

# “Labor Supply Response to the Earned Income Tax Credit”

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  - ▶ Provide maximum benefits to families with no income
  - ▶ Benefits reduced (almost dollar for dollar) with additional earnings
  - ▶ Simple labor supply theory predicts that this type of welfare program will discourage labor force participation
- ▶ Advocates of the Earned Income Tax Credit (EITC) argue that this policy has much less distortion on labor supply
  - ▶ In fact, for the lowest income earners, the EITC is said to encourage labor force participation

# EITC Design

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  - ▶ In 1996 federal EITC spending nearly 2x that of Aid to Families with Dependent Children (AFDC)
- ▶ Eligibility Requirements:
  - ▶ (1) Positive earned income
  - ▶ (2) Adjusted gross income and earned income below a specified threshold (2013: between \$14,340 and \$51,567)
  - ▶ (3) Have a qualified child
  - ▶ (Also, must be a taxpayer)

# EITC Budget Constraint

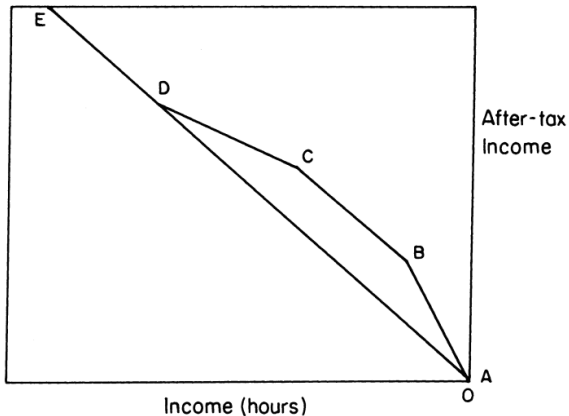


FIGURE I  
EITC Budget Constraint

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  - ▶ Phase-out region: Reduction in hours
  - ▶ Beyond the credit region: Taxpayers may decide to reduce their hours to receive the credit

# Identification Strategy

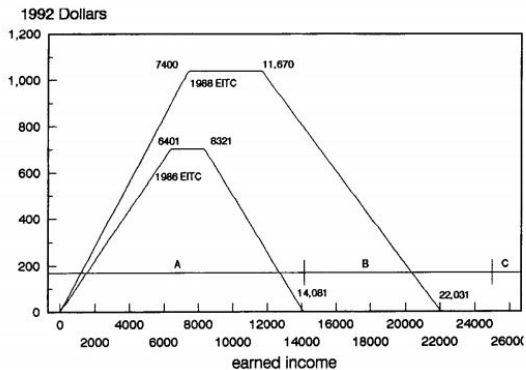
- ▶ Exploit the 1987 expansion (TRA86) of the EITC (draw picture)
  - ▶ Increased the subsidy rate from 11 to 14%
  - ▶ Increased the maximum income from \$5,000 to \$6,080
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  - ▶ Increased the maximum income from \$5,000 to \$6,080
  - ▶ Reduced the phase-out rate from 12.22 to 10%
- ▶ At every level of earnings the EITC amount after the expansion was at least as large as it was before
  - ▶ Theoretical prediction: labor force participation will increase but hours worked will decrease

# 1986 and 1988 EITC



# Identification Strategy

## Continued

- ▶ Natural experiment caused by TRA86
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  - ▶ Control (2): Single women with children and more than high school educ

- ▶ March CPS samples from 1985-1987, 1989-1991

- ▶ March CPS samples from 1985-1987, 1989-1991
- ▶ Sample includes:
  - ▶ Unmarried females (widowed, divorced, and never married)
  - ▶ Ages between 16 and 44 years old
  - ▶ Exclude any women with negative earned income or positive earned income but zero hours of work
  - ▶ Pooled sample size: 67,097 observations

