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# Are There Returns to Experience at Low-Skill Jobs? Evidence from Single Mothers in the United States over the 1990s

**Upjohn Institute Working Paper 16-255**

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## ABSTRACT

Policy changes in the United States in the 1990s resulted in sizable increases in employment rates of single mothers. We show that this increase led to a large and abrupt increase in work experience for single mothers with young children. We then examine the economic return to this increase in experience for affected single mothers. Despite the increases in experience, single mothers' real wages and employment have remained relatively unchanged. The empirical analysis suggests that an additional year of experience increases single mothers' wage rates by less than 2 percent, a percentage lower than previous estimates in the literature.

**JEL Classification Codes:** J31, I38, J12, J24

**Key Words:** Wage returns to experience, Welfare reform, Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996, Single mothers, Low-skill labor, Current Population Survey, Synthetic cohorts

## Acknowledgments

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A primary motivation for the sweeping changes to America's social insurance system in the 1990s was encouraging work among low-income families. The earned-income tax credit (EITC) provided a generous incentive for low-income working families to leave welfare for work, expansions in public health insurance (Medicaid) allowed them to retain insurance while working, and cash welfare was overhauled with stronger work requirements. Beyond the direct effect of increased earned income, it was hoped that low-income households would reap the rewards of work experience in the form of higher wages and enhanced employment opportunities. The magnitude of the returns to experience for this group is of central importance for assessing the long-term benefits of encouraging work among vulnerable populations.

Our analysis addresses this question by examining the abrupt increase in work experience accrued by certain single mothers in the 1990s and how that increase in experience affected their earnings. As we show, much of the increase in employment (and reductions in welfare use) occurred because mothers with very young children returned to work earlier; changes in employment and welfare use were small among mothers with older children, most of whom already tended to work. This meant that some single mothers had spent many more months working than others at the same point in their lives, depending on the years of their children's births. When we look at the earnings of these otherwise similar parents, however, we find little difference, suggesting any returns to experience are small. The empirical analysis in this paper formalizes and confirms this basic observation.

Despite the large body of research examining the policy changes enacted in the 1990s, relatively little is known about how resulting increases in work experience affected later earnings of the target population. A key challenge to identifying the returns to experience in this group arises because welfare reform (along with related policies) was implemented nationally and over a compressed time frame. Thus, traditional sources of policy-related variation using differences across time or across states are unable to identify the returns to experience. A number of papers have used evidence from other time periods, alternative sources of identification, or field experiments to overcome these issues. However, some of these studies (Gladden and Taber 2000; Loeb and Corcoran 2001; Grogger 2009) suggest that the returns on experience should be large, while others suggest zero or relatively low returns to experience for welfare-leavers and other unskilled workers (see Friedlander and Burtless [1995], Card and Hyslop [2005], and Dustmann and Meghir [2005]).

Our analysis contributes to this literature by exploiting a new source of variation in how welfare reform and related policies have affected the employment rates of single mothers based on the ages of their children at the time of welfare reform. First, we show that prior to 1996, relatively few single women with children under age six worked at all. At the same time, however, most single women with older children held a job. When rates of employment among single mothers surged after welfare reform, almost all of the increase occurred among the cohort of women whose children were less than six years old; employment (and welfare use) rates of women with older children changed little over

the 1990s.[1] As a result, in the time between when a youngest child was born in 1995 and turned six in 2001, on average his mother had worked about 4.2 years—1.1 years more than an otherwise similar mother whose child was born in 1990. This increase in employment and in work experience may be the largest policy-induced increase studied in the United States, measured both in terms of the increase in years of experience and by the size of the population affected.

Using this variation in employment across single mothers based on the age of their youngest child, we estimate the returns to work experience. Because welfare reform differentially affected single mothers based on the age of their youngest child, single mothers with young children at the time of welfare reform increased their labor supply and subsequently gained more experience relative to single mothers with slightly older children. Accordingly, we identify the returns to experience based on this discontinuous increase in experience among otherwise similar groups. In certain specifications, we augment this analysis using comparisons between states with high and low rates of welfare use prior to welfare reform, and through comparisons to married mothers with similarly aged children.

Our results suggest that additional years of experience have no discernible effects on the earnings, wages, or employment opportunities of affected single parents. This result is in line with the evidence of Card and Hyslop (2005), which suggests that the

[1] Because families with more than one dependent child are on average more likely to have a younger child, one implication is that the large differences in employment rates (and changes in employment rates) between parents based on the number of children are virtually eliminated once one controls for the age of the youngest child. In other words, mothers of young children increased their labor supply and, as a result, the employment rates of single parents with two children increased relative to the rates of parents with only one child, largely because multichild households are more likely to include a young child.

temporary employment effects of a welfare experiment in Canada had no long-term effects on the labor market outcomes of welfare program participants. Our analysis, however, covers a much larger population, including relatively more-skilled single mothers, and concerns a permanent change in policy.

## BACKGROUND

### Policy Changes over the 1990s

We examine the returns to experience of single mothers during the 1990s because this period included significant changes in social policy that dramatically changed patterns of employment of low-income single mothers. Dissatisfaction with rising rates of nonemployment and welfare use among single-parent households prompted a vast reorganization of the social safety net in the 1990s. A key theme of this revision was an emphasis on work. A variety of tax, spending, and regulatory provisions were revised to increase the rewards for work or reduce benefits available to nonworkers. The most prominent of these changes include the Personal Responsibility and Work Opportunity Reconciliation Act of 1996—otherwise known as welfare reform—which combined three things: 1) time-limited financial or child-care support for working parents with work requirements, and sanctions for noncompliance with program rules; 2) the expansion of the EITC, which subsidizes employment for low-income parents; and 3) the expansion of public health insurance to the children of working low-income parents; as well as other provisions like increases in the minimum wage.

During the period of these policy changes, single-parent families' employment and welfare use changed dramatically. Annual rates of welfare participation among single mothers recorded in the March Current Population Survey fell from 33 percent in 1993 to 11 percent in 2000. Administrative data show that the welfare rolls fell from 5.0 million families and 14.1 million individuals in 1993 to 2.2 million families and 5.8 million individuals by 2001 (U.S. Department of Health and Human Services 2008). Over the same period, employment among single mothers increased rapidly: between 1993 and 1999, annual employment rates rose from 69 percent to 83 percent.

A large literature finds that policy changes played a central role in the decline in welfare use and increases in employment experienced by single parents in the 1990s (for examples, see Bell [2001]; Blank [2002]; Grogger, Karoly, and Klerman [2002]; Meyer and Sullivan [2004]; and Grogger and Karoly [2005]). A consistent conclusion of this literature is that the tax and welfare changes enacted over the 1990s sharply increased the employment of single mothers and cut welfare rolls. Moreover, while some welfare-related policies were revised earlier in the 1990s using welfare "waivers," these changes produced relatively minor changes in aggregate welfare use (Looney 2006). By far the largest changes in welfare use and employment occurred in a relatively short period, starting in 1994 and accelerating sharply following the 1996 passage of welfare reform.

The fact that the largest policy changes occurred at roughly the same time (the largest EITC expansions were phased in between 1993 and 1996, and welfare reform was implemented over an 18-month period starting in late 1996) meant that single parents experienced a rapid increase in employment starting around 1994. Thus, single parents

prior to the mid-1990s experienced a very different policy environment, which resulted in different employment histories. However, the fact that these increases were primarily policy-driven implies that the changes in employment—and the resulting gains in work experience—were in large part exogenous.

**Single Mothers' Employment and Welfare Use and the Age Structure of Children**

The starting point in our analysis is documenting some stylized facts about how the changes in employment (and welfare use) among single mothers over the 1990s depended to a great degree on the ages of their youngest children. In particular, the age of the youngest child appears to be a more important factor in explaining patterns of employment and welfare use than other family characteristics such as the total number of children (although these factors tend to be related, because families with more minor children are more likely to have younger children). We show that during the period of welfare reform, when employment increased substantially and welfare use plummeted, most of these changes were concentrated in families with young children. This, in turn, implies that the cohort of mothers whose youngest children were under age six in the mid-1990s experienced an abrupt and discontinuous increase in employment and work experience relative to mothers whose children were born slightly earlier.

It is not surprising that the age of the youngest child matters for maternal labor supply—the need to care for young children raises the costs of work for single parents. Moreover, it is also important for determining changes in the maternal labor supply: for example, Gelbach (2002) finds that the availability of publicly provided kindergarten

increases the labor supply of single mothers whose youngest child is five by between 6 and 24 percent and reduces their use of public assistance by 10 percent.

Such costs are likely be an important reason why mothers with young children are less likely to work than mothers with older children, and why they had among the highest rates of welfare use of any group in the early 1990s.

To illustrate these patterns, we draw primarily on data from the March CPS from 1980 to 2014. Each year, this sample includes between 1,400 and 3,500 never-married mothers with children under age 18. Table 1 provides summary statistics for all single mothers with a youngest child below age 18, and Tables 2 and 3 focus on single mothers with a youngest child in more specific age groups. These women tend to be low-skill—more than half never finish high school—are more likely to be nonwhite, and more than half have a child under age five. Over the 1990s, the fraction of these mothers working full-time rose from a low of 31 percent in 1992 to almost 50 percent in 2000. Over the same period, among working parents, the median wage trended up from $9.83 to $10.30.

To illustrate these trends in employment and welfare use among single mothers, we first follow methodology from Meyer (2010) to examine heterogeneity based on the age of the mother's youngest child. Specifically, we estimate the following regression specification:

$$E_i = \sum_{a=\leq 5,6-12,13-18} \sum_{t=1980}^{2010} \gamma_{a,t} 1(year_i = t) * 1(yngch_i = a) + \delta X_i + \varepsilon_i .$$

In this specification, $E_i$ is an employment indicator equal to 1 if individual $i$ is employed and 0 otherwise. The variable $X_i$ denotes individual-level control variables; these control variables are (demeaned) dummies for marital status, race, number of kids, age, and

**Table 1 Summary Statistics for Single Mothers**

| Survey year | *N* | % non-white | Fraction with ≤12 years of schooling | Median mother's age | Median no. of own children | Fraction with age of youngest child ≤ 5 | Median age of youngest child | Median age of eldest child | Fraction in full-time employment in previous year | Fraction in part-time employment in previous year | Median weeks worked | Median wage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | 4781 | 0.365 | 0.706 | 33 | 2 | 0.447 | 6 | 10 | 0.498 | 0.091 | 52 | 11.861 |
| 1991 | 4890 | 0.366 | 0.707 | 33 | 2 | 0.461 | 6 | 10 | 0.473 | 0.098 | 52 | 11.721 |
| 1992 | 4868 | 0.360 | 0.648 | 33 | 2 | 0.459 | 6 | 10 | 0.458 | 0.100 | 52 | 11.654 |
| 1993 | 4931 | 0.374 | 0.634 | 33 | 2 | 0.464 | 6 | 10 | 0.454 | 0.106 | 52 | 11.376 |
| 1994 | 4948 | 0.380 | 0.611 | 33 | 2 | 0.471 | 6 | 10 | 0.452 | 0.109 | 52 | 11.371 |
| 1995 | 4859 | 0.363 | 0.595 | 33 | 2 | 0.457 | 6 | 10 | 0.473 | 0.112 | 52 | 11.153 |
| 1996 | 4314 | 0.365 | 0.580 | 33 | 2 | 0.452 | 6 | 10 | 0.496 | 0.113 | 52 | 11.254 |
| 1997 | 4364 | 0.364 | 0.594 | 34 | 2 | 0.444 | 6 | 10 | 0.508 | 0.123 | 52 | 11.083 |
| 1998 | 4211 | 0.364 | 0.582 | 34 | 2 | 0.440 | 6 | 10 | 0.530 | 0.126 | 52 | 10.961 |
| 1999 | 4188 | 0.356 | 0.571 | 33 | 2 | 0.438 | 6 | 10 | 0.566 | 0.121 | 52 | 11.383 |
| 2000 | 4132 | 0.357 | 0.585 | 33 | 2 | 0.428 | 7 | 10 | 0.578 | 0.118 | 52 | 11.756 |
| 2001 | 7308 | 0.354 | 0.569 | 33 | 2 | 0.446 | 6 | 10 | 0.574 | 0.115 | 52 | 11.967 |
| 2002 | 7220 | 0.359 | 0.567 | 34 | 2 | 0.432 | 7 | 10 | 0.563 | 0.115 | 52 | 12.111 |
| 2003 | 7272 | 0.368 | 0.558 | 34 | 2 | 0.438 | 7 | 10 | 0.556 | 0.112 | 52 | 12.514 |
| 2004 | 6944 | 0.365 | 0.551 | 34 | 2 | 0.438 | 7 | 11 | 0.545 | 0.113 | 52 | 12.319 |
| 2005 | 6880 | 0.360 | 0.545 | 33 | 2 | 0.458 | 6 | 10 | 0.533 | 0.118 | 52 | 12.279 |
| 2006 | 6738 | 0.371 | 0.536 | 34 | 2 | 0.451 | 6 | 10 | 0.530 | 0.119 | 52 | 12.139 |
| 2007 | 6619 | 0.358 | 0.527 | 33 | 2 | 0.463 | 6 | 10 | 0.540 | 0.115 | 52 | 12.266 |
| 2008 | 6492 | 0.369 | 0.519 | 34 | 2 | 0.464 | 6 | 10 | 0.530 | 0.119 | 52 | 12.269 |
| 2009 | 6557 | 0.366 | 0.508 | 33 | 2 | 0.473 | 6 | 10 | 0.499 | 0.126 | 52 | 11.673 |
| 2010 | 6860 | 0.359 | 0.507 | 33 | 2 | 0.472 | 6 | 10 | 0.473 | 0.127 | 52 | 12.019 |
| 2011 | 6716 | 0.368 | 0.500 | 33 | 2 | 0.481 | 6 | 10 | 0.454 | 0.142 | 52 | 11.818 |
| 2012 | 6659 | 0.358 | 0.482 | 33 | 2 | 0.486 | 6 | 10 | 0.471 | 0.136 | 52 | 11.580 |
| 2013 | 6445 | 0.375 | 0.483 | 33 | 2 | 0.478 | 6 | 10 | 0.466 | 0.148 | 52 | 11.680 |
| 2014 | 4433 | 0.365 | 0.464 | 33 | 2 | 0.469 | 6 | 10 | 0.482 | 0.141 | 52 | 11.503 |

NOTE: The sample is restricted to single (separated, divorced, never married, and married but spouse absent) mothers between ages 19 and 44. See Appendix Table A1 for sample restriction details. Median weeks worked and median wage are conditional on employment. Wages are CPI-adjusted to 2009 dollars. Wages are computed as total wage and salary income divided by the product of weeks worked and usual hours worked per week.
SOURCE: Data from the Integrated Public Use Microdata Series of the Current Population Survey (IPUMS CPS).

