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The Effect of the Expanded Child and Dependent Care Tax Credit on Maternal Labor Supply

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Abstract

Policies that subsidize childcare have many potential economic benefits such as mitigating the high cost of childcare, incentivizing families to have more children, increasing paid childcare participation, and increasing parental labor supply. In this paper, I focus on the effect of childcare subsidies on maternal labor supply through a tax policy expansion. The Child and Dependent Care Tax Credit (CDCTC) is the primary federal childcare subsidy in the United States, and it was temporarily expanded in 2021 under the American Rescue Plan Act. This expansion increased the generosity of the credit and made it fully refundable for the 2021 tax year. I test whether this expansion affected mothers' hours worked and find a small correlation between the credit expansion and hours worked.

Introduction

A Los Angeles mom of two lost her job as an operations executive for an education startup and stayed home with her children while their daycare was closed. An Ohio mom of four who was almost finished with her human services degree put her education on hold to care for her children. A New York mom of two reevaluated her work-life balance and quit her job as a marketing executive after working from home was leaving her family burnt out (Feintzeig and Weber, 2021). These are just a few stories of the estimated 3.5 million mothers in the United States who left work in spring of 2020, only some of whom have returned to the workforce (Heggeness et al., 2021). Mothers have historically carried the majority of the childcare burden due to traditional gender roles and cultural expectations. In 2022, the maternal labor force participation rate was 67.9% for mothers with children under 6 and 76.7% for mothers with children ages 6-17 ("Employment Characteristics of Families", 2023). This trend was reversed for fathers – the paternal labor force participation for fathers with children under 6 was 94.4%, compared to 91.8% for fathers with children ages 6-17. The pandemic only exacerbated this gap. A 2022 survey found that 45% of mothers with children aged five and under who left the workforce during the pandemic cited childcare as a major reason for leaving, compared with 14% of fathers (Gitlin et al., 2022).

The cost of childcare is also extremely high and is becoming unattainable for many families. $9,193 is the average annual cost of childcare per child, which is 17% of median household income in 2022 ("National and State Child Care Data Overview", 2023). Similarly, a 2023 Care.com survey of 3,000 U.S. families found that they are spending 27% of their household income, on average, on childcare expenses ("This is How Much Child Care Costs", 2023). For some families, the difference between the foregone salary of a parent who is staying

home and paid childcare is negligible. And the situation is even more dire for single parents who have to be the sole provider and still need childcare.

Looking at what policies other countries have in place to support parents with young children can help contextualize this issue. The U.S. federal government spends $500 annually per child on early childhood care, compared to the OECD average of $14,436 (Miller, 2021). Many other wealthy countries prioritize childcare by building it into the welfare system, providing paid parental leave, and subsidizing childcare costs. The U.S. does not have a federal paid parental leave policy and only offers limited subsidized childcare to the lowest-income families. Programs such as the Child Care and Development Block Grant, Head Start, Smart Start, and state-funded Pre-K programs are among the few federal and state government childcare assistance programs.

The only other government source of childcare assistance in the U.S. is through the tax code. The Child and Dependent Care Tax Credit (CDCTC) is the primary federal subsidy for childcare expenses ("The CDCTC: Temporary Expansion", 2021). It is available to taxpayers with earned income that have paid for care for dependent children under age 13 or for another qualifying dependent such as a spouse or family member so that they can work or look for work. Taxpayers who meet these requirements receive a nonrefundable tax credit that is equal to a percentage, determined by adjusted gross income (AGI), of their eligible childcare expenses. The CDCTC was established in 1976 and has been around in various forms ever since (Dunbar, 1999).

In March of 2021, the American Rescue Plan Act was passed under the Biden administration as a Covid-19 stimulus package ("White House Fact Sheet", 2022). The Child and Dependent Care Tax Credit was expanded under this act, as well as the Child Tax Credit (CTC)

and Earned Income Tax Credit (EITC). The CDCTC expansion made the credit more generous by increasing the credit rate and amount of eligible expenses. In addition, the credit was made fully refundable. The CTC is available to taxpayers with dependent children under age 17, and its expansion increased the amount of the credit, as well as making it fully refundable and removing the work requirement. The EITC is a tax credit for low-income workers, and it was made more generous and available to younger and older workers without children. These changes only applied to the 2021 tax year, which uses data on income, expenditures, employment, and demographics from 2021 and is processed in early 2022.

The expansion of federal childcare subsidies such as the CDCTC is one proposed policy that could increase parental labor supply, as well as potentially incentivize people to have more children, ease the financial burden of childcare, increase participation in paid childcare, and support the development of young children. The question that I am interested in researching is: What is the effect of the American Rescue Plan Child and Dependent Care Tax Credit expansion on short-term maternal labor supply? Examining this temporary expansion could help determine how effective this policy was in achieving the goals of increasing labor force participation for mothers and making childcare more affordable for working families.

I predict that the expanded Child and Dependent Care Tax Credit will positively affect maternal labor supply because the childcare subsidy could increase hours worked or push mothers on the margin of returning to work back into the workforce. I expect that this change will be more significant for families who previously did not qualify for the CDCTC and for part-time workers, who have more flexibility to change their hours. However, this may be limited by taxpayers' knowledge about the tax credit expansion and expectation that the expansion was temporary.