# Summary Statistics

TABLE I  
SUMMARY STATISTICS

Variable	Group				
	Without children	With children			
		All	Education		
			Less than high school	High school	Beyond high school
Age	26.78 (7.02)	31.17 (7.07)	28.67 (7.39)	30.88 (6.79)	33.97 (6.21)
Education	13.44 (2.33)	12.05 (2.28)	9.33 (1.81)	12.00 (0.00)	14.63 (1.54)
Nonwhite	0.15 (0.36)	0.37 (0.48)	0.43 (0.49)	0.37 (0.48)	0.33 (0.47)
Preschool children	0.00 (0.00)	0.48 (0.50)	0.61 (0.49)	0.48 (0.50)	0.36 (0.48)
Filing unit size	1.00 (0.00)	2.74 (0.96)	3.03 (1.17)	2.66 (0.88)	2.60 (0.81)
Earned income	15,119 (13,799)	11,262 (12,498)	4109 (7844)	10,678 (10,679)	18,856 (14,497)
Earnings conditional on working	15,880 (13,708)	15,188 (12,289)	8414 (9475)	13,758 (10,225)	20,589 (13,920)
Labor force participation	0.952 (0.214)	0.742 (0.438)	0.488 (0.500)	0.776 (0.417)	0.916 (0.278)
Weekly participation	0.789 (0.324)	0.603 (0.437)	0.326 (0.415)	0.635 (0.426)	0.803 (0.336)
Hours of work	1531 (814)	1202 (951)	617 (847)	1260 (920)	1640 (812)
Observations	46,287	20,810	5396	9702	5712

Data are from survey years 1985-1987 and 1989-1991 of the March Current Population Survey (CPS). The sample contains unmarried women between the ages of 16 and 44. We exclude women who were separated during the previous year, ill or disabled, in school. We also exclude women with negative earnings, negative unearned income, or with nonzero earnings and zero hours of work. All figures are in 1992 dollars. Preschool children is the share of the sample with preschool children. Labor force participation equals one if annual hours are positive, zero otherwise. Weekly participation equals annual weeks worked divided by 52. Standard deviations are in parentheses. Means are weighted with CPS March supplement weights.

# Results for Labor Force Participation

TABLE II  
LABOR FORCE PARTICIPATION RATES OF UNMARRIED WOMEN

	Pre-TRA86 (1)	Post-TRA86 (2)	Difference (3)	Difference-in- differences (4)
<i>A. Treatment group:</i>				
With children [20,810]	0.729 (0.004)	0.753 (0.004)	0.024 (0.006)	
<i>Control group:</i>				
Without children [46,287]	0.952 (0.001)	0.952 (0.001)	0.000 (0.002)	0.024 (0.006)
<i>B. Treatment group:</i>				
Less than high school, with children [5396]	0.479 (0.010)	0.497 (0.010)	0.018 (0.014)	
<i>Control group 1:</i>				
Less than high school, without children [3958]	0.784 (0.010)	0.761 (0.009)	-0.023 (0.013)	0.041 (0.019)
<i>Control group 2:</i>				
Beyond high school, with children [5712]	0.911 (0.005)	0.920 (0.005)	0.009 (0.007)	0.009 (0.015)
<i>C. Treatment group:</i>				
High school, with children [9702]	0.764 (0.006)	0.787 (0.006)	0.023 (0.008)	
<i>Control group 1:</i>				
High school, without children [16,527]	0.945 (0.002)	0.943 (0.003)	-0.002 (0.004)	0.025 (0.009)
<i>Control group 2:</i>				
Beyond high school, with children [5712]	0.911 (0.005)	0.920 (0.005)	0.009 (0.007)	0.014 (0.011)

Data are from the March CPS, 1985–1987 and 1989–1991. Pre-TRA86 years are 1984–1986. Post-TRA86 years are 1988–1990. Labor force participation equals one if annual hours are positive, zero otherwise. Standard errors are in parentheses. Sample sizes are in square brackets. Means are weighted with CPS March supplement weights.

# Regression Analysis: Labor Force Participation

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  - ▶ Control for changes over time and correlation of demographics with labor force participation
  - ▶ Reduces residual variance and improves estimation efficiency

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- ▶  $P(lfp_{it} = 1) = \Phi(\alpha + \beta Z_{it} + \gamma_0 treatment_i + \gamma_1 post86_i + \gamma_2 (treatment * post86)_{it})$ 
  - ▶  $lfp = 1$  if a woman reported working at least one hour during the previous year
  - ▶  $Z_{it}$  is a vector of controls
  - ▶  $treatment_i = 1$  if woman has a child
  - ▶  $post86_t = 1$  if the time is after the 1986 tax reform