**Table 2 Summary Statistics for Single Mothers, Age of Youngest Child 0 through 5**

| Survey year | *N* | % non-white | Fraction with ≤12 years of schooling | Median mother's age | Median no. of own children | Fraction with age of youngest child ≤ 5 | Median age of youngest child | Median age of eldest child | Fraction in full-time employment in previous year | Fraction in part-time employment in previous year | Median weeks worked | Median wage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | 2146 | 0.407 | 0.753 | 27 | 2 | 1 | 2 | 5 | 0.357 | 0.093 | 51 | 10.541 |
| 1991 | 2259 | 0.399 | 0.766 | 27 | 2 | 1 | 2 | 5 | 0.332 | 0.099 | 48 | 9.858 |
| 1992 | 2217 | 0.400 | 0.707 | 28 | 2 | 1 | 2 | 5 | 0.316 | 0.087 | 50 | 9.969 |
| 1993 | 2261 | 0.407 | 0.686 | 27 | 2 | 1 | 2 | 5 | 0.302 | 0.109 | 50 | 9.328 |
| 1994 | 2306 | 0.409 | 0.647 | 27 | 2 | 1 | 2 | 5 | 0.319 | 0.105 | 52 | 9.849 |
| 1995 | 2236 | 0.383 | 0.644 | 27 | 2 | 1 | 2 | 5 | 0.352 | 0.115 | 52 | 9.707 |
| 1996 | 1948 | 0.390 | 0.623 | 27 | 2 | 1 | 2 | 5 | 0.372 | 0.116 | 52 | 9.739 |
| 1997 | 1944 | 0.383 | 0.631 | 26 | 2 | 1 | 2 | 4 | 0.405 | 0.143 | 52 | 9.426 |
| 1998 | 1858 | 0.375 | 0.617 | 27 | 2 | 1 | 2 | 5 | 0.411 | 0.142 | 52 | 9.634 |
| 1999 | 1798 | 0.389 | 0.615 | 27 | 2 | 1 | 3 | 5 | 0.467 | 0.139 | 52 | 9.865 |
| 2000 | 1733 | 0.381 | 0.615 | 26 | 2 | 1 | 2 | 4 | 0.493 | 0.132 | 52 | 10.296 |
| 2001 | 3145 | 0.365 | 0.597 | 27 | 2 | 1 | 2 | 4 | 0.470 | 0.136 | 52 | 10.770 |
| 2002 | 3061 | 0.366 | 0.589 | 27 | 2 | 1 | 2 | 5 | 0.478 | 0.129 | 52 | 10.900 |
| 2003 | 3118 | 0.386 | 0.582 | 27 | 2 | 1 | 2 | 5 | 0.468 | 0.126 | 52 | 11.066 |
| 2004 | 2946 | 0.389 | 0.578 | 27 | 2 | 1 | 2 | 5 | 0.441 | 0.130 | 52 | 10.815 |
| 2005 | 3039 | 0.370 | 0.580 | 27 | 2 | 1 | 2 | 4 | 0.423 | 0.133 | 52 | 10.642 |
| 2006 | 2922 | 0.380 | 0.561 | 27 | 2 | 1 | 2 | 4 | 0.431 | 0.136 | 52 | 10.556 |
| 2007 | 2918 | 0.371 | 0.557 | 27 | 2 | 1 | 2 | 4 | 0.439 | 0.126 | 52 | 10.733 |
| 2008 | 2891 | 0.392 | 0.559 | 28 | 2 | 1 | 2 | 4 | 0.438 | 0.126 | 52 | 10.347 |
| 2009 | 2954 | 0.376 | 0.533 | 27 | 2 | 1 | 2 | 4 | 0.398 | 0.135 | 52 | 10.284 |
| 2010 | 3137 | 0.360 | 0.532 | 27 | 2 | 1 | 2 | 4 | 0.382 | 0.141 | 52 | 10.577 |
| 2011 | 3132 | 0.369 | 0.532 | 27 | 2 | 1 | 2 | 5 | 0.350 | 0.154 | 52 | 10.242 |
| 2012 | 3109 | 0.355 | 0.515 | 28 | 2 | 1 | 2 | 5 | 0.378 | 0.145 | 52 | 9.832 |
| 2013 | 2993 | 0.388 | 0.515 | 27 | 2 | 1 | 2 | 5 | 0.378 | 0.167 | 52 | 10.268 |
| 2014 | 2045 | 0.381 | 0.492 | 28 | 2 | 1 | 2 | 5 | 0.395 | 0.154 | 52 | 10.618 |

NOTE: The sample is restricted to single (separated, divorced, never married, and married but spouse absent) mothers between ages 19 and 44. See Appendix Table A1 for sample restriction details. Median weeks worked and median wage are conditional on employment. Wages are CPI-adjusted to 2009 dollars. Wages are computed as total wage and salary income divided by the product of weeks worked and usual hours worked per week.
SOURCE: Data from IPUMS CPS.

**Table 3 Summary Statistics for Single Mothers, Age of Youngest Child = 10**

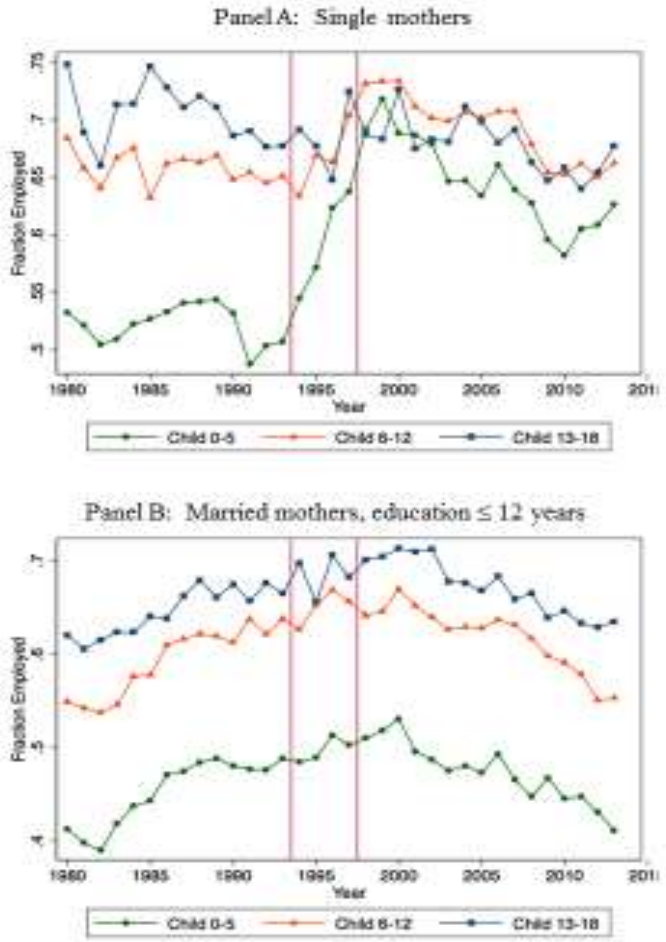
| Survey year | *N* | % non-white | Fraction with ≤12 years of schooling | Median mother's age | Median no. of own children | Fraction with age of youngest child ≤ 5 | Median age of youngest child | Median age of eldest child | Fraction in full-time employment in previous year | Fraction in part-time employment in previous year | Median weeks worked | Median wage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | 235 | 0.338 | 0.614 | 35 | 2 | 0 | 10 | 11 | 0.564 | 0.110 | 52 | 10.938 |
| 1991 | 230 | 0.337 | 0.686 | 35 | 2 | 0 | 10 | 11 | 0.569 | 0.096 | 52 | 12.097 |
| 1992 | 224 | 0.329 | 0.557 | 35 | 2 | 0 | 10 | 12 | 0.603 | 0.096 | 52 | 11.351 |
| 1993 | 250 | 0.346 | 0.544 | 37 | 2 | 0 | 10 | 12 | 0.581 | 0.083 | 52 | 12.591 |
| 1994 | 235 | 0.322 | 0.583 | 35 | 2 | 0 | 10 | 12 | 0.537 | 0.128 | 52 | 13.555 |
| 1995 | 202 | 0.368 | 0.587 | 36 | 2 | 0 | 10 | 13 | 0.575 | 0.121 | 52 | 10.718 |
| 1996 | 180 | 0.273 | 0.541 | 35 | 2 | 0 | 10 | 13 | 0.567 | 0.154 | 52 | 11.497 |
| 1997 | 190 | 0.336 | 0.550 | 37 | 2 | 0 | 10 | 12 | 0.599 | 0.126 | 52 | 10.753 |
| 1998 | 170 | 0.317 | 0.548 | 36 | 2 | 0 | 10 | 11 | 0.621 | 0.114 | 52 | 12.203 |
| 1999 | 196 | 0.332 | 0.517 | 37 | 2 | 0 | 10 | 12 | 0.669 | 0.090 | 52 | 13.385 |
| 2000 | 210 | 0.405 | 0.550 | 36 | 2 | 0 | 10 | 12 | 0.621 | 0.121 | 52 | 11.756 |
| 2001 | 356 | 0.347 | 0.553 | 36 | 2 | 0 | 10 | 12 | 0.621 | 0.164 | 52 | 12.924 |
| 2002 | 362 | 0.410 | 0.474 | 36 | 2 | 0 | 10 | 12 | 0.656 | 0.091 | 52 | 14.556 |
| 2003 | 370 | 0.316 | 0.542 | 36 | 2 | 0 | 10 | 12 | 0.627 | 0.125 | 52 | 13.742 |
| 2004 | 323 | 0.334 | 0.454 | 36 | 2 | 0 | 10 | 12 | 0.672 | 0.081 | 52 | 14.143 |
| 2005 | 327 | 0.314 | 0.520 | 36 | 2 | 0 | 10 | 12 | 0.562 | 0.135 | 52 | 14.378 |
| 2006 | 321 | 0.318 | 0.468 | 37 | 2 | 0 | 10 | 12 | 0.609 | 0.106 | 52 | 13.723 |
| 2007 | 324 | 0.367 | 0.466 | 37 | 2 | 0 | 10 | 12 | 0.602 | 0.141 | 52 | 12.777 |
| 2008 | 335 | 0.298 | 0.430 | 37 | 2 | 0 | 10 | 13 | 0.614 | 0.131 | 52 | 13.929 |
| 2009 | 288 | 0.341 | 0.406 | 36 | 2 | 0 | 10 | 12 | 0.610 | 0.134 | 52 | 14.048 |
| 2010 | 299 | 0.340 | 0.489 | 37 | 2 | 0 | 10 | 13 | 0.567 | 0.132 | 52 | 13.355 |
| 2011 | 324 | 0.379 | 0.484 | 36 | 2 | 0 | 10 | 13 | 0.561 | 0.129 | 52 | 12.606 |
| 2012 | 309 | 0.377 | 0.450 | 36 | 2 | 0 | 10 | 12 | 0.608 | 0.117 | 52 | 13.289 |
| 2013 | 286 | 0.387 | 0.420 | 37 | 2 | 0 | 10 | 12 | 0.584 | 0.142 | 52 | 13.476 |
| 2014 | 171 | 0.392 | 0.429 | 37 | 2 | 0 | 10 | 11 | 0.514 | 0.127 | 52 | 12.191 |

NOTE: The sample is restricted to single (separated, divorced, never married, and married but spouse absent) mothers between ages 19 and 44. See Appendix Table A1 for sample restriction details. Median weeks worked and median wage are conditional on employment. Wages are CPI-adjusted to 2009 dollars. Wages are computed as total wage and salary income divided by the product of weeks worked and usual hours worked per week.
SOURCE: Data from IPUMS CPS.

education. In addition to the control variables, we regress the employment indicator on a set of year dummies interacted with dummies for age groups of the mother's youngest child ($yngch_i$).

Figure 1, Panel A, presents a plot of the estimated $\gamma_{a,t}$ coefficients from estimating the above regression for single mothers. For the sake of comparison, Figure 1, Panel B, presents a similar plot of the estimated coefficients from estimating a separate regression using married

**Figure 1 Mothers' Employment Rates by Year, Marital Status, and Age of Youngest Child**




**NOTE:** The figures are constructed by regressing an employment indicator on control variables and year dummies interacted with the age of the youngest child. The control variables include dummies for marital status, race, age, education, and number of kids. In the case of single mothers, marital status is restricted to divorced, widowed, or never married; in the case of married mothers, marital status is restricted to married with spouse present or married with spouse absent. Mother's age is restricted to ages 19 through 44. The figure plots the estimated coefficients on the year dummies interacted with number of kids. Vertical lines mark 1993.5 and 1997.5.
**SOURCE:** Authors' calculations using data from the Integrated Public Use Microdata Series of the Current Population Survey (IPUMS CPS).

mothers with less than or equal to 12 years of schooling. These figures illustrate noticeable increases in employment rates for single mothers during the mid-1990s. The plots highlight the effects of policies targeted at single mothers specifically, since no noticeable effects are detected for plausibly comparable, unaffected, or untargeted groups, such as married mothers with less than or equal to 12 years of schooling. Furthermore, Figure 1, Panel A, highlights a particularly significant increase in employment among single mothers with young children (ages less than or equal to five), as employment rates for this group increased from roughly 0.55 in 1990 to 0.70 in 2000.

Note, however, that employment rates of women with older children change by much less over the same time period. For example, among women whose youngest child was between 13 and 18 years old, average employment rates fluctuated in a narrow range around 70 percent through the 1980s and early 1990s—and then continued to remain roughly in that range through the 2000s. One implication of this pattern is that the policy changes of the 1990s appear to have precipitated few employment effects among single mothers with older children.

This heterogeneity based on the youngest child's age appears to be a more important determinant of behavior than other family characteristics, particularly the total number of children. For example, a number of studies have examined heterogeneity in behavior based on number of children for a single mother, and they have used identification strategies based on differences in the number of children to estimate the effects of the earned-income tax credit, the size of which varies based on a worker's earnings, tax filing status, and number of children.

