Minimum Wages and Poverty:
Evidence on Single Mothers in the Post-Welfare Reform Era[*]

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Abstract

Following the passage of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996, many policymakers argued that increases in the minimum wage were necessary to prevent single mothers from falling into poverty. Using pooled cross-sectional data from the 1998 to 2005 March Current Population Survey (CPS), this study provides estimates of the effect of minimum wage increases on poverty rates of low-skilled single mothers. The evidence shows that post-PRWORA minimum wage increases failed to reduce poverty among single mothers for two reasons. First, most single mothers were not directly affected by minimum wage increases because they already earned wages higher than state or federal minimum wage levels. Second, while less-educated working single mothers' wages were raised by minimum wage hikes, adverse employment and hours effects actually reduced low-skilled single mothers' wage income. A 10 percent increase in the minimum wage was associated with a 13.4 percent reduction in employment and a 14.4 percent reduction in wage income. Taken together, these findings suggest that post-PRWORA minimum wage increases did not help, and may have hurt, many less-educated single mothers.

(JEL: J21, J38, J23)

Introduction

Two of the central goals of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996 were to increase single mothers' labor supply and to reduce their welfare dependency. Along with a growing economy and expansions in the Earned Income Tax Credit (EITC), state and federal welfare reforms played an important role in increasing labor force participation of single mothers in the 1990s (see Blank, 2002; and Grogger 2002; 2003; 2004 for a discussion of these policies). However, following the passage of work requirements and time limits on welfare benefits, many policymakers argued that minimum wages increases were needed to ensure that less-skilled single mothers in the labor force would not fall into poverty. Statements typical of this sentiment were offered by U.S. Senators Hillary Rodham Clinton (D-NY), Edward M. Kennedy (D-MA), and John F. Kerry (D-MA):

> "It is unacceptable that Americans working full time are living in poverty. Every day the minimum wage is not increased, it continues to lose value and working families fall further behind. It is past time to stand up for working families and raise the minimum wage…A single mother with two children who works 40 hours a week, 52 weeks a year earns just $10,700 per year – almost $6,000 below the federal poverty line for a family of three." (Clinton, 2006)

> "[T]he jobs available to women leaving welfare are often minimum wage jobs, and it is difficult, if not impossible, for them to meet the needs of their families and raise their children. Daily life is often harsh for low-income working mothers in all parts of the country, whether or not they have been on welfare. For them, survival is the daily goal. If they work hard enough and their working hours are long enough, they can make ends meet – but only barely….We must stop asking these families to do it all alone. They are working too many hours for too little pay, without access to the support they need to make ends meet and improve the quality of their lives. One of the most important steps we can take is to guarantee a fair minimum wage." (Kennedy, 2004)

> "It's long overdue time to raise the minimum wage. If we raise the minimum wage, which I will do over several years to $7 an hour, 9.2 million women who are trying to raise their families would earn another $3,800 a year." (Kerry, 2004)

While raising the minimum wage may not be an especially target efficient means of alleviating poverty among single mothers (see Burkhauser and Sabia, 2007), less-educated single mothers may experience important wage, employment, and income effects from minimum wage increases, which could affect their poverty rates. However, to this point, little attention in the minimum wage literature has been paid to this low-skilled vulnerable population.

The effect of minimum wage increases on poverty is theoretically ambiguous. An increase in the minimum wage may increase the wages of less-skilled working single mothers, which may raise their incomes and alleviate poverty. However, a minimum wage hike may also cause adverse employment or hours effects that reduce wage income and increase poverty.[1] Thus, the overall effect on poverty is an empirical question, which this paper seeks to answer.

Using data from a pooled cross-section of unmarried mothers from the March 1998 to March 2005 Current Population Survey (CPS), this study presents estimates of the effect of minimum wage increases on single mothers' poverty rates. The evidence shows that post-PRWORA minimum wage increases failed to alleviate poverty among all single mothers or among less-educated single mothers for two reasons. First, consistent with Burkhauser and Sabia (2007), most working single mothers earn wage rates greater than state or federal minimum wage levels and are not directly affected by minimum wage policy. But secondly, even among less-educated single mothers who are directly

[1] Minimum wage hikes may also have indirect effects on the labor supply decisions of other workers in the household, which could also affect poverty. This is probably less likely in female-headed households with young children than in married households or in households with adult children, which are more likely to have multiple workers. However, minimum wages could affect labor supply decisions of other non-related adults in single mother-headed households which could affect total household income and resultant poverty.

affected by minimum wage increases, such hikes do not reduce poverty because of substantial adverse employment and hours effects. While minimum wage increases did increase the wages of less-educated working single mothers (elasticity = 0.94) leaving some of these women better off, adverse employment and hours effects left others worse off. A 10 percent increase in the minimum wage resulted in a 13.4 percent reduction in employment and a 15.8 percent reduction in usual weekly hours worked among single mothers without a high school diploma. On net, minimum wage increases actually reduced wage income among less-educated single mothers. Taken together, these findings suggest that post-PRWORA minimum wage increases were an ineffective anti-poverty tool for single mothers and hurt, rather than helped, many less-educated single mothers.

Literature Review

While much of the post-PRWORA political rhetoric over minimum wage increases has focused on single mothers, the recent empirical literature has generally focused on other low-skilled populations. Most studies have examined the employment effects of minimum wage increases on teenagers and younger high school dropouts. In a review of over 90 empirical studies on the minimum wage, Neumark and Wascher (2006) conclude that the evidence is "overwhelming" that the least-skilled workers most likely to be adversely affected by minimum wages experience the strongest disemployment effects.[2,3] Most recently, Neumark (2007) examines the effect of minimum wages in the

[2] See, for example, Campolieti et al., 2006; Campolieti et al., 2005; Burkhauser, Couch, and Wittenburg, 2000a,b; Deere, Murphy, and Welch, 1995; Neumark, 2001; Neumark and Wascher, 1992, 2002; Neumark et al., 2004; Partridge and Partridge, 1999; Currie and Fallick, 1996; Williams, 1993; Couch and Wittenburg, 2001; Sabia, 2006.

post-PRWORA era and finds evidence of adverse employment effects for younger workers and high school dropouts. However, despite this large literature, few studies have examined poverty effects for single mothers, a vulnerable population frequently cited by policymakers as a target for minimum wage protection.