Literature Review

Factors that influence female labor supply, in general, are important to include in a basic maternal labor supply model, before the CDCTC expansion is considered. The literature includes a variety of variables that influence female labor supply and generally shows that 'family friendly' policies have a positive effect on female labor supply. Blau and Kahn (2013) included parental leave, right to part-time work, male and female part-time work incidence, and public childcare spending as a fraction of GDP in their female labor supply model. They found that right to and equal treatment of part time work has a significant positive effect on female labor force participation. Winkler (2022) focused on two sets of factors that determine women's labor force participation: those related to market wage and those related to reservation wage. Market wage is affected by education, labor force experience, and demand for labor. Reservation wage, which is defined as the wage at which a woman is willing to enter the labor market, is influenced by spouse's income, availability of market substitutes for household production such as purchased food and childcare, household technology, the presence of children, broader social norms, and family preferences. Other factors that could be considered are marital status, age of children, number of children, full-time vs. part-time work, expectations of the mother as the secondary earner and high marginal tax rates, childcare cost and availability, preferences for childcare inside or outside of the home, child quality, lifecycle labor trajectories, education, occupation, fertility, cultural expectations and customs, and government policies (Turon, 2022).

In addition to general female labor supply variables, focusing on mothers with young children and exploring the relationship between subsidized childcare and maternal labor supply can contextualize this issue. Other studies have found a significant positive relationship between subsidized childcare and maternal labor supply, but the magnitude of the relationship varies

depending on the policy. Ilin et al. (2021) found that access to free Pre-K programs increases maternal labor force participation by 2.3 percentage points, and the effect is even greater for married, college educated, and white women, households with income less than 200% of the federal poverty level, and households with income greater than 400% of the federal poverty level. Similarly, access to Head Start, which is one of the few federally funded childcare programs for low-income families with young children, increases short-term employment and wages of single mothers (Wikle and Wilson, 2023). Baker et al. (2008) investigated the Quebec Family Policy in Canada, which heavily subsidized childcare for all families, regardless of income. Using a difference in difference approach, they found that employment of women in two-parent families rose by 7.7 percentage points in Quebec, compared to the rest of Canada. Connelly (1992) modeled the labor force participation decision for mothers with young children by maximizing utility of goods, child quality, and leisure, subject to a production function for child quality, a budget constraint, the mother's time constraint, and the child's time constraint. She found that the predicted cost of childcare has a negative effect on the probability of labor force participation for married mothers.

There have also been studies on the relationship between maternal labor supply and other tax credits. Michelmore and Pilkauskas (2021) found significant positive effects of the Earned Income Tax Credit on maternal labor supply, which are concentrated among mothers with children under age three. Additionally, Enriquez et al. (2023) estimated variation in labor supply in response to changes to the Child Tax Credit (CTC) from the 2021 American Rescue Act. They found no statistically significant effects of the CTC expansion on labor force participation or hours worked, even across different demographic groups.

Finally, I will focus on previous and hypothetical expansions of the Child and Dependent Care Tax Credit, which provides background information on the nuances of the credit and its effect on other outcomes. Hartley et al. (2022) were interested in the relationship between expanding the CDCTC by making it fully refundable and increasing its generosity, and child poverty. They found that expanding the CDCTC would decrease child poverty by 7.9% and 17.3% for the proposed Promoting Affordable Childcare for Everyone (PACE) and Child and Dependent Care Tax Credit Enhancement (CDCTCE) Acts, respectively, for families that were previously paying for childcare. Pepin (2020) investigated the effect of the 2003 CDCTC expansion on paid childcare participation and labor market outcomes. This expansion made the credit more generous, which is one piece of the 2021 expansion. She found significant increases in employment among married mothers and paid childcare participation as a result of this expansion. Pepin (2022) also looked at how making the CDCTC permanently refundable would affect eligibility for the credit and marginal labor supply decisions. Refundability is the second piece of the 2021 CDCTC expansion, so ideas from both of her papers can be synthesized to explore the full effects of the 2021 expansion. She found the greatest eligibility increases among single parent, black, and Hispanic households. Additionally, many families with incomes that were too low to qualify previously could become eligible for the CDCTC if refundability led them to pay for childcare.

My paper builds on existing literature about the relationship between subsidized childcare and maternal labor supply by focusing on subsidizing childcare through tax policy. Using the temporary expansion of the Child and Dependent Care Credit in 2021 allows me to examine maternal labor supply before, during, and after the credit. There have been studies on the 2003 CDCTC expansion and pieces of the 2021 expansion separately, but I will combine the

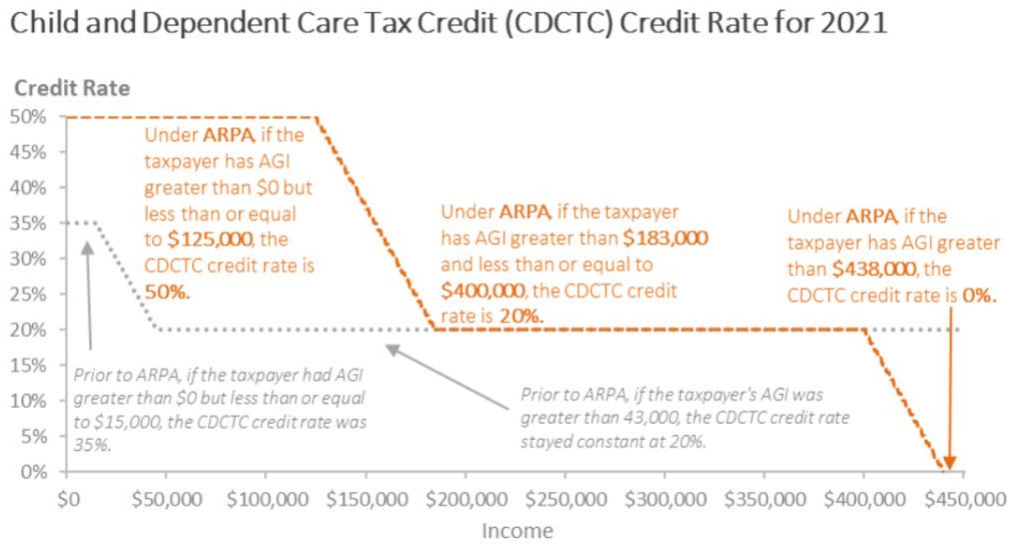
refundability and increased generosity pieces in my analysis of the 2021 CDCTC expansion. I will first create a general maternal labor supply model and then add the CDCTC policy and expansion to measure the effect on hours worked.