Because families with more minor children tend also to have younger children, it is important for our strategy to demonstrate that changes in employment are associated with the age

of the child and not simply the number of children. To illustrate this point, we first present figures based on number of children and then examine figures based on number of children and age of the mother's youngest child. We follow methodology from Meyer (2010) to examine heterogeneity based on the number of children. Specifically, we estimate the following regression specification:

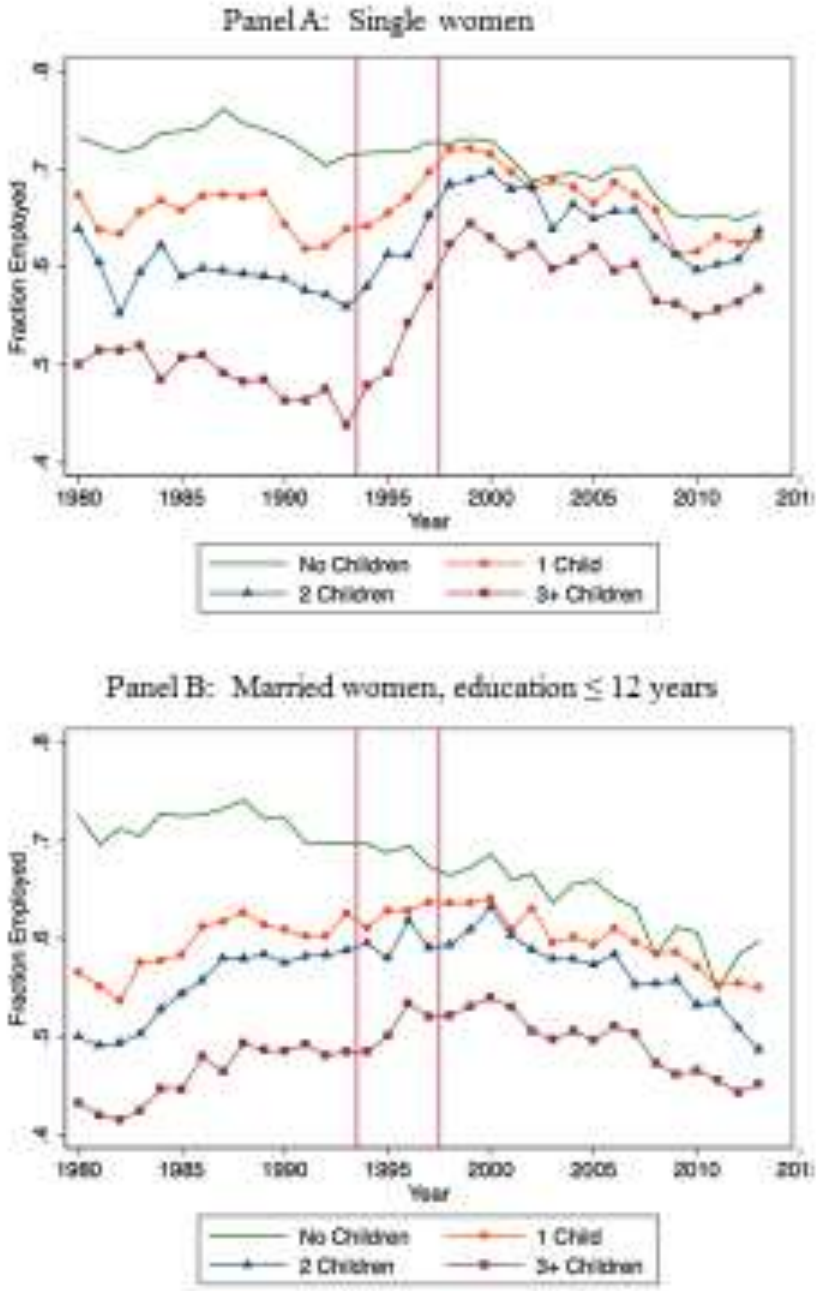
$$E_i = \sum_{n=0,1,2,\geq 3} \sum_{t=1980}^{2010} \gamma_{n,t} 1(year_i = t) * 1(Nkids_i = n) + \delta X_i + \varepsilon_i .$$

In this specification, $E_i$ is an employment indicator equal to 1 if individual $i$ is employed and 0 otherwise. The variable $X_i$ denotes individual-level control variables; these control variables are (demeaned) dummies for marital status, race, age, and education. In addition to the control variables, we regress the employment indicator on a set of year dummies interacted with dummies for the woman's number of children ($Nkids_i$).

Figure 2, Panel A, presents a plot of the estimated $\gamma_{n,t}$ coefficients from estimating the above regression for single women. For comparison's sake, Figure 2, Panel B, presents a similar plot of the estimated coefficients from a separate regression using married women with 12 or fewer years of schooling. These figures are based on Figure 2 from Meyer (2010). As emphasized by Meyer, the plots show noticeable increases in employment among single mothers during the mid-1990s. Similar to Figure 1, the plots highlight the effects of policies targeted at single mothers specifically, since no noticeable effects are detected for plausibly comparable, unaffected, or untargeted groups such as single women without children.

We next turn to examining trends in single mothers' employment based on age of the mother's youngest child and number of children. In particular, we estimate the following regression specification:

**Figure 2 Mothers' Employment Rates by Year, Marital Status, and Number of Children**




**NOTE:** The figures are constructed by regressing an employment indicator on control variables and year dummies interacted with number of kids. The control variables include dummies for marital status, race, age, and education. In the case of single mothers, marital status is restricted to divorced, widowed, or never married; in the case of married mothers, marital status is restricted to married with spouse present or married with spouse absent. Mother's age is restricted to ages 19 through 44. The figure plots the estimated coefficients on the year dummies interacted with number of kids. Vertical lines mark 1993.5 and 1997.5.
**SOURCE**: Based on Figure 2 from Meyer (2010), using IPUMS CPS data.

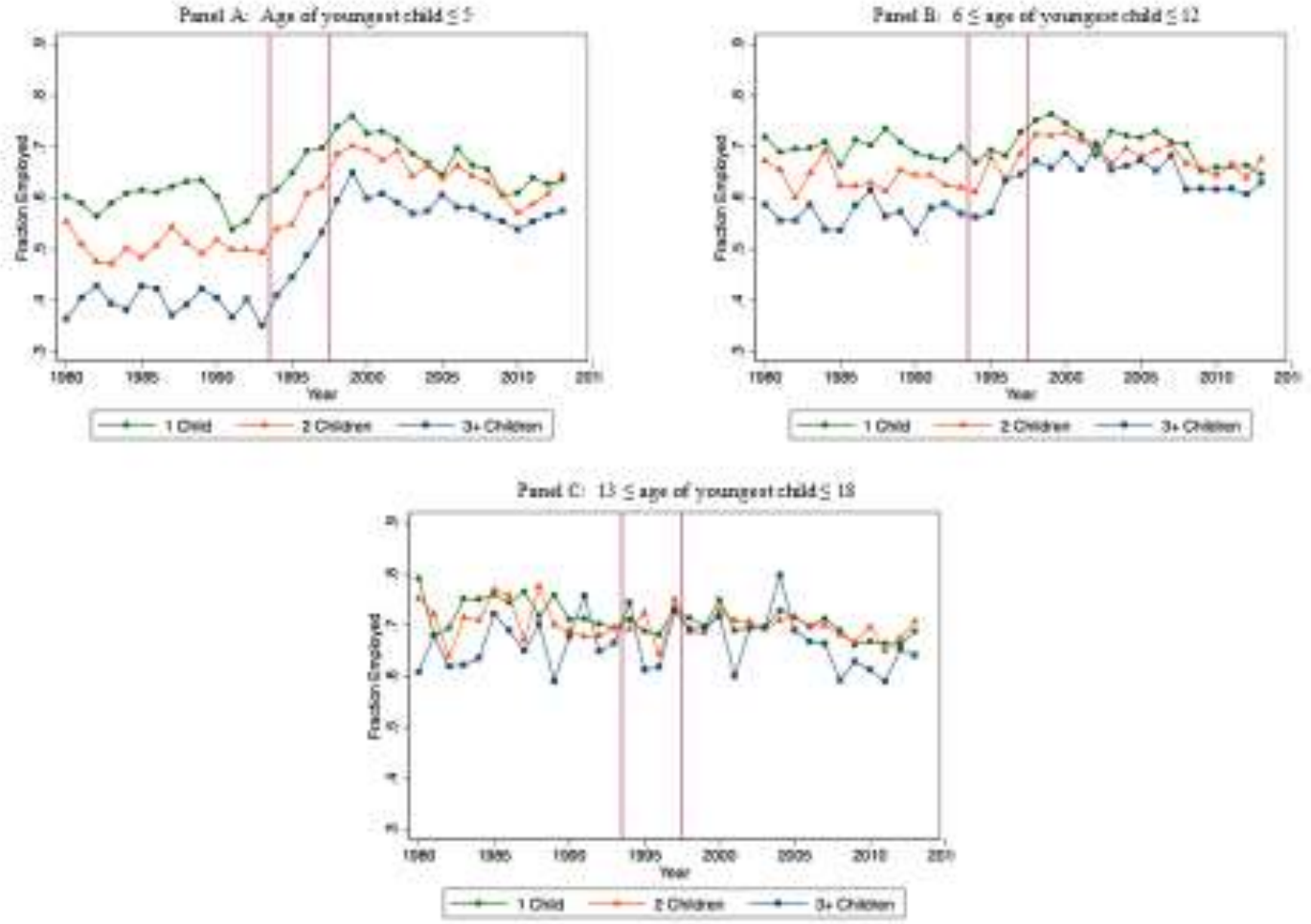
$$E_i = \sum_{a=\leq 5,6-12,13-18} \sum_{n=0,1,2,\geq 3} \sum_{t=1980}^{2010} \gamma_{n,t,a} 1(year_i = t) * 1(Nkids_i = n) * 1(yngch_i = a) + \delta X_i + \varepsilon_i.$$

This specification is similar to the one above, except that the coefficients on the year and number of kids' interactions are further decomposed using interactions with the age of the youngest child. The variable $yngch_i$ denotes the age of the youngest child for mother $i$, and we group the child's age into the following categories: 0 through 5, 6 through 12, and 13 through 18. This grouping allows us to look at mothers with young children who have yet to start formal schooling at age 6.

Figure 3, Panels A through C, plots the estimated coefficients from this specification with the age-of-youngest-child decomposition. The plots indicate that most of the increase in employment among single mothers came from single mothers with young children. Specifically, for mothers with differing numbers of children, Figure 3, Panel C, shows no noticeable changes in employment rates for single mothers with relatively older children. In contrast, Figure 3, Panel A, shows noticeable increases in employment rates of single mothers with relatively young children among families, regardless of the number of children in the family. Hence, it appears that incentives related to the age of the youngest child are the primary driver of employment changes over this period.

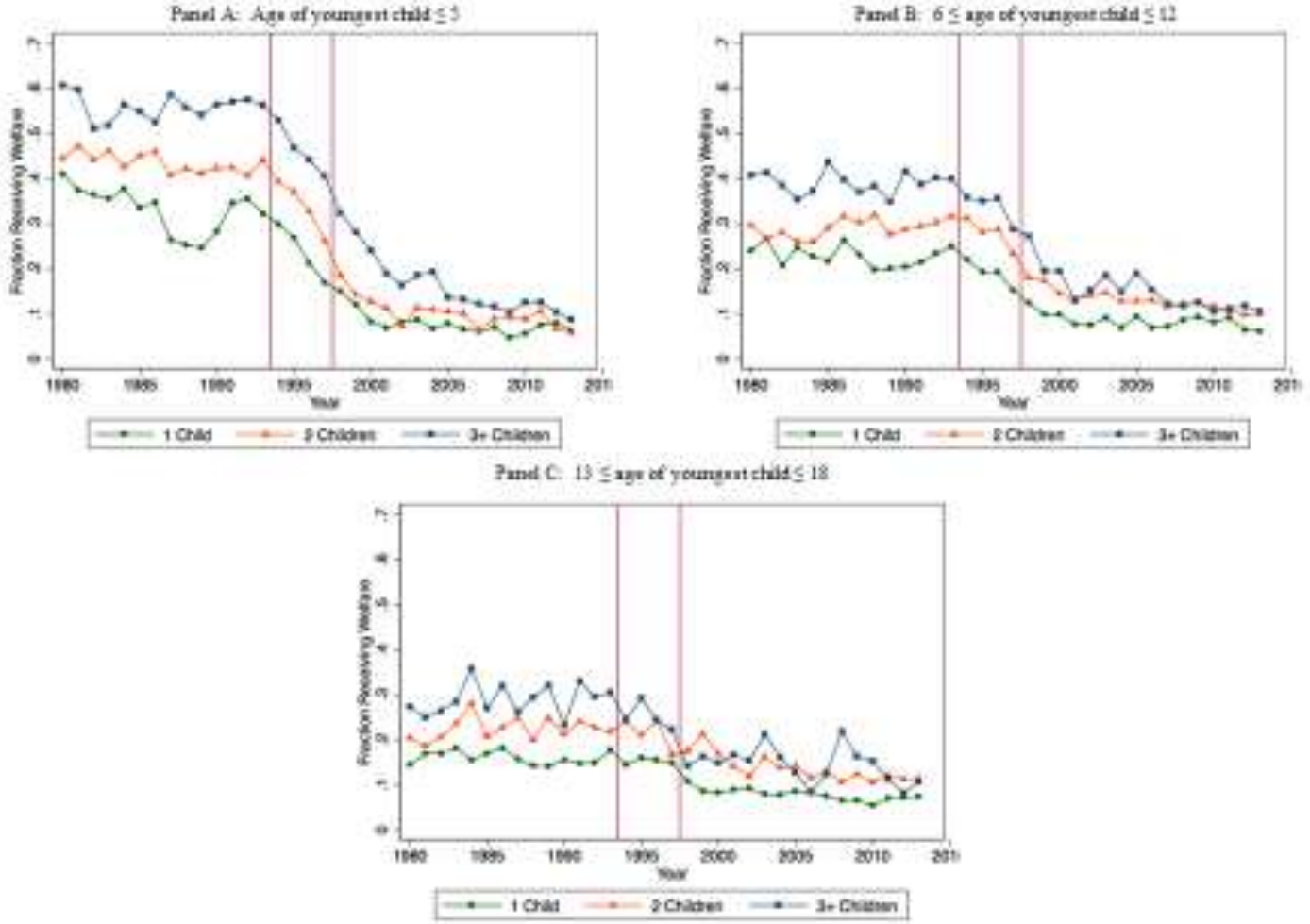
An obvious source of these incentives is the availability and structure of welfare benefits. Figure 4 presents evidence to demonstrate that welfare use was particularly high among single mothers with young children. We present estimates of single mothers' welfare use by number of kids and the age of the youngest child using the same regression as above but replacing the employment indicator with a welfare use indicator (i.e., the left-hand-side variable is $W_i$, which is equal to 1 if individual $i$ receives welfare and 0 otherwise). Figure 4, Panel A, demonstrates that

**Figure 3 Single Mothers' Employment Rates by Year, Age of Youngest Child, and Number of Kids**




**NOTE:** Please see notes for Figures 1 and 2 for additional details.
**SOURCE:** Authors' calculations using data from IPUMS CPS.

**Figure 4 Single Mothers' Welfare Receipt by Year, Age of Youngest Child, and Number of Kids**




**NOTE:** Please see notes for Figures 1 and 2 for additional details.
**SOURCE:** Authors' calculations using data from IPUMS CPS.

for any number of children, women with young children had relatively high prereform (i.e., pre-1994) welfare use rates and significant reductions in welfare use at the time of the policy changes in the mid-1990s. In contrast, Figure 5, Panels B and C, illustrate that the changes were more modest among single mothers with older children.

