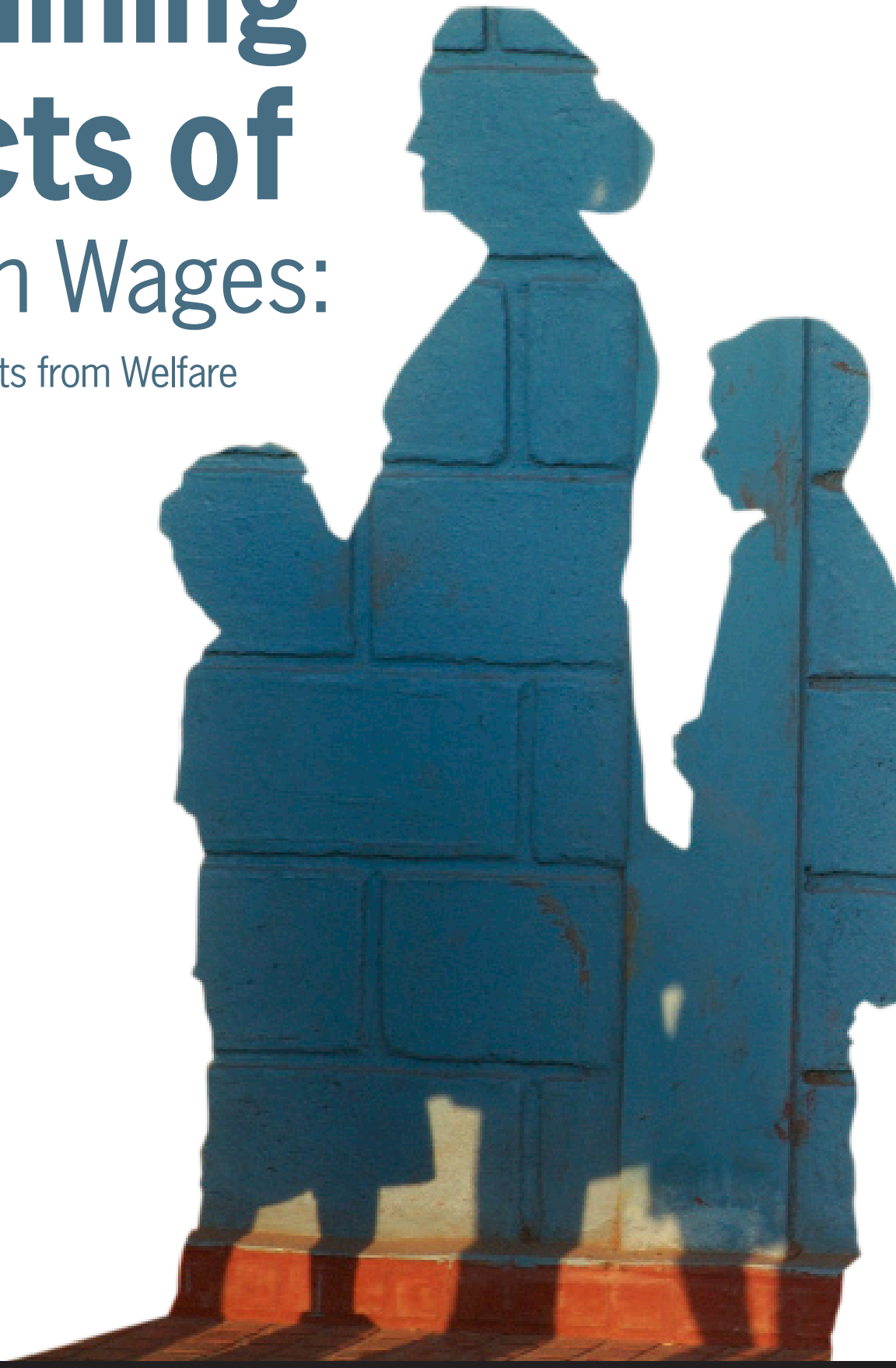
Examining Effects of Minimum Wages:

Single Mothers' Exits from Welfare



By Peter D. Brandon

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The primary aim of minimum wage policies is to enable individuals and families to achieve economic security and independence without recourse to government assistance (Brown at al. 1982, 1983; Ellwood 1988). Although minimum wage policies aim to raise the living standards of workers, most economic studies based upon standard models of labor demand and supply show that such wage gains are trumped by higher levels of disemployment (Brown 1988). With only a few exceptions, the majority of studies provide strong evidence of a disemployment effect among the least-skilled workers when minimum wages are increased (Neumark and Wascher 2007).

Nowadays, the literature on the disemployment effects of minimum wages is voluminous. However, equally far from an exaggeration is characterizing this literature as still containing large knowledge gaps. A particularly conspicuous hole in the literature, which has significant policy implications, is the lack of understanding about the relationship between minimum wages and welfare recipiency. Presently, most of the minimum wage literature focuses on high school dropouts and teenagers, with some attention paid also to poor adults (Card 1992a, b; Card and Krueger 1994, 1995; Currie and Falick 1996; Neumark and Wascher 1992, 1994; Deere, Murphy, and Welch 1995). But analysis of the potential effects of minimum wages on the economic fortunes of single mothers, including their receipt of welfare, has been understudied except for a handful of papers (Brandon 1995a; Turner 1999; Page et al. 2005; Sabia 2007).

Despite limited research on the relationship between welfare receipt and minimum wage policies, minimum wages could potentially affect welfare participation among single mothers. Recent research suggests that a sizable minority of single mothers, both on and off welfare, work (Brandon 1995b), and that they are willing to accept jobs with wages approximating the federal minimum wage (Page et al. 2005). Logically, if higher minimum wages lower demand for the least-skilled workers, then minimum wages might push single mothers onto welfare or diminish their chances of leaving welfare through work.

This study attempts to reduce the gap in knowledge about the effects of minimum wage increases on single mothers' economic prospects by examining the relationship between higher minimum wages and prolonged welfare dependency among single mothers. Apart from Brandon (1995a) and Turner (1999), the link between minimum wages and the duration of welfare receipt among single mothers remains obscure.

Increasing knowledge on this topic is especially important in the current era of cash assistance for the poor. Passage of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) meant that single mothers on welfare must work or face sanctions and that the cumulative amount of time for which they could receive welfare payments is limited. As well, around the same time as the passage of PRWORA, Congress and state legislative assemblies passed laws increasing minimum wages, perhaps assuming that higher minimum wages would provide greater financial incentive for welfare recipients to move from welfare to work, and thereby avoid welfare reform's new punitive measures.

In this study, variation in minimum wages across states and over time is used to identify the effect of higher minimum wages on exits from the Temporary Assistance for Needy Families/Aid to Families with Dependent Children (TANF/AFDC) program among single mothers. Results suggest that higher minimum wage levels and minimum wage increases lengthen the duration of TANF/AFDC receipt among single mothers. Higher minimum wages may therefore lead to disemployment among welfare mothers: an effect found previously for other low-wage workers. The

findings reported here suggest that minimum wage policies might thwart welfare reform policies mandating work among welfare mothers and placing time-limits on benefits. Even if some low-skilled single mothers achieve economic independence, their gains need weighing against the losses faced by others who have their time on welfare extended.

BACKGROUND

The literature on the effects of minimum wage hikes on the employment opportunities of low-wage workers is enormous. Fortunately, there are numerous review articles in the literature. (See Lester 1946; Gramlich 1976; Mincer 1976; Welch and Cunningham 1978; Parsons 1980; Freeman et al. 1981; Brown et al. 1982; Brown et al. 1983; Brown 1988; Neumark and Wascher 1992, 2007.) With exceptions (see Card and Krueger 1994, for example), this literature supports standard economic theory that minimum wage increases, all else equal, will lower the demand for low-skill labor (Katz and Krueger 1992).