# Regression Results: Labor Force Participation

TABLE III  
PROBIT RESULTS: CHILDREN VERSUS NO CHILDREN ALL UNMARRIED WOMEN

Variables	Sample: all unmarried women					
	Without covariates (1)	Demographic characteristics (2)	Unemployment and AFDC (3)	State dummies (4)	Second child dummy (5)	Separate year interactions (6)
Coefficient estimates						
Other income (1000s)	—	-0.035 (.001)	-0.034 (.001)	-0.034 (.001)	-0.034 (.001)	-0.039 (.001)
Number of preschool children	—	-0.395 (.016)	-0.279 (.018)	-0.281 (.018)	-0.278 (.018)	-0.279 (.018)
Nonwhite	—	-0.422 (.016)	-0.521 (.030)	-0.520 (.031)	-0.518 (.031)	-0.518 (.031)
Age	—	-0.237 (.059)	-0.209 (.060)	-0.195 (.060)	-0.194 (.060)	-0.193 (.060)
Age squared	—	0.007 (.002)	0.006 (.002)	0.006 (.002)	0.006 (.002)	0.006 (.002)
Education	—	-0.020 (.014)	-0.029 (.014)	-0.029 (.014)	-0.029 (.014)	-0.029 (.014)
Education squared	—	0.010 (.001)	0.010 (.001)	0.010 (.001)	0.010 (.001)	0.010 (.001)
Second child	—	—	—	—	-0.118 (.040)	-0.117 (.040)
State Unemployment rate	—	—	-0.096 (.007)	-0.063 (.012)	-0.064 (.012)	-0.064 (.012)
State Unemployment rate kids × kids	—	—	0.028 (.010)	0.029 (.010)	0.029 (.010)	0.030 (.010)
Maximum monthly AFDC benefit	—	—	-0.001 (.000)	-0.001 (.000)	-0.001 (.001)	-0.001 (.000)
Kids ( $\gamma_0$ )	-1.053 (.020)	-0.250 (.029)	-1.403 (.106)	-1.438 (.108)	-1.458 (.110)	-1.462 (.110)
Post86 ( $\gamma_1$ )	-0.001 (.028)	0.019 (.031)	-0.152 (.067)	-0.104 (.069)	-0.094 (.069)	
Kids × Post86 ( $\gamma_2$ )	0.069 (.027)	0.074 (.030)	0.103 (.037)	0.113 (.037)	0.087 (.043)	—
Kids × 1988						0.033 (.057)
Kids × 1989						0.116 (.068)
Kids × 1990						0.112 (.057)
Second child × post86					0.051 (.043)	—
Log likelihood	-20759	-17105	-16793	-16633	-16629	-16626
Predicted participation response for treatment group		.019 (.008)	.026 (.010)	.028 (.009)	.022 (.009)	.028 (.014), (.015), (.015)

Data are from survey years 1985–1987 and 1988–1991 of the March CPS. The dependent variable is labor force participation. It equals one if the woman worked at least one hour during the tax year. *Post86* equals one for tax years 1988, 1989, 1990. *Kids* equals one if the tax filing unit contained at least one child. In addition to the variables shown, all regressions include year dummies for 1984, 1985, 1989, and 1990. Columns (2) through (6) also include variables for the number of children in the tax filing unit age-cubed. Columns (3) through (6) also include interactions of age and *nonwhite* with *post86* and with *kids*. Columns (4) through (6) also include a full set of state dummies. Column (6) also includes interactions of *second child* with the year dummies for 1988, 1989, and 1990. The number of observations is 67,097. Standard errors are in parentheses. Regressions are weighted with CPS March supplement weights.



# Regression Results: Labor Force Participation

Continued

Table IV  
PROBIT RESULTS: CHILDREN VERSUS NO CHILDREN  
DIFFERENT SUBSAMPLES

Variables	Sample				
	Less than high school (1)	High school (2)	Beyond high school (3)	Predicted earned income in EITC range (4)	Predicted earned income above EITC range (5)
<b>Coefficient estimates</b>					
<i>Kids</i> ( $\gamma_0$ )	-0.663 (.202)	-1.551 (.164)	-1.352 (.264)	-1.427 (.126)	-1.071 (.357)
<i>Post86</i> ( $\gamma_1$ )	-0.232 (.126)	-0.040 (.105)	0.188 (.158)	-0.022 (.078)	-0.151 (.221)
<i>Kids</i> $\times$ <i>Post86</i> ( $\gamma_2$ )	0.181 (.083)	0.103 (.062)	0.030 (.098)	0.137 (.049)	-0.048 (.119)
Log likelihood	-5052	-7723	-3380	-13845	-2612
Number of observations	9354	26,229	31,514	51,535	15,562
<i>Predicted participation response for treatment group</i>	.061 (.024)	.026 (.014)	.004 (.011)	.036 (.012)	-.007 (.016)