Moreover, cross-state variation prior to welfare reform appears to be an important determinant of the changes in employment (and welfare use) of single mothers with young children over the 1990s. For each state, we calculate the fraction of single mothers between 1991 and 1993 who receive welfare. We rank all states and divide them into low, medium, and high prereform welfare-use groups. Appendix Table A2 presents the ranking of all states based on prereform welfare use. States ranked 1 through 15 are grouped into the low category, states ranked 16 through 35 into the medium category, and states ranked 36 and higher into the high category. The fraction of single mothers receiving welfare is roughly 0.36 or higher among those in the high welfare-use states. Using this grouping, we estimate the following regression specification:

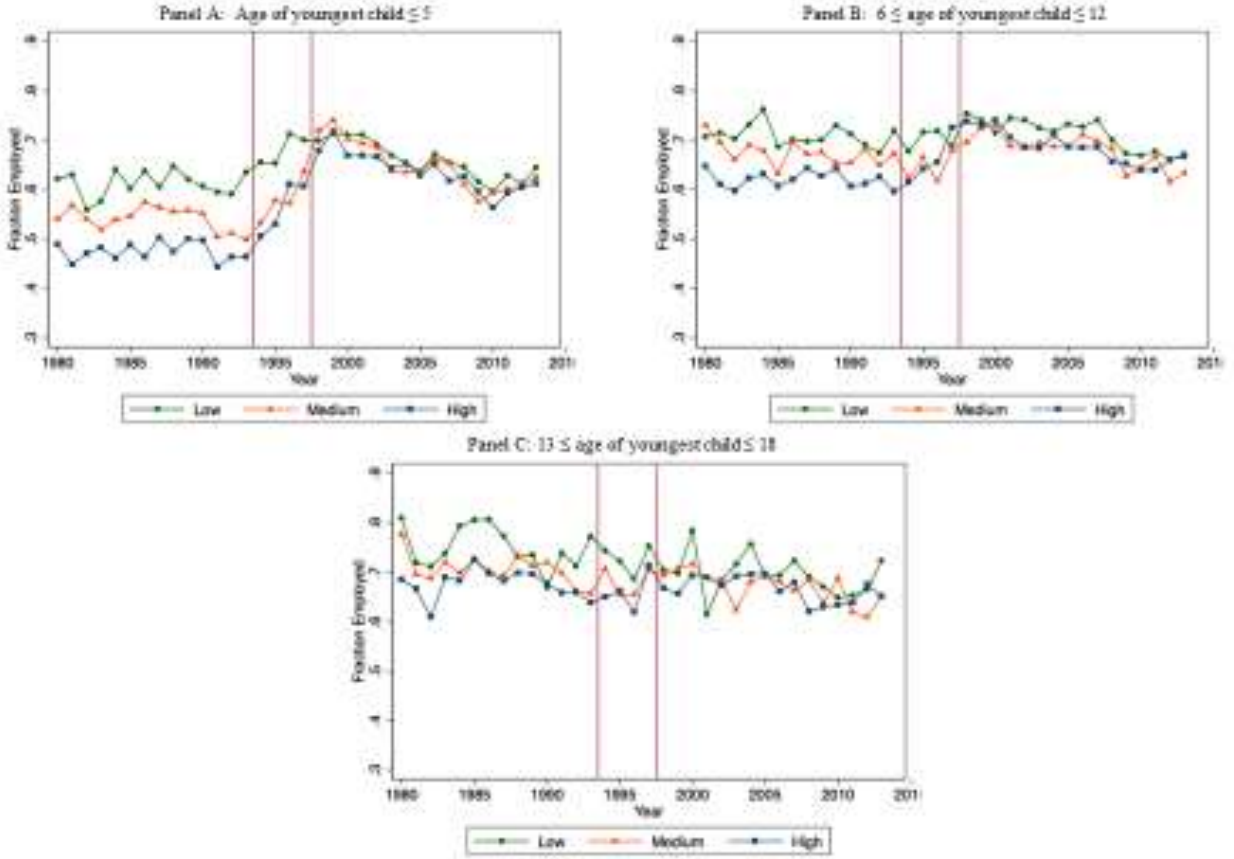
$$E_i = \sum_{a=\leq 5,6-12,13-18} \sum_{g=low,medium,high} \sum_{t=1980}^{2010} \gamma_{t,g,a} 1(year_i = t) * 1(state\_welfare_i = g) * 1(yngch_i = a)$$

$$+ \delta X_i + \varepsilon_i .$$

In this specification, *state_welfare*$_i$ is a variable that captures the prereform state welfare-use group for individual *i*'s state.

Figure 5 presents plots of the estimated coefficients using the state welfare-use decomposition. Consistent with Figure 1, Panels A through C of Figure 5 indicate that the largest changes in employment are among women with relatively young children. Furthermore, Figure

**Figure 5 Single Mothers' Employment Rates by Average State Welfare Use in 1991–1993**




**NOTE:** Vertical lines mark 1993.5 and 1997.5. These figures plot dummies from the following regressions. Within each group of state welfare use, we regress an employment indicator on year dummies interacted with dummies for age of the youngest child and dummies for marital status (separated, divorced, never married), race, mother's age, education, and number of kids. The figures plot the coefficients on the year dummies interacted with the age of the youngest child dummies. State welfare use is computed using the following steps. First, within each state, we compute the fraction of individuals observed between 1991 and 1993 who receive welfare benefits. Second, we rank states based on the average welfare use between 1991 and 1993. The "low" group consists of individuals in the 15 lowest welfare-use states, the "high" group consists of individuals in the 15 highest welfare-use states, and the "medium" group consists of individuals in the remaining states. For the low states, welfare use ranges from roughly 14 to 26 percent of single mothers; for the high group, welfare use ranges from roughly 35 to 45 percent. Table A2 lists the specific states in each group.
**SOURCE:** Authors' calculations using data from IPUMS CPS.

5A indicates that, even among single mothers with relatively young kids, the changes in employment were largest among those mothers who were in states with relatively high prereform welfare use.

Overall, Figures 1 through 5 indicate that, while previous studies highlight increases in employment among single mothers with more children, these increases in employment are generally driven by increases among women with young children. Moreover, even when examining heterogeneity based on prereform welfare use, the most dramatic increases in employment are among mothers with young children in states with high prereform welfare use. We highlight the variation in employment based on the age of the youngest child, since the empirical analysis below exploits this variation to estimate the returns to work experience completed over the youngest child's lifetime.

## EMPIRICAL ANALYSIS

### Measuring Increases in Experience Using Synthetic Cohorts

The fact that the largest changes in employment for single mothers occurred among those with younger children and that those increases occurred proximate to the implementation of welfare reform indicates that some women accumulated more work experience than others because of these policy changes. We use these policy-induced differences in work experience to identify the labor market return to experience in this population.

The first step in this analysis is to measure the increase in accumulated work experience. One approach is to use individual longitudinal data spanning the entire period in question that provide information on annual employment, but this would necessitate panels of an appropriate

size to focus on single parents and to differentiate children based on age, which makes this strategy unfeasible. Instead, our strategy uses synthetic cohorts to follow single mothers over time and measure their accumulated work experience.

The advantage of this approach is that it allows us to draw from large annual cross sections from the CPS, which provide rich detail on income, employment, and family structure. Moreover, for the population of single mothers in question, the changes in employment and income are so great that the resulting changes in accrued work experience across narrowly defined cohorts are large.

Moreover, for econometric identification, the cohort is the appropriate level of analysis to examine the return to experience in this context. For instance, an identification strategy based on the timing of welfare reform and related policy changes necessarily entails a comparison between cohorts depending on their exposure to the change. Hence, even if longitudinal data were available, our strategy would necessarily eliminate any within-cohort variation in work experience—say, between women who worked full-time and those who worked intermittently or part-time—which are sources of variation potentially endogenous to unobserved characteristics of the individual. Hence, we feel a cohort-based strategy appropriately captures the variation in experience due to each cohort's exposure to welfare-reform policies.

We create synthetic cohorts for single mothers based on the birth year of their youngest child. For example, consider single mothers who are observed in 1990 with a youngest child of age one. Based on the age of the youngest child, these mothers are categorized in the 1989 child birth cohort. To follow these mothers over time, we follow the children's birth cohort over time. Specifically, we construct a profile for single mothers with children born in 1989 using single

mothers who are observed in 1991 with a youngest child of age two, then single mothers who are observed in 1992 with a youngest child of age three, and so on. Thus, using repeated cross-section data from the CPS, we are able to create a synthetic panel data set based on the birth cohort and age of the youngest child.

Once the synthetic cohorts are created, we calculate cumulative work experience for each cohort of single mothers at each observed age of the youngest child. First, in each cohort-age cell, we calculate the average number of weeks worked. Second, we calculate cumulative work experience by summing the average weeks worked over all younger ages in the cohort.

**Graphical Evidence: An Abrupt Increase in Work Experience**

Figure 6 illustrates employment profiles over the youngest child's age for different cohorts of single mothers. In particular, following the strategy for creating synthetic cohorts described in the last section, single mothers are grouped into cohorts based on the birth year of their youngest child. For each cohort of single mothers, the employment profiles are constructed by calculating the fraction employed by the age of the youngest child. Figure 7 presents similar employment profiles using the average number of weeks worked by age of the youngest child for different cohorts of single mothers.

We highlight two features of these plots. First, the profiles for different cohorts of single mothers converge by age six of the youngest child. Second, the employment and weeks-worked profiles differ noticeably across cohorts. In particular, roughly 30 percent of single mothers with a newborn child in 1990 were employed, whereas about 50 percent of single mothers with a newborn child in 2000 were employed. These plots are consistent with the earlier figures in indicating that most of the employment increases among single mothers over the 1990s occurred

**Figure 6 Employment by Age of Youngest Child, Birth Cohorts 1990–2000**

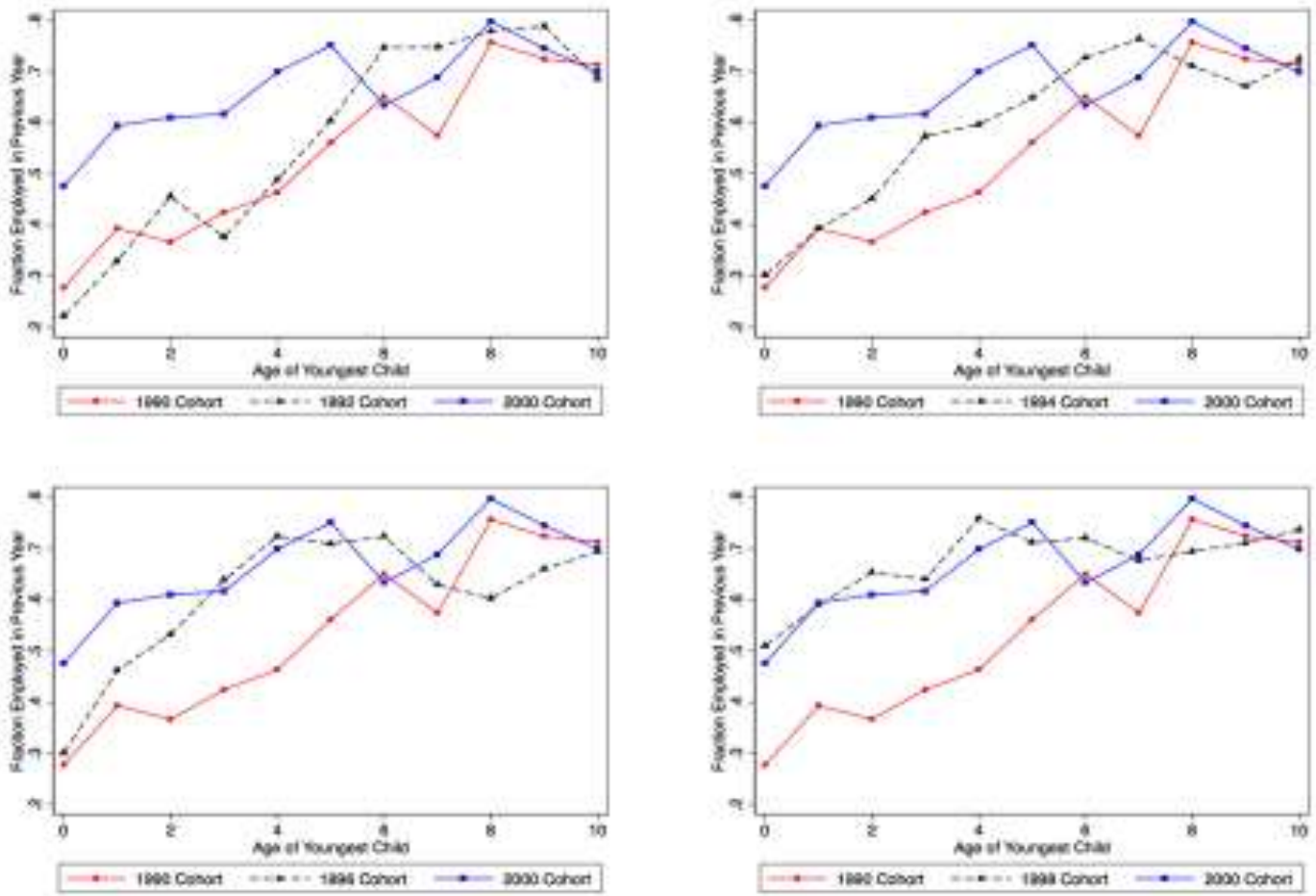
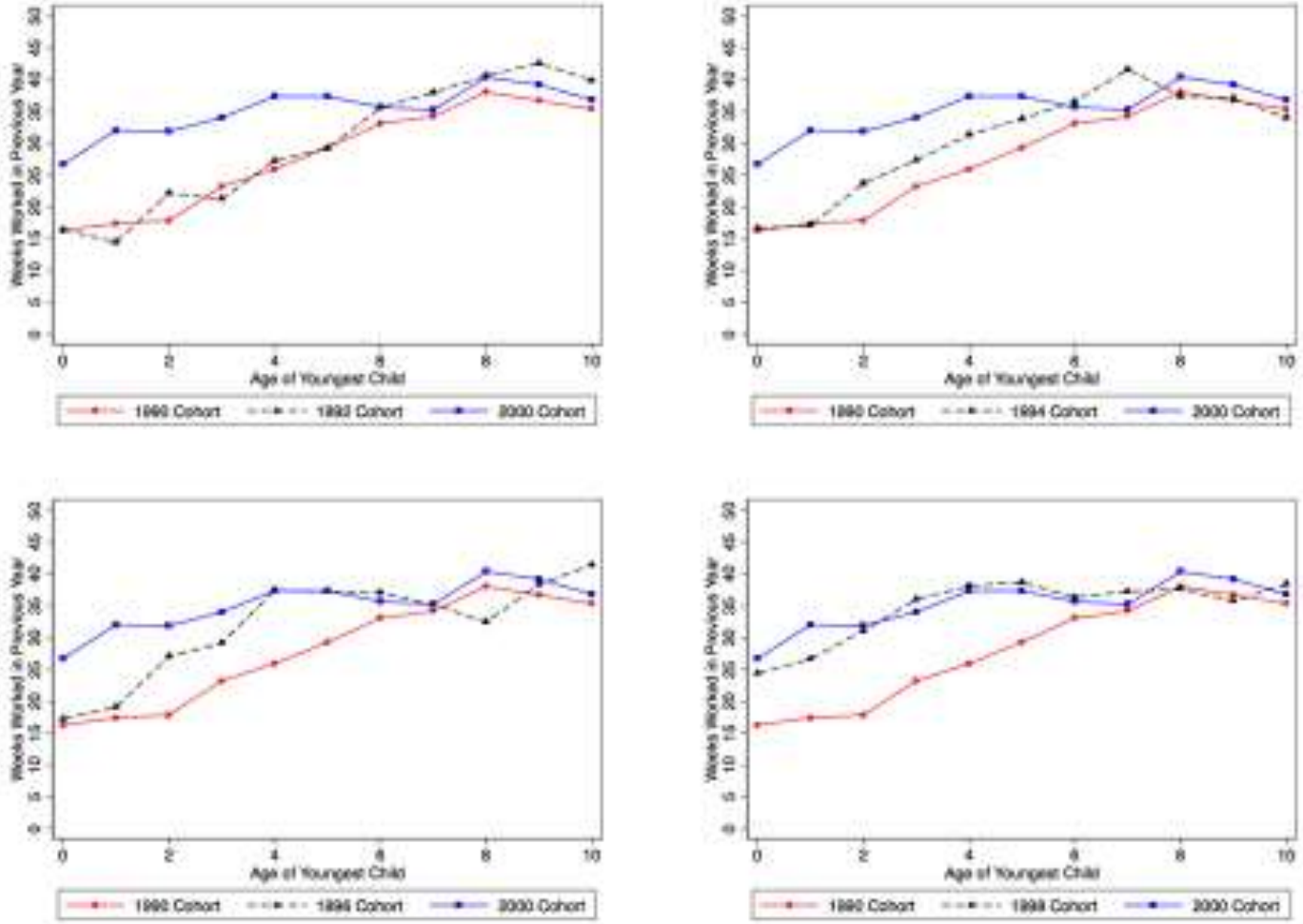


