Earned Income Tax Credit and Single Older Mothers' Labor Supply

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Abstract

The Earned Income Tax Credit (EITC) is a tax policy program that provides financial support to many low to moderate income families in the United States (US). While its impact on labor supply for younger single women and younger married couples has been extensively studied, its impact on older workers have not been studied as extensively. Against the setting of an aging population in the US, it becomes crucial to understand if the EITC has any impacts on older workers. This paper examines the effects of the Omnibus Budget Reconciliation Act of 1993 (OBRA93), where the EITC was expanded upon, on the labor supply of single older mothers. Data from the RAND Health and Retirement Study (HRS) is used and the method of analysis is through difference-in-differences (DID).

A succinct background, structure and theoretical implications of the EITC is provided. The paper also reviews past literature pertaining to the structural and empirical study of EITC expansions on labor supply, with a focus on younger single women and younger married couples. Unlike many other analysis which uses the Current Population Survey (CPS) dataset, the RAND HRS awards more comprehensive information on older workers' employment and family related statuses. The sample of concern is restricted to single, older women coming from the initial HRS cohort who were aged between 52 and 62 during the OBRA93 expansion, and also are more likely to be eligible for claiming the EITC based on their education level.

The DID analysis results show that the OBRA93 expansion had no significant effect on single older mothers across all outcomes analyzed of labor force participation, labor hours supplied, income, or household assets. Being inconsistent with earlier findings that observe positive effects on labor force participation rates for younger single mothers, this suggests further research on this topic and a possible extension to exploring the effects on intergenerational monetary or time transfers through grandchild care.

1. Introduction

The Earned Income Tax Credit (EITC) is one of the largest cash-transfer programs by the United States' public assistance system for low-income families (Nichols & Rothstein, 2015). According to Tax Policy Center [TPC] (2022), in 2019, 26.7 million recipients received a total of $64.5 billion returns from the EITC with $55.7 billion being the refundable portion (around 86%). The efficacy and beneficence of the EITC is ubiquitous throughout the literature – from being coined by Nichols and Rothstein (2015) as "one of the largest and least controversial elements of the US welfare state" to it being "the cornerstone of U.S. anti-poverty policy" by Hoynes (2014). In that respect, it is no surprise that the EITC and its impacts have been intensively studied with regards to the various forms of key family decisions: employment status and labor supply in married couples or single individuals with or without children; marriage and fertility rates; and even consumption patterns (Hotz & Scholz, 2003). At any rate, the EITC seems to be excelling at its core intentions – to administer monetary assistance whilst incentivizing work.

However, past literature on the labor supply effects of EITC expansions are largely focused on younger prime-working single women or married couples aged between 18 and 50 years old. In recent times, we are no stranger to the fact that the U.S. population is facing an aging population, with an increasing median age reaching a record high in 2022. With a population that is getting older, the workforce is also shifting to consist of a higher proportion of older workers. Therefore, it is worthwhile to study policy impacts on labor supply for older workers so that further tweaks to improve upon it can be made in a coherent and justified manner. In this paper, I will be estimating the effects of a EITC expansion on the labor supply of single older mothers.

In this paper, in Section 2 I will first give a brief introduction on the EITC, on how it works, how taxpayers can claim the tax credit, the credit schedule of the EITC, and the theoretical implications of the EITC. In Section 3, I provide a short literature review on past literature revolving the EITC and labor supply on both single mothers and married couples. In Section 4, I introduce the data that I will be utilizing and explain how I work with the data to get my final sample. Section 5 outlines my methodology and empirical strategy and lays out the

assumptions for such an analysis. I wrap up with discussions on the results, limitations, further research, and give a conclusion in Section 6.

2. The Earned Income Tax Credit (EITC)

2.1 Background on EITC

The EITC is a refundable, federal income tax credit enacted in 1975 that provides financial support to low- to moderate-income working individuals and families by reducing their taxes based on their qualifying status.

There are a few basic qualifiers that a taxpayer must satisfy before applying for the EITC. Namely, the taxpayer must have worked and earned income under a certain amount, have earned investment income under a certain amount, and have valid citizenship or residency status. For certain groups of taxpayers such as those in the military or clergy, there are some other special rules which would apply to them. Taxpayers would either file as an individual or jointly with their spouse (if married) depending on their own situation. Depending on the filing status, the maximum permissible adjusted gross income (AGI) differs. AGI is defined as gross income less adjustments – gross income consists of any form of income such as wages, dividends, capital gains and adjustments would include debts like student loans or alimony payments.