It is timely to expand the literature on minimum wages to incorporate the potential effects of increases on single mothers on welfare. Few studies show the relationship between minimum wages and the duration of welfare use among single mothers, but other research findings on the associations among maternal earnings, economic conditions, and welfare dependency hint at pursuing this line of inquiry. (See Bane and Ellwood 1994; Blank 1997; Hoynes 2000; Blank 2001; Schoeni and Blank 2000; Figlio and Ziliak 1999; and Moffitt 1999.) An implication arising from the past studies is that if there is a disemployment effect among less-skilled single mothers due to minimum wage increases, a positive relationship between minimum wages and welfare participation might occur. Indeed, Page et al. (2005) and Sabia (2007) concluded that the potential relationship was positive as both studies found that higher minimum wages were associated with increased welfare receipt.

This research builds upon past studies by conjecturing that higher minimum wages will lengthen the time that single mothers spend on welfare. Data on welfare spells among single mothers should show that higher minimum wages lengthen welfare spells because if higher minimum wages lower the demand for low-skill labor, single mothers should experience a lower rate of exiting welfare. Presently, only Page et al. (2005), Sabia (2007), Brandon (1995a), and Turner (1999) have explored effects of minimum wage increases on AFDC receipt. Using alternative 1980 panels from the Survey of Income and Program Participation (SIPP), Brandon (1995a) concluded that minimum wages lowered rates of AFDC exit, whereas Turner (1999), using two 1990s panels, concluded the opposite. Here, the 1996 and 2001 panels of the SIPP containing much larger samples are used to update conclusions and address issues raised by Baker, Benjamin, and Stanger (1999) about using relatively short panel data to estimate minimum wage effects.

Also, gaining new insight into the relationship between higher minimum wages and welfare dependency is important given studies showing that higher minimum wages adversely affect economic security. Neumark and Wascher (2001, 2002) and Neumark, Schweitzer, and Wascher (1998) reported that higher minimum wages increase the proportion of poor families, reduce work hours and income among these families, and increase disemployment among household members with wages close to minimum wage. Welfare participation could occur if the minimum wage increase causes such undesirable economic conditions among poor households.

Notwithstanding the contributions made in understanding the impact of minimum wage increases on welfare participation, in this era of state-determined welfare policies, more data are needed about the effects of higher minimum wages on single mothers' welfare use, including the length of participation. The current lack of knowledge persists

despite the high proportion of working single mothers susceptible to the same disemployment effect experienced by other groups of low-wage workers while also being subject to stricter welfare work rules and time limits. Even if welfare mothers are a minority among all low-wage workers, many want to end reliance on welfare, or at a minimum supplement any government aid with their own earnings.

ANALYTICAL APPROACH AND DATA DESCRIPTION

Analytical Approach

Ideally, a "natural experiment" is preferable where the timing of a minimum wage increase was randomized across states so I could study state-specific changes in the duration of welfare spells. However, like most past studies of the effects of minimum wage hikes on employment (Brown et al. 1982), my study lacks experimental data to estimate the true effects of minimum wage increases. But, during the period under study (1996-2004), several state legislatures increased minimum wages (see Appendix A), and those legislative actions enable relating state-specific effects of minimum wages to welfare durations.

Survival analysis techniques are used to estimate the effects of increases in state minimum wages on TANF/AFDC exits. The dependent variable is the duration of time, measured in months, that occurs from the start of TANF/AFDC participation until that participation ends (i.e., an exit from the TANF/AFDC program) or the survey ends (i.e., right censoring). Single mothers can start their TANF/AFDC participation at any time during the survey, but right censoring is unavoidable. Importantly, as shown later, survival time analysis yields a hazard rate, which estimates for every month the probability that a single mother exits welfare in the next month, conditional on participation in the current month.

In this study of an exit from the TANF/AFDC program, the hazard rate is generated by a parametric regression survival-time model, the log-logistic model. This model was chosen because the distribution of the duration of time on the TANF/AFDC program (the dependent variable) fits the log-logistic distribution much better than the other distributions considered, e.g., the Weibull, log-normal, and exponential distributions. Also, except for the log-normal model, the appropriateness of other models was rejected according to the Akaike information criterion (AIC) (Akaike 1974). The log-logistic survival time model is estimated by maximum likelihood.

A common form of the log-logistic survival function S(t) is:

$$S(t) = 1 - [1 / (1 + \exp(-w))], \quad (1)$$

where $w = [\ln(t) - b(2)] / b(1)$.

The distribution is specified as a two-parameter distribution generalized to include the effects of covariates on survival times. The generalized log-logistic is called an accelerated life model where the logarithm of survival time is a linear function of the independent variables.

$$w = [\ln(t) - b(2) - b x_1 * x_1 - \ldots - b x_n * x_n] / b(1). \quad (2)$$

Other functional expressions of the model are:

$$h(t) = f(t) / S(t) \quad (3)$$

$$f(t) = \exp[-(\ln(t) - \beta(2)) / \beta(1)] / [(1 + \exp(-(\ln(t) - \beta(2)) / \beta(1)))^2 * \beta(1) * t] \quad (4)$$

$$h(t) = f(t) / [1 - (1 / (1 + \exp(-((\ln(t) - \beta(2)) / \beta(1)))))], \quad (5)$$

and of the accelerated model are:

$$f(t;z) = \exp[-(\ln(t) - \beta(2) - \beta(2) - \beta x_1 * x_1 - \ldots - \beta x_n * x_n) / [(1 + \exp(-(\ln(t) - \beta(2) - \beta x_1 * x_1 - \ldots - \beta x_n * x_n) / \beta(1)))^2 * \beta(1) * t] \quad (6)$$

$$h(t;z) = f(t;z) / [1 - (1 / (1 + \exp(-((\ln(t) - \beta(2) - \beta x_1 * x_1 - \ldots - \beta x_n * x_n) / \beta(1)))))], \quad (7)$$

where: $\beta(1)$ = scale parameter

$\beta(2)$ = index parameter

βxn = parameter from regression for variable n

xn = value of the nth variable

t = time.

Ultimately, this model allows for monotonically falling ($\beta(2) \leq 1$), as well as for an "inverted" U-shaped, hazard rate ($\beta(2) > 1$). Under these conditions, the hazard of leaving the TANF/AFDC program is expected to first rise and then fall. The explanatory variables, such as the level of the effective minimum wage in a state, or an indicator of a rise in the state minimum wage, should determine the level and shape of the hazard function. If a 0, 1 binary indicator of a change in a state minimum wage is statistically significant to the hazard of exiting the TANF/ AFDC program, then, in theory, this predictor should increase or decrease the estimated hazard producing a proportional hazards model. Finally, an attractive feature of this modeling strategy is that the parameter estimates are interpretable as proportional-odds model estimates in terms of log odds or the relative odds of survival (Allison 1995).

Data Description

For this study, I used data from the SIPP, a longitudinal survey of a random sample of the U.S. population. The specific SIPP panels used were the 1996 and 2001 panels, each of which contains four rotation groups spanning two alternative periods, April 1996 through March 2000 and February 2001 through January 2004. (Because these SIPP panels are longer than the earlier panels Brandon [1995a] used, the issues raised by Baker and colleagues [1999] are of less concern.) Each rotation group from the 1996 panel provides information on 48 consecutive months, and similarly the 2001 panel provides information on 36 consecutive months. Each wave of the survey was collected every four months, so each participant was interviewed three times a year about his or her monthly experiences over the previous quarter. Thus, the data provide monthly information on household composition, labor market behavior, program participation, and income sources (U.S. Bureau of the Census 1991).

The SIPP is particularly useful for this study because it contains monthly, longitudinal information on the welfare participation of single mothers. Possessing monthly data on welfare receipt makes analyses of exits from welfare more accurate, although the length of time to study one or subsequent transitions is limited. Combining the 1996 and 2001 SIPP panels yielded a sample of 8,865 women who reported in the month they were first observed in the SIPP that they were single mothers raising children under the age of 18 years. About 76 percent of these single mothers, (N = 6,732), never reported participation in the TANF/AFDC program over the entire course of the SIPP. However, the remaining 2,133 single mothers either already received welfare or at some future month over the course of the SIPP panel participated in the TANF/AFDC for one or more months.