An exception to this gap in the minimum wage literature is a recent paper by Burkhauser and Sabia (2007), who estimate the effects of minimum wage increases on all single mothers in both the pre-and post-welfare reform era. They find that minimum wage increases had no effect on single mothers' poverty rates, and attribute this finding to the poor target efficiency of the minimum wage. While it is true that the majority of single mothers may not be directly affected by minimum wage increases because they are not poor and do not earn sufficiently low wages, less-skilled single mothers — a population not specifically examined in the Burkhauser and Sabia (2007) study — may be impacted. The current study builds on the paper by Burkhauser and Sabia (2007) by specifically examining the effects of minimum wages on poverty rates of less-educated single mothers.

While not specifically examining the effect of minimum wage increases on poverty rates of single mothers, studies of other low-skilled populations have generally found little evidence of poverty-reducing effects of minimum wage increases. Dynamic analyses of the effect of minimum wage hikes on household-specific flows into and out of poverty (Neumark and Wascher, 2001, 2002; Neumark et al., 2005) have found that while some low-skilled workers who remain employed after a minimum wage hike are

[3]This review suggests that the positive employment effects found in some studies (see Card and Krueger, 1994; Card and Krueger, 1995) are outliers. While it is possible for minimum wage increases to have a positive effect on employment—for instance, if labor markets are characterized by monopsony power—Aaronson and French (2006; 2007) find little evidence of monopsonistic markets when examining the effects of minimum wage increases on output prices.

moved out of poverty due to positive wage effects, other low-skilled workers are moved into poverty as a result of adverse employment or hours effects. Neumark and Wascher (2002) conclude that the net effect of minimum wage increases resembles income redistribution among low-income families, leaving many worse off. Golan et al. (2001) also find evidence of adverse distributional effects, while Gundersen and Ziliak (2004) find essentially no relationship between minimum wage hikes and poverty.[4]

While no studies in the minimum wage literature have examined poverty effects of minimum wage increases for less-educated single mothers, a few studies have examined the effect of minimum wage increases on single mothers' welfare receipt. Page et al. (2005) find that a 10 percent increase in the minimum wage is associated with a 1 to 2 percent increase in welfare caseloads, which suggests there may be important adverse employment or income effects for less-educated single mothers.[5]

Furthermore, while not specifically examining the effects of minimum wage policies, three studies by Grogger (2002; 2003; 2004) estimate the effects of time limits and EITC expansions on single mothers' labor supply, and include the minimum wage as a control variable. Grogger finds some evidence that increasing minimum wages are negatively, but insignificantly associated with single mothers' employment. However,

[4] An exception to these findings can be found in a paper by Addison and Blackburn (1999), who find that minimum wage hikes had a modest negative effect on poverty rates of teenagers and junior high school dropouts in the pre-welfare reform era.

[5] Brandon (1995) and Turner (1999) use data from the Survey of Income and Program Participation (SIPP) to estimate the effect of minimum wage increases on the probability of exit from AFDC and reach opposite conclusions. However, these studies focus on only a few years of data and minimum wage effects are likely to be imprecisely estimated in short panels (Baker et al., 1999; Page et al., 2005). The Council of Economic Advisors (CEA) estimates the effects of welfare reform policies and minimum wage increases on welfare caseloads and finds that minimum wage hikes are associated with a decrease in welfare caseloads. However, Page et al. (2005) convincingly show that the treatment of state-specific time trends and the time period chosen for analysis can explain differences in their findings from that of the CEA.

this is not unexpected given that many single mothers, particularly those at the higher end of the skill distribution, are not affected by minimum wage policy.

The current study contributes to the existing minimum wage literature in two key ways. First, this is the first study in the literature to examine the poverty effects of minimum wage increases for less-educated single mothers, a population targeted by policymakers for minimum wage protection in the post-PRWORA era. Second, this study examines the effects of minimum wage increases on the key underlying components of single mothers' poverty, including employment and wage income.

Econometric Model

The following fixed effects specification is used to estimate the effect of minimum wage increases on poverty:

$$P_{ist} = \beta MW_{st} + X_{st}\delta + \pi EITC_{st} + Z_i\gamma + \alpha_s + \tau_t + \phi_s(t) + \varepsilon_{ist} \qquad (1)$$

where P_{ist} is an indicator variable measuring whether single mother *i* in state *s* lives in a household whose income falls below the federal poverty line at time *t*, MW_{st} is the natural log of the higher of the real state or federal minimum wage in time period *t*, X_{st} is a set of state and year-specific economic controls, $EITC_{st}$ is the natural log of the higher of the state or federal maximum EITC refundable credit, and Z_i are a set of individual-specific characteristics. The remaining controls are a set of fixed effects: α_s is a time-invariant state effect, which controls for fixed state-specific unmeasured characteristics, τ_t is a state-invariant year effects, which controls for time trends common to all states, $\phi_s(t)$ is a state-specific time effect, which controls for state-specific unobserved time trends, and ε_{ist} is the unobserved error term. Fixed effects are included to control for the

endogeneity of state minimum wage laws.[6] Identification of $\hat{\beta}$ comes from variation in minimum wages around a state-specific trend.