Credit amount claimable for each taxpayer is determined by AGI and number of qualifying children. The maximum credit amount varies accordingly to the AGI and the number of qualifying children which ranges from zero to three. Since the policy's main target is low-income families or individuals with children, the increment of the credit from childless to one child is the highest and it decreases as the number of children increase. For example, for tax year 2023, a single unmarried taxpayer with no children with AGI under $17,640 can get a maximum credit of $600. And a married, filing jointly taxpayer with two children with AGI under $59,478 can get a maximum credit of $6,604.

The credit schedule has three phases: phase-in, flat, and phase-out. During the phase-in, as income increases, the eligible credit amount increases at a constant rate until it reaches the maximum credit amount. Then, the flat portion is the portion where an additional dollar earned does not change the eligible credit amount for the taxpayer. Lastly, the phase-out

occurs, and any additional dollar earned reduces the credit amount by the phase-out rate until it eventually reaches zero, where the taxpayer has the maximum AGI. Figure 1 below shows the 2023 EITC credit schedule with the phase-in, flat and phase-out regions.

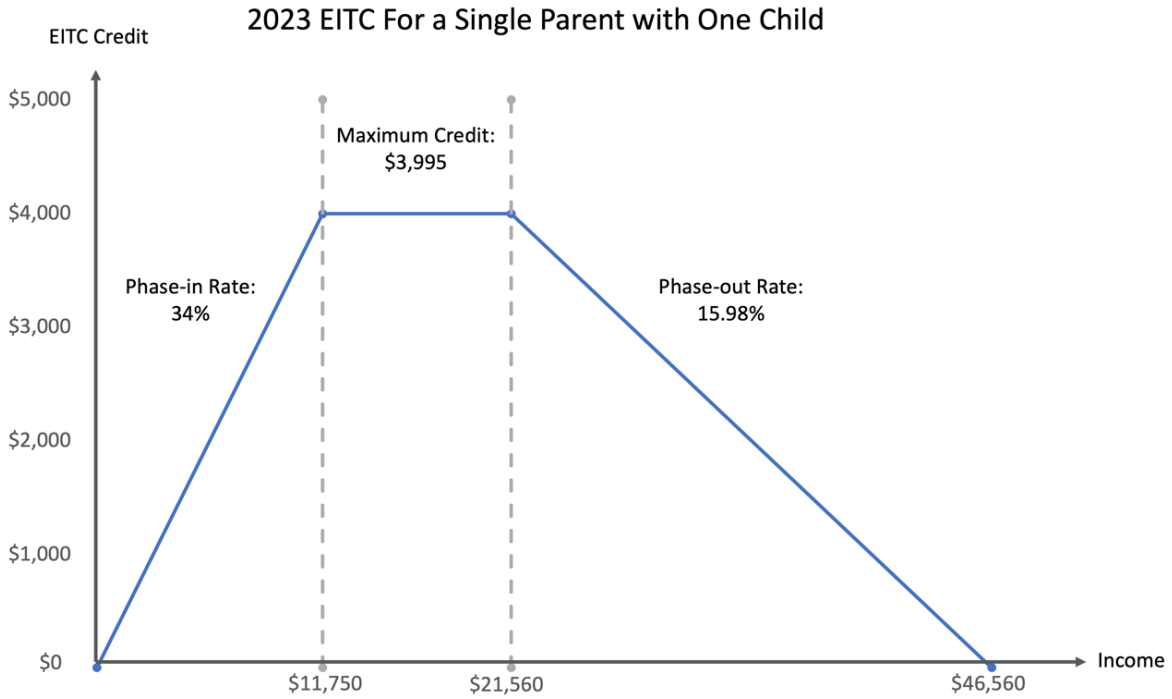

Figure 1: EITC Phases for tax year 2023 – Applicable for single parents with one child