**Figure 7 Weeks Worked by Age of Youngest Child, Birth Cohorts 1990–2000**



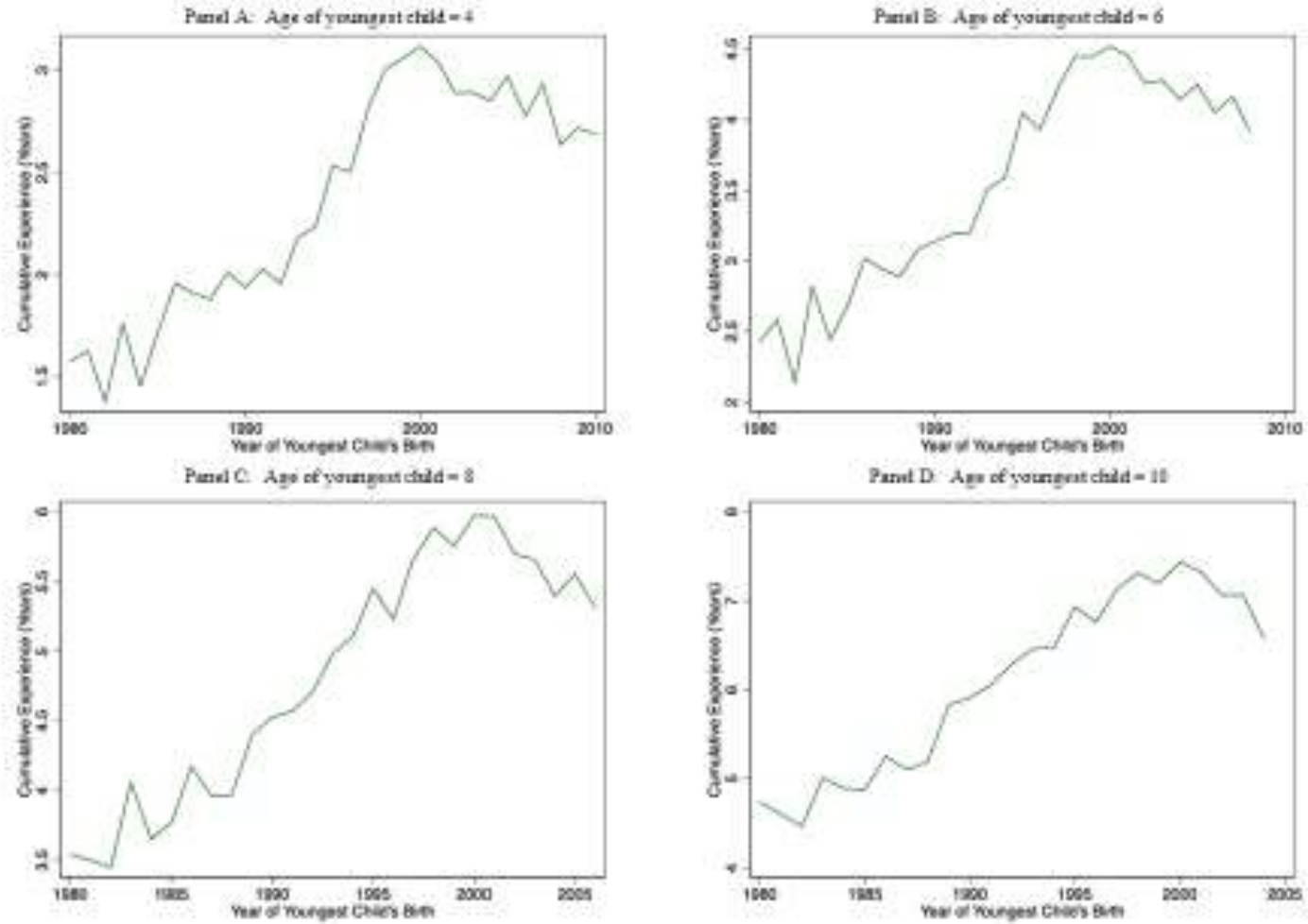
among single mothers with young children. The evidence from these employment profiles is consistent with the intuition that the policy changes over the 1990s led some single mothers to start working when their children were relatively young rather than waiting until their children were older and starting school. The policy changes may not have been successful at getting single mothers who were not planning on working to start work.

Following the estimation strategy, we next compute the synthetic cohort measure of cumulative experience by calculating the cumulative values from the weeks-worked employment profiles in Figure 7. Specifically, for a given cohort of single mothers, we calculate cumulative experience at a given age of the youngest child by summing average weeks worked over all younger ages of the youngest child. Figure 8 presents plots of cumulative experience by cohorts at different ages of the youngest child. The plot for a youngest child at age four highlights that, on average, single mothers with a youngest child of that age in 2000 had roughly 50 percent more completed experience than similar mothers in 1990. The age-four plot also highlights the discrete changes in employment for these single mothers in the mid-1990s. The plots at older ages of the youngest child illustrate more linear increases in cumulative experience, since these mothers with older children gradually spend more time in the post-policy-change (i.e., post-1995) environment. For example, consider single mothers with a youngest child of age 10. Single mothers in the 1990, 1991, and 1992 cohorts have spent, respectively, four, five, and six years in the post-1995 environment.

**The Returns to Experience in a Regression Framework**

To examine how these changes in work experience affect wages, we first examine the basic relationship between mean wages and cumulative experience. The slope of this relationship

**Figure 8 Cumulative Experience by Birth Cohort and Age of Youngest Child**




**NOTE:** Within a given birth cohort, cumulative experience is calculated by summing experience (average weeks worked) over age of the youngest child.
**SOURCE:** Authors' calculations using data from IPUMS CPS.

reflects the return to experience. Within each cohort-age-of-youngest-child cell, we compute mean log wages. Figure 9, Panel A, plots mean log wages (vertical axis) against cumulative experience (horizontal axis). A linear regression using this cell-level data indicates a return to experience of about 2.8 percent. Figure 9, Panel B, presents a similar plot using, as the vertical axis variable, cell means of residuals from regressing log wages on calendar year and demographic control variables. This plot illustrates a main result of the analysis: after netting out differences in wages that are correlated with other control variables, we find that higher cumulative experience does not appear to be associated with higher wages.

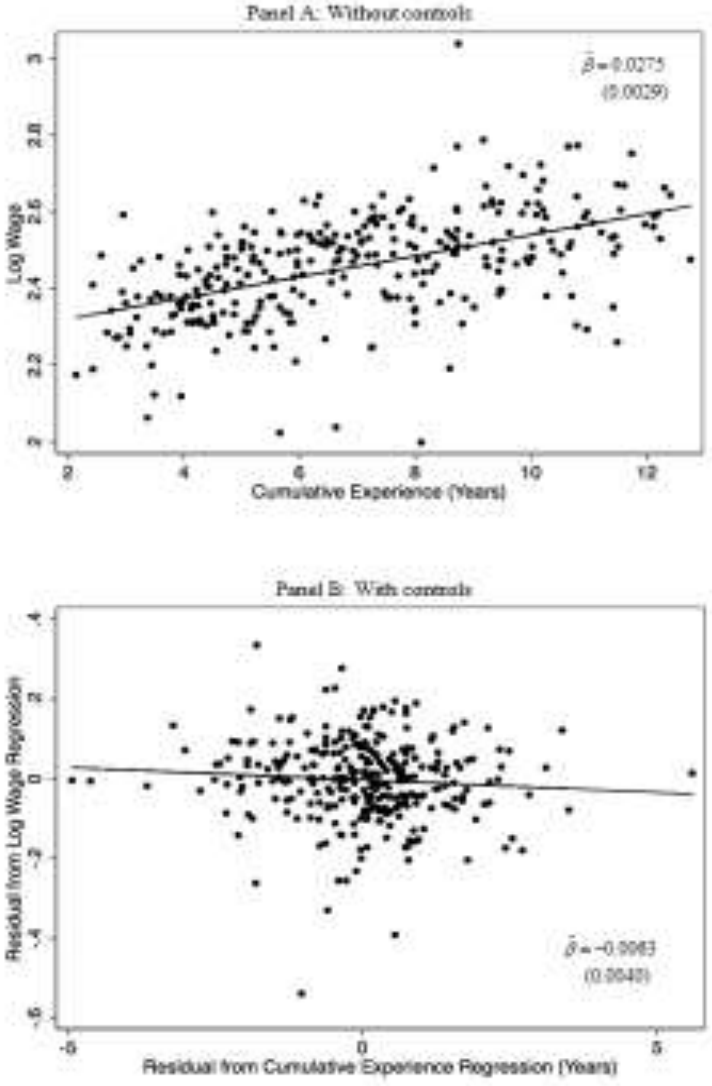
To formalize this relationship and test its robustness, we adopt a traditional economic model of the returns to experience in regression form:

$$y_{c,a} = \beta_0 + \beta_1 Expr_{c,a} + \delta_a + \varepsilon_{c,a}.$$

In this specification, the subscripts $c$ and $a$ denote the birth cohort of the mother's youngest child and the age of the youngest child, respectively; $\delta_a$ denotes fixed effects for the age of the youngest child; $y_{c,a}$ denotes the mean residualized log wage for a given cohort $c$ and a given age $a$; and $\varepsilon_{c,a}$ denotes the error term.

In the regression specification above, the coefficient of interest is $\beta_1$; this coefficient captures the return to experience. Intuitively, the return to experience reflects the percentage change in average hourly wages, given a one-year increase in completed work experience over the youngest child's lifetime, holding other covariates in the wage equation constant. The identification of this coefficient is based on the assumption that variation in the cohort-level

## Figure 9 Wages by Experience




**NOTE:** The sample is restricted to never-married mothers between ages 19 and 44 and with children age 18 or younger. Wage residuals are computed by regressing log wages on a fourth-order polynomial in mother's age and dummies for calendar year, race, education, number of kids, age of the eldest child, and age of the youngest child. Cumulative experience residuals are computed by regressing experience (cumulative weeks worked) on a fourth-order polynomial in mother's age and dummies for calendar year, race education, number of kids, age of the eldest child, and age of the youngest child. Using cells computed at the cohort and age-of-the-youngest-child level, the slope coefficients, denoted by β, are estimated by regressing log wages on experience or the wage residuals on the experience residuals. Cells with the age of the youngest child $\leq 5$ are excluded. Standard errors for the estimated slope coefficients are clustered at the cohort level; the standard errors are shown in parentheses below the estimated coefficients.
**SOURCE:** Authors' calculations using data from IPUMS CPS.

experience measure is independent from the error term $\varepsilon_{c,a}$ because it is driven by exogenous policy changes over the 1990s.[2]

We use a residualized log wage measure in the synthetic cohort regressions so that we can net out wage differences that are correlated with other covariates. To obtain the wage residuals, we first restrict the sample to unmarried mothers and calculate the hourly wage for each individual using total annual wage and salary income divided by the product of total weeks worked in the year and the usual hours per week. Next, we pool the repeated cross sections to estimate the following regression specification:

$$Y_i = \alpha_0 + \alpha' X_i + u_i ,$$

where the subscript *i* denotes the individual, *Y* denotes the log hourly wage, and the vector *X* represents a rich set of individual-level covariates. Specifically, the covariates are a fourth-order polynomial in mother's age and dummies for calendar year, race, education, age of the eldest child, age of the youngest child, and number of kids. After estimating this regression, we obtain the residuals, $\hat{u}_i = Y_i - \hat{\alpha}_0 - \hat{\alpha}' X_i$. Last, as with the experience measure, we collapse the data into cells based on birth cohort and age of the youngest child; within each cell, we calculate the mean of the residual to obtain $y_{c,a}$. In addition to looking at wage outcomes, we look at

[2] We have also examined results using a more formal first-stage regression with the following specification: $wkswork_i = \gamma_0 state_i + \gamma_1 year_i + \gamma_2 welfare\_reform_i * yngch_i + v_i$.

In this specification, the *i* subscript refers to the individual, *state* and *year* denote dummies for the corresponding variables, and *v* denotes the error term. The key terms in this specification are the interactions between dummies for the age of the youngest child, denoted by *yngch*, and a welfare reform indicator, denoted by *welfare_reform*. This indicator is equal to 1 if the individual is observed after her state implemented any welfare reform (including state-level time limits or waivers, or federal welfare reform). Thus, the *welfare_reform* indicator varies across states and years. The coefficients on the interactions therefore reflect policy variation in weeks worked across different ages of the youngest child. Using this estimated first stage, we obtain predicted values for weeks worked and then use these predicted values to calculate the synthetic cohort measure of experience. As with the results presented below, we do not find significant returns to experience using this more formal two-stage analysis.

employment outcomes. To do this, we set $Y_i$ equal to an individual-level indicator for employment and then follow similar steps to calculate employment residuals so that $y_{c,a}$ captures the mean of the employment residual.

While we initially collapse the data into cells based on the youngest child's birth year and age, we also consider cells based on additional covariates. For example, we examine results that include race and number of kids as additional covariates to create the outcome and experience cells. When calculating experience with these additional covariates, we sum average weeks worked over the age of the youngest child within each cohort-race-and-number-of-kids cell. Similarly, the outcomes are computed as the means of the residuals within these finer cells. By including additional covariates when creating the cells, we can potentially estimate more accurate cohort measures; however, this comes at a cost, as the additional covariates also create the possibility that some cells may have few or zero observations. Qualitatively, the results do not change significantly when using these additional covariates to create the synthetic cohorts. We also consider several sample restrictions, none of which lead to substantially different results. For example, we present some results below in which we only use unmarried mothers with less than or equal to 12 years of schooling to create the synthetic cohorts. Furthermore, we create cell means based on splits between high and low prereform welfare-use states. With these cell differences, the return to experience is estimated based on comparing wage changes across the youngest child's age in states like Texas to wage changes across the youngest child's age in states like California. Texas had relatively low prereform welfare use and hence experienced relatively minimal changes in employment rates for single mothers. In contrast, California had relatively high prereform welfare use and hence experienced relatively large changes in

employment rates for single mothers. Thus, with positive returns to experience, one would expect an increase in the wage differential between single mothers with older children in California and those in Texas.

Since we are not able to track individual mothers over time, measurement error is an inherent concern with the synthetic cohorts. In particular, the composition of a cohort is not consistent across age-of-youngest-child cells, as some women in each youngest-child-birth-year cohort go on to have additional children. For example, a woman who has a child in 1991 and another in 1994 will appear in the youngest-child-birth-year cohort in 1991, 1992, and 1993, but then will drop out of this cohort and appear in the 1994 youngest-child-birth-year cohort in later years. This issue will only bias the estimates of $\beta_1$ if the fertility rate changed during the 1990s. Joyce, Kaestner, and Korenman (2002) and Hao and Cherlin (2004) find relatively small effects of welfare reform on fertility decisions; in a review article, Blank (2007) concludes that welfare reform had little or no overall effect on single mothers' fertility decisions. We also address this measurement issue by repeating our analysis with a sample limited to single mothers with two or more children, since a greater fraction of these women have completed childbearing than the overall population of single mothers.