As this study examines the impact of minimum wages on welfare exits, the relevant subgroup of single mothers is drawn from the 2,133 who reported welfare use. These 2,133 single mothers contributed 33,147 person months of continuous TANF/AFDC receipt. However, of those 2,133 single mothers on welfare, 1,448 were already participating in the TANF/AFDC program when they were first observed in the SIPP. Thus, the month they began TANF/AFDC program participation occurred befor the first month of observation in the SIPP. Since the month they began TANF/AFDC participation was either unknown or unusable because no other data were collected, in statistical terms these 1,448 single mothers were "left censored." These left-censored observations were excluded from later analyses since their inclusion would distort the estimated effects of minimum wage increases on welfare exits.

So, for the survival analyses only the remaining 685 single mothers who were not left-censored were included. These 685 women when first observed were single mothers but not receiving TANF/AFDC. However, over the course of the SIPP, they entered the TANF/AFDC program and received cash support for varying lengths of time. During that participation, it was possible for their state of residence

Table 1. Definitions of variables	
Socio-demographic Variables:	**Definition of variables**
Mother's age	Mother's age measured in years
Non-Hispanic black	1 = Non-Hispanic white, 0 otherwise
Hispanic	1 = Hispanic, 0 otherwise
Other	1 = Other[a], 0 otherwise
Non-Hispanic white	1 = Non-Hispanic black, 0 otherwise
Entered into marriage	1 = Married over course of the SIPP panel, 0 otherwise
Less than high school	1 = Did not complete high school, 0 otherwise
High school only	1 = Completed high school only, 0 otherwise
Some college	1 = Completed some college after high school, 0 otherwise
College plus	1 = Complete college or above college, 0 otherwise
Currently employed	1 = Reported currently working, 0 otherwise
Hours worked	Number of hours worked per week
Work disabled	1 = Work disabling condition, 0 otherwise
Raising an infant	1 = Child younger than 2 years of age, 0 otherwise
Number of children	Number of own children less than 18 years in household
Log of monthly family income (1990 dollars)	Log of monthly family income
Number of welfare spells	Number of TANF/AFDC spells
Ever had welfare in past[b]	1 = At least one TANF/AFDC spell before start of current spell and before start of SIPP observation period.
Industry[c]	Census classifications using the 2002 3-digit industry codes. (Concordance performed for 1996 industry codes.)
Occupation[c]	Census classifications using the 2002 3-digit occupation codes. (Concordance performed for 1996 occupation codes.)
State Level Variables	
Monthly TANF/AFDC benefit level/100	Monthly state TANF/AFDC benefit level in 1990 dollars by family size. (Log form for regressions in Table 5.)
State unemployment rate	Annual state unemployment rate
EITC	Annual state Earned Income Tax Credit
Minimum wage level when first observed	Effective state minimum wage level in 1990 dollars when single mother observed at start of her TANF/AFDC spell or at beginning of SIPP observation if she never enters TANF/AFDC. (Transformed to log form in Table 5.)
Change in magnitude	Magnitude of change (measured in cents) in the effective state minimum wage level in 1990 dollars during a single mother's TANF/AFDC spell or over SIPP panel if she never enters TANF/AFDC. (Transformed to log form in Table 5.)
Up to 5 percent change in minimum wage	1 = Change in effective minimum wage was below or equal to 5 percent, increase, 0 otherwise.
Above 5 percent change in minimum wage	1 = Change in effective minimum wage was strictly above 5 percent increase , 0 otherwise.
No change in minimum wage	No legislative change in effective minimum wage in a state during a single mother's TANF/AFDC spell or over the course of her SIPP observation if mother never entered TANF/AFDC.
1 change in minimum wage	1 = Only one state legislative change in effective minimum wage during a single mother's TANF/AFDC spell or over the course of SIPP panel if she never entered TANF/AFDC.
2 or more changes in minimum wage	1 = Two or more state legislative changes in effective minimum wage during a single mother's TANF/AFDC spell or over the course of SIPP panel if she never entered TANF/AFDC.

Notes: State-level data derived from multiple sources. See appendices A and B. [a]Included in "Other" category are Native Americans, Aleutians, and Asians/Pacific Islanders. [b]Data collected from the SIPP topical module on "Recipiency History at Wave 1 of data collection. [c]Industry and occupation categories omitted because of large number of categories (see Table 2). State variables are self-explanatory.

Table 2. Means of variables for modeling effects of state minimum wage increases on TANF/AFDC exits, by type of welfare participation				
	Circumstances of single mother when either first observed in a welfare spell of at beginning of SIPP panel:			
Independent variables:	On welfare when first observed	Went on welfare but only one spell	Went on welfare and multiple spells	Never went on welfare during panel
Socio-demographic Characteristics				
Mother's age	31.8	31.1	31.8	34.9
Non-Hispanic black	0.39	0.39	0.38	0.25
Hispanic	0.21	0.16	0.20	0.14
Other	0.03	0.06	0.09	0.03
Non-Hispanic white	0.37	0.39	0.33	0.58
Less than high school	0.38	0.33	0.40	0.15
High school only	0.38	0.41	0.38	0.40
Some college	0.22	0.24	0.21	0.34
College plus	0.02	0.02	0.01	0.11
Currently employed	0.23	0.45	0.48	0.76
Hours worked	8.72	18.3	17.7	29.68
Work disabled	0.24	0.23	0.25	0.09
Raising an infant	0.30	0.28	0.27	0.17
Number of children	2.1	1.8	2.0	1.6
Log of monthly family income	6.32	5.48	5.75	6.75
Ever had welfare in past	0.08	0.31	0.33	0.20
Number of welfare spells	1.33	1.0	2.29	n.a.
State-Level Variables				
Monthly TANF/AFDC benefit level/100	3.12	2.63	2.80	2.50
EITC	0.03	0.03	0.03	0.03
State unemployment rate	5.3	5.0	5.1	4.8
Minimum wage level when first observed	$3.82	$3.96	$3.95	$3.84
Change in magnitude	0.12	0.06	0.05	0.20
No change in minimum wage	0.68	0.83	0.86	0.69
1 change in minimum wage	0.15	0.12	0.12	0.13
2 or more changes in minimum wage	0.17	0.05	0.02	0.14
N =	1,448	512	173	6,732

Source: 1996 and 2001 SIPP panels. Notes: State welfare reform policies and state and time dummies that are included as controls in subsequent multivariate analyses are excluded from table; all economic variables transformed into 1990 dollars; n.a. = not applicable.

to raise its minimum wage above the federal level.

Nearly 75 percent of the 685 single mothers, N = 512, had only one TANF/AFDC spell during the SIPP observation period. About 40 percent of these 512 single mothers stayed on welfare until the end of the SIPP observation period, i.e., they were "right censored." In any event, these 685 single mothers who entered the TANF/AFDC program in some month after they were first observed contributed 7,061 person months. For 28.4 percent of these person-months on welfare, increases in state minimum wages above the federal minimum wage occurred.

For analyses, welfare exits among the 512 single mothers who had only one spell of TANF/AFDC participation are examined. They contributed 4,449 person-months. After accounting for those who moved interstate, the few without AFDC benefits, and those with no minimum wages available due to aggregation of smaller states, there were 445 single mothers contributing 3,841 person-months left for the survival analyses. These reductions in sample size were inevitable. The remaining single mothers are those for whom the maximum amount of information was available on their first (non-left-censored) welfare spell, and for whom any effects of minimum wage increases are not confounded with other factors, such as moving interstate.

Combining the SIPP panels provided much time-varying socio-demographic and economic data on single mothers who participated in the TANF/AFDC program. Still, because of the construction of the SIPP, I was limited to 36 or 48 months of data on each single mother. The weakness of the SIPP is that it disallows analyses of repeated welfare participation. And, as noted, many single mothers received TANF/AFDC when they were first interviewed in the SIPP. Not knowing if this was a protracted spell of TANF/AFDC use or a short one would have biased the estimates of program exit rates due to state minimum wage increases.