Tax Credit Details and Expansions

The American Rescue Plan Act of 2021 expanded three tax credits: the Child and Dependent Care Tax Credit, Child Tax Credit, and Earned Income Tax Credit ("White House Fact Sheet", 2022). It provided stimulus payments to Americans with the goals of supporting working families, achieving economic recovery, and reducing child poverty in response to the pandemic. This was a temporary expansion and only applied to the 2021 tax year.

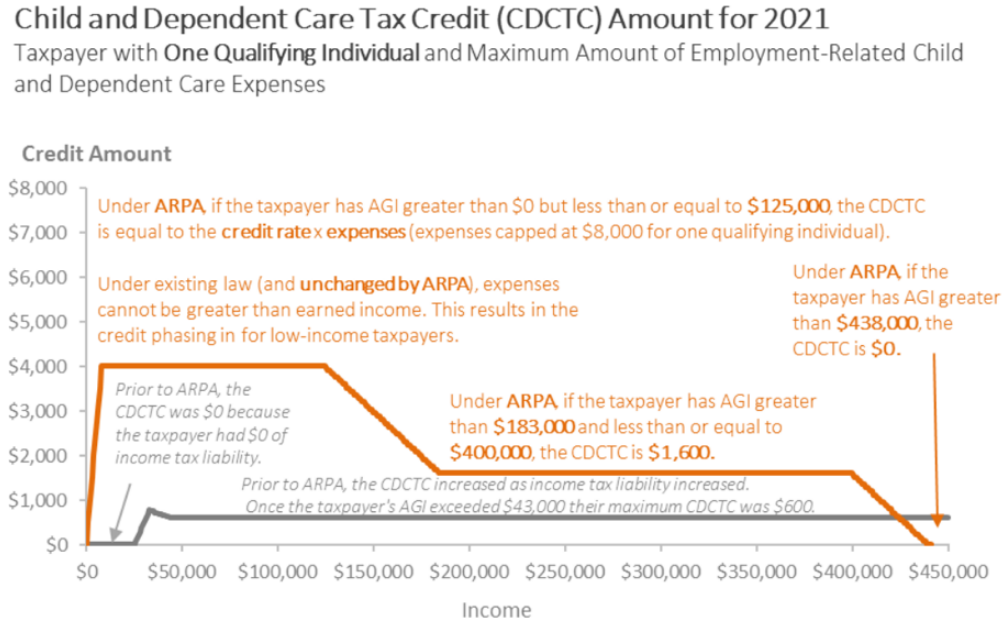
The Child and Dependent Care Credit helps offset childcare expenses for working families. Families who pay for care outside the home for dependent children under age 13 are eligible to receive this credit. The CDCTC is typically a nonrefundable credit, which means that it is limited by tax liability. Under the American Rescue Plan Act, the CDCTC was made fully refundable, which expanded eligibility to many low-income families who previously did not have tax liability and could not claim the credit ("The CDCTC: Temporary Expansion", 2021). This meant that anyone whose credit amount was greater than their tax liability received the difference as a refund. The amount of qualifying expenses for the CDCTC also increased in 2021 from $3,000 to $8,000 for one qualifying individual and from $6,000 to $16,000 for two or more qualifying individuals. Finally, the credit rate increased to 50% for AGI between $0 and $125,000, which decreased by 1% for every additional $2000 of AGI until reaching 20% for AGI between $183,000 and $400,000. Between AGI of $400,000 and $438,000, the credit rate declined by 1% for every additional $2000 of AGI and then became unavailable for any taxpayer

with AGI over $438,000. The credit rate was previously 35% for AGI between $0 and $15,000, which decreased by 1% for each additional $2000 of AGI until reaching 20% for AGI above $43,000. This meant that the maximum credit amount increased from $600 to $4,000 for one child and $1200 to $8,000 for two or more children.[1] The following graphs present the credit rate, CDCTC value for one qualifying dependent, and CDCTC value for two or more qualifying dependents prior to the expansion and during the American Rescue Plan CDCTC expansion. As shown on the graphs, the largest increases in the value of the CDCTC were concentrated among low and middle-income taxpayers.

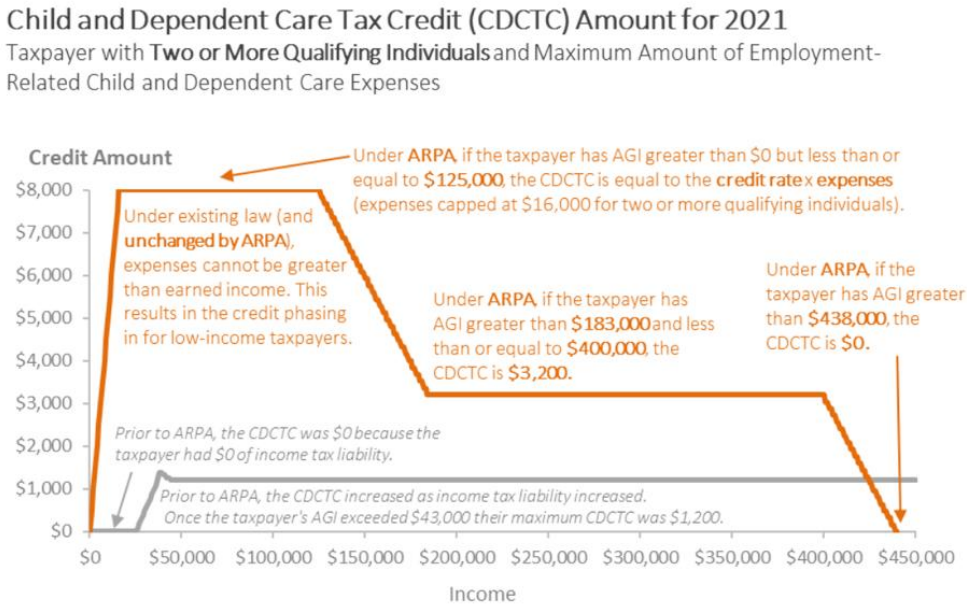


SOURCE: Congressional Research Service: The Child and Dependent Care Tax Credit (CDCTC): Temporary Expansion for 2021 Under the American Rescue Plan Act of 2021