When it was first introduced, the maximum credit amount for single mothers with children was $400 which is equivalent to about $950 in 2019 dollars (Crandall-Hollick, 2022). It has since increased by almost a factor of 9, where the maximum credit for a claimant with 1 qualifying child is $3,526 in 2019 (Internal Revenue Service, 2019). Along the years, there have also been a sizeable number of expansions: the Tax Reform Act of 1986 (TRA86); Omnibus Budget Reconciliation Act of 1990 (OBRA90); Omnibus Budget Reconciliation Act of 1993 (OBRA93); Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA); American Recovery and Reinvestment Act of 2009 (ARRA); and most recently a temporary expansion of the EITC as part of the American Rescue Plan Act of 2021 (ARPA). As part of the efforts to expedite recovery from the COVID-19 Recession, the ARPA temporarily expanded the EITC for claimants who do not have any qualifying children – the age range for working adults without any children was expanded to include those aged between 19-24 and 65 or over, and the maximum was raised from $538 to $1,502 (TPC, 2022). This temporary expansion of the EITC shows its salience as a tool in providing cash assistance to needy individuals and families. Consequently, research on the impacts the EITC has on labor supply behavior is warranted.

More specifically, my expansion of concern would be the OBRA93. The OBRA93 is chosen as it substantially increased the maximum credit entitlement of taxpayers and added an entirely new category (referred to as the "childless EITC") for taxpayers with no children. From years 1991 to 1993, the maximum credit increased within the range of $110 to $149. Meanwhile, from the OBRA93, maximum credit entitlements were increased by $604 for those with one qualifying child and by $1,017 for those with two or more qualifying children. Starting from the tax year 1994, eligible taxpayers with no children could receive a maximum credit of $306, where they were previously ineligible to claim any tax credit under the EITC.

2.2 EITC Economic Theory

The structure of the EITC can be examined theoretically, and several observations on its impact on labor force participation and labor hours supplied can be made from looking Figure 2 below. The graph plots consumption (c) against the leisure time (t) of a taxpayer. As t decreases, the taxpayer is working more and therefore able to consume more. The orange slope is the budget constraint a working taxpayer faces in the absence of the EITC. With the EITC, the budget constraint is expanded to the blue slope which has varying slopes according to which region it is in.

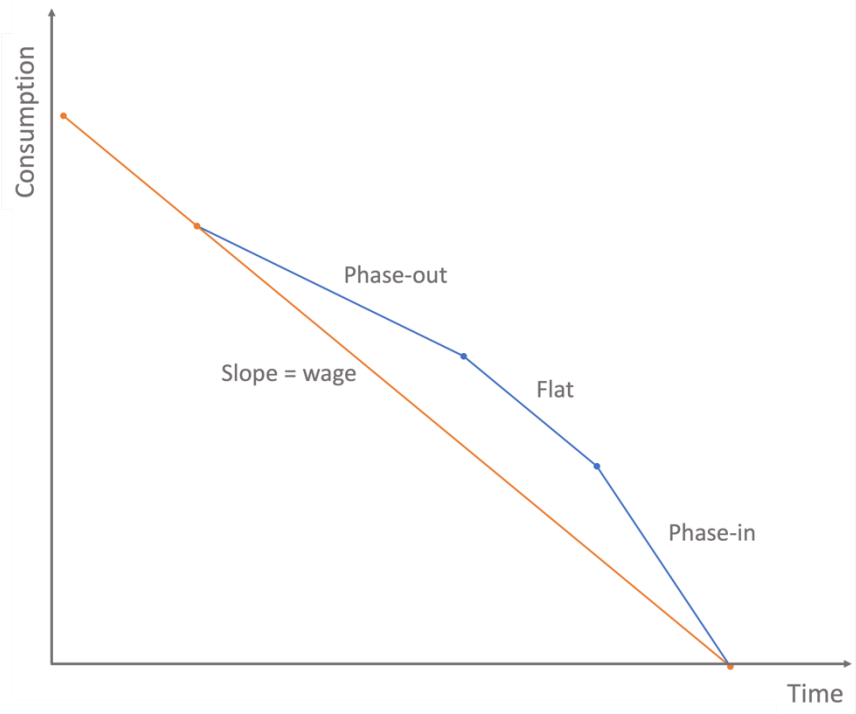

Figure 2: Budget constraints with and without EITC

Firstly, the graph tells us that labor force participation should increase. At the point where the leisure time is at endowment, there is a substitution effect that lowers t and there is no income effect. Thus, the EITC should result in an unambiguous increase in labor force participation rates. Secondly, how labor hours supplied changes would depend on the region. In the phase-in region, the net wage due to the EITC is higher than the actual wage of the worker so the income effect causes an increase in t while the substitution effect causes a decrease in t. Thus, in the phase-in region, the impact on hours worked would be ambiguous and depends on whether the income or substitution effect is stronger. In the flat region, the net wage is equivalent to the actual wage so there is no substitution effect but there would be an income effect which increases t and hence reduces hours worked unambiguously. In the phase-out region, the net wage is lower than actual wage, so both the substitution and income effect increase t and reduces hours worked. This again leads to an unambiguous reduction in hours worked. If most workers have earnings in the flat and phase-out region, we will anticipate that the EITC reduces labor hours supplied as a whole. The EITC would only increase labor hours if many workers have earnings in the phase-in region and the substitution effect dominates the income effect.