For all the single mothers, a record of their experiences in the labor market, changes in their household composition, and shifts in their sources of income were created. Durations of jobs, occupations, and housing arrangements, as well as numbers of co-residing children, were added to information collected on their demographic characteristics, e.g., education levels. Combined, the variables portray the experiences of 445 single mothers who either ended their first welfare spell or received welfare for the duration of the SIPP observation period.

Besides generating the sample of single mothers from the two SIPP panels, I collected data on minimum wages, welfare reform measures, the Earned Income Tax Credit (EITC), and state TANF/AFDC benefit levels by family size. Once assembled, these data were modified to span the same period as the SIPP panels. Then, these state-level data were appended to every single mother who lived in each identifiable state. When an increase in a state minimum wage over the federal level occurred and coincided with a welfare spell, that increase and the amount of the increase were added to each individual's record. Integrating these data sources produced one large source of data that contained the timing of changes in state minimum wages, other policy data, and the timing of changes in mothers' TANF/AFDC participation. Details about creating these state-level data and overlay with SIPP panels are in Appendices A and B.

FINDINGS

Table 1 defines the variables used in analyses. Table 2 reports descriptive statistics on most of the variables for all groups of single mothers pertinent to the study. Other tables and figures relate to empirical analyses and statistical models based on the sample of single mothers who participated in the TANF/AFDC program.

Descriptive Analyses

Table 2 provides descriptive statistics on the sample of single mothers drawn from the SIPP panels. Except for 6,732 sin-

Table 3. Number of jobs worked and distribution of industries and occupations of single mothers when first observed, by type of welfare spell				
	On welfare when first observed	Went on welfare but only one spell	Went on welfare and multiple spells	Never went on welfare during panel
Number of jobs working				
None	70.01	47.8	48.5	21.7
One	26.3	46.7	46.2	68.6
Two	3.7	5.8	5.2	9.63
	1,448	512	173	6,732
Occupation				
Management, business, or finance	2.30	5.99	4.49	11.24
Sciences related	0.46	1.50	0.0	2.03
Community or social services	0.69	0.0	0.0	0.84
Education	4.15	3.37	4.49	6.21
Arts, design, entertainment, sport/media	0.92	0.37	0.0	0.95
Services	45.62	35.96	38.20	28.19
Sales and related activities	15.90	20.60	21.35	12.11
Office and administration support	17.05	16.10	19.10	25.04
Agriculture	1.15	0.37	0.0	0.59
Construction/production	7.83	12.73	10.11	9.40
Transportation	3.92	3.00	2.25	3.40
N =	434	267	89	5,267
Industry				
Agriculture	0.0	0.0	0.0	0.14
Utilities/Manufacturing	5.11	10.42	9.3	14.56
Trade	16.55	24.32	23.3	15.44
Transport	2.92	0.77	0.0	3.21
Information	1.22	1.16	0.0	2.45
Finance/Insurance	2.68	2.70	3.5	6.65
Real Estate	1.46	1.54	0.0	1.70
Professional/Management/ Scientific	10.22	11.20	8.1	7.32
Service	56.93	43.63	55.8	42.98
Public Administration	2.92	4.25	0.0	5.56
N =	411	259	86	5,070

Source: 1996 and 2001 SIPP panels. Notes: Sample sizes vary due to missing data at first month of observation; Industry and occupation codes are uniform across panels, but sub-categories are aggregated for presentational ease; For occupations: Agriculture = farming, fishing, and forestry; Services = personal care and services, building and ground clearing, food preparation, protective services, healthcare (support, practitioners, and technicians); Education = education, training, and library; Sciences related = life, physical and social sciences, and architecture and engineering; For industry: Agriculture = farming, fishing, hunting, and forestry; Utilities/ Manufacturing = utilities, manufacturing, and construction; Trade = wholesale, and retail; Services = education, healthcare and social assistance, arts, entertainment, and recreation, accommodation and food services, and other services, except public administration.

gle mothers who never used welfare, many characteristics of the other three groupings of single mothers are similar with respect to age, race, and educational levels, although the high school drop-out rate is higher for single mothers who had multiple TANF/AFDC spells and were unable to work due to disability. The groups differ more on employment status, hours worked, past welfare histories, and state minimum wage changes experienced. Among the single mothers who received TANF/AFDC, those who were already on welfare experienced more minimum wage increases compared with those single mothers who went on welfare after the SIPP began. The latter again reinforces the left-censoring feature that is frequently evident in household panel surveys. In any case, many single mothers who entered welfare experienced one or more changes in the minimum wage. The single mothers who never went on welfare experienced more minimum wage changes, but this is because measuring changes in the prevailing minimum wages is taken over a longer period, namely the time spent as SIPP respondents, not the relatively shorter period of a spell of welfare receipt.

Single mothers who never went on welfare during the SIPP panel are different from single mothers who participated in the TANF/AFDC program. Those who never went on welfare were older, better educated, wealthier, and more likely to work and work more hours, while being less likely to have an infant, have more children, and possess a work-related disability. About 20 percent had, at some point before the SIPP, received TANF/AFDC. This is still fewer mothers than those who went on TANF/AFDC during the SIPP (about 30 percent) but more than those who were already on TANF/AFDC when the SIPP began (about 8 percent).

When single mothers work, other differences appear among them depending upon whether they also receive welfare (Table 3). The single mothers who are already on welfare or go on welfare are much more likely to work in service occupations or service industries. If the single mothers who experience welfare and work are not in service occupations, they are most likely to have sales occupations. Overall, among mothers who received welfare at some time, fewer worked in office and administration support occupations, manufacturing industries, or management, business, and finance occupations. The latter occupations usually have higher wages.

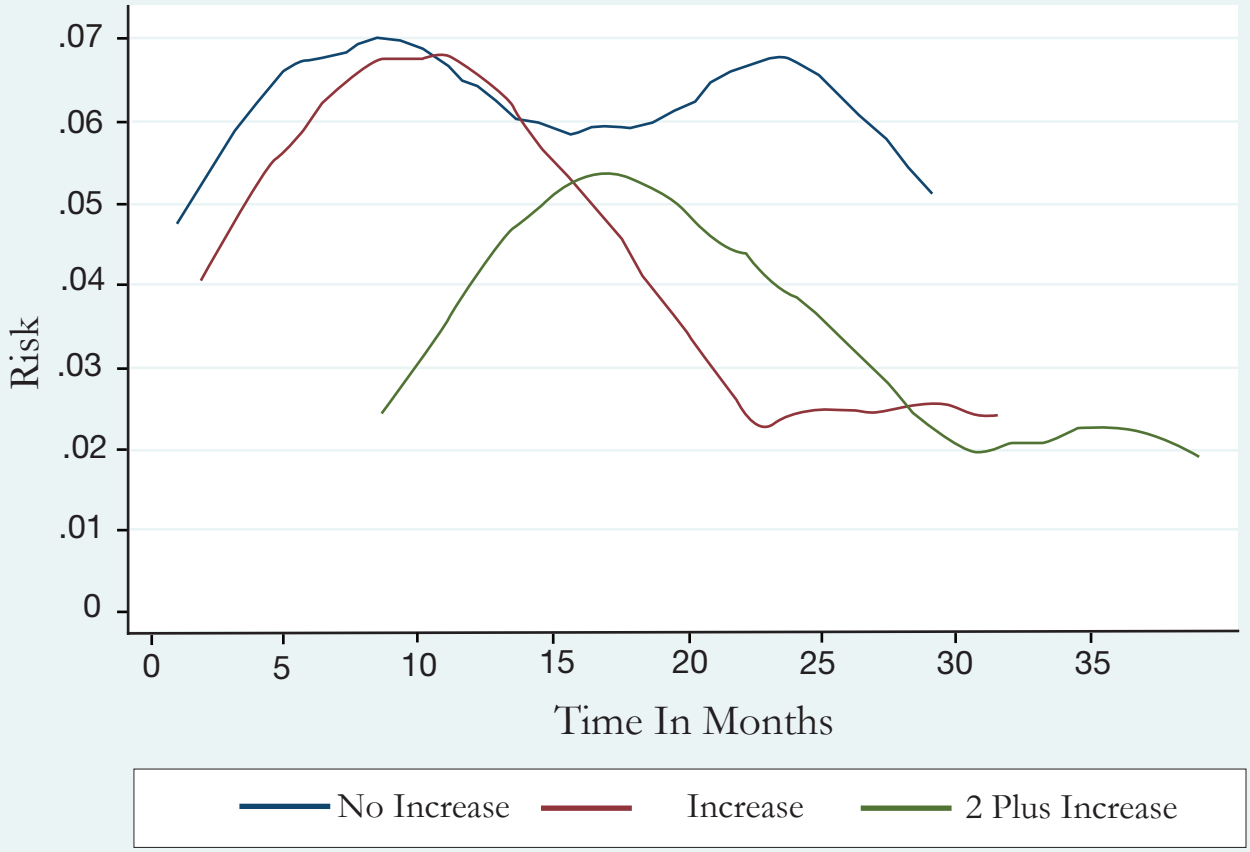
Turning to the 685 single mothers who participated in the TANF/AFDC program and contributed 7,061 person-months on welfare to the survival time analyses, 22.8 percent of their welfare person-months coincided with state minimum wage increases above the federal minimum. Table 4 summarizes survival times on the TANF/AFDC program in person-months arrayed by the number of increases in the state minimum wage over the federal minimum wage that occurred over the SIPP observation period.