As in Page et al. (2005), state-specific time trends are included to control for unmeasured trends in state-specific business cycles or in implementation of federal welfare reforms that could be correlated with changes in minimum wage policy. Legislatures may be more willing to enact minimum wage increases during periods of strong economic growth because fewer workers are earning low wages, and there are fewer organized political opponents of such wage hikes. For example, in January 2007, the Associated Press (2007) reported that the South Carolina Small Business Chamber of Commerce was not opposing a proposed federal minimum wage increase because "most small businesses are not paying the minimum wage."[7]

In the above model, we allow for a state-specific quadratic time trend, defining $\phi_s(t) = \alpha_s t + \alpha_s t^2$.[8] While the inclusion of state-specific trends may reduce the precision of estimates, the findings by Page et al. (2005) suggest that failure to adequately control for unmeasured state-specific trends can lead to important forms of heterogeneity bias in estimated minimum wage effects for single mothers. Moreover, as in Page et. al (2005), analyses of predicted residuals in models excluding state-specific time-trends suggest that

[6] Equation (1) is also used to estimate the effect of minimum wage increases on several components of poverty, including wages, employment, hours, and wage income.

[7] Moreover, the same newspaper article reported that "only two people showed up for a Friday rally at U.S. Sen. Lindsey Graham's office in Columbia. Business groups have not opposed the increase[.]"

[8] The sensitivity of the results was tested by including higher-order polynomials (up to four) in the specification of state trends and the results were substantively unchanged. Results using a simple linear time trend also similar produced similar results.

the inclusion of non-linear trends better fit the data. All regression models are estimated via weighted least squares with standard errors clustered at the state level.[9]

Data

Equation (1) is estimated using pooled cross-sectional data from the 1998 to 2005 March Current Population Survey (CPS). Questions about poverty and wage income are asked with reference to the previous year; thus, these data correspond to the calendar years 1997-2004. While the unit of observation is the individual, the estimate of β in equation (1) can be interpreted as the estimated effect of state minimum wage increases on predicted poverty rates. The weighted means and standard deviations of the key dependent and independent variables are found in Table 1. To be included in the sample, an individual must be a single female head of household aged 15-55 with children under 18 living in the family, a comparable sample to that investigated by Page et al. (2005).

Dependent Variables. The key dependent variable is whether the single mother lives in poverty. In 2004, a single mother with two children would be defined as living in poverty if family income were less than $15,219. Among all single mothers over the period 1998-2004, 31.9 percent reported that their total household income was below the poverty line. The percentage was much higher for single mothers without a high school diploma (57.4 percent) and lower for those with a high school diploma or more (25.8 percent). Figure 1 shows poverty trends over time for single women by educational attainment. Poverty rates fell from 1997-2000, then remained steady or slightly increased from 2001-2004. Note that among single mothers who were employed, poverty rates

[9] Weighting is appropriate if one wishes to estimate the extent to which minimum wage increases will affect overall U.S. employment probabilities.

were much lower, consistent with employment being highly negatively correlated with poverty.

The remaining outcomes examined are also listed in Table 1: employment, usual weekly hours worked, and wage income. As expected, less educated single mothers have lower employment rates than more highly educated single mothers (63.1 percent versus 86.6 percent), fewer weekly hours worked (22.7 hours versus 33.3 hours), and less wage income ($6,881 versus $19,335).[10]

Minimum Wage. The key independent variable is the minimum wage, measured as the natural log of the larger of the state or federal minimum wage. On October 1, 1997, the second phase of the 1996-97 federal minimum wage increase was implemented, raising the federal minimum wage from $4.75 per hour to $5.15 per hour.[11] During the 1998-2004 period, there were no changes in the federal minimum wage, but many states increased their state minimum wages, particularly in the post-2000 period. States that set minimum wages above the federal level increasingly chose to set their wages at higher multiples of the federal minimum wage. The mean state minimum wage among those states was 13 percent higher than the federal minimum wage in 1995 and over 25 percent higher than the federal minimum wage in 2004. Table 2 lists state and federal minimum wage changes from 1998 to 2004. During the period examined, most state minimum wage changes occurred in Northeastern and Pacific states. This, these states will provide most of the identifying variation in the model.

[10] Weekly hours and income figures are unconditional measures. In the final column of Table 1, mean poverty rates, hours worked, and wage income, conditional on employment, are presented.
[11] Because the analysis uses annual data, the federal minimum wage in 1997 is the average of the two federal minimum wages that prevailed, weighted by the share of months each was in effect.

In addition to state effects, year effects, and state-specific quadratic time trends, several state-and year-specific control variables are included as regressors. These are described below.

State Economic and Welfare Controls. State economic conditions are expected to influence single mothers' poverty because they affect employment opportunities and income. As in Burkhauser et al. (2000a,b), Card and Krueger (1995), Deere et al., (1995), Sabia (2006), and Page et al. (2005), several measures of economic health are included as regressors; these include the natural log of the average wage rate for workers aged 25-54, the unemployment rate for prime age males aged 25-54, and the natural log of the state Gross Domestic Product (GDP). The natural log of the state and year-specific maximum TANF and food stamp benefit for a family of three is also included in the model to capture non-work benefits, as declines in a state's real AFDC-food stamp benefit are expected to increase labor supply (Moffitt, 1992).

Maximum EITC Refundable Credit. Several studies have found that expansions in the EITC are associated with an increase in labor force participation of low-skilled workers (see, for example, Hotz and Scholz, 2003; Eissa et al., 2005; Meyer and Rosenbaum, 2001; Ellwood, 2000; Grogger, 2003; Meyer and Rosenbaum, 2000; Hotz et al., 2002; Eissa and Liebman, 1996). Because the EITC may have an important effect on labor supply decisions for single mothers, a variable is included measuring the natural log of the higher of the state or federal maximum family-specific refundable EITC benefit is included. From 1998 to 2004, nine states enacted or increased their refundable EITC credit, thus increasing the maximum credit available to workers. For example, New York, Minnesota, and Vermont each offered refundable credits of at least 30 percent of

the federal EITC, which would increase the maximum credit by nearly $1,200 for a family with two or more children.

Individual and Family Controls. Finally, several individual- and family-level characteristics are included as controls: age, age squared, race, education, whether the mother has a disability, whether there are young children under 6 in the household, the number of children in the household, and whether the mother lives in a metropolitan statistical area (MSA).