3. Literature Review

Eissa and Liebman (1996) had previously evaluated the impact of the TRA86 expansion on the labor supply of single women and found that there was a larger (positive) impact on the labor force participation of single mothers as compared to single women without children. They used a difference-in-differences approach to estimate the effects, with the treatment group being single mothers and the control group being single women with no children. This corroborates with the theoretical predictions that we have seen above.

In 2001, Meyer and Rosembaum expanded on the literature by providing a structural model on the decision to work for a single woman and assessing the impact of the EITC as well as other tax changes on single women's labor supply in terms of weekly and annual employment (hours worked) compared to a single woman without a child.

A more recent paper by Eissa and Hoynes (2004) used two estimation strategies, one of them also being a difference-in-differences method, to evaluate the effect of three EITC expansions

(TRA86, OBRA90 and OBRA93) on the labor force participation of married couples. In their paper, they found that EITC expansions led to a reduction in total family labor supply driven by the larger decline in labour force participation of married women compared to the increase in participation by married men. All three papers mentioned made use of the Current Population Survey (CPS) data. Instead of using the CPS, I conduct my analysis using another dataset.

4. Data

The data that I use comes from the RAND HRS Longitudinal File 2020 (V1)[1] [RAND HRS] and the RAND HRS Family Data 2018 (V2)[2] [RAND HRS Fam]. The Health and Retirement Study (HRS, https://hrs.isr.umich.edu) is a public dataset comprising of survey results collected from two surveys – the HRS Core Interview and the Exit Interview. The RAND HRS includes fifteen waves of data across seventeen survey years which were conducted annually from 1992 to 1995 and biennially from 1996 to 2020. I chose the RAND HRS as there are respondents who are in the age range of my target sample. Since I am examining the impact of an EITC expansion on single older mothers, I would require a comprehensive dataset on older workers' with relevant employment and family related variables. The RAND HRS is ideal as it not only contains current employment outcomes of older workers, but there is also information on their kids. This is contrasted with the CPS data used by previous papers where the respondents are mostly prime working aged individuals and couples. Due to the 2001 EGTRRA expansion where the phase-out range for married couples was increased, waves that occurred after 2001 (wave 6 and onwards) will not be considered in my analysis. As I am only looking at older single women, not many will have qualifying children aged 18 and below by waves 4 and 5 so I will be restricting the time frame to waves 1, 2 and 3.

Although there are seven cohorts' data available in the RAND HRS, only two cohorts were interviewed during or before the 1993 EITC expansion. One of which is the Study of Assets

[1] The RAND HRS Longitudinal File is an easy-to-use dataset based on the HRS core data. This file was developed at RAND with funding from the National Institute on Aging and the Social Security Administration. The HRS (Health and Retirement Study) is sponsored by the National Institute on Aging (grant number NIA U01AG009740) and is conducted by the University of –Michigan.

[2] The RAND HRS Family Data contain detailed information about the characteristics of respondents' families, including kids, kids-in-law, parents and siblings. This file was developed at RAND with funding from the National Institute on Aging and the Health and Retirement Study.

and Health Dynamics (AHEAD) cohort, whose first interview year is 1993. However, the AHEAD cohort comprises of those born before 1924. As of the 1993 expansion, the ages of the AHEAD cohort ranges from 70 to 103 and therefore would not be applicable in this analysis since they are past the age of retirement and most of them are no longer in the workforce. Therefore, we are left with the initial HRS cohort who were born between 1931 and 1941 and within the age range of 52 to 62 when the OBRA93 expansion was put in place. The age group of the initial HRS cohort is ideal for my analysis because it is interesting to see if the EITC's expansion has any effects on their labor supply, especially a positive one, considering they are close to retirement age and may naturally work less but may still have children aged 18 and below, making them eligible for the EITC.