The pattern displayed in Table 4 suggests that the median number of months on the TANF/AFDC program rises among single mothers when minimum wages are increased. When there was no increase in minimum wages during welfare spells, 50 percent of those spells ended within six months of the start of the spells. However, when one increase in the minimum wage occurred during a welfare spell, it took 10 months for 50 percent of those spells to end, i.e., four months longer. Although sample sizes fall rapidly and necessitate cautious interpretation, when more than one increase in the minimum wage occurred during welfare spells, it took 20 months for 50 percent of those spells to end. Thus, it took more then 3 times as many months for 50 percent of spells to end if two or more increases occurred in the minimum wage compared with spells where none or only one change occurred in the minimum wage. Furthermore, the incidence rate reported in Table 4 indicates that higher minimum wages are associated with longer spells of TANF/AFDC participation because the pro-

Table 4. Summary statistics measuring survival time (months) of TANF/AFDC participation before exiting, by number of increases in state minimum wage					
Number of changes in state minimum wage levels while on welfare:	Person-months at risk of exiting welfare	Incidence rate	Survival time in months until exiting any welfare spell		
			25%	50%	75%
None	5,349	0.098	4	6	15
One	1,107	0.069	4	10	20
Two or more	695	0.028	14	20	+
Total number of person-months	7,061				

Source: 1996 and 2001 SIPP panels. Notes: Person-month format for all single mothers who had one or more spells of TANF/AFDC receipt; no controls for order of TANF/AFDC spells; all person-months are not left censored; mean and median durations of participation (months) available upon request; + = insufficient person-months for summary survival time calculation.

Figure 1: Hazard of Exits from First Welfare Spell Among Single Mothers
(By State Minimum Wage Increase)



Source 1996, 2001 SIPP panels; 1st non-left-censored spell.

Table 5. Log-logistic survival-time regression estimating effects of minimum wage increases on welfare exits among single mothers			
	Model 1	**Model 2**	**Model 3**
Log effective state minimum wage level (1990 dollars)	2.132**	1.855**	2.174**
	[1.017]	[0.947]	[1.019]
Log magnitude of state minimum wage increases (1990 dollars)	2.499***	n.a.	n.a.
	[0.592]		
Experienced one increase in state minimum wage	n.a.	0.435**	n.a.
		[0.222]	
Experienced more than one increase in state minimum wage	n.a.	1.605***	n.a.
		[0.168]	
Up to 5 percent change in state minimum wage	n.a.	n.a.	0.322
			[0.244]
Above a 5 percent change in state minimum wage	n.a.	n.a.	0.825***
			[0.171s]
Mother's age	-0.004	-0.004	-0.004
	[0.007]	[0.007]	[0.007]
Non-Hispanic black	0.146	0.136	0.139
	[0.129]	[0.121]	[0.128]
Hispanic	0.175	0.153	0.171
	[0.115]	[0.118]	[0.111]
Other	0.301	0.304	0.296
	[0.216]	[0.209]	[0.211]
Entered into marriage	-1.176***	-1.066***	-1.188***
	[0.325]	[0.263]	[0.321]
High school only	-0.083	-0.094	-0.081
	[0.114]	[0.110]	[0.114]
Some college	-0.211	-0.227*	-0.205
	[0.147]	[0.138]	[0.148]
College plus	0.863**	0.859***	0.853**
	[0.352]	[0.294]	[0.348]
Employed	-0.670***	-0.684***	-0.660***
	[0.183]	[0.155]	[0.182]
Work disabled	0.405*	0.440**	0.409*
	[0.208]	[0.201]	[0.205]
Raising an infant	-0.067	-0.069	-0.067
	[0.168]	[0.163]	[0.167]
Number of children	0.157**	0.150**	0.164**
	[0.078]	[0.072]	[0.077]
Log of monthly family income ($1990)	-0.004	0.002	-0.009
	[0.070]	[0.062]	[0.070]
Ever had welfare in past	0.188	0.181	0.174
	[0.148]	[0.140]	[0.150]

Table 5 (Con't)			
Log of monthly TANF/AFDC benefit level ($1990)	-0.087	-0.184	-0.102
	[0.212]	[0.221]	[0.212]
EITC	-0.807**	-0.491	-0.743**
	[0.354]	[0.332]	[0.359]
State unemployment rate	0.117*	0.110*	0.120*
	[0.068]	[0.054]	[0.068]
Constant	-1.382	-0.92	-1.542
	[1.348]	[1.263]	[1.333]
Log likelihood	-478.46	-470.60	-477.38
Ln-gam	-0.54***	-0.56***	-0.57***
N =	3,834	3,834	3,834

Source: 1996 and 2001 SIPP panels. Notes: n.a. = not applicable; robust standard errors clustered at the state level in brackets; regressions control for state fixed effects and state welfare reform policies; * p ≤ .10, ** p ≤ .05, *** p ≤ .01.

Table 6. Predicted median durations, hazard rates, and odds of longer durations of first TANF/AFDC spells from log-logistic survival time regressions, by model

	Measures of state minimum wage change	Median duration of welfare spell (months)[a]:	Hazard rate of exit from welfare spell[b]	Odds of a longer welfare spell[c]
Model 1	Level of minimum wage	12.6 (8.0)	0.074 (0.05)	n.a.
Model 2	No change	10.71 (6.10)	0.083 (0.054)	
	One legislative change	14.12*** (5.8)	0.060*** (0.047)	0.46
	Two or more legislative changes	39.0 (15.9)	0.02 (0.01)	0.06
Model 3	No change	10.73 (6.13)	0.06 (0.04)	n.a.
	Less than 5 percent change	14.9*** (7.4)	0.065*** (0.041)	0.57[d]
	More than 5 percent change	19.8 (9.8)	0.041 (0.031)	0.24

Source: 1996 and 2001 SIPP panels. Notes: Person-month format for all single mothers who had only one (non-left-censored) spell of TANF/AFDC receipt; predictions are based on three survival time regressions that specified state minimum wage levels (1990 dollars) and types of increases in state minimum wages (legislative or magnitude). [a]Predicted medians are significantly different at p ≤ .001 using nonparametric equality of medians test. [b]Predicted mean hazard rates are significantly different at p ≤ .001 using t-tests. [c]Based on formula shown in endnote 3. [d]Based upon an insignificant coefficient in Model 3 in Table 5.

portion of welfare spells ending as a proportion of those at risk of ending falls precipitously with increases in minimum wages. Overall, results show the positive correlation reported in the literature (Brandon 1995a; Grogger 2002, 2003, 2004; Page et al. 2005) between higher minimum wages and welfare receipt.