While all of regressions in this study control for each of the above control variables, the discussion of findings below and the results presented in the main tables are limited to the effects of the minimum wage. Estimated coefficients on the control variables are available in the appendix or upon request.[12] There are 42,373 single mothers in the sample with non-missing observations. Of these single mothers, approximately 19 percent (7,918) had not completed high school and 81 percent (34,445) had completed high school or received some post-high school education.[13]

Results

Key estimation results are presented in Tables 3-6. All regressions are weighted and standard errors are clustered at the state level. Reports of statistically significant results refer to estimated effects that are significant at the 5 percent significance level.

Poverty Effects. Table 3 presents estimates of the effect of minimum wage increases on single mothers' poverty rates. In column (1), the results in Burkhauser and Sabia (2007) are replicated for the post-welfare reform era. Consistent with their results,

[12] The full set of coefficient estimates on employment models are found in the appendix.
[13] All control variables that measure dollar amounts (EITC benefits, AFDC-FS benefits, annual income, state GDP, and state mean wage) are adjusted for inflation and are measured in 2004 dollars.

there is no evidence that minimum wage increases reduced poverty rates among all single mothers. In fact, the sign on the estimated coefficient is positive. This result could suggest that while minimum wage increases lifted some single mothers out of poverty by increasing their wages, adverse employment and hours effects caused other single mothers to fall into poverty. However, as Burkhauser and Sabia (2007) emphasize, the lack of a significant effect may also be driven by the fact that most working single mothers are not directly affected by minimum wage increases because they already earn wages higher than state or federal minimums.

In columns (2) and (3), poverty effects are estimated by single mothers' educational attainment to better isolate those lower-skilled single mothers who are most likely to be affected by minimum wage policy. Single mothers who had completed high school would not be expected to be affected by minimum wage increases because they likely already earn wages higher than state or federal minimums. For these more highly educated single mothers, there is no evidence that minimum wages impact poverty (column 3).

Minimum wage increases are, however, expected to affect the economic well-being of less-skilled single mothers without a high school diploma (column 2). However, even among these single mothers, there is still no evidence that minimum wage increases affect poverty rates. The absence of significant poverty effects for less-educated single mothers suggests that adverse employment and hours effects may undermine any positive wage gains. This possibility is explicitly tested later.

In columns (4)-(6), the sample is restricted to working single mothers. In these specifications, the minimum wage is given its best chance to reduce poverty because

single mothers who may have become unemployed and had their incomes reduced because of minimum wage increases are excluded from the sample. These results continue to show that minimum wage increases have no effect on poverty. While the findings on all single mothers (column 4) and more highly educated single mothers (column 6) may be explained by these populations not being affected by minimum wage hikes, the results for less-educated single mothers (column 5) suggests that adverse hours effects may undermine income gains from positive wage effects.

Taken together, the results in Table 3 provide little evidence that post-PRWORA minimum wage increases affected poverty rates of all single mothers or of less-educated single mothers. In the remaining tables, we explore the underlying reasons for these findings.

Wage Distributions. If minimum wage increases are to affect single mothers' income or poverty rates, they must first affect workers' wage rates. The first six columns of Table 4 show the wage distribution of working single mothers by educational attainment.[14] All wages are in 2004 dollars and are calculated as the ratio of annual wage income to annual hours worked. Row (1) shows the wage distribution for all working single mothers. During the post-PRWORA period, 66 percent of single mothers earned wage rates greater than $7.25 per hour and nearly 50 percent earned wages greater than $10.00 per hour. Given that the highest state minimum wage during this period was $7.16 per hour, the wage distribution in row (1) suggests that most working single mothers earned sufficiently high wages such that they are not directly affected by minimum wage increases, a point emphasized by Burkhauser and Sabia (2007).

[14] If a working single mother's imputed wage rate is less than $2.00 per hour, it is bottom-coded to $2.00 per hour. Wage rates are similarly top coded at $150 per hour. The results were not sensitive to modest changes in the selection of bottom- and top-coded values.

The remaining two rows of Table 4 present the wage distribution by educational attainment. The wage distribution in row (2) reflects that there are substantially more low-skilled, low-wage women among single mothers who had not completed high school. Only 38 percent of single mothers without a high school diploma have wage rates greater than $7.25 per hour and 47 percent have wage rates less than $6.00 per hour. This suggests that minimum wage policy is likely to directly affect single mothers who are less-educated. In contrast to these lower-skilled workers, single mothers with at least a high school diploma (row 3) are unlikely to be affected by minimum wage policy because these workers are higher-skill, higher-wage workers.

In the final column of Table 4, estimates of the effect of minimum wage increases on the wages of working single mothers are presented. Each estimate is an elasticity that comes from a regression model that includes the full set of controls in Table 1 as well as state fixed effects, year fixed effects, and state-specific quadratic time trends. Consistent with the observed wage distribution, there is little evidence that minimum wage increases significantly affect wages of all single mothers (row 1, final column) or more highly educated single mothers (row 3, final column). However, for less-educated single mothers (row 2, final column), there is a significant wage effect. A 10 percent increase in the minimum wage is associated with a 9.4 percent increase in wages.

In summary, there are two important findings to take away from Tables 4. First, minimum wage increases do not affect the vast majority of working single mothers because most earn wages greater than state or federal minimum wages. Second, minimum wage increases do increase the wages of less-educated single mothers. However, taken together with the results in Table 3, the findings for less-educated single

mothers suggests that while some working mothers did get a wage boost from post-PRWORA minimum wage increases, these wage increases did not lead to a reduction in poverty. One reason minimum wage increases may have been an ineffective anti-poverty tool among less-skilled single mothers is because of adverse employment and hours effects. This possibility is explored in Table 5.