[1] $600 and $1200 are the maximum credit amount for taxpayers with AGI greater than $43,000. This figure might be slightly higher for those with lower AGI, but it is unlikely that they would reach the maximum eligible expenses, and they are limited by earned income, which must be greater than eligible expenses to receive the credit.



SOURCE: Congressional Research Service: The Child and Dependent Care Tax Credit (CDCTC): Temporary Expansion for 2021 Under the American Rescue Plan Act of 2021



SOURCE: Congressional Research Service: The Child and Dependent Care Tax Credit (CDCTC): Temporary Expansion for 2021 Under the American Rescue Plan Act of 2021

The Child Tax Credit is typically available as a nonrefundable credit for working families with dependent children under age 17 at a value of $2,000 per child. There is also an Additional Child Tax Credit (ACTC), which allows low to moderate-income families to receive up to $1500 of the CTC as a refundable credit. Under the American Rescue Plan Act, the amount of the Child Tax Credit increased to $3,600 per child under age 6 and $3,000 per child ages 6 to 17 ("Policy Basics: The Child Tax Credit", 2022). The CTC also became fully refundable and the work requirement was removed, which effectively made the credit a cash transfer to families with children.

The Earned Income Tax Credit is a fully refundable tax credit for low-income workers that has historically been targeted towards low-income families. Under the American Rescue Plan Act, the maximum EITC increased from $540 to $1500 for workers without dependent children and the qualifying age range extended to include both younger and older workers ("White House Fact Sheet", 2022). These changes did not affect taxpayers with children.

These three credits are closely related and can have interaction effects. Nonrefundable credits are applied before refundable credits, so before this expansion, the CDCTC and CTC were applied before the EITC in order to maximize the refund. However, when all three credits were fully refundable under the American Rescue Plan, interaction effects did not exist, and all credits could be refunded to taxpayers in full.

Additionally, some states have supplemental child care tax credits, but the differences in policy details across states make it difficult to measure their impact. The amount of the credit, AGI eligibility, and refundability varies drastically between states.

Data

I use data from the Annual Social and Economic Supplement (ASEC) from the Current Population Survey (CPS), which contains extensive labor force, welfare, and demographic data. This survey is administered to roughly 90,000 American households every March on a rotating basis, so a fraction of the respondents are the same across two consecutive years. Each year contains a personal, family unit, and household data file. For each year that the survey is published, demographic data such as age, marital status, and number of children is for that current year, while data on employment and income is from the previous year. This structure is very similar to the tax cycle, in which taxes are done in the first few months of the year, using income and employment forms from the previous year.

First, I create an extensive dataset for each year. Because of the structure of this data, the 2021 ASEC data file represents data from 2020, the 2022 ASEC file represents 2021, and the 2023 ASEC file represents 2022. I merge the person, family, and household datasets for each year, which creates a set of data for each respondent that includes their answers to the person, family, and household level questions of the survey. I then create new variables related to the policy. I am making the assumption that if someone is married, they are filing their taxes jointly because it is more advantageous, so I create a family AGI variable by summing personal AGI within each family unit. If someone is single, this variable would just be their own AGI. Family AGI is then used to determine the CDCTC credit rate. This credit rate was multiplied by capped reported childcare expenses to calculate each family's Child and Dependent Care Tax Credit amount. For individuals who did not pay for childcare outside of the home in a given year, this value will be zero. The value of this credit was also limited by someone's reported federal income tax liability to determine the final CDCTC value. The AGI thresholds, corresponding

credit rates, and caps for childcare expenses are modified for the expanded CDCTC in the 2021 dataset. Additionally, the CDCTC value was made fully refundable for the 2021 dataset. Finally, I narrow down my sample of respondents to mothers, which is my group of interest. I define a 'mother' as a woman who identifies as the reference person or spouse in a family unit and indicates that she has children under 18 in her family unit a given year. Table 1 summarizes variables of interest for the sample of mothers in each year. On average, mothers in the full sample are about 40 years old, have about two children, tend to be high school or college educated, and work between 25-27 hours per week. Note that the average value of the CDCTC is higher in 2021 than 2020 and 2022.

Additionally, I narrow down my full sample of mothers to a subset of those who paid for childcare because they are the ones who are affected by this policy. 18.89%, 19.81%, and 20.57% of mothers in the full sample paid for childcare in 2020, 2021, and 2022, respectively. While the full sample of mothers includes mothers who did not have any childcare expenses, and therefore have a CDCTC value of zero, the average values for childcare expenses and the CDCTC for the subset of mothers who paid for childcare are higher because they include only those who indicated that they paid for childcare in the corresponding year. Table 2 summarizes variables of interest for the subset of mothers who paid for childcare in each year. Note that this subset of mothers is slightly younger, more educated, has higher incomes, works more hours, and more of them have younger children, on average, compared to the full sample of mothers.