Figure 1 reinforces the direction of association suggested by Table 4. Figure 1 shows trends over 35 months for the subset of first observed welfare spells that are non-left censored. (Figure 1 is therefore based on person-months generated by the 512 single mothers, not the larger sample of 685 single mothers who had multiple welfare spells.) Figure 1 shows that the welfare spells ending at the fastest rate and with the shortest durations of TANF/AFDC participation are those that do not coincide with minimum wage increases. Reflecting contents in Table 4, exits from welfare spells that overlap with increases in minimum wages are less rapid compared with spells that do not overlap, and spells are longer. Figure 1 also suggests (despite sample sizes) that the rates of exit for first observed welfare spells coinciding with two or more minimum wage increases are much lower than spells coinciding with only one minimum wage increase.

There appears an association between increases in minimum wages and rates of exits among single mothers from the TANF/AFDC program. Apparently, longer welfare spells (because of slower exits) are associated with increases in minimum wages. Though suggestive, Table 4 and Figure 1 fail to control for other factors that might confound the effects of increases in minimum wages, such as demographic characteristics of the single mothers or welfare policies in a state since passage of PRWORA. Without controlling for time varying and time invariant individual- and state-level characteristics, the apparent association between higher minimum wages and welfare exits is potentially spurious. As the SIPP contains measures of individual characteristics and identifiers for merging state-level characteristics, estimating the net effect of higher minimum wages on TANF/AFDC exits is possible using survival time multivariate regressions. Results from these continuous time hazard regressions are presented in Table 5.

Survival Modeling Analyses

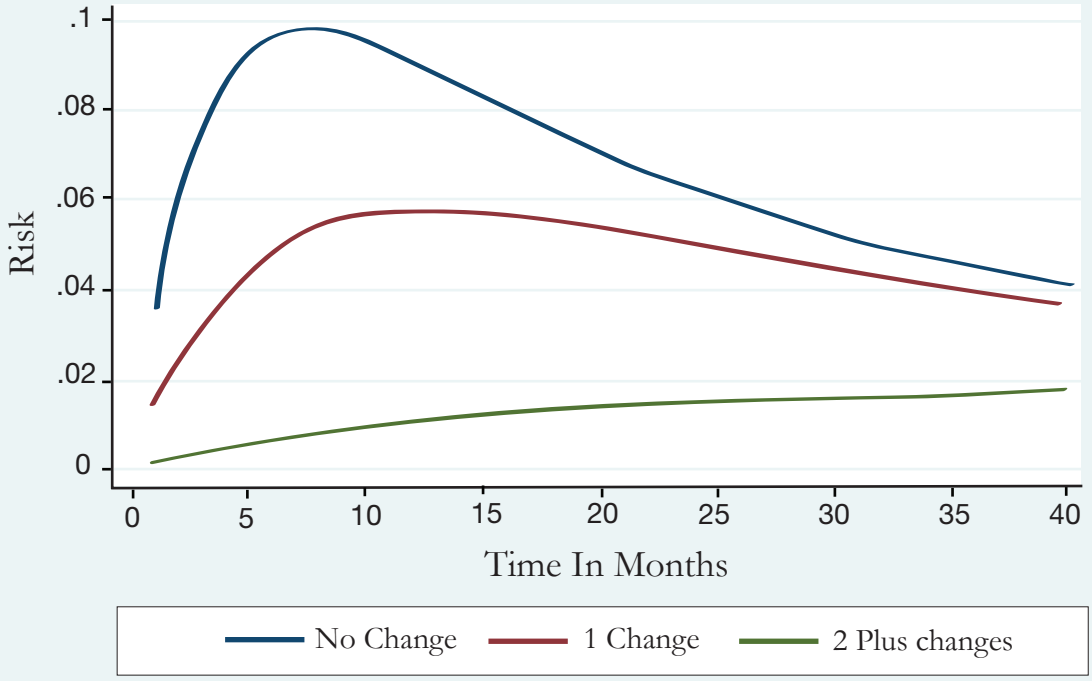
Table 5 presents estimated coefficients for minimum wages from three log-logistic survival time models. In each model, the log of the effective minimum wage level is used. Each model also contains measures of minimum wage changes during the first observed (non-left-censored) welfare spell. In Model 1, the log of the change in magnitude of the effective minimum wage is specified; in Model 2, the number of legislative changes in the minimum wage are specified; and in Model 3, changes in magnitudes of effective minimum wages are reclassified into three categories with the first category, (1) zero percent change, the omitted category; the other two categories, (2) above zero but below a 5 percent change, and (3) above a five percent change, are included. (See Table 1 for definitions.)

Controlling for other factors, e.g., high school noncompletion (which is a comparison group in models), the two estimated coefficients in Model 1 for minimum wages reveal the magnitude and direction of minimum wage effects. The two statistically significant estimated coefficients suggest that higher effective minimum wage levels (2.13) and higher increases in the magnitudes of minimum wages (2.49) lengthen welfare spells. Or, alternatively, minimum wage estimates suggest rates of exit from TANF/AFDC spells decrease.

Model 2 in Table 5 takes a different tack to estimating the effect of higher minimum wages on welfare exits. The estimated effect (1.85) of the effective minimum wage level is significant but so also are coefficients estimating legislative increases in the minimum wage (0.435 and 1.605). Thus, minimum wage increases experienced during this welfare spell lowers the rate of exits from TANF/AFDC.

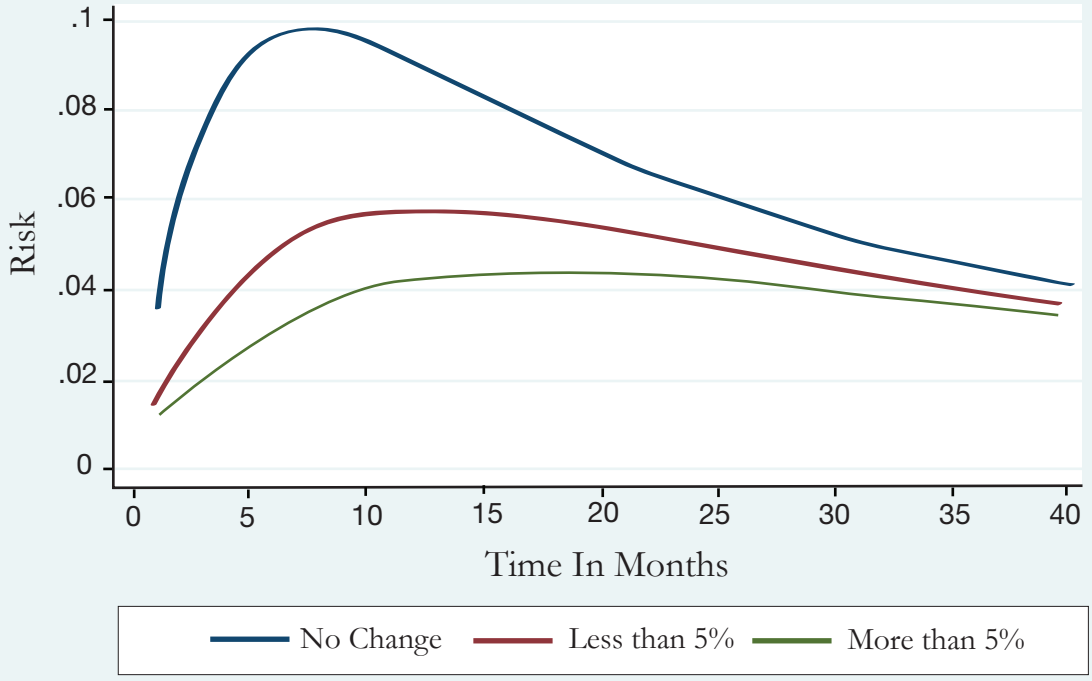
Finally Model 3 in Table 5 tests whether the magnitude of

Figure 2: Hazard of Welfare Exit Among Single Mothers
(By Number of Minimum Wage Increase)



Source 1996, 2001 SIPP panels; 1st non-left-censored spell.