I will only be considering the sample of women in the initial HRS cohort who were single during the start of the interviews and since I am investigating the effects of the EITC expansion on labor supply, I will also be restricting the sample to the women who are more likely to be eligible for the EITC. Eligibility for the EITC is based on income being below a certain amount, but income is endogenous as it would be affected by labor supply. To circumvent this, I use education as a proxy for eligibility and I restrict the sample to single women with an education level equivalent to being a high school graduate or less. Since education is arguably a pre-determined factor and is unlikely to be affected by the EITC, it can be a good proxy for eligibility. Furthermore, this method of sorting has also been used in a previous paper by Eissa and Hoynes (2004). Another requirement for claiming the EITC is the presence of a qualifying child aged 18 and below. Thus, for the group of mothers, I would only include those who have at least one child aged 18 and below. Single women with no children are also kept as part of the control group. After I keep only the observations of single women in the initial HRS cohort who are high school graduates or less and either have no children or have a qualifying child, the sample size is 1,343 observations and 99 women. The control group, consisting of single women without children, has 36 observations and 12 women while the treatment group, consisting of single mothers with at least one qualifying child has 261 observations and 87 women. Income and assets are deflated to June 2023 prices using the Bureau of Labor Statistics' CPI Inflation Calculator. Table A1 in the appendix shows the observations left after each step of the process above.

Table 1 below shows the summary statistics for the control and treatment groups. After performing some t-tests on the summary variables, I observe a few differences between the control and treatment group. Those in the control group tend to be older (59.3 versus 56.0 years), work more weeks a year (52.0 versus 50.4 weeks), and have more household assets ($266,921 versus $76,990). This suggests that the results should be interpreted with caution as the two groups could have been affected differently due to their difference in characteristics and not solely through the expansion.

Table 1: *Summary Statistics*

	Control		Treatment	
	Mean	SD	Mean	SD
Age	59.3	4.17	56.0	3.26
Years of Education	10.9	3.35	9.80	2.80
Proportion White	0.75	0	0.51	0
Proportion in Labor Force	0.42	0.50	0.52	0.50
Proportion Working for Pay	0.42	0.50	0.48	0.50
Hours Worked/Week (Main Job)	37.9	8.35	36.4	9.29
Weeks Worked/Year (Main Job)	52.0	0	50.4	4.85
Individual Income/Year	13 531	18 335	16 116	21 528
Household Income	42 129	50 438	27 622	25 981
Household Assets	266 921	547 309	76 990	202 031
Respondents	12		87	
Observations	36		261	

Note: : Means and standard deviations are averaged over the three waves in each comparison group.

Table 1: Summary statistics for the control and treatment groups

5. Methodology and Empirical Strategy

In this paper, I use a difference-in-differences (DID) method to analyze the impact of the OBRA93 reform on all single women in the initial HRS cohort.

The empirical specification is as shown:

$$y_{pjst} = \beta_0 + \beta_1\left(OBRA93_t * Treatment_p\right) + ThreeChildrenFE_j + RaceFE_j + StateFE_s + WaveFE_t + \varepsilon_{pjst}$$

y_{pjst} gives us the outcome variables of the woman by parity p, demographic j, in state s and wave year t. $Treatment_p$ is a dummy variable which takes a value of 1 for a woman who has at least one qualifying child as of wave 1 and value 0 for those with no children and it is the variable for whether the individual belongs in the control or treatment group. $OBRA93_t$ is a dummy variable taking value 1 for the waves that occurred after the OBRA93 expansion and 0 otherwise. The coefficient of concern is β_1, which is the coefficient for the interaction term between treatment and expansion and it captures the effect of the expansion. ε_{pjst} is the error term. Fixed effects (FE) are included for number of children in the household, race, state, and wave year. Fixed effect for number of children is a binary regressor of whether the respondent has more than 3 children. Race fixed effect is a binary regressor of whether the respondent is white. Fixed effects for state and wave consist of binary regressors for each state and each wave respectively.

For such DID analysis, one assumption is that the composition of the treatment and control groups remains the same. Another assumption would be that without the OBRA93 expansion, the trends in labor supply outcomes would be the same for mothers with either no children or one or more children. To support this assumption, one would usually check for parallel trends in the outcomes before the intervention for the base control and base treatment groups. However, since I am limited by the fact that there is only one point of data before the OBRA93 expansion in the RAND HRS dataset, I am not able to check for parallel trends. This will be discussed further in section 5.2. Nonetheless, the graphs for the trends of probability in labor force and average hours worked are shown in figure 3 and figure 4 respectively. The dotted line refers to the year of intervention (1993).

