The Effects of Higher Minimum Wages on Welfare Recipiency

Mark Turner
Johns Hopkins University

July 1999

Presented at the National Association for Welfare Research and Statistics, August 1998; Institute for Policy Studies at Johns Hopkins University, November 1998; American Economic Association, January 1999; Department of Economics, Hood College, May 1999; and the Joint Center for Poverty Research Conference, June 1999. I thank the Census Bureau and Joint Center for Poverty Research for financial support. I also wish to thank, Greg Acs, Michael Davern, Michelle DeLair, Berna Demiralp, Jens Ludwig, John Marcotte, and David Neumark for their helpful comments and suggestions. Send comments to the Institute for Policy Studies, Johns Hopkins University, Wyman Park Building, 3400 N. Charles Street, Baltimore, MD 21218, phone: (410) 516-5481, E-mail: mturner@jhu.edu.

Abstract

"The Effects of Higher Minimum Wages on Welfare Recipiency"

In his State of the Union Address, President Clinton again called for an increase in the federal minimum wage in two 50-cent increments, from $5.15 to $6.15 per hour. Once again business groups and some economists argue that raising the minimum wage hinders the employment prospects of low-skilled workers. Not surprisingly, most welfare recipients are low-skilled (Ellwood 1986). Some contend that raising the minimum wage impedes welfare-to-work transitions. Alternatively, others argue that higher minimum wages draw women off welfare into employment.

This study examines the relationship between minimum wage increases and welfare recipiency. Using the 1990 and 1991 Survey of Income and Program Participation (SIPP), I examine the effect a minimum wage increase would have on welfare participation at a point in time (static models), and use discrete time hazard models (dynamic models) to assess whether higher minimum wages affect the propensity of exiting and of re-entering Aid to Families with Dependent Children (AFDC), the predecessor to Temporary Aid to Needy Families (TANF). The main independent variable, effective minimum wage (defined as the higher of state and federal minimum wages) varies over time and across states. Controlling for an array of factors, static models predict that a 50-cent minimum wage increase would reduce welfare participation by 1.3 percentage points, resulting in 41,000 fewer single mothers receiving welfare. Dynamic models predict that the higher minimum wage would increase welfare exit rates by 2.5 percentage points and would have no effect on former welfare recipients' chances of re-entering welfare.

Introduction

Welfare reform legislation signed into law in 1996 requires states to move most of their welfare recipients into either government-sponsored employment activities or private-sector employment. In the wake of welfare reform, nominal minimum wages have increased at the federal and state levels. The Clinton Administration raised the federal minimum wage by 90 cents to its current $5.15 per hour beginning in September 1997. Most recently, the Administration proposed to increase the federal minimum wage again in two 50-cent increments over two years, to $6.15 per hour. Congressional Republicans have proposed a $1 minimum wage increase spread over three years. Surprisingly, few studies have focused on the effect minimum wage increases might have on welfare recipiency (Nakosteen & Zimmer, 1989; Martin & Giannaros, 1990; Brandon, 1995; Page, Spetz, & Millar, 1998).

Some economists and policymakers believe that a higher minimum wage will enlarge welfare rolls because employers would hire fewer low-skilled workers. This is possible given that most welfare recipients are low-skilled (Ellwood, 1986). Recent research by the Employment Policies Institute contends that approximately 215,000 teen jobs disappeared following a 50-cent federal minimum wage increase in 1996 (EPI, 1998). Given that employment is one of the main routes off of welfare, this possible decline in employment could reduce welfare-to-work transitions.

On the other hand, proponents of a minimum wage increase argue that it would create an incentive for single mothers *not* to take-up welfare and for current welfare recipients to leave welfare and to find work. Some economists and policymakers contend that higher wages make work worthwhile (i.e., parents could then earn enough to cover the costs associated with work). Pavetti (1993) found that some women wanted to make the transition from welfare to work, but felt that the wages were not high enough to cover the costs associated with work (e.g., child care, transportation costs, and the reduction and loss of housing benefits). She found that when welfare mothers took account of these additional expenses, many low-wage jobs did not pay enough for welfare recipients to leave welfare for the labor market. For example, Edin and Lein (1997) found

that the monthly expenses for poor wage-reliant mothers were nearly 50 percent higher than welfare-reliant mothers' monthly expenses.

Economic theory unambiguously predicts that a higher minimum wage would reduce employment among the low-skilled. However, this assertion does not necessarily hold for a subgroup of low-skilled workers, i.e., welfare mothers. Since employment is one of the main routes off of welfare, higher minimum wages may draw more welfare mothers into the labor market where they compete for fewer employment opportunities with other low-skilled workers. We might expect lower welfare participation if welfare mothers are at least as productive as other low-skilled workers (e.g., teenagers) because some welfare mothers who enter the labor market find work. Moreover, lower welfare participation rates could occur in response to higher minimum wages if welfare mothers tend to be more productive than other low-skilled workers.

Given these conflicting viewpoints, more research about the effects of higher minimum wages on welfare recipiency is necessary. This paper contributes to the literature by using the 1990 and 1991 Survey of Income and Program Participation (SIPP) to study transitions in welfare recipiency. The SIPP includes a measure of monthly AFDC participation as well as a comprehensive set of individual demographic and family characteristics. In addition, I am able to analyze the effect minimum wages have on AFDC participation over time because these data are longitudinal—respondents are followed for up to 2.5 years.

Background

Conceptual models of welfare-use, based on a discrete choice framework, suggest several reasons why minimum wage increases might be important. First, economic theory and some empirical research suggest that higher minimum wages decrease the availability of jobs for low-skilled workers. For example, most of the minimum wage literature predicts that a 10 percent increase in the minimum wage would reduce teen employment between 1 and 3 percent (for an excellent review of the literature see Brown, Gilroy, & Kohen, 1983). Second, higher minimum

wages will likely increase the number of welfare recipients participating in the labor market—either actively seeking a job or working.

In general, models of welfare participation assume that a woman on welfare chooses between staying on or exiting welfare via a job or marriage. The expected returns on these options can vary through time, as job and marriage offers are obtained, producing a sequence of decisions, which give rise to welfare spells.

Based on this theoretical framework and earlier empirical research, I theorize that welfare recipiency depends on the value of the welfare option relative to job or marriage options through time. Employment and marriage opportunities in turn depend on (a) local labor market conditions (including unemployment rates, the cost-of-living, and minimum wage levels); (b) policy parameters such as the welfare benefit level; and, (c) personal characteristics such as age and education, number and age of children, the availability of other income (e.g., child support).

Most studies have found that welfare recipiency is closely linked to factors that influence the relative attractiveness of work over welfare. For example, using the National Longitudinal Study of Youth (NLSY), Pavetti (1993) finds that almost half of the exits from welfare occurred when women entered the labor force. Harris (1991), examining data from a longitudinal survey of teenage mothers in Baltimore, reports that almost two-thirds of welfare spells ended through work. Similarly, Fitzgerald (1995), using the 1984 and 1985 SIPP panels, finds that 45 percent of welfare exits ended because of increased earnings. Moreover, he finds that weak local labor markets characterized by high unemployment rates reduce the likelihood of leaving welfare through increased earnings.

Local labor market conditions—Politicians and policy analysts have attributed some of the recent reductions in welfare caseloads to historically low levels of unemployment and steady wage growth. Yet, until recently these labor demand factors had received little attention in the literature.

It is important that policy analysts as well as politicians understand the link between local labor market conditions and welfare utilization.

Recent studies have used local labor market conditions measured at the metropolitan area, census tract, and zip code levels in assessing how local labor market conditions affect welfare participation. For example, Hoynes (1996) uses administrative data from California to examine the effect demographic characteristics, local labor market variables, neighborhood characteristics, and time and county dummy variables have on the probability of a welfare exit. She finds that higher unemployment rates, lower employment growth, lower employment to population ratios, and lower wage growth are associated with longer welfare spells. Similarly, Fitzgerald (1995), using the SIPP merged with county and Labor Market Areas (LMA), finds that higher unemployment rates reduce welfare exit rates, especially for blacks. Specifically, he finds that a 2.7 percentage point increase in the local unemployment rate would reduce the welfare exit rate for blacks by 11.3 percentage points, but only by 3.6 percentage points for whites.