Our estimation strategy may also suffer from selection bias in the wage equation. Since wages are only observed for working single mothers, and since the policy changes may have induced more low-skilled single mothers to enter the labor market, the estimation of the wage equation may lead to biased estimates of the wage residuals. To address this concern, we present results in which we exclude observations when the age of the youngest child is a relatively low number. Given that the employment rate of women with older children is relatively constant over

time, by focusing on observations in which the youngest child's age is relatively high, we use only observations with roughly constant probabilities of employment to estimate the wage equation. Intuitively, one might be concerned about the accuracy of comparing average wages of single mothers with a newborn child in 1990 to average wages of single mothers with a newborn child in 2000 because a larger fraction of the mothers in 2000 work, and the additional workers may have relatively low wages that reduce the average wage. However, it is more plausible to compare average wages of single mothers with a youngest child of age 10 in 1990 and average wages of single mothers with a youngest child of age 10 in 2000; the fractions of mothers who are employed and the average weeks worked are roughly the same across these groups, and hence the ability characteristics of these working single mothers are plausibly similar.

**Regression Results**

We present the first set of regression results in Table 4. These results represent the returns to experience using wage residuals as the outcome. Panel A presents results using all single mothers, Panel B presents results using only single mothers with less than or equal to 12 years of schooling, and Panel C presents results using only single mothers in high prereform (1991–1993) welfare-use states. We focus on these latter two subgroups since the policy changes over the 1990s may have particularly affected women in these groups. The different columns in Table 4 present results when excluding observations at relatively low ages of the youngest child. As described above, these exclusions are meant to address selection bias by comparing groups with similar employment rates and average weeks worked.

**Table 4 Wages vs. Experience**

| | | | | |
|---|---|---|---|---|
| **PANEL A: FULL SAMPLE** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00584 | 0.00791 | 0.0108 | 0.000334 |
| | (0.00459) | (0.00451) | (0.00436) | (0.00952) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.004 | 0.010 | 0.020 | 0.000 |
| **PANEL B: EDUCATION ≤ 12 YEARS** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00565 | 0.00676 | 0.00647 | 0.00756 |
| | (0.00694) | (0.00736) | (0.0102) | (0.0122) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.002 | 0.004 | 0.004 | 0.003 |
| **PANEL C: STATES WITH HIGH PREREFORM WELFARE USE** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00373 | 0.000903 | 0.00308 | −0.00484 |
| | (0.00483) | (0.00572) | (0.00506) | (0.0132) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.002 | 0.001 | 0.002 | 0.002 |

NOTE: "Expr" stands for years of experience. All regressions are based on cells created according to the youngest child's birth cohort and the age of the youngest child. "yngch" denotes age of the youngest child. Standard errors clustered by child's birth cohort.
SOURCE: Data from IPUMS CPS.

The estimated returns to experience in Table 4 are all statistically indistinguishable from zero. Moreover, the point estimates represent economically insignificant returns to experience, and the standard errors are sufficiently small so that a return of 2 percent or higher can be rejected in many cases. Table 5 presents results using employment residuals as the outcome variable. The results are similar to those in Table 4 in that no statistically or economically significant returns to experience are detected. Thus, the additional completed work experience for single mothers in later childbirth cohorts does not appear to be associated with higher wage rates or higher employment probabilities.

**Table 5 Employment vs. Experience**

| | | | | |
|---|---|---|---|---|
| **PANEL A: FULL SAMPLE** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | −0.00382 | −0.0146 | −0.0204 | 0.000230 |
| | (0.00542) | (0.00556) | (0.00492) | (0.0120) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.003 | 0.063 | 0.152 | 0.000 |
| **PANEL B: EDUCATION ≤ 12 YEARS** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | −0.000898 | −0.0128 | −0.0151 | −0.00643 |
| | (0.00756) | (0.00786) | (0.00816) | (0.0140) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.000 | 0.023 | 0.041 | 0.004 |
| **PANEL C: STATES WITH HIGH PREREFORM WELFARE USE** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | −0.00108 | −0.0135 | −0.0202 | 0.00437 |
| | (0.00600) | (0.00760) | (0.00776) | (0.0131) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.000 | 0.032 | 0.089 | 0.002 |

NOTE: "Expr" stands for years of experience. All regressions are based on cells created according to the youngest child's birth cohort and the age of the youngest child. "yngch" denotes age of the youngest child. Standard errors clustered by child's birth cohort.
SOURCE: Data from IPUMS CPS.

In Tables 6 and 7, we focus on wage residuals and examine the robustness of the regression results using different sample restrictions and comparison groups. In Table 6, we restrict the sample to focus on specific cohorts that may be more comparable to one another (Panels A and B). We also present results that focus on single mothers with two or more children, since these women are more likely to have completed their childbearing and hence there may be less measurement error in the synthetic cohorts. As with the previous results, we do not detect economically or statistically significant returns to experience.

**Table 6 Wages vs. Experience**

| | | | | |
|---|---|---|---|---|
| **PANEL A: YOUNGEST CHILD'S BIRTH COHORT ≥ 1985** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00652 | 0.00715 | 0.00895 | 0.000774 |
| | (0.00577) | (0.00629) | (0.00596) | (0.0116) |
| Observations | 399 | 234 | 147 | 87 |
| $R^2$ | 0.003 | 0.006 | 0.010 | 0.000 |
| **PANEL B: YOUNGEST CHILD'S BIRTH COHORT = 1980–1998** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00132 | 0.000817 | 0.00561 | −0.00719 |
| | (0.00593) | (0.00550) | (0.00551) | (0.0108) |
| Observations | 358 | 244 | 133 | 111 |
| $R^2$ | 0.000 | 0.000 | 0.005 | 0.007 |
| **PANEL C: NUMBER OF KIDS ≥ 2** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00135 | 0.00192 | 0.00458 | −0.00777 |
| | (0.00475) | (0.00445) | (0.00453) | (0.0130) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.000 | 0.001 | 0.004 | 0.005 |

NOTE: "Expr" stands for years of experience. All regressions are based on cells created according to the youngest child's birth cohort and the age of the youngest child. "yngch" denotes age of the youngest child. Standard errors clustered by child's birth cohort.
SOURCE: Data from IPUMS CPS.

In Table 7, we consider differences between single mothers and married mothers with less than or equal to 12 years of schooling and differences between single mothers in high prereform welfare-use states and those in low prereform welfare-use states. For these regressions, we calculate cohort-age cells for each of the groups and then compute differences in the cells between the two groups. The regressions are based on the cell-level differences between the two groups:

$$y^{group1}{}_{c,a} - y^{group2}{}_{c,a} = \beta_0 + \beta_1 (Expr^{group1}{}_{c,a} - Expr^{group2}{}_{c,a}) + \delta_a + \varepsilon_{c,a}.$$

In this case, the return to experience reflects the impacts of a one-year increase in relative experience on relative wages. Intuitively, since single mothers increased their employment relative to high-school-educated married mothers, one would expect a change in the relative wage difference between these groups if there is a return to the additional work experience. Similarly, since single mothers in high prereform welfare-use states increased their employment

relative to single mothers in low prereform welfare-use states, one would expect a change in relative wage rates if there is a return to the additional work experience. Overall, the results in Table 7 are consistent with the results in the earlier tables. While the standard errors are slightly larger than those in the previous tables, no significant returns to experience are detected.

**Table 7 Comparisons across Groups**

| | | | | |
|---|---|---|---|---|
| **PANEL A: COMPARING SINGLE MOTHERS AND MARRIED MOTHERS WITH EDUCATION ≤ 12 YEARS** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00193 | −0.00279 | −0.0140 | 0.0234 |
| | (0.00387) | (0.00637) | (0.00587) | (0.0128) |
| Observations | 399 | 234 | 147 | 87 |
| $R^2$ | 0.000 | 0.000 | 0.015 | 0.016 |
| **PANEL B: COMPARING HIGH WELFARE-USE STATES AND LOW WELFARE-USE STATES** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00297 | 0.00515 | 0.00403 | 0.00856 |
| | (0.00620) | (0.00860) | (0.0123) | (0.0245) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.000 | 0.000 | 0.000 | 0.001 |

NOTE: "Expr" stands for years of experience. All regressions are based on cells created according to the youngest child's birth cohort and the age of the youngest child. "yngch" denotes age of the youngest child. Standard errors clustered by child's birth cohort. For the comparisons between married and single mothers in Panel A, we focus on youngest child's birth cohort equal to 1985 and beyond.
SOURCE: Data from IPUMS CPS.

## Discussion

The graphical evidence and regression estimates from the previous sections indicate relatively low returns to experience for single mothers. In this section, we present evidence on single mothers' occupation and industry characteristics. First, we examine the occupation and industry characteristics of employed single mothers with young children before the policy changes of the 1990s. We compare these characteristics to the corresponding characteristics for employed single mothers with young children after the policy changes. This comparison presents evidence on whether single mothers who increased their employment after the policy changes moved into the same types of jobs in which previous working single mothers were employed. Second, we examine the occupation and industry characteristics of employed single mothers with

older children prior to the policy changes. We compare these characteristics to the corresponding characteristics for recently employed single mothers with older children. This comparison presents evidence on whether single mothers who have increased their completed work experience following the policy changes have similar job characteristics as the earlier employed single mothers with less completed work experience.

Table 8 presents tabulations on occupation and industry characteristics for single mothers with young children (age of the youngest child between zero and five). We focus on the set of single mothers observed just prior to the policy changes (from 1990 through 1993) and just after the policy changes (from 1998 through 2001). For the single mothers prior to the policy changes, the five most common occupations are cashiers, nurses, secretaries, wait staff, and salespersons; these occupations cover 27.6 percent of this group of single mothers. The four most common industries are restaurants, health services, education services, and business services; these industries cover 33.1 percent of this group of single mothers. For the single mothers with young children just after the policy changes, the tabulations are similar to those prior to the policy changes. The five most common occupations are the same before and after the policy changes, and they account for a similar share of employed single mothers with young children (24.9 percent for the postreform group). The four most common industries are also the same following the policy changes, and they account for 37.7 percent of the group of single mothers following the policy changes. This evidence suggests that single mothers who were induced to enter the labor market following the policy changes in the mid-1990s entered jobs that were similar to those held by previously employed single mothers with young children.

**Table 8 Occupation and Industry Characteristics of Employed Single Mothers, Youngest Child Ages 0 through 5**

Observed between 1990 and 1993 ($N$ = 5287)

| Ranking | occupation | Fraction in occupation |
|---|---|---|
| 1 | Cashiers | 0.075 |
| 2 | Secretaries | 0.056 |
| 3 | Nursing aides, orderlies, and attendants | 0.047 |
| 4 | Waiters/waitresses | 0.040 |
| 5 | Salespersons, not elsewhere classified (n.e.c.) | 0.033 |
| 6 | Cooks, variously defined | 0.027 |
| 7 | Child care workers | 0.025 |
| 8 | Managers and administrators, n.e.c. | 0.025 |
| 9 | Housekeepers, maids, butlers, stewards, and lodging-quarters cleaners | 0.025 |
| 10 | Assemblers of electrical equipment | 0.021 |

Observed between 1990 and 1993 ($N$ = 5280)

| Ranking | industry | Fraction in industry |
|---|---|---|
| 1 | Eating and drinking places | 0.107 |
| 2 | Medical and other health services, except hospitals | 0.085 |
| 3 | Educational services | 0.075 |
| 4 | Hospitals | 0.056 |
| 5 | Miscellaneous business services | 0.055 |
| 6 | Food stores, except dairy products | 0.042 |
| 7 | Hotels and lodging places | 0.032 |
| 8 | General merchandise stores | 0.031 |
| 9 | Federal public administration | 0.028 |
| 10 | Banking and credit agencies | 0.027 |

Observed between 1998 and 2001 ($N$ = 6353)

| Ranking | occupation | Fraction in occupation |
|---|---|---|
| 1 | Cashiers | 0.072 |
| 2 | Nursing aides, orderlies, and attendants | 0.056 |
| 3 | Salespersons, n.e.c. | 0.039 |
| 4 | Waiters/waitresses | 0.034 |
| 5 | Secretaries | 0.031 |
| 6 | Cooks, variously defined | 0.027 |
| 7 | Receptionists | 0.024 |
| 8 | Customer service reps, investigators and adjusters, except insurance | 0.023 |
| 9 | Teacher's aides | 0.021 |
| 10 | Managers and administrators, n.e.c. | 0.021 |

Observed between 1998 and 2001 ($N$ = 6348)

| Ranking | industry | Fraction in industry |
|---|---|---|
| 1 | Eating and drinking places | 0.105 |
| 2 | Medical and other health services, except hospitals | 0.097 |
| 3 | Educational services | 0.089 |
| 4 | Miscellaneous business services | 0.074 |
| 5 | Hospitals | 0.045 |
| 6 | Food stores, except dairy products | 0.041 |
| 7 | General merchandise stores | 0.038 |
| 8 | Banking and credit agencies | 0.034 |
| 9 | Welfare and religious services | 0.029 |
| 10 | Hotels and lodging places | 0.025 |

NOTE: $N$ refers to the total number of observations in the specified sample period; this number is used as the denominator when computing the fractions in each occupation. Ranking is based on the fraction in each occupation or industry; the most frequent occupations are assigned the lowest numerical rankings. Occupation categories are based on the 1990 basis categories, and industry classifications are based on the 1950 basis categories.
SOURCE: Data from IPUMS CPS.

Table 9 presents tabulations on occupation and industry characteristics for employed single mothers with older children (age of the youngest child from 13 through 18). These tabulations are similar in spirit to those in Table 8 in that the occupation and industry characteristics for single mothers with older children in the prereform years are generally similar to those for employed single mothers with older children in the postreform years. Specifically, nurses, secretaries, and cleaners are among the most common occupations for single mothers with older children both pre- and postreform; health-related services, education services, and restaurants are among the most common industries. These statistics suggest that, relative to the prereform single mothers, recent single mothers with older children have more completed work experience but similar occupation and industry characteristics.

## CONCLUSION

This paper presents evidence on the returns to experience for single mothers. Policy changes in the United Sates in the 1990s led to significant increases in employment of single mothers, particularly those with young children at the time of the changes. As a result, single mothers with young children at the time of these policy changes gained more experience than those with slightly older children. Accordingly, we identify the returns to experience based on this discontinuous increase in experience among otherwise similar groups. Overall, our results suggest that additional years of experience have had no discernible effect on the earnings, wages, or employment opportunities of affected single parents.