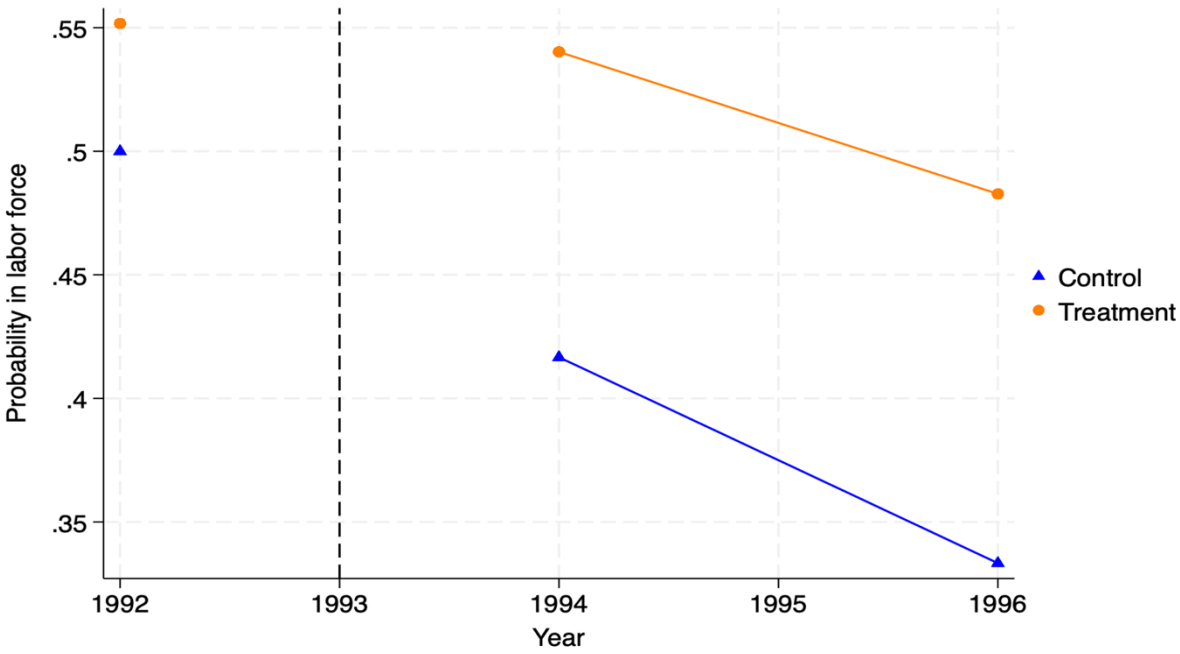

Figure 3: Probability in Labor Force Trends for Control and Treatment Groups

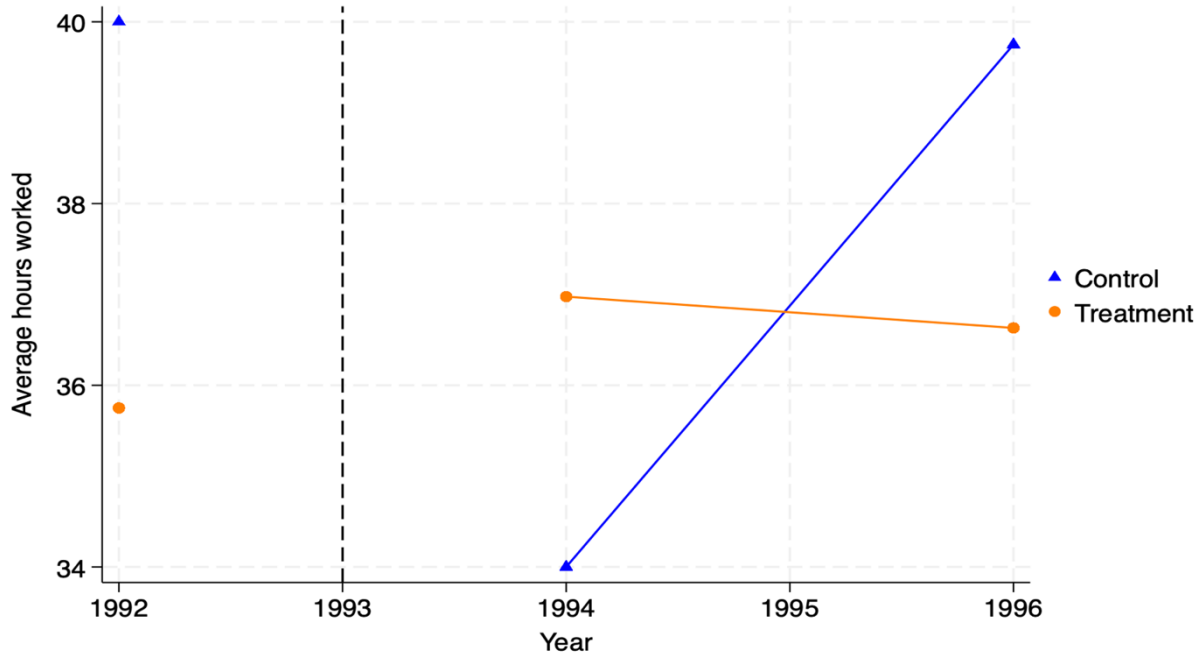

Figure 4: Average Hours Worked Trends for Control and Treatment Groups

6. Discussion

6.1 Results

Tables 2 and 3 show the DID estimates for the labor supply outcomes of proportion being in the labor force and proportion working for pay. I show the coefficients of the interaction term using just ordinary least squares (OLS) as well as with FE by making use of the *xtreg* command in Stata. For both OLS and FE, the standard errors are clustered at the individual household identifier and personal identification number (hhidpn) level.

In table 2, we have two panels A and B for the effect of the OBRA93 expansion on the likelihood of being in the labor force and the likelihood of working for pay respectively. Compared to single women without children, single mothers are both more likely to be in the labor force and working for pay after the OBRA93 expansion. However, since the standard errors are all larger than the coefficients for both the OLS and FE columns, the regression conclusion would be that the OBRA93 expansion had no significant effect on these mothers' likelihood of being in the labor force and likelihood of working for pay.

Table 2: *Difference-in-differences estimates of OBRA93 on Labor Supply of Women*

Panel A: In Labor Force		
	OLS	FE
	0.087	0.080
	(0.153)	(0.152)
Observations	290	290
Number of respondents	99	99
Proportion of Control Group	0.12	0.12
R^2	0.008	0.037
Panel B: Working for Pay		
	OLS	FE
	0.085	0.088
	(0.153)	(0.153)
Observations	290	290
Number of respondents	99	99
Proportion of Control Group	0.12	0.12
R^2	0.004	0.043