Surprisingly, a scant amount of research has examined how changes in state or federally mandated wage floors, i.e., minimum wages, affect welfare recipiency. Two papers, one by Peter Brandon and the other by Marianne Page, Joanne Spetz, and Jane Millar, find that higher minimum wages are associated with higher welfare participation rates.

Brandon (1995), using the 1986, 1987, and 1988 SIPP panels, mistakenly includes 344 single mothers receiving welfare, 35 percent of his sample, who had been on welfare for an indeterminate duration. Not knowing if these were protracted spells of welfare or if they were one of many short spells bias his estimates of exit rates. Unfortunately, the SIPP does not collect information on the timing and duration of any past use of public assistance. By not precisely controlling for spell duration, Brandon may underestimate the effect higher minimum wages have on welfare exit rates. Nevertheless, he finds that higher minimum wages prolong welfare dependency. Controlling for individual-level characteristics (i.e., age, educational attainment, household transfer income, disability status, and family composition), state-level variables (i.e.,

state-specific minimum wage levels and AFDC benefit levels), and in some specifications, state and industry dummy variables, Brandon finds that higher minimum wages lower the likelihood of exiting welfare for work. He also finds that among all working welfare mothers, those working in states with higher minimum wages work fewer hours and work shorter periods of time than working welfare mothers in states with lower minimum wages.

Page, Spetz, and Millar (1998), using state per capita welfare caseload and state and federal minimum wage data from 1981 to 1994, find that a 10 percent increase in the minimum wage is estimated to increase welfare caseloads by about 3.5 percent. These models control for state labor market conditions (average production wages, unemployment rate, population, gross state product), the state public assistance policies (AFDC and Food Stamp benefit levels, and whether the state provided AFDC to two-parent households), and state and time fixed effects.

Data and Methods

To gain an understanding of the likely effects of the proposed minimum wage on welfare recipiency, I have to go back to older data. The main data sets for this study are the 1990 and 1991 Survey of Income and Program Participation (SIPP). From the SIPP, one can draw a nationally representative longitudinal sample of single mothers with resident children less than 18 years old. These data contain detailed information on single mothers' program participation (e.g., Aid to Families with Dependent Children), human capital, family composition, demographic characteristics, as well as information on the state in which they live. As such, it is a well-suited data source for investigating the effect of state and federal minimum wages increases on welfare recipiency. Respondents were interviewed every four months, and they answered questions about activity in the previous four months. Each respondent was interviewed eight times, generating 32 months of data. The 1990 SIPP panel includes 23,627 households and spans October 1989 to August 1992. The 1991 SIPP panel includes 15,626 households and spans October 1990 to August 1993.[1]

During the analysis period, 1989 through 1993, federal minimum wages increased by 90 cents and several states imposed binding minimum wages. The federal minimum wage went from $3.35 to $3.80 in April 1990, and increased again in April 1991, to $4.25. Table 1 shows that in January 1990, 17 states had state minimum wages that exceeded the federal minimum of $3.35 per hour. Over the next year, 12 of these states increased their minimum wages. The average increase in binding state minimum wages between 1989 and 1993 was 8.4 percent.

These data are particularly suited for this analysis for two reasons. First, they contain detailed information on program participation reported on a monthly basis for a two and a half year span. Second, they incorporate detailed demographic characteristics and family background. Table 2 lists variable definitions.

The data set, however, has some important limitations. First, SIPP does not uniquely identify nine states: Alaska, Idaho, Iowa, Maine, Montana, North Dakota, South Dakota, Vermont, and Wyoming. Only 2.6 percent of the average monthly AFDC-Basic caseload in 1990 resided in these states. However, seven of these states had state minimum wages that exceeded the federal minimum at sometime between 1989 and 1993. Unfortunately, respondents in these states are not included in this analysis. Second, the analysis based on the hazard models is limited to respondents who begin their spells during the span of the panel. Furthermore, SIPP only follows respondents for 32 months. As a result of these two conditions, I cannot fully gauge the effect minimum wage increases have on long-term welfare recipiency. Third, the smallest geographic identifier in the SIPP public-use files is the state of residence. As a result, I am unable to evaluate the influence that local labor market conditions, measured at the SMSA, county, or neighborhood level, have on welfare recipiency. Several studies (i.e., Fitzgerald, 1995; Hoynes, 1996) used datasets that contained more precise geographic identifiers. To the extent that minimum wages differentially affect local labor markets, this study may not properly identify the effect of higher minimum wages on welfare recipiency. Nevertheless, Fitzgerald (1995) found that the lack of local

labor market variables in previous welfare research did not bias estimates of the effect of personal characteristics or welfare benefit levels.

Welfare participation— Similar to Fitzgerald (1995) and others, I code welfare participation as either receipt of AFDC or general assistance during each month of the SIPP panel. This definition includes women who misreport their AFDC receipt as general assistance, a well-documented problem in the SIPP (Marquis & Moore, 1989).

Local labor market condition— Congress amended the Fair Labor Standards Act in 1989, mandating a federal minimum wage increase in two increments—from $3.35 to $3.80 per hour effective April 1990, and from $3.80 to $4.25 effective April 1991. In addition, a number of states had minimum wages above the federal minimum. Employers in each state must pay their workers the higher of the state and federal minimum wages, which is the effective minimum wage. The minimum wage data were reported monthly and were merged onto the SIPP panels at the state-level. The level of effective minimum wage, the primary independent variable in this study, is lagged by three months because I assume respondents do not react instantaneously to changes in minimum wages. It may take three months for respondents to find out about and respond to the new wage floor. For example, respondents' welfare participation in January 1991 is assumed to be a function of the effective minimum wage in October 1990. Sensitivity analysis in the next section tests several lag structures and validates the use of a three-month lag.

I use state-level unemployment rates and nominal average manufacturing wage rates to characterize local labor markets. Unemployment rates measure the states' labor demand, while average manufacturing wage rates measure the cost-of-living. During wave 1 in the SIPP panels, the average unemployment rate was 6.3 percent and the average manufacturing wage was $10.89 per hour.

Empirical Results

I use nationally representative data and two different statistical methods in determining whether the proposed minimum wage increase influences welfare participation. First, I use multivariate econometric models and a nationally representative sample of female heads of household from the SIPP to examine whether minimum wage increases affect *welfare participation* at a point in time (static analysis). Second, I use discrete-time hazard models and subsamples of single mothers from the SIPP to determine whether minimum wage hikes affect *exit from* and *re-entry into welfare* (dynamic analysis).

Static Models – Welfare Participation

I identify a sample of single mothers heading households during the 16th reference month in the 1990 and 1991 SIPP panels (January - April 1991 and January - April 1992, respectively) to estimate whether minimum wage increases affect welfare participation. Taking account of a three-month lag in the minimum wage variable, this period of analysis includes a 45 cent increase in the federal minimum wage as well as seven binding changes in state minimum wages. Binding increases in state minimum wages occur when states increase their minimum wages where the new minimum exceeds the prevailing federal minimum.

Sample weights are used to calculate population means because the SIPP oversamples certain demographic groups. The dataset includes 2,737 respondents, representing 7.3 million single mothers with resident children less than 18 years old. Nearly 30 percent of these single mothers receive welfare. This population has the following characteristics (first column in Table 3): half are nonwhite, a third have never been married, 40 percent have preschool-aged children, 26 percent do not have a high school degree, 40 percent have a high school degree, and 34 percent have at least some college education. Almost 60 percent have recent work experience and 15 percent report having either a physical or mental disability. In addition, one out of ten lives in assisted housing (i.e., public housing or Section 8).

The basic choice model of welfare participation posits that single mothers choose whether to participate by comparing utility on and off welfare. Multivariate probit models are used to estimate how higher minimum wages might influence the probability of receiving welfare. These models assume a latent variable structure of the form:

$$W^*_{ij} = aL_j + bX_i + x_{ij}$$

where W^*_{ij} is the net benefit of receiving welfare. We observe that $w_{ij}=1$ if $W_{ij} >0$, indicating individual i received welfare, otherwise $w_{ij}=0$. L_j is a vector of variables measuring the effective minimum wage lagged by 3 months, manufacturing wages, unemployment rates, and welfare benefit levels for state j. X_i is a vector of variables measuring age, marital history, family structure, educational attainment, work experience, family income and transfers, and lagged welfare participation. The term ξ_{ij} is a standard normal random error term. Single mother I's probability of receiving welfare is $P(w_{ij}=1)$. Marginal effects for each explanatory variable are calculated by multiplying the regression coefficient by the probability density function (PDF). The PDF is evaluated at $5.15 for the effective minimum wage and at population means for other independent variables. Population means and marginal effects are listed in Table 3.

