Labor force participation responses to the 1993 EITC expansion

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Abstract

This paper examines the effect of the 1993 Earned Income Tax Credit expansion on the labor force participation of single women by comparing the changes from before to after the expansion in the participation of women with no, one, and two or more children. Both quasi−experimental and regression−based difference−in−difference estimates from annual 1991−1998 March CPS data indicate that this expansion significantly narrowed the labor force participation gaps between these three groups.

1. Introduction

The earned income tax credit (EITC) is a refundable U.S. federal income tax credit available to families with earned income that is positive but below a specified amount, in 2000 equal to $10,380, $27,413, and $31,152 for families with no, one, and two or more children, respectively. Since 1975, the EITC has grown from a small program targeted towards offsetting the social security payroll tax for low-income families with children to the single largest cash-transfer program for such families, with 19 million recipients and over $25 billion in outlays in 1998. Much of this growth is attributable to program expansions that occurred as part of the Omnibus Budget Reconciliation Acts of 1990 and 1993. Both expansions substantially increased the maximum EITC benefit level, the rate at which the credit is phased in as earnings increases, and the threshold earnings level for eligibility. The 1990 expansion initiated a slight benefit premium for families with two or more children. The 1993 expansion increased this premium considerably and also instituted a small credit for families with no dependent children.

Table I shows the maximum EITC credit, along with the rates and ranges at which the credit first rises and then falls as earnings increases, for each year from 1990 to 1998 (U.S. House of Representatives, various years). The maximum credit rose steadily over time, with annual phase-in rate increases through 1996 corresponding to three-year implementations of each expansion. In particular, the 1993 expansion significantly widened the additional credit provided to families with more than one child. Between 1993 and 1996, the maximum credit rose by $2,045 (135%) for families with two or more children but by only $718 (50%) for families with one child.

This paper examines the differential effects that the 1993 EITC expansion had on the labor force participation of single women with no, one, and two or more children. Since earned income is required for eligibility and only a modest credit is available to families with no children, standard labor supply theory predicts that EITC expansions will increase the labor force participation of single women with children relative to that of those without children. Similarly, a relatively larger expansion of the credit available to single women with two or more children is expected to increase their participation relative to that of those with one child.

Recent research has studied labor force participation effects of the 1990 and 1993 expansions, as well as the expansion that was part of the Tax Reform Act of 1986, by treating them as natural experiments. Specifically, the difference across individuals with varying amounts of children in the change in participation from before to after an expansion provides an estimate of the impact of the EITC on participation. Several studies have thus estimated probit difference-in-difference labor force participation models in cross-sectional CPS data. Eissa and Liebman (1996) found that the 1986 expansion increased the probability of participation for single mothers relative to that for single women with no children by two percentage points. Eissa and Hoynes (1998) estimated that the overall effect of the three expansions was to slightly increase participation by married men but to reduce participation by married women. Meyer and Rosenbaum (1999) show that a large share of the increase in participation of single mothers relative to that of single women without children is attributable to the three expansions.

This paper builds on these past studies and especially that of Meyer and Rosenbaum (2000), who found that labor force participation of single mothers with two or more children increased by ten percentage points more than participation of single mothers with one child between 1993 and 1996. While their unadjusted difference-in-difference estimate does not hold constant other factors affecting work decisions, our regression model includes numerous demographic variables, several controls for the welfare reform of 1996, and fixed state effects. Also we

incorporate data from 1997 and 1998, during which time behavioral adjustments to the 1993 expansion, which was not completely phased in until 1996, were likely still taking place.

We analyze annual March CPS data from 1991–1998 using both quasi-experimental and regression-based difference-in-difference techniques. Both methods reveal that the gap in the likelihood of labor force participation between single mothers with two or more children and those with one child was significantly smaller in 1998 than in 1993, as was the analogous participation gap between single women with one child and no children.