Figure 3: Hazard of Welfare Exit Among Single Mothers
(By Percent Change in Minimum Wage)



Source 1996, 2001 SIPP panels; 1st non-left-censored spell.

the increases in minimum wages also lowers exit rates from welfare. Estimates from this regression indicate that in addition to minimum wage levels decreasing welfare spell exit rates (2.174), so, too, does larger magnitudes in the size of minimum wage increases. Increases of more than 5 percent higher than the prevailing effective minimum wage decrease welfare spell exits; in other words, relatively larger increases in the effective minimum wage extend time on welfare.

For Models 2 and 3 that include categorical measures of the number or magnitude of changes in minimum wages during a spell of TANF/AFDC participation, the exponentiated estimated parameters for $\beta(1)$ and $\beta(2)$ are 2.50 and 1.75 (Model 2), and 4.13 and 1.76 (Model 3), respectively. The estimated parameters suggest that ongoing TANF/AFDC participation leads to an increasing and then decreasing rate of exit from the program. Since both models indicate that there is initially an increasing rate of exits, the estimated coefficients for the magnitudes and numbers of changes in minimum wages should lower the rate of exit so that the coefficients are below the rate of exit if no changes in minimum wages occur. So, the relevant minimum wage measures of changes in magnitude and number determine the height and shape of the hazard rates. Figures 2 and 3 (discussed below) display such a pattern of the predicted hazard rates over time.

The estimated coefficients for the effects of minimum wage levels were statistically significant in all models. Unreported additional statistical tests on the models, e.g., log likelihood ratio tests, indicated that inclusion of the minimum wage variables in the multivariate models produced more appropriate survival time models of TANF/AFDC spell exits. Although efforts to specify a discrete time survival model failed due to sample size and computational constraints, results from the first stage of this alternative estimation procedure were consistent with the findings from the continuous time survival models.

The log-logistic model permits a proportional odds and an accelerated failure-time representation (Allison 1995). Thus, the parameter estimates yielded from the three log-logistic models are interpretable as proportional odds estimates in terms of log odds or relative odds of survival. The translation makes the interpretation of the log-logistic minimum wage coefficients appealingly intuitive. Formulaically, to calculate the proportional odds coefficients (log odds) I use $-\beta/\beta(2)$, and to retrieve the odds coefficients I use $\exp(-(-\beta/\beta(2)))$.

The transformed coefficients for the minimum wage variables in Models 2 and 3 offer clear substantive interpretations. Net of the models' controls, Table 6 suggests that single mothers who experience changes in minimum wages while receiving welfare are significantly less likely to leave welfare compared to other welfare-receiving mothers who experience no such changes. From Model 2, single mothers who experience one change are approximately .46 times less likely to exit the TANF/AFDC program compared with welfare mothers experiencing no minimum wage change; single mothers who experience two or more changes during their receipt of welfare are about .06 times less likely to exit the TANF/AFDC program than welfare mothers experiencing no minimum wage change. For Model 3, single mothers who experienced more than a 5 percent increase in the magnitude of the minimum wage were approximately .24 times less likely to exit the TANF/AFDC program than welfare mothers experiencing no (percentage) change in the minimum wage.

Predictions for median spell durations and hazard rates are also displayed in Table 6. The predictions of median spell durations and hazard rates are based on covariates in models all set to the sample average values. Though comparisons of numbers in Tables 4 and 6 are inappropriate due to differing samples and methods, the overall effect of longer median spell durations if minimum wages are increased is apparent.

The predicted values in Table 6 indicate that median durations of TANF/AFDC spells are longer if a minimum wage increase happens during receipt of welfare. For Model 2, if there is one minimum wage increase, the predicted median spell length of TANF/AF DC participation increases by nearly four months, and the predicted hazard rate decreases by two percentage points. In Model 3, if there is a minimum wage increase of less than 5 percent, the predicted median spell length of TANF/AFDC participation increases by more than four months, and the predicted hazard rate decreases by nearly two percentage points. Though the predicted median length of a welfare spell seems unrealistic (39 months) for two or more legislative changes (Model 2), the predicted median length of a welfare spell (19.8 months) for a more than five percentage point increase in the magnitude of the minimum wage seems reasonable (Model 3). Also in Model 3, for more than a 5 percent increase in the level of the minimum wage compared to none, the hazard rate of leaving the TANF/AFDC program is greatly reduced from .06 to .04.

Overall, minimum wage predictions from Models 2 and 3 are consistent with the trends presented in Table 4 and Figure 1. Statistical tests performed on the predicted hazard

Table A.1
States with minimum wages increases between 1996 and 2003†

Year	States
1996	CA, CO, CT, DE, IL, MD, MA, MO, NE, NV, NH, OK, PA, RI, UT, WI.
1997	AR, CA, CT, DE, IL, MD, MA, MI, MN, MO, NE, NV, NH, NC, OK, OR, PA, RI, UT, WA, WI.
1998	CA, CO, IN, KY, NJ, OR.
1999	CT, DE, IN, OR, RI, WA.
2000	CT, DE, MA, NY, RI, WA.
2001	CA, CT, GA, MA, TX, WA.
2002	CA, CT, HI, WA.
2003	CT, HI, OR, WA.

Source: 1996 and 2001 SIPP Panels and data collected by author from various publications. †Not exhaustive enumeration due to state aggregations done by the U.S. Census Bureau to maintain respondent confidentiality (U.S. Bureau of the Census, 1991).

rates (t-tests and analysis of variance) and median survival lengths (nonparametric equality of medians tests) suggested that these estimates were different from one another.

Similarities between earlier empirical survival analyses and regression models are found when comparing Figures 2 and 3 with Figure 1. The predicted behavior of the hazard rates follow the log-logistic distribution, especially for welfare spells that did not coincide with one or more minimum wage increases. Figures 2 and 3, like Figure 1, display that for spells without minimum wage increases the predicted hazard rate rises rapidly and peaks between seven and 10 months of program participation. Then, the hazard rates in Figures 2 and 3 decrease over subsequent months. Except for the last few months of the SIPP observation period, welfare spells that never incorporated a minimum wage increase are predicted to always end more rapidly than the welfare spells that coincided with increases in the minimum wage. In Figures 2 and 3, the predicted hazard rate of exiting a spell of welfare if one or more increases in the minimum wage occurred is not as large in magnitude compared with no increase. Overall, the predicted hazard rates displayed in Figures 2 and 3, as well as predictions for median durations of TANF/AFDC spells, are consistent with the descriptive analyses of survival times and incidence rates. Finally, both figures show that the categorical variables measuring changes in minimum wages shift the estimated hazard rates downwards and attenuate their shapes as suggested previously.

The focus of this study is to generate new findings on the impact of minimum wages on single mothers' welfare exits, then to interpret those findings, and finally to understand the implications of those findings. But the focus does not mean that the other findings are unimportant. To the contrary, even if they are peripheral to the study's central aim, there are still some important findings worth highlighting, even if briefly.

Firstly, the state Earned Income Tax Credit (EITC) variable suggests that this policy tool shortens TANF/AFDC spells, or alternatively leads to higher rates of exits. Moreover, employment and marriage also increase the rate of welfare exits. By contrast, a work-related disability, higher state unemployment rates, and more children lower the rate of welfare exits. Insignificant results for racial and educational differences were surprising, as was the inexplicable findings that the highest educated single mothers have lower exit rates from welfare. For the latter, the data was carefully scrutinized but no reporting errors or programming mistakes were found. Other findings such as raising an infant and having a welfare history were in the expected direction—lower rates of welfare spell exits—but these coefficients were also insignificant. If sample sizes were larger, the possibility exists that these other covariates in the model would reveal more robust results to compare with past findings, which have already been reported in the welfare literature (Moffitt 1994).