My results suggest that higher minimum wages reduce welfare participation. For example, a 50-cent increase in the effective minimum wage is predicted to lower welfare participation by 3.2 percentage points. This translates into nearly 102,000 fewer single mothers receiving welfare.[2] To obtain a similar effect, *other* family income (e.g., child support) would have to increase by more than $2,000 per family in a year.

Consistent with the earlier welfare literature, the other independent variables have predicted effects on welfare participation. Nonwhites, never-married mothers, those with more children, the less educated, those who received welfare during the previous year, mothers living in government assisted housing, and those with less work experience are more likely to receive welfare. For example, nonwhite mothers are 2.5 percentage points more likely to receive welfare

than white mothers. Mothers who did not work during the past year are 8 percentage points more likely to be on welfare than those who had recent work experience. Furthermore, mothers living in assisted housing are 4 percentage points more likely to be on welfare than mothers in unsubsidized housing. In addition, higher welfare benefit levels are correlated with higher welfare participation rates.

The estimates presented above may be misleading if unobserved state as well as national labor market conditions are correlated with differences in state minimum wages. State and year dummy variables are added to the model in Table 3 to disentangle the effect of minimum wages on welfare participation controlling for state-specific fixed unobserved characteristics. I am able to include state fixed effects because some states increased their minimum wages between the two SIPP panels.

Adding state fixed effects reduces the magnitude of the marginal effect, but it is still statistically significant (see Table 4). Similarly, adding a year dummy reduces the magnitude but maintains its statistical significance. Adding both state and year dummy variables reduces the marginal effect to -0.0266 from -0.0641 with neither state nor year fixed effects. This estimate suggests that a 50-cent increase in the minimum wage would lower welfare participation by 1.3 percentage points three months later; resulting in 41,000 fewer single mothers receiving welfare.

In the static analysis, picking an analysis period is arbitrary. Nevertheless, changing the period of analysis substantially alters the estimated effect higher minimum wages have on welfare participation. Since the welfare participation variable is lagged by one year, months earlier than 16 cannot be used as the period of analysis. Thus, to test the robustness of these results, I change the period of observation from the 16th reference month to the 24th reference month (September - December 1991 and September - December 1992). These estimates yield a positive coefficient with a large standard error. One reason these estimates are imprecisely measured is that only 7 states had minimum wages that exceeded the federal minimum wage during the 24th reference month. During this period, only 96 respondents lived in states with binding state minimums. In

contrast, during the 16th reference month 12 states had minimum wages that exceeded the federal minimum. The econometric models presented above using data from the 16th reference month are based on 306 respondents in states with binding state minimums. For example, during the 16th reference month in the 1990 SIPP Panel, California's state minimum wage exceeded the federal minimum; California has the largest welfare caseload in the country and accounts for a proportionately large share of observations in the SIPP.

Dynamic Models – Welfare Exit

Some policymakers and economists contend that a minimum wage hike would reduce employment opportunities for low-skilled workers and make it more difficult for welfare recipients to find jobs and leave welfare. Others, in turn, argue that higher minimum wages make work relatively more attractive than welfare and thus reduce welfare participation. Here I use a nationally representative sample of single mothers initially receiving welfare and discrete time hazard models to examine whether a minimum wage increase affects their chances of leaving welfare. I then use competing risk models to determine whether a higher minimum wage influences welfare-to-work transitions because of higher hourly wage rates in the low-skilled labor market. Competing risk models are typically used in this context to identify how and perhaps why single mothers exit welfare in response to changes in welfare policies and labor market conditions. Research on the ways women leave welfare tells us that new jobs, increased earnings, and marriage are the primary routes off of welfare. The models described below are primarily concerned with identifying whether welfare mothers leave welfare because of increased earnings. Thus, I estimate the probability of three possible outcomes: exiting welfare because of increased earnings, exiting for all other reasons, and not exiting welfare.

Description of welfare spells— Table 5 shows that there are an estimated 3.1 million (1,298) welfare spells during this period, of which 1.9 million (804 or 63 percent of all spells) were on-going

at the beginning of the survey (left-censored) and 0.5 million (165 or 16 percent of all spells) were on-going welfare spells at the end of the survey (right-censored). The last column in Table 5 lists the 0.7 million (329) completed spells which I observe in their entirety, from the beginning to the end. Sixty percent of them end within 4 months, while more than three-fourths end within 8 months after they start. The mean length is 12.3 months, overall, and is 6.3 months for completed spells.

Table 6 shows that welfare recipients in states that have minimum wages above the federal minimum wage (binding state minimum wage) have longer welfare spells than recipients in states that have state minimum wages lower than the federal minimum (non-binding state minimum wage). In particular, the average spell length for welfare recipients in states with binding minimum wages is 19.9 months, but it is 11.8 months for those in states with non-binding state minimum wage. This result may be attributable to higher minimum wages or to other confounding factors such as differences in state labor markets. Multivariate econometric models are needed to disentangle the effect higher minimum wages, controlling for other confounding factors, have on welfare exits.

Multivariate analysis— Minimum wage level's influence on the decision to leave welfare can be estimated using discrete time hazard models. These models exclude respondents who had on-going welfare spells at the beginning of the survey (i.e., the 804 respondents who were left-censored). Such models estimate the probability that an event (in this case, welfare nonparticipation) occurs at a specific time, given that it has not already occurred. Using a standard logistic parameterization of the hazard rate, I can express the probability that a single mother stops receiving welfare in a given month conditional on her received welfare during the previous month, on local labor market conditions, and on her demographic characteristics as:

$$Exit(t) = \Pr[w_{ijt} \mid w_{ij(t-1)} = 1; L_{jt}, X_{it}] = \frac{e^{\tilde{a}L_{jt} + \tilde{b}X_{it}}}{1 + e^{\tilde{a}L_{jt} + \tilde{b}X_{it}}}$$

where Exit(t) is the probability of welfare nonparticipation in month t, á and â are vectors of coefficients to be estimated, and L_{jt} and X_{it} are the full set of explanatory variables, similar to the static model above. In contrast to the static model, this specification allows time-variant factors to influence a single mothers' welfare participation decision over time. The unit of observation is a person-month. Each single mother who begins a welfare spell remain at risk of exiting welfare until one of the following happens: getting married, no longer having resident children less than 18, or leaving welfare due to other reasons. These discrete time hazards models are estimated by compiling all "at-risk" person-months and running a standard logit regression.[3] Similar to the static model above, explanatory variables include measures of the local labor market (i.e., effective minimum wage lagged by 3 months, state manufacturing wages, unemployment rates, and AFDC benefit levels), and respondents' demographic characteristics (i.e., age, marital history, family structure, educational attainment, work experience, and family income and other program participation). All time-varying variables take on their appropriate month t values; the minimum wage variable is lagged by three months.

Empirical evidence from these models suggests that a 50-cent minimum wage increase would boost welfare exit. Table 7 shows that the effective minimum wage lagged by three months has a positive, but statistically insignificant effect on welfare exits. Specifically, a 50-cent increase (1/2 unit change) in the effective minimum wage is estimated to increase welfare exits by 0.35 percentage points. However, the coefficient is statistically indistinguishable from zero.

Adding both state and year fixed effects increases the magnitude and the precision of the minimum wage estimate. Model 4 in Table 8 predicts that a 50-cent increase in the minimum wage would increase the probability of a welfare exit by 2.5 percentage points. These models predict that a 50-cent increase in the effective minimum wage, to $5.65 per hour, would prompt an additional 6,000 to leave welfare the following month.[4]

Other labor market and demographic characteristics have the expected effects on welfare exits. For example, lower welfare exit rates are associated with never being married, more children, higher welfare benefit levels, and living in government-assisted housing. Furthermore, welfare mothers who are older, who have more *other* family income (e.g., monthly child support payments), and work experience are more likely to leave welfare than those who are younger, have less *other* family income, and less work experience, all else equal.