2. Empirical Framework

We examine the 1992–1999 March CPS files, which contain data from 1991–1998. Following the previous literature, the sample is restricted to single women (never married, divorced, or widowed) aged 19–44 who are not in the armed forces, disabled, or enrolled in school. The lower age bound avoids counting EITC children as mothers, while the upper bound limits the number of former single mothers categorized as non-mothers. Consistent with the tax code, children are defined as any own children who are either younger than age 19 or are full-time students aged between 19 and 23. Single women are analyzed because they are the largest EITC-eligible group, making up 53% of eligible 1999 CPS respondents, and because the assumption that work decisions are made individually is more plausible for single women than for married couples. Like earlier studies, we define labor force participation as working positive hours during the year because for this measure the predicted EITC impact is unambiguous.

Since the 1993 EITC expansion provided different benefit increases to families with no, one, and two or more children, single women are divided into a control group with exactly one child, a primary treatment group with two or more children, and a secondary treatment group with no children. Estimates comparing the changes from before to after the expansion in labor force participation rates for treatment and control groups can be interpreted as EITC effects as long as no other factors affect participation of the three groups differently and underlying participation trends do not vary across the three groups. The structure of the expansion suggests that these difference-in-difference estimates will be positive for the primary treatment group, reflecting a greater increase in labor force participation for women with two or more children than for those with one child, and negative for the secondary treatment group.

If demographic characteristics that affect work decisions vary across these treatment and control groups, unadjusted difference-in-difference estimates might not reflect true "treatment effects" of the expansion. Therefore the following probit equation is also estimated:

$$\Pr(work_{it} = 1) = \beta_0 + \beta_1 TWO\_KIDS_{it} + \beta_2 NO\_KIDS_{it} + \boldsymbol{\beta_3 YEAR_t} + \boldsymbol{\beta_4}(TWO\_KIDS*YEAR)_{it}$$
$$+ \boldsymbol{\beta_5}(NO\_KIDS*YEAR)_{it} + \boldsymbol{\beta_6 X_{it}} + \boldsymbol{\beta_7 WELFARE_{it}} + \boldsymbol{\beta_8 STATE_i} + \varepsilon_{it}. \qquad (1)$$

The dependent variable *work* is a binary indicator equaling one for women who worked at least one hour during the year. *TWO_KIDS* and *NO_KIDS* are indicators that the respondent has at least two children or no children, respectively. Since the comparison group is mothers with one child, the expected sign is negative for β_1 and positive for β_2. *YEAR* (*STATE*) is a vector of year (state) indicators.

*TWO_KIDS*YEAR* is a vector of interactions between *TWO_KIDS* and each year indicator. *NO_KIDS*YEAR* is defined analogously for the *NO_KIDS* indicator. The treatment effects of interest are the parameter vectors $\boldsymbol{\beta_4}$ and $\boldsymbol{\beta_5}$. We exclude years 1991–1993 from each of these interaction vectors (while the separate **YEAR** vector excludes only 1991) so that the difference-in-difference baseline is the average participation likelihood before implementation of the 1993

EITC expansion began in 1994. The structure of the expansion suggests that parameters in β_4 will be positive while those in β_5 will be negative.

X is a vector of demographic characteristics including age and its square, education and its square, number of preschool children, unearned income, and whether the woman was a widow, divorced, white, and lived in a central city. (Dollar-valued variables are converted to 1999 constant dollars using the CPI for all urban consumers.) To control for the effects of macroeconomic shocks, X also includes the state unemployment rate. The **WELFARE** vector contains three welfare system measures, two of which reflect reforms that accompanied the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996, based on the state of residence of the respondent. PRWORA phased out the entitlement-based Aid to Families with Dependent Children (AFDC) program in favor of the more restrictive Temporary Assistance for Needy Families (TANF) program, which instituted stricter eligibility requirements and time limits on benefits. Before PRWORA began, many states were granted waivers allowing states to enact TANF-like eligibility requirements and time limits. These reforms might have encouraged entry into the labor force. Therefore, a variable equal to one for a given state once it enacted a waiver is included. Once TANF was in place (not simply approved) in a state, the waiver variable is set equal to zero and a second variable is set equal to one for that state. For mid-year waiver or TANF enactment, the corresponding variable equals the fraction of the year that the waiver or TANF was in effect. (Dates of waiver and TANF enactment are listed in Council of Economic Advisors 1999.) The third welfare measure is the maximum monthly AFDC or TANF benefit available to a family of three in the state.