Employment, Hours, and Income Effects. Columns (1)-(3) of Table 5 present estimates of the effects of minimum wage increases on employment, usual weekly hours, and income for the full sample of single mothers. In this sample, there is little evidence that that minimum wages affect all single mothers; again, this is not surprising given that Tables 4 showed that a substantial share of working single mothers are not affected by minimum wage policy. However, for less-educated single mothers (columns 4-6), there is consistent evidence of adverse effects of minimum wage increases. Column (4) shows that a 10 percent increase in the minimum wage is associated with a 13.4 percent reduction in employment for single mothers who had not completed high school. This estimated employment elasticity is quite large compared to elasticities for teenagers, which tend to range from -0.1 to -0.3 (Neumark and Washcer, 2006), but is more comparable to estimates obtained for non-high school graduates, which recent studies have placed between -0.8 and -0.9 (Burkhauser et al., 2000; Neumark, 2007).

There are several explanations for why less-educated single mothers may experience especially large unemployment effects from minimum wage increases. First, prior to PRWORA, work requirements in many states were much weaker, providing little incentive for many less-educated single mothers to accumulate job experience. Moreover, for some single mothers, employment would have substantially reduced

welfare benefits, creating strong work disincentives. Thus, single mothers without a high school diploma may be even lower skilled than other populations of dropouts, making them more likely to be affected by minimum wage increases. Second, the birth of a child often interrupts work, leading to gaps in the accumulation of experience and skill. In fact, Waldfogel (1998) suggests that the child wage penalty for never-married mothers may be larger than that for other women. And finally, minimum wage increases may shift employment away from low-skilled adults and toward teenagers and students (Lang and Kahn, 1998), which could result in larger estimated effects for low-skilled single mothers.

Despite these large estimated employment effects, examining only employment elasticities may actually obscure the full effects of minimum wage hikes on less educated single mothers' labor supply. This is because changes in employment could mask an increase or decrease in the demand for labor, measured by work hours (Couch and Wittenburg, 2001). For example, employers may respond to increases in the minimum wage not simply by reducing employment, but also by reducing work hours. Column (5) of Table 5 presents the estimated effect of minimum wage increases on usual hours worked for less-educated single mothers. Here, we find a usual weekly work hours elasticity of –1.58, which is approximately 18 percent larger than the estimated employment elasticity. This larger hours elasticity suggests that the estimated employment effect understates the full labor demand effects of minimum wage hikes. The magnitude of this understatement is similar to previous studies, which have found hours elasticities that are 10 to 30 percent larger than employment elasticities (Couch and Wittenburg, 2001; Sabia (2006).

Given the presence of significant adverse employment and hours effects among low-skilled single mothers, we next examine whether there are adverse income effects from minimum wage increases. The findings in column (6) reflect that adverse employment and hours effects reduced net wage income among less-educated single mothers. A 10 percent increase in the minimum wage is associated with a 14.4 percent decline in wage income. This suggests that while minimum wage increases may have reduced wage inequality among working single mothers, such hikes may have actually increased income inequality. While this income decline did not result in a significant increase poverty, this estimated elasticity reflect that minimum wage increases have not helped, and may have hurt, many less-educated single mothers. Thus, while some single mothers may have been lifted out of poverty due to positive wage effects of minimum wage increases, others had their incomes decline due to adverse employment and hours effects.

The credibility of the identification strategy used to obtain the estimates in columns (4-6) is bolstered by falsification tests on more highly educated single mothers. The lack of significant employment, hours, or income effects for more highly educated single mothers (columns 7-9), a population that the minimum wage is not expected to effect, add to our confidence that significant effects for less-educated single mothers are not driven by state-specific time-varying unmeasured heterogeneity.

Robustness of Results. In Table 6, we examine whether the above poverty, employment, hours, and income effects for less-educated single mothers are sensitive to choice of model specification and functional form. In models (1)-(4), we test whether changing the form of the minimum wage variable affects results substantially. In these

models, the key independent variable is defined as the minimum wage *level* rather than the natural log of the minimum wage. The estimated elasticities from models using the minimum wage level are consistent with those reported in Tables 3 and 5.

Neumark et al. (2004), Burkhauser et al. (2000a), and Page et al. (2005) suggest that there may be important lagged minimum wage effects, as minimum wage changes in period *t* may affect employment and hours in period *t+1*. The specifications in columns (5)-(8) include both contemporaneous and one-year lagged minimum wage variables. The implied long-run employment and hours elasticities are significant, and consistent with previous estimates obtained without including lagged effects.

Finally, in the final four columns of Table 6, we test the sensitivity of results to the use of simple linear state time trends rather than quadratic time trends. Page et al. (2005) note that state-specific linear time trends may be sufficient to capture important forms of unmeasured heterogeneity if one is looking at only the pre- or post-welfare reform eras. In each specification, there continues to be little evidence that minimum wage increases affected poverty rates of less-skilled single mothers. Furthermore, employment and hours elasticities remain negative and significant, and are similar in magnitude to those obtained using state-specific quadratic time trends. The coefficient on wage income remains negative, but is insignificant in this specification, suggesting that some care should be taken in interpreting wage income effects.

Discussion and Conclusions

The findings in this study show that state minimum wage increases in the post-PRWORA period did not alleviate poverty among single mothers for two reasons. First,

consistent with findings of Burkhauser and Sabia (2007), most single mothers were not affected by minimum wage policy because they already earned wage rates higher than state and federal minimum wage levels. But, second, even among less-educated mothers who were affected by minimum wage increases, adverse employment and hours effects undermined poverty-alleviating effects caused by wage gains. A 10 percent increase in the minimum wage was associated with a 13.4 percent reduction in employment and a 15.8 percent reduction in usual weekly hours worked. On net, minimum wage increases may have actually reduced less-educated single mothers' wage income.

The results presented in this study reflect that despite policymakers calls for minimum wage increases to decrease poverty among single mothers, minimum wage hikes in the post-PRWORA policy environment did little to reduce poverty. In fact, the unintended adverse employment and hours effects actually left many less-skilled single mothers worse off. These findings are consistent with those of Page et al. (2005) and suggest that adverse employment, hours, and income effects may induce some less-skilled single mothers to join the welfare rolls.