Several independent variables had unexpected signs. For instance, having at least one preschool child is positively correlated with a welfare mother's chances of leaving welfare compared with an otherwise similar welfare mother without a preschool child. Being on welfare with older children may be correlated with unobservable disabilities or soft-skills. As a result, my estimates may incorrectly suggest that having older children is correlated with lower welfare exit rates, while in actuality it is the unobserved disability and lack of soft-skills that are negatively correlated with welfare exits.

Women leave welfare for a variety of reasons, including work, marriage and loss of eligibility through a youngest child turning 18 or leaving the household. Given the emphasis on women going to work under TANF, I am particularly interested in estimating the effect of minimum wages on leaving welfare to work versus leaving welfare for other reasons. As stated previously, economic theory suggests that the effect of minimum wages on welfare participation is ambiguous, but its effect on employment is unambiguously negative.

Competing risk models— For the purposes of this analysis, I model two means by which a welfare spell can end. First, a spell can end because of an increase in earned income. A welfare spell is coded as ending due to an increase in earnings if during either of the first two months off of welfare, earnings exceeded earnings during the last month on welfare by more than $50. Secondly, a spell can end because of some reason other than an earnings increase. Other studies typically include marriage as a route off welfare. However, there are not enough marriage

exits in the SIPP to adequately estimate the influence of minimum wages on welfare exits due to marriage.

Competing risk models are used to identify how and perhaps why respondents exit welfare in response to a minimum wage hike. A quarter of spells end following an increase in personal earnings of at least $50 per month while 42 percent of spells end for other reasons. The remaining welfare spells were on-going at the end of the survey.

Results from competing risk models are presented by simulating the effect a 50 cent minimum wage increase would have on the probability of being in each of the following states: an earnings-related welfare exit, other welfare exit, and no welfare exit. The probability of being in each of these states is first calculated at a $5.15 minimum wage and at the population means for the other independent variables. The probabilities are re-estimated at $5.65 effective minimum wage. Standard errors are then calculated to determine if these resulting simulations are statistically different (See the Technical Appendix).

Simulations in Table 9 show that a higher minimum wage would have a qualitatively small and statistically insignificant effect on welfare exits attributable to higher earnings but would significantly increase welfare exits. Simulations based on a 50-cent minimum wage increase suggest that earnings-related welfare exits would increase by only 0.3 percentage points, from 1.2 percent to 1.5 percent. However, this change is not precisely estimated. Consistent with the earlier bivariate exit models, these competing risk models predict that a minimum wage increase would reduce the likelihood of *not* exiting welfare. Specifically, at a $5.15 effective minimum wage the probability of not exiting welfare is 95 percent, increasing the minimum wage to $5.65 reduces the probability of not exiting to 92 percent.

Only two independent variables used in this analysis are estimated to have a statistically significant effect on the probability of an earnings-related welfare exit: work experience and living in government-assisted housing. Based on my results, a higher minimum wage is more likely to increase earnings-related welfare exits for women with recent work experience. In addition, living in

government-assisted housing is estimated to lower a woman's chances of having an earnings-related welfare exit.

Dynamic Models – Welfare Re-entry

The influence of minimum wages on single mothers' chances of re-entering welfare can be estimated using discrete time hazard models. I choose to exclude respondents who are not observed leaving welfare because of the difficulty in broadly defining those at-risk of entering welfare. For example, who is at risk of entering welfare: all single mothers, married mothers, and/or sexually active teenagers? Thus, the sample used for these analyses only include single mothers who have recently left welfare. Similar to the welfare exit models, I can express the probability of re-entering welfare as a function of local labor market conditions, state public assistance policies, and demographic characteristics as:

$$Entry(t) = \Pr[\, w_{ijt} \mid w_{ij(t-1)} = 0; L_{jt}, X_{it}\,] = \frac{e^{\hat{a}L_{jt} + \hat{b}X_{it}}}{1 + e^{\hat{a}L_{jt} + \hat{b}X_{it}}}$$

where Entry(t) is the probability of welfare participation in wave t, á and â are vectors of coefficients to be estimated, and L_{jt} and X_{it} are the full set of explanatory variables.

Description of post-welfare spells— There are an estimated 6.8 million single mothers (2,720 respondents) who had on-going non-welfare spells at the beginning of the survey (left-censored). The remaining 0.7 million single mothers (290 respondents) are observed exiting welfare. Table 10 shows that former welfare recipients in states that have binding minimum wages are more likely to stay off welfare longer (13.1 months) than former recipients in states with non-binding minimum wages (11 months). Once again, multivariate econometric models are needed to disentangle the effect minimum wage increases, controlling for other confounding factors, have on welfare re-entries.

Multivariate analysis— Empirical results in Table 11 suggest that a higher minimum wage would lower welfare re-entry rates. The regression coefficient is statistically significant at the 10% level. Specifically, a 50-cent minimum wage increase is estimated to lower welfare re-entries by 0.9 percentage points. To obtain a similar effect, state welfare benefit levels would have to decrease by more than $50 per month. Note, lower welfare benefit levels are associated with a lower likelihood of re-entering welfare.

Adding both state and year fixed effects significantly reduces the magnitude of the minimum wage coefficient but has almost no effect on its standard error. Model 4 in Table 12 predicts that a 50-cent increase in the minimum wage would increase the probability of a welfare re-entry. However, the estimate is statistically insignificant. At the 90% significance level, the estimated marginal effect ranges between -0.0478 and +0.0520.

Other labor market and demographic characteristics have the expected effects on welfare re-entries. For example, lower levels of educational attainment are associated with a higher chance of a welfare re-entry.

Sensitivity analysis— Two types of robustness tests are conducted to detect whether minor changes in the econometric specifications alter the predictions presented above. First, in the previous sections the effective minimum wage is lagged by three months because I assume that respondents do not react instantaneously to changes in minimum wages but may take three months to alter their welfare participation. Sensitivity analysis using different lag structures for the effective minimum wage validates my assumption that welfare recipiency takes at least a month to respond to a change in the minimum wage. For example, my estimates predict that welfare participation is not affected by minimum wages measured contemporaneously. Lagging the minimum wage by one-month results in a marginal effect equal to -0.0434, while a three month lag produces a marginal effect equal to -0.0266. Thus, by using a three-month lag, I may actually be

understating the beneficial effects a minimum wage increase has on reducing welfare participation. Lagging the minimum wage by more than three months also yields negative and statistically significant estimates of the marginal effects.

Second, local labor market conditions such as state unemployment rates are affected by minimum wages and presumably influence welfare recipiency. If this is the case, holding state unemployment rates constant in examining the relationship between minimum wage levels and welfare recipiency may be problematic. For example, if higher minimum wages increase unemployment and higher unemployment in turn discourages welfare exits and/or encourages welfare re-entry then the estimates presented above understate the adverse effects of higher minimum wages on welfare recipiency.

Sensitivity analysis reveals that holding state unemployment rates constant does not bias the estimates of higher minimum wages' marginal effects on welfare recipiency. First, most research suggests that higher minimum wages are non-positively associated with lower levels of employment. In a review of the minimum wage literature, Brown, Gilroy, and Kohen (1982) conclude that a 10 percent minimum wage increase decreases teen employment between zero and 3 percent. Second, state unemployment rates have qualitatively small and in some cases statistically insignificant effects on welfare recipiency in the static, welfare exit, and re-entry models. For instance, if a 10 percent minimum wage increase in turn increases state unemployment rates by 3 percent (upper bound estimate in the minimum wage literature), the static model predicts that this higher level of unemployment would boost welfare participation by only 0.01 percentage points. Welfare exit model suggests that a 3 percent increase in state unemployment would increase welfare exit rates, lowering welfare participation. In other sensitivity analyses, I exclude state unemployment rates from the multivariate econometric models. This exclusion has little effect on the minimum wage estimates.

