1 Income-to-Needs Categories, Total Income

Yr. 1 & Yr. 2 Category:	<1	1-1.5	1.5-2	2-5
Contemporaneous minimum wage effect	.072**	.009	-.003	.036
	(.031)	(.021)	(.023)	(.035)
Lagged minimum wage effect	-.031	-.003	.016	.001
	(.030)	(.020)	(.025)	(.036)
Total minimum wage effect	.041	.006	.013	.037
	(.031)	(.023)	(.025)	(.036)
Maximum AFDC benefits	.009	.020	.003	-.001
	(.018)	(.013)	(.015)	(.022)
AFDC waiver	.011	.012	.017	-.028
	(.016)	(.012)	(.014)	(.021)
25th centile of wage distribution	-.008	.012	-.011	.018
	(.011)	(.008)	(.010)	(.015)
N	15027	7221	5750	62623

Dependent variable is year 2 income-to-needs ratio. Specifications are estimated separately based on year 1 and year 2 income-to-needs ratios. Families with reported incomes below zero were excluded. In addition to reported variables, all specifications include year 1 income-to-needs ratio, state effects, year effects, the prime-age male unemployment rate, and the 50th centile of the wage distribution. Standard errors are reported in parentheses.

Table 8: Estimates of Minimum Wages Effects on Number of Workers and Earnings Per Worker

A. Effects on Number of Workers in Family, Multinomial Logit Estimates

Yr 1:	Contemporaneous Effects All observations	Lagged Effects All observations	Total Effects All observations
Yr. 2			
Less workers than in yr. 1	.023**	-.007	.015*
	(.007)	(.008)	(.009)
Same number as in yr. 1	-.028**	.018	-.010
	(.014)	(.015)	(.017)
More workers than in yr. 1	.006	-.011	-.005
	(.009)	(.010)	(.010)

	Contemporaneous Effects		Lagged Effects		Total Effects	
Yr 1:	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Yr. 2						
Less workers than in yr. 1	.020	.023**	-.038**	-.002	-.018	.021**
	(.016)	(.009)	(.017)	(.009)	(.019)	(.010)
Same number as in yr. 1	-.061	-.022	.062	.010	.001	-.012
	(.044)	(.015)	(.047)	(.016)	(.053)	(.018)
More workers than in yr. 1	.041	-.001	-.024	-.008	.017	-.009
	(.038)	(.009)	(.040)	(.009)	(.046)	(.010)

B. Effects on Real Earnings per Worker, Logit Estimates, Families with At Least One Worker in Each Year

Yr 1:	Contemporaneous Effects All observations	Lagged Effects All observations	Total Effects All observations
Yr. 2			
Higher earnings/ worker	.017	.012	.029*
	(.014)	(.015)	(.017)

	Contemporaneous Effects		Lagged Effects		Total Effects	
Yr 1:	Poor	Non-poor	Poor	Non-poor	Poor	Non-poor
Yr. 2						
Higher earnings/ worker	.060	.013	-.009	.013	.051	.026
	(.058)	(.015)	(.058)	(.015)	(.066)	(.017)

The control variables are the same as in Panel C of Table 4A. Partial derivatives of the probabilities of each outcome with respect to the minimum wage are reported. In Panel B the reference category is lower real earnings per worker.