Both unconditional and probit estimates are obtained for the full sample of 75,293 single women, the subset of 35,783 with 12 or fewer years of schooling, and the complementary subset of 39,510 with more than 12 years of schooling. In the 1999 CPS, 84 percent of single women in the less educated group but only 38 percent in the more educated group qualify for the EITC. Thus we anticipate that the expansion will have a larger effect on the less educated group.

3. Results

3.1 Descriptive Statistics

The mean age of sample respondents, among whom 83% work and 77% are white, is 30. The number of EITC-eligible children is zero for 58% of the sample and at least two for 21% of the sample. On average respondents have 13 years of schooling, earnings of $18,000, and $2,000 in unearned income. More educated respondents on average are more likely to work (92% vs. 74%), have fewer children (68% vs. 47% have no dependent children and 14% vs. 28% have two or more children), and have $11,700 more earnings than less educated respondents.

3.2 Unconditional Difference-in-Difference Models

Table II reports unconditional difference-in-difference results. Panels A, B, and C show estimates for the full, less educated, and more educated sample, respectively. Each row represents a treatment or control group. In each panel, labor force participation rates before the 1993 expansion (1991–1993) are compared with those during implementation (1994–1996) in the upper portion and after implementation (1997–1998) in the lower portion. The third column is the difference between average rates in the latter (second column) and pre-expansion (first column) periods. The last column is the amount by which the difference (third column) for the treatment group exceeds that for the control group.

Panel A shows that participation rates increased over time for all groups except for a slight decline between the periods during and after implementation among women with no children. Compared with the participation rate increase from the pre-expansion period among control group women with one child, the increase among primary treatment group women with more than one child was four percentage points greater during implementation and ten percentage points greater after implementation. Participation rate increases for control group women were likewise greater than those for secondary treatment group women with no children, but these secondary treatment effects are smaller than the primary treatment effects, particularly for the post-implementation period. These results suggest that the 1993 EITC expansion had a marked effect on the labor force participation of single mothers with children.

Panels B and C reveals similar results for the subsamples of women with different schooling levels. As hypothesized, the Panel B difference-in-difference estimates are generally larger than the Panel C estimates, supporting our interpretation that these estimates represent EITC program effects. In particular, the primary treatment effect for the more educated sample is three times smaller (and insignificant) during implementation, and twice as small after implementation, as the corresponding effects for the less educated sample. The post-expansion results for the secondary treatment group are analogous, although the effect during implementation is similar in magnitude for the two samples and insignificant for the less educated sample.

3.3 Probit Difference-in-Difference Results

Table III contains estimated marginal effects from probit difference-in-difference models. The first column displays results for the full sample. The primary treatment effects – the coefficients on the *TWO_KIDS*YEAR* interactions – are insignificant for 1994 but positive and significant, as expected, for the remaining years. Single women with two or more children steadily increased their propensities to work relative to those with just one child, with the 1998 difference approaching six percentage points. Secondary treatment effects – the coefficients on the *NO_KIDS*YEAR* interactions – are again negative and significant, with magnitudes that are nearly identical each year before doubling in 1998 and comparable to those of the primary treatment effects beyond 1994. In sum, the 1993 EITC expansion appears to have significantly narrowed the participation gap between women with varying numbers of children.

Presumably the reason that primary treatment effects increase over time is a combination of gradual implementation of the expansion through 1996 and lags in both learning about EITC program changes and adjusting to the new incentives. For instance, Eissa and Liebman (1996) found that participation responses to the 1986 EITC expansion, which was implemented in 1987, were insignificant until 1989. These lags would also explain the lack of a primary treatment effect in 1994, since the maximum EITC premium for the second child was less than $100 until that year. Similarly, the significant secondary treatment effect in 1994 might partially represent a lagged response to the 1990 expansion, beyond which further responses were small since the 1993 expansion only minimally increased the maximum credit to families with one child.