Conclusion

This paper has investigated the effect of higher minimum wages on welfare recipiency using micro-data from the 1990 and 1991 SIPP panels. My results predict that minimum wage increases reduce welfare participation. This substantial change in welfare participation occurs because higher minimum wages increase welfare exit rates and have no affect on the likelihood of re-entering welfare. Specifically, static models predict that a 50-cent minimum wage increase would reduce welfare participation by 1.3 percentage points, resulting in nearly 41,000 fewer single mothers receiving welfare, and dynamic models predict that the proposed minimum wage would increase welfare exit rates by 2.5 percentage points.

Increases in minimum wages might lead to lower welfare participation rates because more welfare recipients enter the labor market. However, my results suggest only a small fraction of these new entrants earn more.

This evidence then suggests that the proposed increase would have similar effects now. There are at least two reasons why these predictions may not hold. First, welfare reform may have significantly changed how single mothers respond to local labor market conditions. For example, TANF requires welfare recipients to actively seek employment and imposes sanctions for noncompliance while the old AFDC program did not. In addition, TANF mandates time limits on welfare receipt; the old AFDC program did not. These two policy changes among others implemented under welfare reform may have weakened the inducement that higher minimum wages have on welfare-to-work transitions. Second, under TANF welfare caseloads have fallen dramatically, likely leaving single mothers less responsive to higher minimum wages on welfare. There is a need for further research, which includes long-term welfare recipients and investigates whether short-term and long-term recipients react differently to changes in the minimum wage. Research is also needed to better specify minimum wage-welfare recipiency models that assume fixed local labor market conditions. A better specification would measure both the direct effects of a higher minimum wage on welfare recipiency and the indirect effects via its impact on local labor market conditions.

References

Acs, Gregory, Norma Coe, Keith Watson, and Robert Lerman. 1998. "Does Work Pay? An Analysis of the Work Incentives under TANF." Occasional Paper #9, The Urban Institute.

Allison, Paul. 1984. *Event History Analysis: Regression for Longitudinal Event Data*. Sage University Paper Series: Quantitative Applications in the Social Sciences 07-046. Beverly Hills, CA: Sage Publications, Inc.

Bane, Mary and David Ellwood. 1983. "The Dynamics of Dependence: The Routes to Self-Sufficiency." Report prepared for Assistant Secretary for Planning and Evaluation, Office of Evaluation and Technical Analysis, Office of Income Security Policy, U.S. Department of Health and Human Services. Cambridge, MA: Urban Systems Research and Engineering, Inc.

Blank, Rebecca. 1989. "Analyzing the Length of Welfare Spells." *Journal of Public Economics*, vol. 39.

———. 1994. "The Employment Strategy: Public Policies to Increase Work and Earnings." in *Confronting Poverty: Prescriptions for Change*, Danziger, Sheldon, Gary Sandefur, and Daniel Weinberg (eds), New York, Russell Sage Foundation and Cambridge and London: Harvard University Press.

Brandon, Peter. 1995. "An Empirical Analysis of AFDC Exits, Employment, and State-Level Minimum Wages." Center for Demography and Ecology working paper, University of Wisconsin at Madison.

Brown, Charles, Curtis Gilroy, and Andrew Kohen. 1982. "The Effect of the Minimum Wage on Employment and Unemployment." *Journal of Economic Literature*, vol. 20.

Card, David, and Alan Krueger. 1995. *Myth and Measurement: The New Economics of the Minimum Wage*. Princeton, N.J.: Princeton University Press.

Coder, John, and Patricia Ruggles. 1988. "Welfare Recipiency as Observed in the SIPP." *SIPP Working Paper Series No. 8818*. Washington, DC: Bureau of the Census.

Edin, Kathryn, and Laura Lein. 1997. *Making Ends Meet: How Single Mothers Survive Welfare and Low-Wage Work*. Russell Sage Foundation, New York.

Ellwood, David. 1994. "Welfare Reform and the Clinton Administration." *Social Justice*, vol. 21, no. 1, (Spring).

———. 1986. "Working Off of Welfare: Prospects and Policies for Self-Sufficiency of Women Heading Families." Institute for Research on Poverty Discussion Paper 803-86, University of Wisconsin-Madison.

Employment Policies Institute. 1998. *Job Loss in a Booming Economy, 2nd Edition*, (May).

———. 1997. *The Minimum Wage Debate: Questions and Answers*. Third Edition, (May).

Evans, William, and Mark Turner. 1995. "Employment Effects of Minimum Wage and Subminimum Wage: Comment." working paper, Department of Economics, University of Maryland.

Fitzgerald, John. 1995. “Local Labor Markets and Local Area Effects on Welfare Duration.” *Journal of Policy Analysis and Management*, vol. 14, no. 1

———. 1991. “Welfare Durations and the Marriage Market: Evidence from the Survey of Income and Program Participation.” *Journal of Human Resources*, vol. 26, no. 3, (Summer).

Fitzgerald, John, and Xeujin Zuo. 1991. “Alternative Samples for Welfare Durations in SIPP: Does Attrition Matter?” *Proceedings of the Seventh Annual Research Conference*. Washington, DC: Bureau of the Census.

Gritz, Mark and Thomas MaCurdy. 1992. “Patterns of Welfare Utilization and Multiple Program Participation Among Young Women.” Stanford, CA: The Hoover Institution.

Hoynes, Hilary. 1996. “Local Labor Markets and Welfare Spells: Do Demand Conditions Matter?” National Bureau of Economic Research Working Paper 5643, (June).

Lazere, Edward. 1998. “New Findings from Oregon Suggest Minimum Wage Increases Can Boost Wages for Welfare Recipients Moving to Work.” Center on Budget and Policy Priorities report.

Marquis, Kent, and Jeff Moore. 1989. “Response Errors in SIPP: Preliminary Results.” *Proceedings of the Fifth Annual Research Conference*. Washington, DC: Bureau of the Census.

Martin, Linda, and Demetrios Giannaros. 1990. “Would a Higher Minimum Wage Help Poor Families Headed by Women?” *Monthly Labor Review*, (August).

Mishel, Lawrence, Jared Bernstein, and Edith Rasell. 1995. *Who Wins With a Higher Minimum Wage*. Washington, DC: Economic Policy Institute.

Moffitt, Robert. 1992. “Incentive Effects of the U.S. Welfare System: A Review.” *Journal of Economic Literature*, vol. 30, no. 1, (March).

———. 1986. “Work Incentives in Transfer Programs (Revisited): A Study of the AFDC Program”, in *Research in Labor Economics*, vol. 8 Editor: Ronald Ehrenberg. Greenwich, CT: JAI Press.

Nakosteen, Robert, and Michael Zimmer. 1989. “Minimum Wages and Labor Market Prospects of Women.” *Southern Economic Journal*, vol. 56, no. 2, (October).

Nelson, Dawn, David McMillen, and Dan Kasprzyk. 1985. “An Overview of the SIPP, Update 1.” SIPP Working Paper Series No. 8401.

Neumark, David and William Wascher. 1996. “The Effects of Minimum Wages on Teenage Employment and Enrollment: Evidence From Matched CPS Surveys.” *Research in Labor Economics*, vol. 15.

O′Neill, June, Douglas Wolf, Laurie Bassi, and Michael Hannan. 1984. “An Analysis of Time on Welfare.” Report prepared for Assistant Secretary for Planning and Evaluation, Office of Income Security Policy, U.S. Department of Health and Human Services, Washington, D.C.: The Urban Institute.

Page, Marianne, Joanne Spetz, and Jane Millar. 1998. “Does the Minimum Wage Affect Welfare Caseloads?” Mimeo.

Pavetti, LaDonna. 1993. *The Dynamics of Welfare and Work: Exploring the Process by Which Women Work Their Way Off Welfare*. Doctoral dissertation, Harvard University.

Regenstein, Marsha, Jack Meyer, and Jennifer Dickemper Hicks. 1998. “Job Prospects for Welfare Recipients: Employers Speak Out.“ The Urban Institute, Series A, no. A-25, (August).

Reynolds, Alan. 1997. “Even in Boom, Minimum Wage Destroys Jobs.“*The Wall Street Journal*, section A, page 14, August, 20.

Ruggles, Patricia. 1989. ”Welfare Dependency and Its Causes: Determinants of the Duration of Welfare Spells.“ *SIPP Working Paper Series No. 8908*. Washington, DC: Bureau of the Census.