In contrast to the increasing the minimum wage, which is poorly targeted toward poor single mothers and has important adverse employment, hours, and wage income effects for many who are less-skilled, a far more effective pro-work strategy would be to expand the federal Earned Income Tax Credit (EITC) or state supplements to it. Much of the empirical literature finds that expansions in the EITC increase employment among low-skilled workers, including single mothers (Hotz and Scholz, 2003; Eissa et al., 2005; Meyer and Rosenbaum, 2001; Ellwood, 2000; Grogger, 2003; Meyer and Rosenbaum, 2000; Hotz et al., 2002; Eissa and Liebman, 1996). Given that employment is an

important anti-poverty mechanism and that wage subsidies increase income to the working poor, expansions in the EITC appear to be a more effective means of aiding single mothers. In terms of target efficiency, most working poor households—especially single mother households—would benefit from the EITC, while only a small minority would gain from a minimum wage hike (CBO, 2007; Burkhauser et al., 1996b). Moreover, because EITC costs are not borne by employers, there will be no reduction in demand for low-skilled workers, as is the case with minimum wage increases.

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Table 1: Weighted Means and Standard Deviations of Variables

	All	< HS Educ	≥ HS Educ	Employed
Poverty	0.319 (0.466)	0.574 (0.495)	0.258 (0.437)	0.234 (0.424)
Employment	0.821 (0.383)	0.631 (0.483)	0.866 (0.340)	---
Usual Weekly Hours Worked	31.3 (17.0)	22.7 (19.1)	33.3 (15.8)	38.1 (9.55)
Annual Wage Income	16,933 (22515.9)	6,881.0 (13684.1)	19,335.2 (23525.7)	20,627.1 (23267.3)
Log (Minimum Wage)	1.66 (0.085)	1.67 (0.089)	1.66 (0.084)	1.66 (0.084)
Log (Max EITC Benefit)	8.00 (0.286)	8.05 (0.277)	7.99 (0.287)	7.99 (0.285)
Ln (Max AFDC-FS3 Benefit)	6.43 (0.192)	6.43 (0.201)	6.43 (0.189)	6.42 (0.191)
Less than HS Educ	0.193 (0.395)	---	---	0.148 (0.355)
Some College (< 4 Years College)	0.327 (0.469)	---	---	0.349 (0.477)
College	0.095 (0.294)	---	---	0.109 (0.312)
Post-College	0.035 (0.184)	---	---	0.041 (0.198)
Disability	0.087 (0.282)	0.142 (0.349)	0.074 (0.262)	0.036 (0.186)
Child < 6 years	0.359 (0.480)	0.421 (0.494)	0.345 (0.475)	0.343 (0.475)
Number of Children	1.81 (1.01)	2.16 (1.25)	1.73 (0.929)	1.75 (0.949)
Age	35.6 (8.97)	33.7 (9.96)	36.1 (8.66)	35.7 (8.72)
Black	0.327 (0.469)	0.341 (0.474)	0.325 (0.468)	0.317 (0.465)
Non-MSA	0.169 (0.375)	0.165 (0.371)	0.170 (0.376)	0.167 (0.374)
State Unemployment Rate (Males Aged 25-54)	0.093 (0.024)	0.095 (0.023)	0.092 (0.024)	0.092 (0.025)
Log (State Mean Wage) (All Aged 25-54)	3.33 (0.187)	3.32 (0.186)	3.33 (0.188)	3.33 (0.188)
Ln (State GDP)	12.5 (0.952)	12.7 (0.938)	12.5 (0.952)	12.5 (0.950)
N	42,373	7,918	34,445	34,770

Source: Computed by the author.
Data: March 1997 to March 2005 Current Population Survey. Sample limited to unmarried mothers aged 15-55.

Table 2: State Minimum Wages from 1997 to 2004 that were Higher than the Federal Minimum on January 1

	1997	1998	1999	2000	2001	2002	2003	2004
Federal minimum[1]	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15
Northeast								
New England								
Maine	---	---	---	---	---	5.75	6.25	6.25
New Hampshire	---	---	---	---	---	---	---	---
Vermont	5.00	---	---	5.75	6.25	6.25	6.25	6.75
Massachusetts	5.25	---	---	6.00	6.75	6.75	6.75	6.75
Rhose Island	5.15	---	---	5.65	6.15	6.15	6.15	6.15
Connecticut	4.77	---	5.65	6.15	6.40	6.70	6.90	7.10
Middle Atlantic								
New Jersey	5.05	---	---	---	---	---	---	---
New York	---	---	---	---	---	---	---	---
Pennsylvania	---	---	---	---	---	---	---	---
Midwest								
East North Central								
Illinois	---	---	---	---	---	---	---	5.50
West North Central								
Minnesota	---	---	---	---	---	---	---	---
Iowa	---	---	---	---	---	---	---	---
South								
South Atlantic								
Delaware	5.00	---	---	5.65	6.15	6.15	6.15	6.15
District of Columbia	5.75	5.75	6.15	6.15	6.15	6.15	6.15	6.15
East South Central								
None	---	---	---	---	---	---	---	---
West South								
None	---	---	---	---	---	---	---	---
West								
Mountain								
None	---	---	---	---	---	---	---	---
Pacific								
Washington	4.90	---	5.70	6.50	6.72	6.90	7.01	7.16
Oregon	5.50	6.00	6.50	6.50	6.50	6.50	6.90	7.05
California	---	5.00	5.75	5.75	6.25	6.75	6.75	6.75
Pacific (noncontiguous)								
Alaska	5.25	5.65	5.65	5.65	5.65	5.65	7.15	7.15
Hawaii	5.25	5.25	5.25	5.25	5.25	5.75	6.25	6.25

Source: Fiscal Policies Institute (2004) and the U.S. Department of Labor.