An alternative explanation for the observed temporal pattern is that treatment effects in part reflect participation responses to TANF implementation and the preceding waivers, but this seems unlikely because a vector of welfare system controls are included. The unexpected negative sign on the waiver measure suggests that waivers were enacted in states with relatively low and declining participation rates. Since TANF is a federal program that received much pre-implementation publicity on a national level, it may have instead had a geographically uniform impact on work decisions of single mothers that could contribute to the size of the 1998

treatment effects. However, since many states never enacted waivers and TANF implementation did not begin until the fall of 1996, it is unlikely that the size or significance of the 1994–1997 treatment effects is related to welfare reform.

3.4 Segmentation by Education

The second and third columns of Table III show the results for the subsamples segmented by education level. Again, the effect of the EITC expansion is stronger for less educated single women. The primary treatment effects increase monotonically during and after expansion implementation for the less educated segment, but are insignificant during implementation and much smaller in magnitude thereafter for the more educated segment. The secondary treatment effects are likewise larger in magnitude for less educated women after 1994, but are mostly insignificant for both segments. These results provide further evidence that the results reflect the effects of EITC program changes rather than another policy change that would impact women of different education levels similarly. The increase in the magnitude of the primary treatment effect between 1997 and 1998 for less educated but not more educated women is consistent with the possibility that a small component of the 1998 effect represents a geographically invariant impact of welfare reform.

4. Conclusion

The growth of the EITC program since the late 1980s has led to a significant increase in the labor market participation of single mothers. Our analysis implies that in response to the 1993 EITC expansion, the likelihood of participation increased by between five and six percentage points for single mothers with two or more children relative to those with only one child. A similar increase is observed for single women with one child relative to those with no children. Among single women with twelve or fewer years of schooling, a subgroup particularly likely to respond to EITC incentives, mothers with more than one child increased their participation propensities by seven to ten percentage points compared with mothers with one child. The analogous effect was substantially smaller among single women with more than twelve years of education. These results imply that the EITC does in fact impact work decisions and more specifically that it is possible to increase labor force participation among specific demographic groups by appropriately adjusting their incentives. They also suggest that the EITC expansion to occur as part of the recently approved federal tax cut will further increase participation among single females, though as Eissa and Liebman (1996) note returns to expansions likely decrease over time because remaining non-participators are further from the participation margin.

Our results suggest at least two directions for further investigation. First, the magnitudes of the 1998 EITC effect estimates imply that other factors for which we failed to adequately control may increase the labor force participation of single women with children relative to that of single women without children. Subsequent analysis could attempt to identify these factors and in particular investigate the effect of welfare reform in more detail. While Council of Economic Advisors (1999) found that TANF implementation played a significant role in the recent decline in welfare caseloads, the estimated effects of our rudimentary welfare reform controls imply that TANF did not cause single women to begin working. In that light, a complementary potential extension of this analysis would examine if the reverse was true – that women induced into the labor force by the EITC had previously received welfare – by analyzing whether the 1993 EITC expansion reduced the receipt of public assistance.

References

Council of Economic Advisors (1999) "The Effects of Welfare Policy and the Economic Expansion on Welfare Caseloads: An Update" *Technical Report*.

Eissa, N., and H. Hoynes (1998) "The Earned Income Tax Credit and the Labor Supply of Married Couples" NBER working paper 6856.

Eissa, N., and J. Liebman (1996) "Labor Supply Responses to the Earned Income Tax Credit" *Quarterly Journal of Economics* **111**, 605-637.

Meyer, B.D., and D.T. Rosenbaum (2000) "Making Single Mothers Work: Recent Tax and Welfare Policy and Its Effects" NBER working paper 7491.

Meyer, B.D., and D.T. Rosenbaum (1999) "Welfare, The Earned Income Tax Credit, and the Labor Supply of Single Mothers" NBER working paper 7363.

U.S. House of Representatives, Committee on Ways and Means (various years) *Green Book, Background Material and Data on Programs Within the Jurisdiction of the Committee on Ways and Means*, Government Printing Office: Washington DC.