Spalter-Roth, Roberta. 1994. ”The Real Employment Opportunities of Women Participating in AFDC: What the Market Can Provide.“ *Social Justice*, vol. 21, no.1, (Spring).

Spalter-Roth, Roberta, Heidi Hartmann, and Linda Andrews. 1990. “Mothers, Children, and Low-Wage Work: The Ability to Earn a Family Wage.“ Working Paper, Institute for Women=s Policy Center.

Turner, Mark. 1996. ”The Effects of Part-Time Work and the Minimum Wage on Educational Outcomes.“ Ph.d. dissertation, University of Maryland.

U.S. Department of Health and Human Services. 1998. Characteristics and Financial Circumstances of TANF Recipients Fiscal Year 1998. Administration for Children and Families, Office of Planning and Evaluation. Washington, DC

U.S. House of Representatives. 1992. *1992 Green Book*. Committee on Ways and Means. U.S. Government Printing Office, Washington, DC

Wallace, Geoffrey. 1999. “Searching for a Way off Welfare: A Structural Competing Risk Analysis of AFDC Durations.“ presented at the Urban Institute, (February).

Wellington, Alison. 1991. “Effects of the Minimum Wage on the Employment Status of Youths: An Update.” *Journal of Human Resources*, vol. 26, no. 1 (Winter).

Table 1. State and Federal Minimum Wage Levels: 1989 to 1993

Year [1]	States with Minimum Wages Exceeding Federal Minimum [2]	# of States with State Minimum Wage Increases [3]	Federal Minimum
1989	AK CA CT DC HI ME MA MN NH RI VT WA 3.85 4.25 4.25 4.75 3.85 3.75 3.75 3.85 3.65 4.00 3.65 3.85	10	$3.35
1990	AK CA CT DC HI IA ME MA MN NH ND OR PA RI VT WA WI 3.85 4.25 4.25 4.85 3.85 3.85 3.85 3.75 3.95 3.75 3.40 4.25 3.70 4.25 3.75 4.25 3.65	12	3.35
1991	AK CA CT DC HI IA ME MN MT NH OR RI VT WA 4.30 4.25 4.25 5.45 3.85 4.25 3.85 4.25 4.25 3.85 4.75 4.25 3.85 4.25	8	3.80
1992	AK CT DC IA OR RI 4.75 4.27 5.45 4.65 4.75 4.45	4	4.25
1993	AK CT DC HI IA NJ OR RI 4.75 4.27 5.45 5.25 4.65 5.05 4.75 4.45	3	4.25

Source: The Council of State Governments, *Book of the States*. Vol. *27-29,* Lexington, KY; U.S. Department of Labor, Bureau of Labor Statistics, *Monthly Labor Review*, January 1988-January 1994.

Note:

[1]January in the given year.

[2]Alaska (AK), California (CA), Connecticut (CT), District of Columbia (DC), Hawaii (HI), Iowa (IA), Maine (ME), Massachusetts (MA), Minnesota (MN), Montana (MT), New Hampshire (NH), New Jersey (NJ), Oregon (OR), Rhode Island (RI), Vermont (VT), Washington (WA).

[3]States identified to increase their minimum wages met two conditions: (1) the state minimum wage (SMW) increased, SMW(t) > SMW(t-1), and (2) the new state minimum wage was higher than the federal minimum wage (FMW), SMW(t) > FMW(t).

Table 2. Variable Definitions

Variable Name	Definition	Frequency
	Program Participation, Benefit Levels, and Income	
Received Welfare	1 if the respondent received Aid to Families with Dependent Children (AFDC) or General Assistance (GA) during the 4th reference month, wave 1	Fixed
Entered Welfare	1 if the respondent received AFDC or GA during reference month, 0 otherwise	TV
Exited Welfare	1 if the respondent did not receive AFDC or GA during reference month, 0 otherwise	TV
Months in spell: 5-8[1]	1 if the first observed AFDC/GA (non AFDC/GA) spell is in its 5th, 6th, 7th, or 8th month, 0 otherwise	TV
Months in spell: 9-12[1]	1 if the first observed AFDC/GA (non AFDC/GA) spell is in its 9th, 10th, 11th, or 12th month, 0 otherwise	TV
Months in spell: 13-16[1]	1 if the first observed AFDC/GA (non AFDC/GA) spell is in its 13th, 14th, 15th, or 16th month, 0 otherwise	TV
Months in spell: 17-20[1]	1 if the first observed AFDC/GA (non AFDC/GA) spell is in its 17th, 18th, 19th, or 20th month, 0 otherwise	TV
Months in spell: 21-24[1]	1 if the first observed AFDC/GA (non AFDC/GA) spell is in its 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, or 28th month, 0 otherwise	TV
AFDC Benefits	Maximum state AFDC benefit levels for a family of three (hundreds of dollars)	TV
Assisted Housing	1 if the respondent lived in government assisted housing (e.g., public housing or section 8) during reference month, 0 otherwise	TV
	Local Labor Market Conditions	

Variable Name	Definition	Frequency
Effective Minimum Wage Lagged 3 Months	Higher of the state and federal minimum wage lagged by 3 months	TV
State Manufacturing Wages	State average hourly earnings in the manufacturing industry (1-digit SIC)	TV
State Unemployment rate	State-wide unemployment rate	TV
	Human Capital	
High school degree[2]	1 if the respondent received a high school degree during or prior to each reference month, 0 otherwise	TV
Some college[2]	1 if the respondent received some post-secondary education during or prior to each reference month, 0 otherwise	TV
Work experience	1 if the respondent was employed at any time during Wave 1, 0 otherwise	Fixed
	Demographic Characteristics	
Nonwhite	1 if the respondent was African-American, Hispanic, Asian, Pacific Islander, American Indian, or other nonCaucasian, 0 otherwise	Fixed
Age	Respondent=s age at the start of spell	Fixed
Disability	1 if the respondent has a physical, mental, or other disability that could inhibit work	Fixed
Never married	1 if the respondent was never married during the reference month, 0 otherwise	TV
Number of children	Number of resident, biological children less than 18 years old during the reference month	TV
Youngest child < 6 years old	1 if the youngest biological-resident child less than 6 years old, 0 otherwise	TV

Variable Name	Definition	Frequency
Other Family Income	Monthly family income minus means-tested transfers and respondent=s earnings	TV

Notes: TV = time -variant variable. Fixed = static variable.

Reference categories:

[1]Respondent first observed AFDC/GA spell is in its 1st, 2nd, 3rd, or 4th month.

[2]Respondent had not received a high school diploma during or prior to each reference month.

Table 3. Effect of Minimum Wages on Welfare Participation - Static Models

[The dependent variable is welfare participation was measured during the 16th reference month]

Independent Variables	**Mean (Std. Dev.)**	**Regression Coefficient**	**Standard Error**	**Marginal Effect**
Effective Minimum Wage Lagged 3 Months	4.035 (0.232)	-.5133	0.1866	**-0.0641**
Nonwhite	0.488 (0.500)	0.1964	0.0826	**0.0245**
Never Married	0.341 (0.474)	0.1671	0.0896	**0.0209**
Age (years)	33.338 (8.808)	-0.0281	0.0056	**-0.0035**
Number of Children	1.881 (1.044)	0.0700	0.0372	***0.0087***
Child(ren) < 6 years old	0.402 (0.490)	0.0750	0.0944	0.0094
Other Family Income	0.708 (1.335)	-0.1237	0.0348	**-0.0155**
High School Degree	0.397 (0.489)	-0.2941	0.0923	***-0.0367***
Some College	0.342 (0.475)	-0.3779	0.1009	**-0.0472**
Welfare Participation Last Year	0.282 (0.450)	1.9848	0.0870	**0.2480**
Work Experience	0.596 (0.491)	-0.6453	0.0875	**-0.0806**
Disabled	0.153 (0.360)	0.2632	0.0995	**0.0329**
State Manufacturing Wages	10.889 (1.245)	-0.0678	0.0380	***-0.0085***

State Unemployment rate	6.312 (1.241)	0.0336	0.0319	0.0042
AFDC Benefits	3.969 (1.703)	0.0999	0.0280	**0.0125**
Assisted Housing	0.100 (0.300)	0.3440	0.1168	**0.0430**

Welfare Participation	0.292 (0.455)	—	—	—
Number of observations (person-months)	2,737	Number of Female-Headed Households with Resident Children less than 18 years old		7,288,186

Marginal effects statistically significant at the 5% level in bold.
Marginal effects statistically significant at the 10% level in bold-italic.