Note: : Standard errors clustered at the hhidpn level. * significant at 10% level; ** significant at 5% level; *** significant at 1% level. FE includes number of children, education, race, time and state fixed effects.

Table 2: Difference-in-difference estimates for labor participation and working for pay rates.

In table 3, there are another three panels C, D, and E for the effect of the OBRA93 expansion on the hours worked per week, weeks worked per year, and hours worked per year at their main job respectively. Hours worked per year is constructed by multiplying the hours worked per week with the weeks worked per year for each respondent. Similar to the table 2 results, single women with children also seem to supply more labor in terms of hours and weeks worked, but both OLS and FE coefficients are not significant, and I am not able to conclude that the OBRA93 expansion had any effect on hours and weeks supplied for these single older mothers.

Table 3: *Difference-in-differences estimates of OBRA93 on Labor Supply of Women (cont.)*

Panel C: Hours worked/ week at main job		
	OLS	FE
	4.36	1.20
	(5.88)	(7.59)
Observations	135	135
Number of respondents	57	57
Proportion of Control Group	0.12	0.12
R^2	0.008	0.038
Panel D: Weeks worked/year at main job		
	OLS	FE
	0.71	-0.24
	(0.61)	(0.26)
Observations	135	135
Number of respondents	57	57
Proportion of Control Group	0.12	0.12
R^2	0.017	0.007
Panel E: Hours worked/year at main job		
	OLS	FE
	254.7	62.90
	(306.2)	(395.4)
Observations	135	135
Number of respondents	57	57
Proportion of Control Group	0.12	0.12
R^2	0.015	0.037

Note: : Standard errors clustered at the hhidpn level. * significant at 10% level; ** significant at 5% level; *** significant at 1% level. FE includes number of children, education, race, time and state fixed effects.

Table 3: Difference-in-difference estimates for hours and weeks supplied.