[1]In 1997, the federal minimum wage from $4.75 to $5.15 per hour was not implemented until October 1.

Table 3: Effect of Minimum Wage Increases on Single Mothers' Poverty

	All			Working		
	All	< HS Educ	≥ HS Educ	All	< HS Educ	≥ HS Educ
	(1)	(4)	(4)	(1)	(4)	(4)
Log (Minimum Wage)	0.126	-0.092	0.199	0.159	-0.217	0.224
	(0.092)	(0.217)	(0.104)	(0.136)	(0.278)	(0.127)
Elasticity	*0.395*	*-0.160*	*0.771*	*0.679*	*-0.464*	*1.145*
State Effects?	Y	Y	Y	Y	Y	Y
Year Effects?	Y	Y	Y	Y	Y	Y
State -Specific Linear and Quadratic Time Trends?	Y	Y	Y	Y	Y	Y
Demographic, Economic and Policy Controls	Y	Y	Y	Y	Y	Y
N	42,373	7,918	34,455	42,373	7,918	34,455

* Significant at 5% level
Standard errors are clustered at the state level. All regressions are weighted.

Source: Computed by the author.
Data: March 1998 to March 2005 Current Population Survey.

Table 4: Wage Distribution of Working Single Mothers, 1997-2004

	Real Hourly Wage Rate[1]							
	< $4.50	$4.50 to $6.00	$6.01 to $7.25	$7.26 to $10.00	$10.01 to $15.00	> $15.00	Total	Estimated Elasticity[2]
All Working Single Mothers	12.2	11.7	10.2	19.3	22.3	24.4	100.0	0.072
Single Mothers with < High School Education	25.0	22.0	14.6	18.4	11.1	8.9	100.0	0.943*
Single Mothers with ≥ High School Education	10.0	9.8	9.4	19.4	24.2	27.1	100.0	0.066

* Significant at 5% level

Source: Computed by the author.
Data: March 1998 to March 2005 Current Population Survey. Sample limited to unmarried mothers aged 15-55.
[1]Wage rate measured in 2004 dollars.
[2]These elasticities are the estimated effects of a minimum wage increase on wages. They are obtained from regressions of real wage rate on the natural log of the minimum wage, controlling for all other demographic, economic, and policy controls listed in Table 1. Wage rates are bottom coded at $2.00 per hour and top coded at $150 per hour, though estimated elasticites are not sensitive to these coded values.

Table 5: Effect of Minimum Wage Increases on Single Mothers' Employment, Usual Weekly Hours, Wage Income

	All			< HS			≥ HS		
	Work	Hours	Income	Work	Hours	Income	Work	Hours	Income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log (Minimum Wage)	0.011	1.81	1918.4	-0.854*	-35.8*	-9914.2*	0.211	10.1	4175.0
	(0.117)	(5.04)	(6020.7)	(0.290)	(10.2)	(4687.9)	(0.140)	(5.40)	(7791.6)
Min Wage Elasticity	*0.013*	*0.058*	*0.133*	*-1.34*	*-1.58*	*-1.44*	*0.244*	*0.303*	*0.216*
State Effects?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year Effects?	Y	Y	Y	Y	Y	Y	Y	Y	Y
State -Specific Linear and Quadratic Time Trends?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Demographic, Economic and Policy Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	42,373	42,373	42,373	7,918	7,918	7,918	34,455	34,455	34,455

* Significant at 5% level
Standard errors are clustered at the state level. All regressions are weighted.

Source: Computed by the author.
Data: March 1998 to March 2005 Current Population Survey.

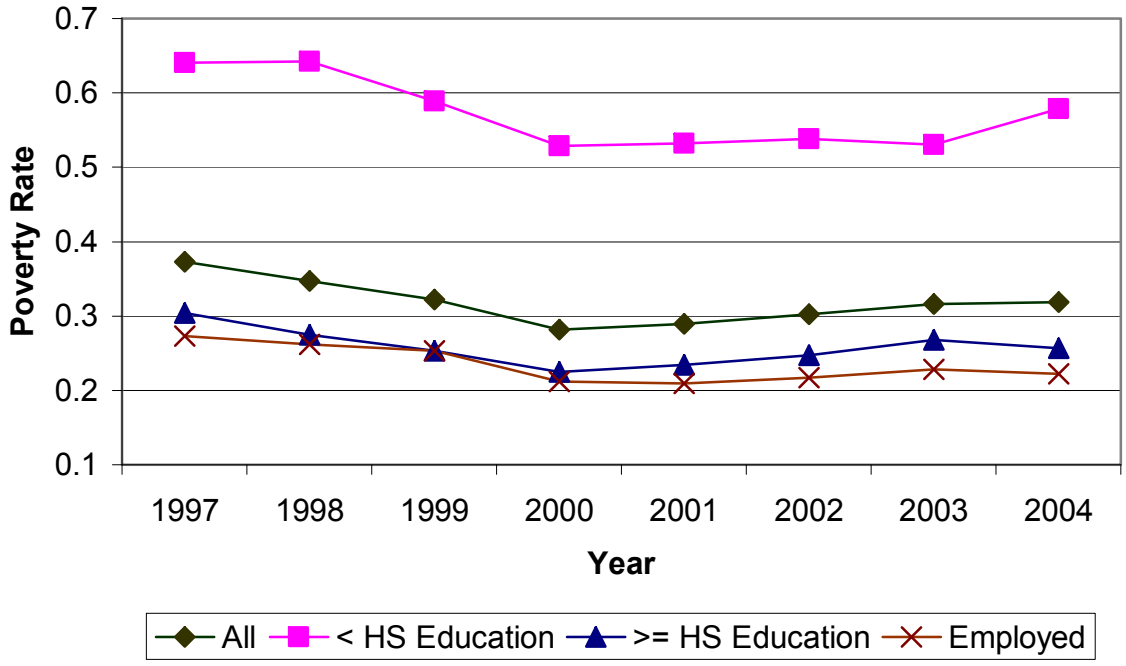
Table 6: Robustness of Estimates of Effect of Minimum Wage on Single Mothers without High School Diploma