**Table 9 Occupation and Industry Characteristics of Employed Single Mothers, Youngest Child Ages 13 through 18**

Observed between 1990 and 1993 (*N* = 2613)

| Ranking | Occupation | Fraction in occupation |
|---|---|---|
| 1 | Secretaries | 0.072 |
| 2 | Managers and administrators, n.e.c. | 0.047 |
| 3 | Nursing aides, orderlies, and attendants | 0.046 |
| 4 | Bookkeepers and accounting and auditing clerks | 0.029 |
| 5 | Cashiers | 0.028 |
| 6 | Assemblers of electrical equipment | 0.028 |
| 7 | Cooks, variously defined | 0.026 |
| 8 | Supervisors and proprietors of sales jobs | 0.025 |
| 9 | Janitors | 0.022 |
| 10 | Housekeepers, maids, butlers, stewards, and lodging-quarters cleaners | 0.021 |

Observed between 1990 and 1993 (*N* = 2613)

| Ranking | Industry | Fraction in industry |
|---|---|---|
| 1 | Educational services | 0.109 |
| 2 | Medical and other health services, except hospitals | 0.085 |
| 3 | Hospitals | 0.083 |
| 4 | Eating and drinking places | 0.049 |
| 5 | Miscellaneous business services | 0.049 |
| 6 | Federal public administration | 0.036 |
| 7 | Electrical machinery, equipment, and supplies | 0.029 |
| 8 | Banking and credit agencies | 0.027 |
| 9 | General merchandise stores | 0.027 |
| 10 | Food stores, except dairy products | 0.024 |

Observed between 2007 and 2010 (*N* = 3895)

| Ranking | Occupation | Fraction in occupation |
|---|---|---|
| 1 | Nursing aides, orderlies, and attendants | 0.064 |
| 2 | Secretaries | 0.047 |
| 3 | Housekeepers, maids, butlers, stewards, and lodging-quarters cleaners | 0.032 |
| 4 | Cashiers | 0.031 |
| 5 | Registered nurses | 0.028 |
| 6 | Supervisors and proprietors of sales jobs | 0.028 |
| 7 | Cooks, variously defined | 0.028 |
| 8 | Customer service reps, investigators and adjusters, except insurance | 0.027 |
| 9 | Managers and administrators, n.e.c. | 0.024 |
| 10 | Bookkeepers and accounting and auditing clerks | 0.018 |

Observed between 2007 and 2010 (*N* = 3886)

| Ranking | Industry | Fraction in industry |
|---|---|---|
| 1 | Medical and other health services, except hospitals | 0.114 |
| 2 | Educational services | 0.105 |
| 3 | Hospitals | 0.070 |
| 4 | Eating and drinking places | 0.055 |
| 5 | Miscellaneous professional and related services | 0.045 |
| 6 | Miscellaneous business services | 0.044 |
| 7 | General merchandise stores | 0.034 |
| 8 | Banking and credit agencies | 0.030 |
| 9 | Local public administration | 0.029 |
| 10 | Food stores, except dairy products | 0.028 |

NOTE: *N* refers to the total number of observations in the specified sample period; this number is used as the denominator when computing the fractions in each occupation. Ranking is based on the fraction in each occupation or industry; the most frequent occupations are assigned the lowest numerical rankings. Occupation categories are based on the 1990 basis categories, and industry classifications are based on the 1950 basis categories.
SOURCE: Data from IPUMS CPS.

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**Appendix Table A1 CPS Sample Restrictions, Survey Years 1970–2014**

| Sample restriction | No. of observations |
|---|---|
| All women | 3882624 |
| Single mothers | 2289068 |
| Ages 19 through 44 | 598646 |
| No. of own children > 0 | 215720 |
| Dropping if age of oldest child + 15 > mother's age | 212237 |
| Dropping if age of oldest child + 45 ≤ mother's age | 212237 |
| Dropping if age of oldest child − age of youngest child > 20 | 212064 |

SOURCE: Data from IPUMS CPS.

**Appendix Table A2 State Welfare Use among Single Mothers, 1991–1993**

| Ranking | State | Fraction receiving welfare | *N* |
|---|---|---|---|
| 1 | Nevada | 0.146 | 144 |
| 2 | Virginia | 0.185 | 157 |
| 3 | Alabama | 0.188 | 224 |
| 4 | Idaho | 0.206 | 131 |
| 5 | Georgia | 0.214 | 196 |
| 6 | Texas | 0.218 | 824 |
| 7 | Delaware | 0.221 | 154 |
| 8 | North Carolina | 0.242 | 604 |
| 9 | Utah | 0.246 | 118 |
| 10 | Arizona | 0.247 | 166 |
| 11 | Indiana | 0.261 | 180 |
| 12 | Oklahoma | 0.264 | 159 |
| 13 | South Dakota | 0.266 | 154 |
| 14 | Florida | 0.266 | 758 |
| 15 | Kansas | 0.269 | 156 |
| 16 | Maryland | 0.270 | 148 |
| 17 | New Mexico | 0.272 | 206 |
| 18 | Missouri | 0.272 | 169 |
| 19 | Montana | 0.276 | 170 |
| 20 | Arkansas | 0.280 | 186 |
| 21 | Iowa | 0.283 | 145 |
| 22 | Nebraska | 0.286 | 126 |
| 23 | Mississippi | 0.289 | 298 |
| 24 | Colorado | 0.291 | 158 |
| 25 | Hawaii | 0.292 | 113 |
| 26 | New Hampshire | 0.306 | 98 |
| 27 | New Jersey | 0.309 | 582 |
| 28 | South Carolina | 0.312 | 231 |
| 29 | Wyoming | 0.328 | 119 |
| 30 | Wisconsin | 0.339 | 183 |
| 31 | Tennessee | 0.340 | 212 |
| 32 | Alaska | 0.348 | 204 |
| 33 | Oregon | 0.348 | 135 |
| 34 | District of Columbia | 0.358 | 215 |
| 35 | Maine | 0.360 | 125 |
| 36 | North Dakota | 0.362 | 138 |
| 37 | Illinois | 0.364 | 674 |
| 38 | California | 0.366 | 1400 |
| 39 | Washington | 0.374 | 131 |
| 40 | Louisiana | 0.377 | 204 |
| 41 | Pennsylvania | 0.380 | 534 |
| 42 | Ohio | 0.384 | 628 |
| 43 | Michigan | 0.408 | 645 |
| 44 | Massachusetts | 0.419 | 513 |
| 45 | West Virginia | 0.425 | 153 |
| 46 | Kentucky | 0.426 | 190 |
| 47 | Connecticut | 0.429 | 112 |
| 48 | Minnesota | 0.431 | 137 |
| 49 | New York | 0.454 | 1307 |
| 50 | Vermont | 0.456 | 90 |
| 51 | Rhode Island | 0.465 | 114 |

NOTE: *N* refers to the total number of observations (i.e., including welfare recipients and nonrecipients) within each state.
SOURCE: Data from IPUMS CPS.

**Appendix Table A3 Summary Statistics for Married Mothers with Education ≤ 12 years**

| Survey year | *N* | % non-white | Median mother's age | Median no. of own children | Fraction with age of youngest child ≤ 5 | Median age of youngest child | Median age of eldest child | Fraction in full-time employment in previous year | Fraction in part-time employment in previous year | Median weeks worked | Median wage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | 8731 | 0.114 | 33 | 2 | 0.487 | 6 | 11 | 0.385 | 0.168 | 52 | 10.811 |
| 1991 | 8504 | 0.113 | 34 | 2 | 0.497 | 6 | 11 | 0.389 | 0.159 | 52 | 10.940 |
| 1992 | 7668 | 0.116 | 34 | 2 | 0.489 | 6 | 11 | 0.397 | 0.163 | 52 | 10.762 |
| 1993 | 7296 | 0.117 | 34 | 2 | 0.484 | 6 | 11 | 0.396 | 0.157 | 52 | 10.772 |
| 1994 | 6670 | 0.120 | 34 | 2 | 0.493 | 6 | 11 | 0.386 | 0.164 | 52 | 10.701 |
| 1995 | 6385 | 0.129 | 34 | 2 | 0.480 | 6 | 11 | 0.398 | 0.163 | 52 | 10.734 |
| 1996 | 5526 | 0.117 | 35 | 2 | 0.473 | 6 | 11 | 0.404 | 0.159 | 52 | 10.821 |
| 1997 | 5494 | 0.125 | 35 | 2 | 0.468 | 6 | 11 | 0.427 | 0.157 | 52 | 10.952 |
| 1998 | 5306 | 0.130 | 35 | 2 | 0.470 | 6 | 11 | 0.422 | 0.152 | 52 | 11.304 |
| 1999 | 5114 | 0.130 | 35 | 2 | 0.465 | 6 | 11 | 0.425 | 0.152 | 52 | 11.383 |
| 2000 | 5067 | 0.129 | 35 | 2 | 0.450 | 6 | 11 | 0.431 | 0.151 | 52 | 11.138 |
| 2001 | 8511 | 0.132 | 35 | 2 | 0.471 | 6 | 11 | 0.438 | 0.144 | 52 | 11.526 |
| 2002 | 8139 | 0.138 | 35 | 2 | 0.471 | 6 | 11 | 0.411 | 0.142 | 52 | 11.645 |
| 2003 | 7860 | 0.143 | 35 | 2 | 0.479 | 6 | 11 | 0.396 | 0.146 | 52 | 11.918 |
| 2004 | 7385 | 0.145 | 35 | 2 | 0.476 | 6 | 11 | 0.388 | 0.138 | 52 | 11.439 |
| 2005 | 6857 | 0.143 | 35 | 2 | 0.487 | 6 | 11 | 0.379 | 0.146 | 52 | 11.460 |
| 2006 | 6625 | 0.136 | 35 | 2 | 0.493 | 6 | 11 | 0.387 | 0.131 | 52 | 11.564 |
| 2007 | 6342 | 0.145 | 35 | 2 | 0.507 | 5 | 11 | 0.402 | 0.130 | 52 | 11.499 |
| 2008 | 5884 | 0.152 | 35 | 2 | 0.501 | 5 | 11 | 0.387 | 0.127 | 52 | 11.442 |
| 2009 | 5670 | 0.145 | 35 | 2 | 0.484 | 6 | 11 | 0.375 | 0.134 | 52 | 11.207 |
| 2010 | 5416 | 0.170 | 35 | 2 | 0.497 | 6 | 11 | 0.362 | 0.136 | 52 | 11.538 |
| 2011 | 5120 | 0.176 | 35 | 2 | 0.505 | 5 | 11 | 0.346 | 0.137 | 52 | 11.345 |
| 2012 | 4679 | 0.177 | 35 | 2 | 0.512 | 5 | 11 | 0.337 | 0.135 | 52 | 11.004 |
| 2013 | 4614 | 0.171 | 35 | 2 | 0.497 | 6 | 12 | 0.337 | 0.130 | 52 | 11.230 |
| 2014 | 3114 | 0.192 | 35 | 2 | 0.491 | 6 | 11 | 0.326 | 0.128 | 52 | 10.618 |

NOTE: The sample is restricted to married (spouses present) mothers between ages 19 and 44. Median weeks worked and median wage are conditional on employment. Wages are CPI-adjusted to 2009 dollars. Wages are computed as total wage and salary income divided by the product of weeks worked and usual hours worked per week.
SOURCE: Data from IPUMS CPS.

**Appendix Table B1: Summary Statistics for Never-Married Mothers**

| Survey year | *N* | % non-white | Fraction with ≤12 years of schooling | Median mother's age | Median no. of own children | Fraction with age of youngest child ≤ 5 | Median age of youngest child | Median age of eldest child | Fraction in full-time employment in previous year | Fraction in part-time employment in previous year | Median weeks worked | Median wage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | 1447 | 0.613 | 0.773 | 27 | 1 | 0.655 | 3 | 6 | 0.357 | 0.084 | 52 | 10.378 |
| 1991 | 1571 | 0.597 | 0.781 | 28 | 1 | 0.679 | 3 | 6 | 0.340 | 0.096 | 52 | 9.767 |
| 1992 | 1582 | 0.603 | 0.753 | 28 | 1 | 0.667 | 3 | 6 | 0.323 | 0.090 | 52 | 9.838 |
| 1993 | 1659 | 0.601 | 0.716 | 28 | 1 | 0.664 | 3 | 6 | 0.316 | 0.111 | 52 | 9.254 |
| 1994 | 1757 | 0.579 | 0.680 | 28 | 1 | 0.677 | 3 | 6 | 0.334 | 0.105 | 52 | 9.274 |
| 1995 | 1722 | 0.546 | 0.678 | 28 | 1 | 0.650 | 4 | 6 | 0.363 | 0.106 | 52 | 9.403 |
| 1996 | 1590 | 0.554 | 0.669 | 28 | 1 | 0.645 | 3 | 6 | 0.372 | 0.112 | 52 | 9.378 |
| 1997 | 1736 | 0.525 | 0.658 | 28 | 1 | 0.640 | 4 | 6 | 0.406 | 0.132 | 52 | 9.200 |
| 1998 | 1711 | 0.525 | 0.631 | 28 | 1 | 0.610 | 4 | 7 | 0.445 | 0.141 | 52 | 9.733 |
| 1999 | 1703 | 0.521 | 0.623 | 28 | 1 | 0.611 | 4 | 7 | 0.493 | 0.133 | 52 | 9.865 |
| 2000 | 1712 | 0.515 | 0.635 | 28 | 1 | 0.605 | 4 | 7 | 0.505 | 0.123 | 52 | 10.296 |
| 2001 | 3052 | 0.489 | 0.632 | 28 | 1 | 0.618 | 4 | 7 | 0.506 | 0.122 | 52 | 10.770 |
| 2002 | 3044 | 0.507 | 0.634 | 29 | 1 | 0.590 | 4 | 7 | 0.500 | 0.123 | 52 | 11.123 |
| 2003 | 3129 | 0.493 | 0.612 | 28 | 1 | 0.607 | 4 | 7 | 0.488 | 0.128 | 52 | 11.459 |
| 2004 | 2988 | 0.498 | 0.605 | 29 | 1 | 0.608 | 4 | 7 | 0.482 | 0.119 | 52 | 11.199 |
| 2005 | 3009 | 0.497 | 0.612 | 28 | 1 | 0.617 | 4 | 7 | 0.466 | 0.124 | 52 | 10.915 |
| 2006 | 3084 | 0.494 | 0.584 | 29 | 1 | 0.606 | 4 | 7 | 0.466 | 0.129 | 52 | 10.556 |
| 2007 | 3004 | 0.481 | 0.574 | 29 | 1 | 0.626 | 4 | 7 | 0.468 | 0.127 | 52 | 10.844 |
| 2008 | 3025 | 0.493 | 0.584 | 29 | 1 | 0.609 | 4 | 7 | 0.471 | 0.123 | 52 | 11.055 |
| 2009 | 3147 | 0.468 | 0.560 | 29 | 1 | 0.615 | 4 | 7 | 0.453 | 0.135 | 52 | 10.399 |
| 2010 | 3324 | 0.458 | 0.566 | 29 | 1 | 0.598 | 4 | 7 | 0.414 | 0.129 | 52 | 11.250 |
| 2011 | 3362 | 0.454 | 0.551 | 29 | 1 | 0.610 | 4 | 7 | 0.383 | 0.153 | 52 | 10.773 |
| 2012 | 3439 | 0.444 | 0.532 | 29 | 1 | 0.615 | 4 | 7 | 0.402 | 0.151 | 52 | 10.376 |
| 2013 | 3429 | 0.474 | 0.544 | 30 | 1 | 0.593 | 4 | 7 | 0.405 | 0.162 | 52 | 10.570 |
| 2014 | 2339 | 0.455 | 0.511 | 30 | 1 | 0.593 | 4 | 7 | 0.420 | 0.142 | 52 | 10.618 |

NOTE: The sample is restricted to never-married mothers between ages 19 and 44. See Appendix Table B8 for sample restriction details. Median weeks worked and median wage are conditional on employment. Wages are CPI-adjusted to 2009 dollars. Wages are computed as total wage and salary income divided by the product of weeks worked and usual hours worked per week.

SOURCE: Data from IPUMS CPS.