Because part-time workers have more flexibility to change their hours than a full-time worker, who may already be at their ceiling for hours worked, regardless of this policy, analyzing the effect of the CDCTC for part-time workers may better reveal the impact of the CDCTC expansion. To facilitate this analysis, I arbitrarily defined 'part-time' as working

between 0 and 32 hours per week. I narrow down my subset of mothers who paid for childcare even further to those who work part-time. Table 3 summarizes variables of interest for this subset. This is a smaller subset of mothers, and they tend to have slightly more children, work fewer hours, are more likely to have a graduate degree, and have higher incomes than the full subset of mothers who paid for childcare.

Finally, I create a dataset of common respondents in two consecutive years of the survey. I use this panel dataset to follow mothers from 2020 to 2021 to compare their actual changes in the amount of the CDCTC and hours worked before and during the expansion, as well as from 2021 to 2022 to compare changes during and after the expansion. 2020 and 2021 had 4347 mothers in common, while 2021 and 2022 had 2637. Additionally, 20.73% of mothers in the 2020-2021 sample paid for childcare in 2020 and 19.25% paid for childcare in 2021. Similarly, 19.64% and 19.38% of mothers in the 2021-2022 sample paid for childcare in 2021 and 2022, respectfully. Table 4 summarizes variables of interest for common mothers in the survey.

Methods

I first build a basic female labor supply model without the policy (see equation 1), which includes factors that have historically influenced female labor supply. I run this model with the full sample of mothers to determine whether factors that influence maternal labor supply are consistent with previous research.

$$Hours\ Worked_i = B_0 + B_1(Number\ of\ Children)_i + B_2(Number\ of\ Children)^2{}_i + B_3(Children\ Under\ 6)_i + B_4(Married)_i + B_5(Partner's\ Income)_i + B_6(Education)_i + B_7(Occupation)_i + B_8(Paid\ for\ Childcare)_i + \mu_i \quad (1)$$

Hours worked per week captures both the intensive labor supply margin – how many hours someone works – and the extensive labor supply margin – whether someone works or not. 'Number of Children' represents the number of children under 18 in a mother's family unit. 'Number of Children^2' allows the relationship between number of children and hours worked to be non-linear. 'Children Under 6' is a dummy variable for whether the mother has children under 6 years old in the family unit. Because of the differential expansion of the Child Tax Credit for families with children under 6, this coefficient also captures the effect of the simultaneous expansion of the CTC.

'Partner's Income' represents the other reference person in the family's income, in thousands. 'Married' is a dummy variable for whether someone is married or not at the time of the survey. 'Education' refers to dummy variables for 'Less than High School', 'High School', 'College', and 'Graduate' that represent someone's highest degree earned. I also include occupational controls, using the major occupation codes from the ASEC questionnaire. 'Paid for Childcare' is a dummy variable for whether someone paid for childcare outside the home in the given year.

To address my research question, a measure of the CDCTC is included (see equation 2). This equation is estimated for both 2020 and 2022 to measure the effect of the non-expanded CDCTC on hours worked. Appendix A displays the results of equation (2) for these samples.

$$Hours\ Worked_i = B_0 + B_1(Number\ of\ Children)_i + B_2(Number\ of\ Children)^2{}_i + B_3(Children\ Under\ 6)_i + B_4(Married)_i + B_5(Partner's\ Income)_i + B_6(Education)_i + B_7(Occupation)_i + B_8(CDCTC)_i + \mu_i \quad (2)$$

For 2021, I create a 'Hypothetical CDCTC' variable, which measures the value of the CDCTC that the family would have received if the credit was not expanded. This represents the

effect of the policy without the expansion. I also create a 'CDCTC Difference' variable, which measures the difference between the hypothetical CDCTC and what the family actually received under the expansion. This variable represents the effect of the policy change on hours worked. Equation 3 is estimated for the subset of mothers most directly impact by this policy change, those paying for childcare. Additionally, it is estimated for part-time workers because they have a greater potential for changing work hours in response to the policy change.

$$Hours\ Worked_i = B_0 + B_1(Number\ of\ Children)_i + B_2(Number\ of\ Children)^2{}_i + B_3(Children\ Under\ 6)_i + B_4(Married)_i + B_5(Partner's\ Income)_i + B_6(Education)_i + B_7(Occupation)_i + B_8(Hypothetical\ CDCTC)_i + B_9(CDCTC\ Difference)_i + \mu_i \quad (3)$$

The panel estimation approach (equation 4) uses the change in hours worked per week between two consecutive years as the dependent variable, with the change in the value of the credit as the independent variable. Since this equation is estimated at the individual level, the covariates that don't usually change over time, such as marital status or education, drop out of the equation. If the change in the policy between 2020 and 2021 generates a large enough credit for mothers to change their labor force participation hourly allocation, then the coefficient on 'ΔCDCTC' will be positive. Similarly, if the change in the policy between 2021 and 2022 generates a large enough decline in the credit for mothers to decrease hours worked, then the coefficient on 'ΔCDCTC' will be negative. While equation (3) was a predictive model, equation (4) models the observed changes in mothers' credits and hours worked across time.

$$\Delta Hours\ Worked_i = B_0 + B_1(\Delta CDCTC)_i \quad (4)$$

It is important to note that these empirical methods model a correlation between the CDCTC and maternal labor supply and do not provide causal evidence that the policy directly changed hours worked. Although causal inference methods are preferred when evaluating the

effects of a policy, I was not able to use them due to the structure of the policy and lack of variation in its execution.

Results

Column 1 in Table 5 presents the results of equation (1) for the full sample of mothers in 2021. I find a significant negative effect of 'Number of Children' on hours worked, which is consistent with the expectation that additional children increase the amount of household labor and childcare expenses, which generally have a negative relationship with labor supply for mothers. 'Number of Children Squared' is significant and positive, which suggests that the relationship between number of children and hours worked is decreasing at a decreasing rate. This means that each additional child has less of an impact on the decrease in hours worked.