DISCUSSION AND CONCLUSIONS

This study suggests that higher minimum wages lowered TANF/AFDC exit rates. Raising minimum wages will not, according to the findings, move more mothers off welfare rolls and onto payrolls. The findings show that higher minimum wages extended the length of time that single mothers received welfare rather than shortened it. Increasing the minimum wage overall does not seem to work in tandem with the new generation of welfare reform rules and policies, nor do increases make work pay for welfare-dependent mothers because such hikes lower the demand for low-skilled labor.

Increases in minimum wages may further disadvantage single mothers if potential employers become more selective in hiring practices, preferring to hire teenagers finishing high school, college students looking for part-time work, or other low-wage workers with fewer family responsibilities. Lang and Kahn's (1998) study suggests that this substitution of younger workers for older ones can happen. Further, increases in minimum wages, if tied to the distribution of human capital levels, raise the educational qualifications of the marginal worker. If hiring becomes based on the marginal worker possessing a high school diploma or better, many mothers on welfare will remain unemployed because they do not possess a high school diploma, as Table 2 showed. Conversely, college and high school students could now find low-wage jobs sufficiently attractive to compete for them, thereby "crowding out" single mothers who are willing to or compelled to work their way off welfare.

The findings that show an adverse effect of higher minimum wages on single mothers' prospects of leaving welfare cast further doubt over the effectiveness of minimum wages as an antipoverty device. The mounting evidence supports the argument that minimum wages are a badly targeted policy tool to reduce poverty (Blank 1997; Sabia 2007). Policymakers apparently have a dilemma: when minimum wages are increased, welfare mothers have more trouble leaving welfare, and hence their ability to avoid time limits is compromised. Raising minimum wages on the one hand, while mandating tougher work rules for welfare eligibility and establishing time limits for participation on the other, is therefore counterproductive. If welfare mothers have to satisfy work rules to receive assistance, yet also want to stay employed and gain work skills, devising another subminimum wage level, like that created for students, along with child care subsidies, is worth consideration.

Apart from highlighting how one social policy can undermine another, the study also broadens the literature. Heretofore, except for the handful of studies noted earlier, findings driving the debate over the antipoverty effectiveness of minimum wages have focused on low-wage workers and teenagers, not single mothers on welfare who, as a group, are disproportionately more likely to live in poverty.

There are better ways of promoting economic independence among welfare mothers and raising their incomes above the poverty line than hiking the minimum wage. Macroeconomic policies that promote a healthy economy would serve all workers, not just welfare mothers willing to work. Employment policies should give former and present welfare mothers greater incentives to work. Many more welfare mothers work than people realize. Their efforts should be encouraged either by raising the earnings disregard of the TANF program or by lowering its benefit reduction rate. Beyond such tinkering, advancing the EITC or expanding state supplements is pivotal because such policy instruments reward work, and as employers do not bear the costs, there is no reduction in the demand for low-skilled workers. If the aim is to convince mothers that welfare is temporary, then those who are not working should attend job training or remedial education programs, and those who are working need to know their employment has long-term benefits.

Few would disagree that increased earnings brings financial and personal rewards. But the benefits of working are

reaped over time, not just by getting a job. For single mothers to exploit the gains from work, conditions supporting their attachment to the low-wage labor market have to exist and remain present. Some of those conditions they can control,such as choice of child care arrangement. Others, however, are beyond their control, may change over time, or eventually limit their work possibilities but increase their odds of welfare participation. One such policy variable is increasing the minimum wage. As recent research suggests (Sabia 2007), higher minimum wages can lessen hours worked for single mothers, decrease their earnings, and increase the chances of losing employment. If such outcomes happen while single mothers receive welfare, they not only lose the gains from working but their welfare benefits as well.

Finally, mothers who move off welfare and into jobs need employment-related services and other assistance. Many former welfare mothers return to welfare because there are too many uncertainties, including unstable employment. Irregular child support payments, unstable child care arrangements, and inadequate health insurance make welfare more attractive than juggling a job and family demands. Policies that promote stability in the early phase of economic independence, such as child support enforcement, EITC information, and the Dependent Care Tax Credit, are essential to keep single mothers from returning to welfare. These sorts of policies targeting former welfare mothers and current ones may ultimately prove more effective at reducing poverty and economic insecurity in this post-welfare reform era than raising the minimum wage.

APPENDIX A
THE STATE MINIMUM WAGE PANEL DATA SET

The panel data on minimum wages include observations covering 50 states and the District of Columbia for the same time period as the SIPP panel data set. For this period of time, I constructed a chronology of changes in each state's minimum wage using information published by each state's labor department or from other publications disseminated by the Bureau of Labor Statistics. With those sources, I created variables that measured the length of time that each state's minimum wage applied and that identified the month when each state's minimum wage was increased above the federal minimum, if the minimum wage increased during the period when SIPP data were collected.

I encountered difficulties while constructing these data. Most problems were a by-product of multiple minimum wages within each state and rules about which workers were covered by the state minimum wage(s). For instance, some states had multiple minimum wages for different types of workers.

Another problem was that several of the least populated states in SIPP were aggregated into multi-state groupings to protect respondents' confidentiality. The multi-state groupings consisted of the following states: Iowa, North Dakota, South Dakota, Alaska, Idaho, Montana, and Wyoming. Few respondents came from those states. Because I was unable to correctly match minimum wages or other state-specific data to those respondents, they were excluded from analyses.

Creation of these state minimum wage data was assisted by two factors: (1) during the period of the SIPP panel, state minimum wage levels were never lowered, and (2) the federal minimum wage level was raised infrequently. Details on state minimum wages are summarized in the table below. The table shows that over the course of these two SIPP panels, several states increased their minimum wages.

APPENDIX B
THE STATE TANF/AFDC PANEL DATA SET

Panel data on TANF/AFDC benefit levels have one observation for each state and protectorate for the same time period as the SIPP panel data set. For this period of time, I constructed a chronology of changes in each state's TANF/AFDC benefit levels by family size using information disseminated by the Administration of Children and Families (U.S. Department of Health and Human Services 2002) and data published in the Green Book (U.S. House of Representatives 2002). From these sources, I created variables that measure the length of time that each state's TANF/AFDC benefit level for each family size was valid, as well as variables that measured nominal levels of benefits for families of different sizes. Obviously, the procedure identified the months when states' AFDC benefit levels increased, if they did go up during the period when SIPP data were collected. The maximum number of benefit level changes in the 5 year period was seven, and the maximum family size was five. (Data I possessed on state TANF/AFDC benefits went up to a family size of 14. However, the marginal increases in benefits above family sizes of five are paltry, and my sample contained few single mothers who had families sized greater than five. For computing efficiency, I appended benefit levels for a family size of five to those few who had family sizes greater than five.)

Before merging these data with the SIPP data, I deflated TANF/AFDC benefits into 1990 real dollar amounts. The deflator I chose was a rebased version of the Consumer Price Index, excluding food and energy, as reported in the 2002 Economic Report of the President (Council of Economic Advisors 2002). This deflator, or its variants, has been commonly used (Moffit 1992). When joining these state-level panel data to the SIPP data, I again encountered the problem of several of the least populated states having been combined to protect respondents' privacy. I had to discard mothers living in those states because I was unable to correctly match TANF/AFDC benefit levels to the mothers' welfare spells.

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Endnotes:

The sample attrition rate from the 2001 SIPP was higher than previous SIPP panels.

Guided by past studies of welfare dynamics, I did not count as two separate spells of welfare participation the few occasions when one month of nonparticipation separated adjacent months of participation during the observation period, which presumably reflects coding errors or "administrative churning." (See Blank and Ruggles 1994; Brandon 1995a; Health and Human Services 2001).

Factors in any SIPP panel that can decrease the size of a sample include individuals who move from the states in which they initially resided; individuals categorized into multi-state groupings; and individuals who reported self-employment.

The formulas are (exp{-(0.43)/.56}), (exp{-(1.60)/.56}), (exp{-(0.32)/.57}), and (exp{-(0.82)/.57}). See Table 5, Models 2 and 3. The number in the denominators is "Ln-Gam," which is produced from the log-logistic regression and shown in Table 5 as well.

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Notes

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