Notes:

Marginal effect are calculated by multiplying the regression coefficients by the probability density function (pdf), where the pdf is evaluated at $5.15 for the effective minimum wage and sample means for the other independent variables.

No respondents resided in the District of Columbia during the 16th reference month.

Table 4. Effect of Minimum Wages on Welfare Participation - Static Models

[The dependent variable is welfare participation during the 16th reference month]

Independent Variables	Model 1	Model 2	Model 3	Model 4
Effective Minimum Wage Lagged 3 months	**-0.0641**	**-0.0587**	**-0.0473**	**-0.0266**
State fixed effect	No	Yes	No	Yes
Year fixed effect	No	No	Yes	Yes

Marginal effects statistically significant at the 5% level in bold.
Marginal effects statistically significant at the 10% level in bold-italic.

Notes:

Number of observations = 2,737; representing 7,288186 female headed households with resident children less than 18 years old.

These models also control for the same set of independent variables listed in Table 3. Marginal effect are calculated by multiplying the regression coefficients by the probability density function (pdf), where the pdf is evaluated at $5.15 for the effective minimum wage and sample means for the other independent variables.

No respondents resided in the District of Columbia during the 16th reference month.

Table 5. Description of Welfare Spells in the 1990 and 1991 SIPP Panels

Welfare Spells	Total	Non-Left Censored Spells	
		Right Censored	Non-Right Censored
Number of spells (Number of respondents)	1,166938 (494)	510,227 (165)	656,711 (329)
Percentage of total	100%	44%	56%
Mean length (months)	12.3	20.1	6.3
Spell Distribution			
1-4	36.3	5.8	60
5-8	11.8	10.1	13.2
9-12	10.6	13.3	8.5
13-16	6.0	4.2	7.5
17-20	5.4	8.2	3.2
21-24	7.9	9.4	6.8
25-28	21.9	49.0	0.9

Note: First observed spell of that type from the 1990 and 1991 SIPP panels.

3,113,912 total welfare spells; 1,946,974 welfare mothers (804 respondents) had on-going welfare spells at the beginning of the survey (left-censored spells).

Table 6. Welfare Spells in the 1990 and 1991 SIPP Panels by States with Binding Minimum Wages

Welfare Spells	State Minimum Wages	
	Binding State Minimum Wage	**Non-binding State Minimum Wage**
Number of spells (Number of respondents)	130,108 (61)	1,036,830 (433)
Percentage of total	11%	89%
Mean length (months)	16.9	11.8
Spell Distribution		
1-4	26.1	37.6
5-8	8.6	12.2
9-12	1.4	11.7
13-16	3.8	6.3
17-20	6.6	5.2
21-24	22.1	6.2
25-28	31.3	20.8

Note: First observed spell of that type from the 1990 and 1991 SIPP panels.

Binding State Minimum Wage: SMW(t) > FMW(t)

Non-binding State Minimum Wage: SMW(t) # FMW(t), where SMW is state minimum wage and FMW is federal minimum wage.

Table 7. Effect of Minimum Wages on Welfare Exits - Dynamic Models
[The dependent variable is welfare participation measured during each reference month]

Independent Variables	Mean (Std. Dev.)	Regression Coefficient	Standard Error	Marginal Effect
Effective Minimum Wage	4.158 (0.217)	0.1413	0.2013	0.0069
Nonwhite	0.558 (0.497)	0.0396	0.0413	0.0018
Never Married	0.429 (0.495)	-0.2603	0.1318	**-0.0105**
Age (years)	29.647 (7.600)	0.0352	0.0073	**0.0016**
Number of Children	1.886 (1.113)	-0.7408	0.0709	**-0.0239**
Child(ren) < 6 years old	0.498 (0.500)	0.6896	0.1287	**0.0453**
Other Family Income	0.354 (0.937)	0.0837	0.0373	**0.0040**
High School Degree	0.354 (0.478)	-0.2634	0.1277	**-0.0106**
Some College	0.203 (0.402)	-0.2791	0.1525	***-0.0111***
Work Experience	0.390 (0.488)	0.5606	0.1231	**0.0343**
Disabled	0.222 (0.416)	0.1030	0.1435	0.0049
State Manufacturing Wages	11.320 (1.217)	-0.0440	0.0528	-0.0020
State Unemployment rate	7.117 (1.449)	0.0634	0.0427	0.0030
AFDC Benefits	4.081 (1.692)	-0.0920	0.0413	**-0.0040**

Independent Variables	Mean (Std. Dev.)	Regression Coefficient	Standard Error	Marginal Effect
Assisted Housing	0.188 (0.391)	-0.5708	0.1850	**-0.0198**
5-8 months in spell	0.190 (0.392)	-0.6527	0.1554	**-0.0219**
9-12 months in spell	0.156 (0.363)	-0.8452	0.1882	**-0.0260**
13-16 months in spell	0.124 (0.330)	-0.8614	0.2155	**-0.0263**
17-20 months in spell	0.111 (0.314)	-1.5418	0.3176	**-0.0359**
21-28 months in spell	0.149 (0.356)	-1.1715	0.2639	**-0.0315**
Exit Rate	0.046 (0.209)	—	—	—
Number of observations (person-months)	5,006	Number of Femaled Headed Households on Welfare with Resident Children less than 18 years old		1,166,939

Marginal effects statistically significant at the 5% level in bold.
Marginal effects statistically significant at the 10% level in bold-italic.

Notes:

Marginal effect is the percentage point change in the probability of a welfare exit conditional on not exiting welfare the previous period,
$[e^{\tilde{a}} - 1]\overline{nw}$

where á (and â) are the estimated coefficient in the complementary log-log models and nw is the sample mean of not being on welfare. Estimated probabilities were calculated using $5.15 for the effective minimum wage and sample means for the other independent variables.

No respondents resided in the District of Columbia, Hawaii, New Hampshire, or New Mexico in this analytical dataset.

Table 8. Effect of Minimum Wages on Welfare Exits with State and Year Fixed Effects - Dynamic Models

[The dependent variable is welfare participation measured during each reference month]

Independent Variables	Model 1	Model 2	Model 3	Model 4[a]
Effective Minimum Wage Lagged 3 months	0.0069	0.0180	0.0188	**0.0497**
State fixed effect	No	Yes	No	Yes
Year fixed effect	No	No	Yes	Yes

Marginal effects statistically significant at the 5% level in bold.
Marginal effects statistically significant at the 10% level in bold-italic.

[a]The Effective Minimum Wage Lagged 3 months coefficient is statistically significant at the 1 percent level.

Notes:

Marginal effect is the percentage point change in the probability of a welfare exit conditional on not exiting welfare the previous period,

$$[e^{\tilde{a}} - 1]\overline{nw}$$

where á (and â) are the estimated coefficient in the complementary log-log models and nw is the sample mean of not being on welfare. Estimated probabilities were calculated using $5.15 for the effective minimum wage and sample means for the other independent variables.

No respondents resided in the District of Columbia, Hawaii, New Hampshire, or New Mexico in this analytical dataset.

Technical Appendix. Standard Errors Calculations

Objective: Calculate standard errors for the difference between two predicted probabilities when varying only one independent variable—the effective minimum wage—assuming the variances of other independent variables are proportionate.

$$V(\hat{P}^2{}_k - \hat{P}^1{}_k)$$

where

$$\hat{P}^1{}_k = \hat{a}_k L^1{}_j + \hat{b}_k X_i$$

$$P^2{}_k = \hat{a}_k L^2{}_j + \hat{b}_k X_i$$

L^1 is the effective minimum wage at \$5.15 and the other local labor market conditions at their sample means. L^2 is the effective minimum wage at \$5..65 and the other labor market conditions measured at their sample means.

$$V(\hat{P}^2{}_k - \hat{P}^1{}_k) = [\frac{1-\hat{P}^2{}_k}{N} + \frac{1-\hat{P}^1{}_k}{N}] * A_k$$

where

$$A_k = \frac{V(a_k \mid L_j, X_i)}{V(a_k)}$$

$V(\alpha|L_j,X_i)$ is given in the regression and $V(\alpha)$ is calculated using the formula below.

$$V(a_k) = \frac{1-\hat{P}^1{}_k}{N}[\frac{1-\sum_{k\neq j}\hat{P}^1{}_j}{1-\sum_k \hat{P}^1{}_k}]^2 + \frac{1-\hat{P}^2{}_k}{N}[\frac{1-\sum_{k\neq j}\hat{P}^2{}_j}{1-\sum_k \hat{P}^2{}_k}]^2$$

where k is equal to the number of estimated coefficients for each independent variable and (k+1) are the number of outcomes. In the bivariate case k equals 1.