**Appendix Table B2: Wages vs. Experience**

| Panel A: Full sample | | | | |
|---|---|---|---|---|
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.0120 | 0.0171 | 0.0182 | 0.0150 |
| | (0.00686) | (0.00778) | (0.00920) | (0.00821) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.011 | 0.030 | 0.037 | 0.019 |
| **Panel B: Education ≤ 12 years** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00877 | 0.0116 | 0.0124 | 0.00997 |
| | (0.0105) | (0.0119) | (0.0157) | (0.0131) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.004 | 0.008 | 0.009 | 0.006 |
| **Panel C: States with high prereform welfare use** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00494 | 0.00588 | 0.00429 | 0.00920 |
| | (0.00685) | (0.00821) | (0.00877) | (0.0118) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.002 | 0.003 | 0.002 | 0.005 |

NOTE: "Expr" stands for years of experience. All regressions are based on cells created according to the youngest child's birth cohort and the age of the youngest child. "yngch" denotes age of the youngest child. Standard errors clustered by child's birth cohort.

SOURCE: Data from IPUMS CPS.

**Appendix Table B3 Employment vs. Experience**

| | | | | |
|---|---|---|---|---|
| Panel A: Full sample | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00801 | 0.00361 | −0.00330 | 0.0174 |
| | (0.00460) | (0.00617) | (0.00595) | (0.0122) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.009 | 0.003 | 0.003 | 0.044 |
| Panel B: Education ≤ 12 years | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00908 | 0.00429 | 0.00330 | 0.00641 |
| | (0.00702) | (0.00858) | (0.00887) | (0.0135) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.008 | 0.002 | 0.001 | 0.004 |
| Panel C: States with high prereform welfare use | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00994 | 0.00465 | −0.00397 | 0.0227 |
| | (0.00550) | (0.00741) | (0.00717) | (0.0147) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.010 | 0.003 | 0.003 | 0.043 |

NOTE: "Expr" stands for years of experience. All regressions are based on cells created according to the youngest child's birth cohort and the age of the youngest child. "yngch" denotes age of the youngest child. Standard errors clustered by child's birth cohort.
SOURCE: Data from IPUMS CPS.

**Appendix Table B4 Wages vs. Experience**

| Panel A: Youngest child's birth cohort ≥ 1985 | | | | |
|---|---|---|---|---|
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.0134 | 0.0232 | 0.0184 | 0.0370 |
| | (0.00784) | (0.0111) | (0.0127) | (0.0123) |
| Observations | 399 | 234 | 147 | 87 |
| $R^2$ | 0.010 | 0.042 | 0.030 | 0.081 |
| **Panel B: Youngest child's birth cohort = 1980–1998** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00377 | 0.00327 | 0.00835 | −0.00322 |
| | (0.00909) | (0.00900) | (0.0115) | (0.00891) |
| Observations | 358 | 244 | 133 | 111 |
| $R^2$ | 0.002 | 0.001 | 0.007 | 0.001 |
| **Panel C: Number of kids ≥ 2** | | | | |
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00620 | 0.0100 | 0.0104 | 0.00915 |
| | (0.00708) | (0.00833) | (0.00973) | (0.0126) |
| Observations | 492 | 297 | 182 | 115 |
| $R^2$ | 0.005 | 0.009 | 0.012 | 0.005 |

NOTE: "Expr" stands for years of experience. All regressions are based on cells created according to the youngest child's birth cohort and the age of the youngest child. "yngch" denotes age of the youngest child. Standard errors clustered by child's birth cohort.

SOURCE: Data from IPUMS CPS.

**Appendix Table B5 Comparisons Across Groups**

| Panel A: Comparing never-married mothers and married mothers with education ≤ 12 years | | | | |
|---|---|---|---|---|
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | 0.00213 | 0.00373 | −0.00491 | 0.0271 |
| | (0.00493) | (0.00915) | (0.0107) | (0.0161) |
| Observations | 399 | 234 | 147 | 87 |
| $R^2$ | 0.000 | 0.001 | 0.001 | 0.022 |

| Panel B: Comparing high welfare-use states and low welfare-use states | | | | |
|---|---|---|---|---|
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | −0.0139 | −0.0142 | −0.0330 | −0.0252 |
| | (0.00769) | (0.0128) | (0.0201) | (0.0443) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.002 | 0.001 | 0.008 | 0.003 |

NOTE: "Expr" stands for years of experience. All regressions are based on cells created according to the youngest child's birth cohort and the age of the youngest child. "yngch" denotes age of the youngest child. Standard errors clustered by child's birth cohort. For the comparisons between married and never-married mothers in Panel A, we focus on youngest child's birth cohort equal to 1985 and beyond.
SOURCE: Data from IPUMS CPS.

**Appendix Table B6 Occupation and Industry Characteristics of Employed Never-Married Mothers, Youngest Child Ages 0 through 5**

Observed between 1990 and 1993 (*N* = 2249)

| Ranking | Occupation | Fraction in occupation |
|---|---|---|
| 1 | Cashiers | 0.100 |
| 2 | Nursing aides, orderlies, and attendants | 0.050 |
| 3 | Secretaries | 0.048 |
| 4 | Waiters/waitresses | 0.040 |
| 5 | Salespersons, n.e.c. | 0.038 |
| 6 | Housekeepers, maids, butlers, stewards, and lodging-quarters cleaners | 0.031 |
| 7 | Cooks, variously defined | 0.028 |
| 8 | Child care workers | 0.025 |
| 9 | Assemblers of electrical equipment | 0.022 |
| 10 | Janitors | 0.020 |

Observed between 1990 and 1993 (*N* = 2247)

| Ranking | Industry | Fraction in industry |
|---|---|---|
| 1 | Eating and drinking places | 0.120 |
| 2 | Medical and other health services, except hospitals | 0.083 |
| 3 | Educational services | 0.068 |
| 4 | Miscellaneous business services | 0.060 |
| 5 | Hospitals | 0.058 |
| 6 | Food stores, except dairy products | 0.048 |
| 7 | General merchandise stores | 0.038 |
| 8 | Hotels and lodging places | 0.037 |
| 9 | Federal public administration | 0.029 |
| 10 | Banking and credit agencies | 0.024 |

Observed between 1998 and 2001 (*N* = 3602)

| Ranking | Occupation | Fraction in occupation |
|---|---|---|
| 1 | Cashiers | 0.084 |
| 2 | Nursing aides, orderlies, and attendants | 0.059 |
| 3 | Salespersons, n.e.c. | 0.041 |
| 4 | Waiters/waitresses | 0.036 |
| 5 | Secretaries | 0.029 |
| 6 | Cooks, variously defined | 0.029 |
| 7 | Receptionists | 0.027 |
| 8 | Customer service reps, investigators and adjusters, except insurance | 0.026 |
| 9 | Teacher's aides | 0.025 |
| 10 | Housekeepers, maids, butlers, stewards, and lodging-quarters cleaners | 0.019 |

Observed between 1998 and 2001 (*N* = 3601)

| Ranking | Industry | Fraction in industry |
|---|---|---|
| 1 | Eating and drinking places | 0.114 |
| 2 | Medical and other health services, except hospitals | 0.095 |
| 3 | Educational services | 0.087 |
| 4 | Miscellaneous business services | 0.081 |
| 5 | Food stores, except dairy products | 0.045 |
| 6 | General merchandise stores | 0.043 |
| 7 | Hospitals | 0.039 |
| 8 | Banking and credit agencies | 0.034 |
| 9 | Welfare and religious services | 0.031 |
| 10 | Hotels and lodging places | 0.025 |

NOTE: *N* refers to the total number of observations in the specified sample period; this number is used as the denominator when computing the fractions in each occupation. Ranking is based on the fraction in each occupation or industry; the most frequent occupations are assigned the lowest numerical rankings. Occupation categories are based on the 1990 basis categories, and industry classifications are based on the 1950 basis categories.
SOURCE: Data from IPUMS CPS.

**Appendix Table B7 Occupation and Industry Characteristics of Employed Never-Married Mothers, Youngest Child Ages 13 through 18**

Observed between 1990 and 1993 (*N* = 360)

| Ranking | Occupation | Fraction in occupation |
|---|---|---|
| 1 | Nursing aides, orderlies, and attendants | 0.078 |
| 2 | Secretaries | 0.064 |
| 3 | Housekeepers, maids, butlers, stewards, and lodging-quarters cleaners | 0.047 |
| 4 | Assemblers of electrical equipment | 0.042 |
| 5 | Textile sewing machine operators | 0.036 |
| 6 | Cooks, variously defined | 0.036 |
| 7 | Cashiers | 0.028 |
| 8 | Janitors | 0.025 |
| 9 | Packers, fillers, and wrappers | 0.022 |
| 10 | Bookkeepers and accounting and auditing clerks | 0.022 |

Observed between 1990 and 1993 (*N* = 360)

| Ranking | Industry | Fraction in industry |
|---|---|---|
| 1 | Educational services | 0.108 |
| 2 | Hospitals | 0.106 |
| 3 | Medical and other health services, except hospitals | 0.083 |
| 4 | Miscellaneous business services | 0.058 |
| 5 | Federal public administration | 0.044 |
| 6 | Eating and drinking places | 0.039 |
| 7 | Banking and credit agencies | 0.033 |
| 8 | Apparel and accessories | 0.031 |
| 9 | Electrical machinery, equipment, and supplies | 0.028 |
| 10 | Welfare and religious services | 0.025 |

Observed between 2007 and 2010 (*N* = 1124)

| Ranking | Occupation | Fraction in occupation |
|---|---|---|
| 1 | Nursing aides, orderlies, and attendants | 0.085 |
| 2 | Housekeepers, maids, butlers, stewards, and lodging-quarters cleaners | 0.044 |
| 3 | Secretaries | 0.042 |
| 4 | Cooks, variously defined | 0.036 |
| 5 | Cashiers | 0.035 |
| 6 | Supervisors and proprietors of sales jobs | 0.031 |
| 7 | Customer service reps, investigators and adjusters, except insurance | 0.031 |
| 8 | Child care workers | 0.026 |
| 9 | Health aides, except nursing | 0.019 |
| 10 | Waiters/waitresses | 0.019 |

Observed between 2007 and 2010 (*N* = 1124)

| Ranking | Industry | Fraction in industry |
|---|---|---|
| 1 | Medical and other health services, except hospitals | 0.127 |
| 2 | Educational services | 0.107 |
| 3 | Eating and drinking places | 0.067 |
| 4 | Hospitals | 0.063 |
| 5 | Miscellaneous business services | 0.051 |
| 6 | Miscellaneous professional and related services | 0.050 |
| 7 | General merchandise stores | 0.035 |
| 8 | Food stores, except dairy products | 0.029 |
| 9 | Federal public administration | 0.026 |
| 10 | Local public administration | 0.026 |

NOTE: *N* refers to the total number of observations in the specified sample period; this number is used as the denominator when computing the fractions in each occupation. Ranking is based on the fraction in each occupation or industry; the most frequent occupations are assigned the lowest numerical rankings. Occupation categories are based on the 1990 basis categories, and industry classifications are based on the 1950 basis categories.
SOURCE: Data from IPUMS CPS.

**Appendix Table B8 CPS Sample Restrictions, Survey Years 1970–2014**

| Sample restriction | No. of observations |
|---|---|
| All women | 3,882,624 |
| Never-married women | 1,616,760 |
| Ages 19 through 44 | 400,376 |
| No. of own children > 0 | 75,565 |
| Dropping if age of oldest child + 15 > mother's age | 73,496 |
| Dropping if age of oldest child + 45 ≤ mother's age | 73,496 |
| Dropping if age of oldest child − age of youngest child > 20 | 73,451 |

SOURCE: Data from IPUMS CPS.

**Appendix Table B9 State Welfare Use among Never-Married Mothers, 1991–1993**

| Ranking | State | Fraction receiving welfare | *N* |
|---|---|---|---|
| 1 | Nevada | 0.136 | 110 |
| 2 | Alabama | 0.155 | 193 |
| 3 | Idaho | 0.173 | 104 |
| 4 | Virginia | 0.183 | 115 |
| 5 | Texas | 0.212 | 628 |
| 6 | Georgia | 0.214 | 159 |
| 7 | Delaware | 0.216 | 125 |
| 8 | Utah | 0.234 | 94 |
| 9 | Arizona | 0.239 | 134 |
| 10 | New Mexico | 0.239 | 163 |
| 11 | Arkansas | 0.248 | 153 |
| 12 | Missouri | 0.252 | 135 |
| 13 | South Dakota | 0.252 | 115 |
| 14 | North Carolina | 0.255 | 436 |
| 15 | Kansas | 0.257 | 136 |
| 16 | Florida | 0.265 | 578 |
| 16 | Oklahoma | 0.265 | 136 |
| 18 | Indiana | 0.268 | 157 |
| 19 | Colorado | 0.271 | 118 |
| 20 | Iowa | 0.278 | 126 |
| 21 | Montana | 0.279 | 147 |
| 22 | Maryland | 0.283 | 106 |
| 23 | New Hampshire | 0.293 | 75 |
| 24 | Mississippi | 0.308 | 237 |
| 25 | Hawaii | 0.309 | 94 |
| 26 | New Jersey | 0.311 | 440 |
| 27 | Nebraska | 0.314 | 105 |
| 28 | South Carolina | 0.320 | 181 |
| 29 | Washington | 0.327 | 101 |
| 30 | Maine | 0.330 | 100 |
| 31 | Alaska | 0.333 | 168 |
| 32 | Wyoming | 0.337 | 104 |
| 33 | Wisconsin | 0.338 | 151 |
| 34 | District of Columbia | 0.345 | 177 |
| 35 | Tennessee | 0.355 | 169 |
| 36 | Oregon | 0.359 | 103 |
| 37 | California | 0.363 | 998 |
| 38 | Louisiana | 0.371 | 167 |
| 39 | Ohio | 0.373 | 528 |
| 40 | Pennsylvania | 0.384 | 411 |
| 41 | Illinois | 0.392 | 556 |
| 42 | Kentucky | 0.393 | 150 |
| 43 | North Dakota | 0.397 | 116 |
| 44 | Michigan | 0.399 | 541 |
| 45 | Connecticut | 0.414 | 87 |
| 46 | Massachusetts | 0.425 | 388 |
| 47 | West Virginia | 0.447 | 123 |
| 48 | Minnesota | 0.450 | 111 |
| 49 | New York | 0.455 | 876 |
| 50 | Vermont | 0.466 | 73 |
| 51 | Rhode Island | 0.483 | 87 |

NOTE: *N* refers to the total number of observations (i.e., including welfare recipients and nonrecipients) within each state.
SOURCE: Data from IPUMS CPS.

**Appendix Table C1 Wages vs. Experience, All Mothers with Education ≤ 12 Years**

| Panel A: Full sample | | | | |
|---|---|---|---|---|
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | −0.000636 | −0.00194 | 0.00485 | −0.0183 |
| | (0.00417) | (.00504) | (0.00388) | (0.0100) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.000 | 0.001 | 0.006 | 0.054 |

| Panel B: States with high prereform welfare use | | | | |
|---|---|---|---|---|
| | yngch ≤ 18 | 6 ≤ yngch ≤ 18 | 6 ≤ yngch ≤ 12 | 13 ≤ yngch ≤ 18 |
| Expr | −5.45e-05 | 0.00383 | −0.000705 | −0.00228 |
| | (0.000859) | (0.00156) | (0.00274) | (0.00571) |
| Observations | 494 | 299 | 182 | 117 |
| $R^2$ | 0.000 | 0.020 | 0.000 | 0.001 |

NOTE: "Expr" stands for years of experience. All regressions are based on cells created according to the youngest child's birth cohort and the age of the youngest child. "yngch" denotes age of the youngest child. Standard errors clustered by child's birth cohort.
SOURCE: Data from IPUMS CPS.