The coefficient on 'Children Under 6' is negative, which reflects both the effect of having young children in the family and the CTC expansion for families with children under 6 years old. I expect that having children under six will decrease hours worked because younger children require more household labor. The CTC expansion could also decrease hours worked because the cash transfer would boost income. However, I can only observe the overall effect so I cannot determine the individual effects of each mechanism.

The coefficient on 'Partner's Income' is positive, indicating that hours worked increases as partner's income increases, on average, holding all else constant. One may think that the more money someone's partner makes, the likelihood that they also need to work could decrease. However, people have a tendency to marry others with the same education level as themselves, which could lead to similar labor force participation among couples (Hou and Myles, 2008). The coefficient on 'Married' is negative, which indicates that being married decreases hours worked,

holding all else constant. Historically, women have been less likely to work if they are married, which is still true today but to a lesser extent (Jones et al., 2015)

I find that hours worked increases as education level increases, which is consistent with the idea that highly educated mothers have a higher labor force attachment because higher levels of education require investment of time and money and typically result in higher salaries. As income increases, the opportunity cost of leaving the workforce or reducing hours to stay home with children increases. Paying for childcare also has a significant positive effect on hours worked. Because this policy only affects families who pay for childcare, I focus on the subset of mothers who paid for childcare in 2021 in my CDCTC analysis.

Column 2 in Table 5 presents the results of equation (3) for the subset of mothers who paid for childcare in 2021. The sample of mothers who paid for childcare generates similar results as the full sample of mothers, although some significance is lost due to the smaller sample size. The coefficient on 'Hypothetical CDCTC' indicates a significant, positive relationship between the CDCTC and hours worked. This is the underlying effect of the CDCTC without the expansion, based on mothers' expectations of the value of the CDCTC that they would typically receive. For each additional dollar of the hypothetical credit amount, hours worked per week increases by 0.0023, on average. The coefficient on 'CDCTC Difference' is also positive and statistically significant. For each additional dollar in the difference between what someone would have received without the expansion and what they actually received, hours worked increases by 0.0005, on average.

In the sample of mothers who paid for childcare in 2021, 1,696 mothers were eligible for the credit pre-expansion, which is defined as having a 'Hypothetical CDCTC' value greater than zero. This equates to 50.73% of the sample of 3343 mothers. Under the CDCTC expansion,

1,479 mothers in this sample gained eligibility for the CDCTC, bringing to total number of mothers in the sample that were eligible for the credit up to 3,175, or 94.97% of the sample.

Column 3 of Table 5 presents the regression results of equation (3) for the subset of mothers who work part-time and pay for childcare. For these mothers, there is not a statistically significant relationship between the hypothetical CDCTC and hours worked, but there is for the CDCTC difference. This suggests that while the existing policy does not affect hours worked, the expansion of the CDCTC does have a positive effect on hours worked. For each additional dollar of the additional CDCTC due to the expansion, hours worked per week increases by 0.0004, on average. To put these results into context, consider the following implied impact. Of the sample of 457 part-time working mothers who paid for childcare, their average CDCTC difference was $1,529.59. When multiplied with the coefficient on 'CDCTC Difference' of 0.0004, this equates to an average impact of the CDCTC expansion of an additional 0.6118 hours of work per week.

The panel data is used to determine if the actual change in the credit affected mothers' change in hours worked. Table 6 presents the results of equation (4) for the sample of common mothers in the sample in 2020-2021 and 2021-2022. I find no statistically significant relationship between the change in the amount of the CDCTC and the change in hours worked for either of these samples

One might argue that the lack of a significant relationship between the change in the credit and the change in hours worked between two consecutive years is the result of the hypothetical model having different underlying assumptions. In the hypothetical model, I predict someone's hypothetical CDCTC without the expansion and their additional CDCTC due to the expansion in one year. Actually observing people's behavior over time may tell a different story because some of the simplifying assumptions may not hold. For example, the hypothetical model

assumes that people were aware of the CDCTC expansion and knew how much they would receive as a result, while this may not have been true.

Additionally, it is difficult to isolate the impact of the policy over a period of time because many things can change over the time period that are not captured by control variables. For example, some children may start kindergarten and their parents may not need to pay for childcare, or some children may become old enough for certain childcare programs. Additionally, many childcare centers were closed in 2020 due to the pandemic, so it is possible that many families did not use the same forms of childcare between 2020 and 2021.

Cost-Benefit Analysis

Comparing the average costs and benefits of the CDCTC expansion using the predictive model for the hypothetical credit value and the additional CDCTC value due to the expansion can provide evidence in evaluating whether this policy was an efficient allocation of federal government resources. I focus on the subset of mothers who pay for childcare in this analysis because they are the group that is directly impacted by the CDCTC and American Rescue Plan CDCTC expansion.

The average value of the hypothetical CDCTC in 2021 for mothers who paid for childcare is $377. This is the average cost to the federal government of the CDCTC, per mother, prior to the American Rescue Plan expansion. I can also quantify average annual benefits of the CDCTC for mothers who pay for childcare in terms of the increased income due to working additional hours. Multiplying the coefficient on ‘Hypothetical CDCTC’ of 0.0023 by the average hypothetical CDCTC in 2021, which was $377, reveals that the average impact of the CDCTC on hours worked per week is 0.8671 hours. Multiplying this by 52 weeks shows the average

annual increase in hours worked is 45.09 hours.[2] I then multiply this average annual increase in hours worked by the average hourly wage among mothers who paid for childcare expenses. For the sample of mothers who paid for childcare, the average hourly wage is $28.20.[3] This equates to an additional $1,271.54 in average income, per year for mothers who paid for childcare. This is the average benefit, per mother, in terms of hypothetical increased income due to increased annual hours worked.