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# Regression Analysis: Hours Worked

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- ▶  $Hours_{it} = \alpha + \beta Z_{it} + \gamma_0 kids_i + \gamma_1 post86_t + \gamma(kids * post86)it + \epsilon_{it}$

- ▶  $Z_{it}$  is a vector of controls
- ▶  $kids_i = 1$  for unmarried women with children
- ▶  $post86_t = 1$  if the time is after the 1986 tax reform

# Regression Results: Hours Worked

TABLE V  
HOURS AND WEEKS REGRESSIONS: CHILDREN VERSUS NO CHILDREN

Dependent variable:	Annual hours	Annual hours	Annual hours	Annual hours	Annual weeks	Annual weeks
Variables	All single women with hours > 0 (1)	Less than high school with hours > 0 (2)	All single women (3)	Less than high school (4)	All single women with hours > 0 (5)	All single women (6)
Coefficient estimates						
Other income (1000s)	-21.83 (.61)	-26.81 (2.93)	-29.92 (.62)	-56.65 (2.46)	-0.433 (.012)	-0.670 (.014)
Number of preschool children	-66.28 (10.42)	-72.21 (25.57)	-136.49 (9.18)	-107.94 (16.92)	-1.833 (.214)	-3.944 (.207)
Nonwhite	-140.94 (11.77)	-142.84 (41.29)	-209.80 (12.43)	-266.32 (36.14)	-2.680 (.241)	-4.788 (.281)
Age	786.82 (22.38)	475.01 (64.29)	576.16 (23.59)	211.04 (54.87)	13.743 (.459)	9.391 (.533)
Age squared	-21.45 (.75)	-12.62 (2.21)	-15.12 (.80)	-4.79 (1.89)	-0.385 (.015)	-0.252 (.018)
Education	56.69 (6.41)	14.22 (17.07)	114.90 (6.14)	-56.03 (15.03)	1.262 (.132)	3.086 (.139)
Education squared	-1.58 (.25)	-0.21 (1.22)	-2.22 (.24)	5.97 (1.05)	-0.041 (.005)	-0.068 (.006)
Unemployment rate	-9.98 (3.85)	-31.37 (14.58)	-15.94 (4.15)	-42.24 (13.00)	-0.130 (.079)	-0.304 (.094)
Unemployment rate × kids	5.27 (4.17)	33.60 (13.44)	1.33 (4.14)	34.40 (11.10)	0.054 (.086)	-.065 (.094)
Maximum monthly AFDC benefit	-0.22 (.06)	-0.10 (.18)	-0.54 (.06)	-0.14 (.14)	-0.005 (.001)	-.014 (.001)
Kids ( $\gamma_k$ )	-83.03 (47.82)	-249.44 (132.61)	-186.48 (46.65)	-327.07 (110.24)	-6.856 (.981)	-11.420 (1.054)
Post86 ( $\gamma_1$ )	-29.95 (23.61)	63.27 (78.03)	-45.33 (25.20)	-56.27 (69.26)	0.722 (.484)	0.222 (.569)
Kids × Post86 ( $\gamma_2$ )	25.22 (15.18)	2.98 (46.04)	37.37 (15.31)	83.83 (39.42)	.126 (.311)	.560 (.346)
Observations	59,474	5700	67,097	9354	59,474	67,097

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  - ▶ Many EITC recipients do not know that they receive the credit
  - ▶ It is easier to measure participation than hours worked
  - ▶ It is possible some unknown positive shock explains their findings

# Conclusion

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# Conclusion

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  - ▶ Note that there may be decreasing returns if non-participants are increasingly far from the participation threshold
- ▶ Find no evidence that the EITC decreased hours of work for people already in the labor force
  - ▶ As awareness of the EITC increases (with increasing credit), there may be greater sensitivity to the increasing marginal tax rate
- ▶ A full evaluation of the EITC needs to go beyond the impact on labor supply
  - ▶ Factor in the value of the additional income and change in leisure vs. net income lost by taxpayers and associated deadweight loss

# Discussion

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  - ▶ The authors use the delta method to calculate standard errors, does this adequately account for serial correlation in outcomes over time?

# Discussion

- ▶ This is a Diff-in-Diff paper from 1996, so what do you think about the standard errors?
  - ▶ The authors use the delta method to calculate standard errors, does this adequately account for serial correlation in outcomes over time?
  - ▶ Bertrand et al. (2004) suggest clustering, but at what level??