Table 9. Effect of Minimum Wages on Welfare Exits with State and Year Fixed Effects —Competing Risk Models

	Effective Minimum Wage Lagged 3 Months		
Type of Exit	$5.15	$5.65	**Difference (Standard Error)**
Earnings-Related Exit	0.0118	0.0147	0.0029 (0.242)
Other Exit	0.0369	0.0589	***0.0220 (0.0134)***
No Exit	0.9513	0.9265	**-0.0248 (0.00018)**

Differences in estimated probabilities statistically significant at the 5% level in bold.
Differences in estimated probabilities statistically significant at the 10% level in bold-italic.

Note:

Probability of welfare exit conditional on receiving welfare the previous month equals $P[w_{ijt}=0 \mid w_{ij,t-1}=1; L_{jt}, X_{it}, S_i, Ti]$. X_{it} is a vector of demographic characteristics at their sample means. L_{jt} is a vector of local labor market conditions at $5.15 for the effective minimum wage and at sample means for the other independent variables in the *$5.15* column and is $5.65 for the effective minimum wage, every thing else equal in the *$5.65* column. This model also includes state and year dummy variables.

No respondents resided in the District of Columbia, Hawaii, New Hampshire, or New Mexico in this analytical dataset.

Table 10. Nonwelfare Spells for Recent Welfare Participants in the 1990 and 1991 SIPP Panels by States with Binding Minimum Wages

Nonwelfare Spells	State Minimum Wages: Binding State Minimum Wage	State Minimum Wages: Non-binding State Minimum Wage
Number of spells (Number of respondents)	86,408 (40)	619,718 (250)
Percentage of total	12%	88%
Mean length (months)	13.1	11.0
Spell Distribution		
1-4	29.8	37.0
5-8	8.7	10.9
9-12	7.1	10.1
13-16	7.9	13.4
17-20	13.3	10.3
21-24	26.0	9.5
25-28	7.2	8.8

Binding State Minimum Wage: SMW(t) > FMW(t)

Non-binding State Minimum Wage: SMW(t) # FMW(t), where SMW is state minimum wage and FMW is federal minimum wage.

Notes

First observed spell of that type from the 1990 and 1991 SIPP panels.

6,804,821 single mothers with resident children less than 18 years old (2,720 respondents) had on-going nonwelfare spells at the beginning of the survey (left-censored spells). The remaining 706,126 single mothers (290 respondents) were observed exiting welfare (non-left-censored).

Table 11. Effect of Minimum Wages on Welfare Entries - Dynamic Models

[The dependent variable is welfare nonparticipation measured during each reference month]

Independent Variables	Mean (Std. Dev.)	Regression Coefficients	Standard Errors	Marginal Effect
Effective Minimum Wage	4.215 (0.213)	-0.6148	0.3300	***-0.0174***
Nonwhite	0.566 (0.496)	-0.0261	0.1871	-0.0001
Never Married	0.398 (0.489)	0.1645	0.2060	0.0068
Age (years)	32.335 (8.769)	-0.0026	0.0120	-0.0001
Number of Children	1.805 (1.169)	0.0943	0.0703	0.0037
Child(ren) < 6 years old	0.475 (0.499)	0.1890	0.1998	0.0079
Other Family Income	0.530 (0.938)	-0.0024	0.0855	-0.0001
High School Degree	0.379 (0.485)	-0.4059	0.2003	**-0.0126**
Some College	0.285 (0.452)	-0.5586	0.2457	**-0.0162**
Work Experience	0.472 (0.499)	-0.1900	0.1893	-0.0066
Disabled	0.246 (0.431)	-0.0616	0.2253	-0.0023
State Manufacturing Wages	11.277 (1.357)	-0.1201	0.0877	-0.0043
State Unemployment rate	7.132 (1.472)	0.0465	0.0660	0.0018
AFDC Benefits	3.671 (1.719)	0.1351	0.0629	**0.0055**

Independent Variables	Mean (Std. Dev.)	Regression Coefficients	Standard Errors	Marginal Effect
Assisted Housing	0.076 (0.265)	0.0119	0.2788	0.0005
5-8 months in spell	0.217 (0.412)	-1.0898	0.2497	**-0.0251**
9-12 months in spell	0.179 (0.383)	-1.1570	0.2946	**-0.0260**
13-16 months in spell	0.137 (0.344)	-2.1323	0.5191	**-0.0334**
17-20 months in spell	0.096 (0.295)	-1.8076	0.5241	**-0.0316**
21-28 months in spell		-3.0098	1.0149	**-0.0360**
Re-entry Rate	0.038 (0.191)	—	—	—
Number of observations (person-months)	3,051	Number of femaled headed households with resident children less than 18 years old who recently left welfare		706,126

Marginal effects statistically significant at the 5% level in bold.
Marginal effects statistically significant at the 10% level in bold-italic.

Notes:

Marginal effect is the percentage point change in the probability of a entering welfare conditional on not being on welfare the previous period,

$$[e^{a} - 1]\overline{w}$$

where á (and â) are the estimated coefficient in the complementary log-log models and w is the sample mean of entering welfare. Estimated probabilities were calculated using $5.15 for the effective minimum wage and sample means for the other independent variables.

No respondents resided in the Arizona, Delaware, District of Columbia, Nebraska, New Hampshire, or New Mexico in this analytical dataset.

Table 12. Effect of Minimum Wages on Welfare Entries with State and Year Fixed Effects - Dynamic Models

[The dependent variable is welfare participation measured during each reference month]

Independent Variables	Model 1	Model 2[a]	Model 3[a]	Model 4[a]
Effective Minimum Wage Lagged 3 months	***-0.0174***	-0.0074	-0.0094	0.0021
State fixed effect	No	Yes	No	Yes
Year fixed effect	No	No	Yes	Yes

Marginal effects statistically significant at the 5% level in bold.
Marginal effects statistically significant at the 10% level in bold-italic.

[a]The Effective Minimum Wage Lagged 3 months coefficient is statistically insignificant at the 20 percent level.

Notes:

Marginal effect is the percentage point change in the probability of a entering welfare conditional on not being on welfare the previous period,

$$[e^{a} - 1]\overline{w}$$

where á (and â) are the estimated coefficient in the complementary log-log models and w is the sample mean of entering welfare. Estimated probabilities were calculated using $5.15 for the effective minimum wage and sample means for the other independent variables.

No respondents resided in the Arizona, Delaware, District of Columbia, Nebraska, New Hampshire, or New Mexico in this analytical dataset.

Endnotes

[1]The SIPP uses a rotating, staggered interview design whereby one fourth of the sample is interviewed each month. Thus, the calendar time span of the panel exceeds 32 months.

[2]In fiscal year 1998, the average monthly number of TANF families was 3,176,000 families. See U.S. Department of Health and Human Services, 1998. Reduction in the TANF caseload is calculated by multiplying the estimated percentage point change resulting from a minimum wage increase by the average monthly number of TANF families.

[3]Standard logit models assume independence across observations; however, person-month observations are not independent of one another, and unchanging background characteristics do not vary across person-month for the same person. Thus, the actual number of degrees of freedom is lower than the number of person-months, and the estimated standard errors on regression coefficients tend to be too small. As such, estimated coefficients that appear to be statistically significant should be viewed cautiously while inferences of statistically insignificant differences are, in general, valid.

[4]During fiscal year 1998, 2,897,000 TANF families, or 241,416 per month on average, had their assistance terminated. Increases in TANF exit rates are estimated by multiplying the average number of monthly exit by the estimated percentage point change in welfare exits resulting from a minimum wage hike.