Apart from looking at labor supply outcomes, I also look at some effects on income and assets. In table 4, we have three panels A, B, and C for the effect of the OBRA93 expansion on the respondent's individual annual income, total household income, and total household assets. Household assets in this case is made up of all the household's wealth less the total household debt and includes the value of their residence(s), vehicles, checking and savings accounts, as well as stocks and bonds among many other values. The motivation for evaluating the expansion's impact on income and assets derive from the EITC's other goal of lifting more low-income individuals and families out of poverty. Apart from encouraging more employment amongst the low-income, one of the arguments for expanding on the EITC is that it would help to reduce poverty. From the table, there seems to an opposite effect for individual income and household income, but the results are not statistically significant. There are no effects on household assets either.

Table 4: *Difference-in-differences estimates of OBRA93 on Income and Assets*

Panel A: Net Individual Income (Annual)		
	OLS	FE
	4,736	4,962
	(3,961)	(3,840)
Observations	290	290
Number of respondents	99	99
Proportion of Control Group	0.12	0.12
R^2	0.005	0.036
Panel B: Net Household Income (Annual)		
	OLS	FE
	-16,322	-16,271
	(14,550)	(14,610)
Observations	290	290
Number of respondents	99	99
R^2	0.035	0.053
Panel C: Net Household Assets		
	OLS	FE
	18,147	19,512
	(42,992)	(43,777)
Observations	290	290
Number of respondents	99	99
Proportion of Control Group	0.12	0.12
R^2	0.054	0.025

Note: : Standard errors clustered at the hhidpn level. * significant at 10% level; ** significant at 5% level; *** significant at 1% level. FE includes number of children, education, race, time and state fixed effects.

Table 4: Difference-in-difference estimates for income and assets.

6.2 Limitations

As mentioned previously, the identifying assumption for using such a DID analysis would usually require a check on parallel trends before the expansion occurred which is not checked here as I am limited by the dataset. However, as seen from the past and related literature, the DID method has served as a standard and have been said to be "widely used to evaluate the effect of the EITC on single women" by Eissa and Hoynes (2004). Furthermore, this method is also preferred for this analysis as it can eliminate any shocks that arrive due to other contemporaneous policies by using control groups.

Another limitation stems from the fact that after I keep only the respondents who are single women and are more likely to be eligible for the EITC, the sample size drops drastically and is only a small portion of the initial HRS cohort consisting of 297 observations and 99 unique respondents. Other datasets such as the 1985 to 1997 CPS may contain a richer sample of single women, which is the dataset that was widely used in previous literature. However, since I am focusing on older mothers instead of prime-working aged mothers, the HRS is a better choice despite the small sample size.

6.3 Further Research

In this paper I investigated the effect of an EITC expansion on labor supply outcomes of single women, a question that has been studied intensively across many different expansions but with a different dataset in contrast to past papers. Moving forward, I hope to explore the effect of EITC expansions on other outcomes of interest beyond the nuclear family, such as intergenerational transfers and grandparent childcare. This may be motivated by Bengtson's (2001) hypothesis of "the increasing importance of multigenerational bonds", with the central implication that familial relations outside of the nuclear family (i.e., relationship with grandparents) may be dominating nuclear family ties when it comes to overall well-being of the family.

6.4 Conclusion

From our results, we observe that there are no effects of the OBRA93 expansion on labor force participation, labor hours supplied and income or assets of single older mothers. This is at

odds with previous literature where an overwhelming amount of empirical evidence has confirmed that the EITC does indeed boost labor force participation rates, especially amongst single mothers. However, as I have mentioned, past literature has been concentrated on younger workers and there has not been much investigation into the labor supply of older workers. In fact, the lack of significant effect on older workers' labor supply could point us in a different direction of research as they could possibly be reacting to the EITC expansions in different ways, such as through changes in financial transfers to their adult children or even grandchild care hours.

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8. Appendix

Restriction	Remaining Observations
Whole sample	2,025,030
Keeping females	1,125,292
Keeping initial HRS cohort	316,008
Drop waves 4 and onwards	67,716
Keeping single women	15,273
Keeping high school graduate or less	11,256
Drop missing values of outcomes	11,029
Keep if women with kids have qualifying child	7,514
Keep only if waves 1-3 present	1,343
Keep one observation per hhidpn per wave	297

Table 2A: Remaining observations after each step in the cleaning process