Table I: EITC Parameters 1990–1998

Year	# Kids	Phase-In Rate	Phase-In Range	Maximum Credit	Phase-Out Rate	Phase-Out Range
1990	1	14%	$0 – $6,810	$953	10%	$10,730 – $20,264
	2+	14%	$0 – $6,810	$953	10%	$10,730 – $20,264
1991	1	16.7%	$0 – $7,140	$1,192	11.93%	$11,250 – $21,250
	2+	17.3%	$0 – $7,140	$1,253	12.36%	$11,250 – $21,250
1992	1	17.6%	$0 – $7,520	$1,324	12.57%	$11,840 – $22,370
	2+	18.4%	$0 – $7,520	$1,384	13.14%	$11,840 – $22,370
1993	1	18.5%	$0 – $7,750	$1,434	13.21%	$12,200 – $23,050
	2+	19.5%	$0 – $7,750	$1,511	13.93%	$12,200 – $23,050
1994	1	26.3%	$0 – $7,750	$2,038	15.98%	$11,000 – $23,755
	2+	30%	$0 – $8,425	$2,528	17.68%	$11,000 – $25,296
1995	1	34%	$0 – $6,160	$2,094	15.98%	$11,290 – $24,396
	2+	36%	$0 – $8,640	$3,110	20.22%	$11,290 – $26,673
1996	1	34%	$0 – $6,330	$2,152	15.98%	$11,650 – $25,078
	2+	40%	$0 – $8,890	$3,556	21.06%	$11,650 – $28,495
1997	1	34%	$0 – $6,500	$2,210	15.98%	$11,930 – $25,760
	2+	40%	$0 – $9,140	$3,656	21.06%	$11,930 – $29,290
1998	1	34%	$0 – $6,680	$2,271	15.98%	$12,250 – $26,460
	2+	40%	$0 – $9,390	$3,756	21.06%	$12,250 – $30,080

Table II: Unconditional Labor Force Participation Difference-in-Differences

	Panel A: Full Sample (*n* = 75,293)			
	1991–1993	**1994–1996**	**Difference**	**Difference-in-Difference**
No Kids	0.886	0.897	0.011***	–0.028***
(*n* = 43,471)	(0.003)	(0.003)	(0.004)	(0.009)
1 Kid	0.789	0.828	0.039***	
(*n* = 16,224)	(0.006)	(0.005)	(0.008)	
2+ Kids	0.634	0.713	0.079***	0.040***
(*n* = 15,598)	(0.007)	(0.007)	(0.010)	(0.013)
	1991–1993	**1997–1998**	**Difference**	**Difference-in-Difference**
No Kids	0.886	0.885	–0.001	–0.052***
(*n* = 43,471)	(0.003)	(0.004)	(0.004)	(0.010)
1 Kid	0.789	0.840	0.051***	
(*n* = 16,224)	(0.006)	(0.006)	(0.009)	
2+ Kids	0.634	0.786	0.152***	0.101***
(*n* = 15,598)	(0.007)	(0.008)	(0.010)	(0.014)

	Panel B: 12 years or less schooling (*n* = 35,783)			
	1991–1993	**1994–1996**	**Difference**	**Difference-in-Difference**
No Kids	0.802	0.825	0.023***	–0.020
(*n* = 16,603)	(0.005)	(0.006)	(0.008)	(0.014)
1 Kid	0.723	0.766	0.043***	
(*n* = 9,100)	(0.008)	(0.008)	(0.012)	
2+ Kids	0.540	0.631	0.091***	0.048***
(*n* = 10,080)	(0.009)	(0.009)	(0.013)	(0.017)
	1991–1993	**1997–1998**	**Difference**	**Difference-in-Difference**
No Kids	0.802	0.804	0.002	–0.063***
(*n* = 16,603)	(0.005)	(0.007)	(0.009)	(0.016)
1 Kid	0.723	0.788	0.065***	
(*n* = 9,100)	(0.008)	(0.010)	(0.013)	
2+ Kids	0.540	0.720	0.180***	0.115***
(*n* = 10,080)	(0.009)	(0.011)	(0.014)	(0.019)