	Minimum Wage Levels				Lagged Effects				State-Specific Linear Time Trends			
	Work (1)	Hours (2)	Income (3)	Poverty (4)	Work (5)	Hours (6)	Income (7)	Poverty (8)	Work (9)	Hours (10)	Income (11)	Poverty (12)
Minimum Wage Level	-0.140*	-5.75*	-1628.3*	-0.021	---	---	---	---	---	---	---	---
	(0.046)	(1.72)	(821.3)	(0.037)								
Log (Minimum Wage)	---	---	---	---	-1.39	-104.8*	-14010.4	1.02	-0.797*	-32.6*	-6309.1	-0.258
					(1.37)	(42.3)	(22837.1)	(0.768)	(0.260)	(9.58)	(4071.0)	(0.191)
One Year Lag [Log (Minwage)]	---	---	---	---	0.537	68.6	4070.5	-1.10	---	---	---	---
					(1.35)	(43.2)	(23598.0)	(0.727)				
Elasticity	*-1.18*	*-1.35*	*-1.26*	*-0.195*	*-1.35* [1]	*-1.59* [1]	*-1.44*	*-0.139*	*-1.37*	*-1.44*	*-0.917*	*-0.449*
State Effects?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year Effects?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
State -Specific Linear and Quadratic Time Trends?	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N
Demographic, Economic and Policy Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	7,918	7,918	7,918	7,918	7,918	7,918	7,918	7,918	7,918	7,918	7,918	7,918

* Significant at 5% level
Standard errors are clustered at the state level. All regressions are weighted.

Source: Computed by the author.
Data: March 1998 to March 2005 Current Population Survey.

Figure 1: Poverty Rates of Single Mothers in Post-PRWORA Era (1997-2004)



Appendix Table: Full Set of Estimated Coefficients on Poverty and Employment Models

	Poverty				Employment		
	All	< HS Educ	≥ HS Educ	Employed	All	< HS Educ	≥ HS Educ
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log (Minimum Wage)	0.126	-0.092	0.199	0.159	0.011	-0.854*	0.211
	(0.092)	(0.217)	(0.104)	(0.136)	(0.117)	(0.290)	(0.140)
Less than HS Educ	0.161*	---	---	0.147*	-0.141*		---
	(0.007)			(0.008)	(0.008)		
Some College (< 4 Years College)[1]	-0.107*	---	-0.105*	-0.094*	0.032*		0.033*
	(0.007)		(0.007)	(0.009)	(0.006)		(0.006)
College	-0.187*	---	-0.179*	-0.154*	0.065*		0.069*
	(0.008)		(0.008)	(0.009)	(0.006)		(0.006)
Post-College	-0.192*	---	-0.182*	-0.147*	0.072*		0.077*
	(0.012)		(0.011)	(0.009)	(0.010)		(0.010)
Disability	0.247*	0.184*	0.273*	0.170*	-0.503*	-0.481*	-0.515*
	(0.013)	(0.024)	(0.013)	(0.019)	(0.010)	(0.020)	(0.010)
Child < 6 years	0.083*	0.136*	0.061*	0.054*	-0.040*	-0.040*	-0.044*
	(0.006)	(0.015)	(0.006)	(0.006)	(0.008)	(0.020)	(0.007)
Number of Children	0.081*	0.040*	0.099*	0.092*	-0.042*	-0.040*	-0.043*
	(0.005)	(0.008)	(0.006)	(0.006)	(0.005)	(0.008)	(0.007)
Age	-0.016*	0.013*	-0.030*	-0.022*	0.024*	0.041*	0.017*
	(0.003)	(0.005)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
Black	0.097*	-0.0002*	0.092*	0.078*	-0.017*	-0.009	-0.020*
	(0.008)	(0.0001)	(0.008)	(0.008)	(0.005)	(0.012)	(0.005)
Non-MSA	0.047*	-0.002	0.057	0.049*	-0.013	-0.053	-0.004
	(0.010)	(0.023)	(0.011)	(0.011)	(0.009)	(0.030)	(0.007)
State Unemployment Rate	0.317	-0.335	0.507*	0.164*	0.081	0.099	0.078
(Males Aged 25-54)	(0.197)	(0.683)	(0.231)	(0.233)	(0.227)	(0.513)	(0.234)
Log (State Mean Wage)	-0.050*	0.014	-0.068*	-0.041*	0.043*	0.046	0.046*
(All Aged 25-54)	(0.017)	(0.054)	(0.018)	(0.021)	(0.015)	(0.042)	(0.015)
Ln (State GDP)	0.023	-0.039	0.046	-0.043	0.297	1.11*	0.114
	(0.190)	(0.623)	(0.245)	(0.253)	(0.192)	(0.553)	(0.209)
Log (Max EITC Benefit)	0.018	0.198*	-0.040*	-0.019	0.053*	0.008	0.068*
	(0.015)	(0.038)	(0.017)	(0.017)	(0.016)	(0.030)	(0.017)
Ln (Max AFDC-FS3 Benefit)	1.09*	-0.133	1.32*	0.510	-0.694*	-0.459	-0.730*
	(0.371)	(1.38)	(0.497)	(0.412)	(0.331)	(0.940)	(0.266)
State Effects?	Y	Y	Y	Y	Y	Y	Y
Year Effects?	Y	Y	Y	Y	Y	Y	Y
State -Specific Quadratic Time Trends?	Y	Y	Y	Y	Y	Y	Y
N	42,373	7,918	34,445	34,770	42,373	7,918	34,445

Source: Computed by the author.
Data: March 1998 to March 2005 Current Population Survey. Sample limited to unmarried mothers aged 15-55.

[1]Omitted education category is high school completion.