Similarly, the average value of the CDCTC difference in 2021 for mothers who paid for childcare is $1859.12. This is the average cost to the federal government of the American Rescue Plan expansion of the CDCTC, per mother. To calculate the average benefit of the CDCTC expansion in terms of additional hours and income, I multiply the coefficient on 'CDCTC Difference' of 0.0005 by the average CDCTC difference in 2021 of $1859.12 to find the average impact of the credit expansion on weekly hours worked. I find that the average impact of the credit expansion on hours worked per week is 0.9296, which translates to an average annual increase in hours worked of 48.34 hours. Multiplying this average annual increase in hours by the average annual wage of $28.20 implies average additional annual earnings of $1,363.19. This is the hypothetical average benefit of the CDCTC expansion, per mother, in terms of additional annual income due to increased hours worked.

When I look at the observed changes in hours due to the credit expansion, I don't find any significant benefits in terms of additional hours worked. This may capture the expectation that the CDCTC expansion was temporary, which could make the incentive to change labor

[2] Working 52 weeks per year is the upper bound, which is based on salaried employees that typically have paid time off for holidays, vacations, and sick days. The average worker may work fewer weeks than this.
[3] I took the average 'WSAL_VAL' variable in the sample, which captures annual wage and salary earnings and converted it into an hourly wage. This estimate may be inaccurate because salaried employees are not paid hourly, and their salary does not typically increase as hours worked increases.

supply behavior weaker. Additionally, if people were not aware of this expansion or didn't know the additional amount that they would receive from the credit, the incentive to change behavior also would not be as strong.

It is important to note that I only measured the monetary cost of the policy and the benefit of increased income as a result of additional hours worked. There are also other potential costs and benefits of this policy to weigh that may not be measurable or require additional research, such as the cost of less time spent with children. Similarly, other potential benefits could include financial support for childcare costs, increased fertility, and increased paid childcare participation.

Conclusion

The rising cost of childcare and lack of family friendly policies in the United States have caused many women to leave the workforce to care for their children. Policies that provide financial support for working families with young children have the potential to boost parental labor supply, specifically for mothers, who have historically specialized in household labor.

In this paper, I examine the effect of the American Rescue Plan expansion of the Child and Dependent Care Tax Credit on maternal labor supply. I find a positive, statistically significant correlation between the CDCTC and American Rescue Plan CDCTC expansion on hours worked for mothers who paid for childcare. For each additional dollar of a mother's hypothetical CDCTC, weekly hours worked increases by 0.0023, on average. For each additional dollar of a mother's difference in the credit value due to the expansion, hours worked increases by 0.0005, on average. For mothers who work part-time and pay for childcare, I find a significant positive correlation between only the CDCTC expansion and hours worked. For each additional

dollar of a mother's difference in the credit value due to the expansion, hours worked increases by 0.0004, on average. However, when I analyze the effect of someone's observed change in the CDCTC value on their change in their hours worked using common mothers across 2020-2021 and 2021-2022, I find no statistically significant effects.

Various policies that subsidize childcare such as Universal Pre-K, Head Start, and cash transfer child subsidies generally have a positive effect on maternal labor supply, although the magnitude of the effect varies based on the policy (Ilin et al, 2021; Wikle and Wilson, 2023; Baker et al, 2008). My paper adds to this literature by quantifying the effect of the American Rescue Plan CDCTC expansion on maternal labor supply. I find a significant positive relationship between this childcare subsidy and maternal labor supply using a predictive model, but no statistically significant relationship between the CDCTC expansion and hours worked for observed mothers between 2020-2021 and 2021-2022.

Additionally, economists have predicted how expanding the CDCTC would affect child poverty rates, paid childcare participation, and eligibility for the credit (Hartley et al., 2022; Pepin, 2020; Pepin 2022). I add to this literature by evaluating the costs and benefits in terms of maternal labor supply for the 2021 expansion of the CDCTC.

The hypothetical model provides evidence that the CDCTC and the American Rescue Plan expansion of the CDCTC is correlated with an increase in hours worked, which increases family income. The observed model does not provide any statistically significant effects of the expansion, but this may be due to the expansion being temporary and a lack of knowledge about the expansion. I would be interesting in studying the effects of this expansion if it were made permanent. Additionally, this policy was passed in response to the pandemic, which was an

unprecedented circumstance. It would be interesting to study this expansion if it were passed today and see if the effects of the policy are different.

Regardless of the labor supply effects, The American Rescue Plan expansion of the CDCTC did successfully provide financial support for working families with children to offset the cost of childcare after the pandemic and extended eligibility for the CDCTC to many low-income Americans.

Figures:

Table 1: Summary Statistics for Full Sample of Mothers

Variable	2020	2021	2022
Number of Observations	18199	16876	15934
Age	39.72	39.84	39.94
Number of Children	1.90	1.91	1.90
Children Under 6	0.41	0.41	0.40
Married	0.77	0.77	0.78
Less Than High School	0.07	0.08	0.07
High School	0.36	0.35	0.35
College	0.39	0.39	0.39
Graduate	0.18	0.19	0.19
Hours Worked	25.41	26.67	27.00
Family AGI	118154	126755	133098
Childcare Expenses	1379	1816	1883
CDCTC	59	442	69

Table 2: Summary Statistics for Sample of Mothers Who Pay for Childcare

Variable	2020	2021	2022
Number of Observations	3437	3343	3277
Age	36.64	36.74	37.14
Number of Children	1.97	1.99	2.00
Children Under 6	0.70	0.71	0.68
Married	0.80	0.80	0.81
Less Than High School	0.04	0.04	0.03
High School	0.25	0.26	0.26
College	0.44	0.41	0.42
Graduate	0.27	0.28	0.29
Hours Worked	32.00	32.86	33.34
Family AGI	147921	156465	165697
Childcare Expenses	7304	9170	9156
CDCTC	314	2236	336