	Panel C: More than 12 years schooling (*n* = 39,510)			
	1991–1993	**1994–1996**	**Difference**	**Difference-in-Difference**
No Kids	0.941	0.939	–0.002	–0.022**
(*n* = 26,868)	(0.003)	(0.003)	(0.004)	(0.010)
1 Kid	0.881	0.901	0.020**	
(*n* = 7,124)	(0.007)	(0.006)	(0.009)	
2+ Kids	0.820	0.856	0.036***	0.016
(*n* = 5,518)	(0.009)	(0.009)	(0.013)	(0.016)
	1991–1993	**1997–1998**	**Difference**	**Difference-in-Difference**
No Kids	0.941	0.934	–0.007*	–0.026**
(*n* = 26,868)	(0.003)	(0.004)	(0.004)	(0.011)
1 Kid	0.881	0.900	0.019*	
(*n* = 7,124)	(0.007)	(0.008)	(0.011)	
2+ Kids	0.820	0.894	0.074***	0.055***
(*n* = 5,518)	(0.009)	(0.010)	(0.013)	(0.017)

CPS sample weights are used. Standard errors are in parentheses.
*, **, and *** indicate significance at the 90%, 95%, and 99% levels, respectively.

Table III: Probit Labor Force Participation Difference-in-Difference Estimates

Variable	Full Sample	Schooling ≤ 12	Schooling > 12
No Kids	0.028***	0.028***	0.023***
	(0.006)	(0.010)	(0.006)
2+ Kids	−0.053***	−0.083***	−0.018**
	(0.007)	(0.012)	(0.008)
No Kids * 1994	−0.024**	−0.016	−0.025*
	(0.012)	(0.022)	(0.014)
No Kids * 1995	−0.026**	−0.035	−0.013
	(0.013)	(0.024)	(0.013)
No Kids * 1996	−0.030**	−0.033	−0.022
	(0.013)	(0.023)	(0.014)
No Kids * 1997	−0.027**	−0.034	−0.014
	(0.013)	(0.025)	(0.013)
No Kids * 1998	−0.060***	−0.089***	−0.032**
	(0.014)	(0.024)	(0.015)
2+ Kids * 1994	0.000	0.008	−0.009
	(0.012)	(0.022)	(0.015)
2+ Kids * 1995	0.022*	0.036*	0.010
	(0.011)	(0.021)	(0.013)
2+ Kids * 1996	0.019*	0.045**	−0.002
	(0.011)	(0.021)	(0.015)
2+ Kids * 1997	0.042***	0.067***	0.026**
	(0.010)	(0.020)	(0.010)
2+ Kids * 1998	0.057***	0.102***	0.025**
	(0.009)	(0.017)	(0.011)
Maximum Benefit (÷ 1000)	0.001	0.002	−0.001
	(0.020)	(0.050)	(0.020)
Waiver in Effect	−0.010*	−0.015	−0.006
	(0.006)	(0.012)	(0.006)
TANF Enacted	−0.007	0.031	−0.032***
	(0.012)	(0.025)	(0.012)
Age	0.002	0.002	0.023***
	(0.002)	(0.003)	(0.002)
Age Squared	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Education	0.018***	−0.090***	0.048***
	(0.003)	(0.007)	(0.011)
Education Squared	0.001***	0.008***	−0.001***
	(0.000)	(0.000)	(0.000)
# Kids Age ≤ 6	−0.064***	−0.091***	−0.037***
	(0.003)	(0.005)	(0.003)
Unearned Income (÷ 1000)	−0.005***	−0.010***	−0.003***
	(0.000)	(0.000)	(0.000)
Widow	−0.041***	−0.008	−0.066***
	(0.011)	(0.018)	(0.016)
Divorced	0.039***	0.080***	0.006
	(0.004)	(0.007)	(0.004)
White	0.070***	0.104***	0.045***
	(0.005)	(0.007)	(0.004)
Central City	−0.023***	−0.047***	−0.001
	(0.005)	(0.010)	(0.005)
State Unemployment Rate	−0.006**	−0.006	−0.005**
	(0.002)	(0.004)	(0.002)
Sample Size	75,293	35,783	39,510
Log Likelihood	−28,108	−17,545	−10,228

Coefficients are marginal effects. Standard errors are in parentheses.

*, **, and *** indicate significance at the 90%, 95%, and 99% levels, respectively.

Regressions use CPS sample weights and include fixed year and state effects.