Table 3: Summary Statistics for Sample of Mothers Who Work Part-Time and Pay for Childcare

Variable	2020	2021	2022
Number of Observations	482	457	481
Age	36.00	36.54	36.68
Number of Children	2.08	2.09	2.09
Children Under 6	0.73	0.73	0.70
Married	0.79	0.82	0.80
Less Than High School	0.05	0.05	0.04
High School	0.28	0.26	0.3
College	0.39	0.46	0.41
Graduate	0.27	0.23	0.24
Hours Worked	22.67	21.77	22.41
Family AGI	130304	136813	143340
Childcare Expenses	5432	6159	7027
CDCTC	271	1836	284

Table 4: Summary Statistics for Sample of Common Mothers

	2020/2021		2021/2022	
Variable	2020	2021	2021	2022
Number of Observations	4347	4347	2637	2637
Age	39.67	40.56	39.74	40.64
Number of Children	1.97	1.94	1.99	1.98
Children Under 6	0.43	0.38	0.43	0.37
Married	0.80	0.80	0.79	0.79
Less Than High School	0.08	0.08	0.09	0.08
High School	0.34	0.33	0.34	0.33
College	0.39	0.40	0.37	0.38
Graduate	0.19	0.20	0.20	0.20
Hours Worked	25.43	26.53	26.60	26.80
Family AGI	122905	133233	132737	138391
Childcare Expenses	1525	1655	1803	1793
CDCTC	64	439	409	73

Table 5: Regression Results for Samples of Mothers in 2021
Dependent Variable: Hours Worked

Variable	**(1) OLS: Full Sample**	**(2) OLS: Childcare**	**(3) OLS: Part Time**
Intercept	1.217**	0.229	26.01***
	(0.430)	(1.279)	(3.248)
Number of Children	-0.992***	-1.743**	-0.434
	(0.234)	(0.651)	(1.537)
Number of Children^2	0.089*	0.232	0.005
	(0.041)	(0.124)	(0.299)
Children Under 6 Present	-1.275***	-1.812***	-2.365**
	(0.171)	(0.402)	(0.883)
Married	-0.412*	0.448	-0.788
	(0.198)	(0.478)	(1.056)
Partner's Income	0.003***	0.008***	-0.001
(in thousands)	(0.001)	(0.001)	(0.004)
High School	0.745*	1.230	-0.588
	(0.317)	(0.943)	(1.881)
College	1.408***	1.389	-1.159
	(0.329)	(0.964)	(1.901)
Graduate	2.681***	3.128**	-0.819
	(0.373)	(1.025)	(2.107)
Paid for Childcare	1.492***		
	(0.211)		
Hypothetical CDCTC		0.0023***	-0.0008
		(0.0004)	(0.001)
CDCTC Difference		0.0005***	0.0004*
		(0.0001)	(0.0002)
Occupation			
Management/Business	38.236***	38.59***	1.198
	(0.274)	(0.684)	(1.388)
Professional	35.229***	35.36***	1.726
	(0.243)	(0.638)	(1.271)
Service	31.371***	33.35***	1.190
	(0.274)	(0.727)	(1.219)
Sales	33.631***	35.75***	0.457
	(0.360)	(0.906)	(1.346)
Administrative	34.978***	35.86***	0.620
	(0.292)	(0.758)	(1.306)
Agricultural	29.021***	27.04***	-4.048
	(1.609)	(4.140)	(3.770)
Construction	34.524***	26.69***	4.157
	(1.295)	(2.843)	(3.012)
Maintenance	34.365***	34.32***	8.632
	(1.797)	(2.642)	(4.552)
Production	36.328***	37.18***	0.081
	(0.547)	(1.373)	(1.924)
Transportation	32.859***	35.86***	–
	(0.547)	(1.385)	(–)
	n=16876	n=3343	n=457
	$R^2 = 0.712$	$R^2 = 0.601$	$R^2 = 0.039$

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 6: Regression Results for Common Sample of Mothers Across Years

Variable	**DV: Change in Hours Worked**	
	2020-2021	2021-2022
Intercept	1.146***	0.346
	(0.217)	(0.261)
Change in CDCTC	-0.0001	0.0004
	(0.0002)	(0.0002)
	n=4347	n=2637
	$R^2 = 0.0001$	$R^2 = 0.0005$

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Appendix:

A. Equation (2) for 2020 and 2022

Table 7: Regression Results for Full Sample of Mothers in 2020 and 2022
Dependent Variable: Hours Worked

Variable	**OLS: Mothers 2020**	**OLS: Mothers 2022**
Intercept	0.568	1.401**
	(0.452)	(0.450)
Number of Children	-0.664***	-1.003***
	(0.243)	(0.646)
Number of Children^2	0.014	0.107*
	(0.043)	(0.045)
Children Under 6 Present	-1.080***	-1.098***
	(0.171)	(0.169)
Married	-0.067	-0.707***
	(0.205)	(0.204)
Spouse's Income	0.004***	0.004***
(in thousands)	(0.0007)	(0.0006)
High School	1.139***	0.915**
	(0.330)	(0.332)
College	1.187***	0.899**
	(0.342)	(0.343)
Graduate	2.350***	2.576***
	(0.391)	(0.388)
CDCTC	0.004***	0.003***
	(0.0004)	(0.0004)
Occupation Controls	Yes	Yes
	n=18199	n=15934
	$R^2 = 0.677$	$R^2 = 0.710$

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

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