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Perils and Promise of Basing Welfare Through the Tax System: An Analysis of Tax Filing and Credits

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Abstract

Using Survey of Income and Program Participant (SIPP) Census Data, this paper employs a regression discontinuity and panel data analysis to determine the impact of the tax filing cutoff on an individual's decision to file and whether a person's decision to file is impacted by the value of the tax credit available to them. The Biden administration's expansion of the Child Tax Credit (CTC) changed the CTC from a tax deduction to a cash transfer program as the credit became available to everyone, even if they did not pay taxes. Importantly, to receive the tax credit from the Internal Revenue Service (IRS), individuals and families had to have filed their taxes or needed to fill out a simplified tax form to claim the CTC. The IRS is not a welfare distribution service and this paper studies whether it can effectively distribute programs such as the CTC and reach those who would benefit from the tax credit most. The paper shows mixed findings, suggesting that people with children under 18 file at higher rates and are more likely to receive tax credits. However, there is also a large correlation between filing and education, with people who have more education being more likely to file. The regression results suggest support for the effective distribution of welfare through the IRS but also a need for more tax filing help and outreach to less educated communities.

I. Introduction

The Child Tax Credit (CTC) and Earned Income Tax Credit (EITC) were designed to help lower the tax burden for low-to-middle-income earners and incentivize work. President Joe Biden expanded the CTC for a year in 2021 to make it fully refundable, meaning even those who did not owe taxes could receive the full tax credit. The Biden administration's policy changed the CTC from a tax deduction to a welfare cash transfer program. The policy change also shed light on the vulnerability of people who do not file their taxes (non-filers) since they could not automatically receive the CTC and might miss the benefits of the money. The Internal Revenue Service (IRS) was not created to distribute welfare and considering whether the IRS is the best system to administer welfare to low-income families is an assumption about how we conduct social policy that requires further investigation. Both the CTC and EITC provide low-income individuals with supplemental income but people who do not file their taxes will not automatically receive the expanded CTC benefits and how people decide to file their taxes is an understudied decision. This paper adds to previous literature by attempting to evaluate the efficacy of the IRS as a welfare system using a regression discontinuity model to analyze differences in filing above and below the tax filing cutoff. The findings can provide insight into whether a fully expanded CTC will be effective in incentivizing people to file their taxes or whether the policy will fail to reach the people who would benefit the most from it.

The results of the regression analysis show no significant difference between filing rates on either side of the tax filing cutoff. Instead, the results highlight the difference in the value of filing (vs. not filing) for individuals based on the amount of money they can receive from the CTC or EITC. Relative to not having children, people with three children are 9.94 percentage points more likely to file their taxes and 12.4 percentage points more likely to receive the EITC.

Married couples with children can receive the most money from the EITC and they are the most likely group to file their taxes. Further, single parents, women, and Latine people are more likely to get the EITC demonstrating the policy is somewhat successful in reaching more marginalized groups. However, there is also a strong correlation between education and filing, suggesting filing taxes is easier for people with more education. People with a graduate degree are 48 percentage points more likely to file their taxes than individuals without a high school education (when income levels are the same). With each additional level of education, individuals are more likely to file their taxes.

The results provide evidence that people respond positively to incentives as those who can receive the most money from the EITC/CTC are filing their taxes at the highest rates. This suggests that the policies should continue to be distributed through the IRS as it appears there is no difference in filing for individuals with incomes close to the tax filing cutoff. Those for whom the tax credit values are the highest also file at the highest rates. However, it is also clear that the expanded CTC will not reach everyone as filing is highly correlated with education, likely due to the difficulty and barriers of the tax filing process. Thus, this research suggests that the IRS needs more funding to expand its outreach to less educated people through programs such as VITA and simplifications of the filing process. These steps may help more people receive the CTC/EITC and decrease financial burdens for families across the country.

In the next section, I provide background on the tax credit systems and the 2021 CTC expansion. I also summarize previous literature on non-filers, tax credits, and the relationship between welfare and filing. In Section III, I describe the data used in this study and how I constructed each data sample. Section IV discusses the summary statistics from both data samples and the distribution of the most important variables. The next two sections present the

results from the sharp and fuzzy regression discontinuity analysis including both the first and second-stage regressions. In Section VII, I analyze results from the panel data analysis on filing before and after a change in the CTC. Finally, in Sections VIII and IX, I go over the limitations of the study, the next steps, and the policy implications of this research.

II. Background

On March 11th, 2021, amid the COVID-19 pandemic, President Joe Biden signed the American Rescue Plan (ARP), providing aid to millions of struggling Americans.[1] Part of the ARP included major changes to the Child Tax Credit (CTC). The CTC is a monthly payment families can receive to ease the financial burden of having children that is distributed through the Internal Revenue Service (IRS). The credit was initially established for middle- and upper-income families to lower their average tax rate but has expanded in the past years to include lower-income families.[2] Biden's expansion helped make the CTC less regressive as it created a more equitable distribution of the CTC benefits by allowing people in the lowest income brackets to receive the maximum payment (see Figure 1). It also increased the amount of money working people could receive. The monetary value of the CTC was increased from $2,000 to $3,000 per child and up to $3,600 for children under 6. Anyone who filed their taxes was automatically sent the CTC.[3] Importantly, the Biden administration also made the CTC fully refundable and eliminated the minimum income requirement so people with no income or who did not owe taxes could still get the full payment. In other words, the policy moved from being a tax deduction to a welfare income transfer program. Figure 1 provides a visual representation of the distribution of the phase-in and phase-out structure of the CTC before and after the CTC expansion in 2021. Most notably people who make no income see an increase of $3,000 in the

amount of the CTC they receive. Although the expansion expired at the end of 2021, Biden proposed a continued expansion in his Build Back Better policy.[4]

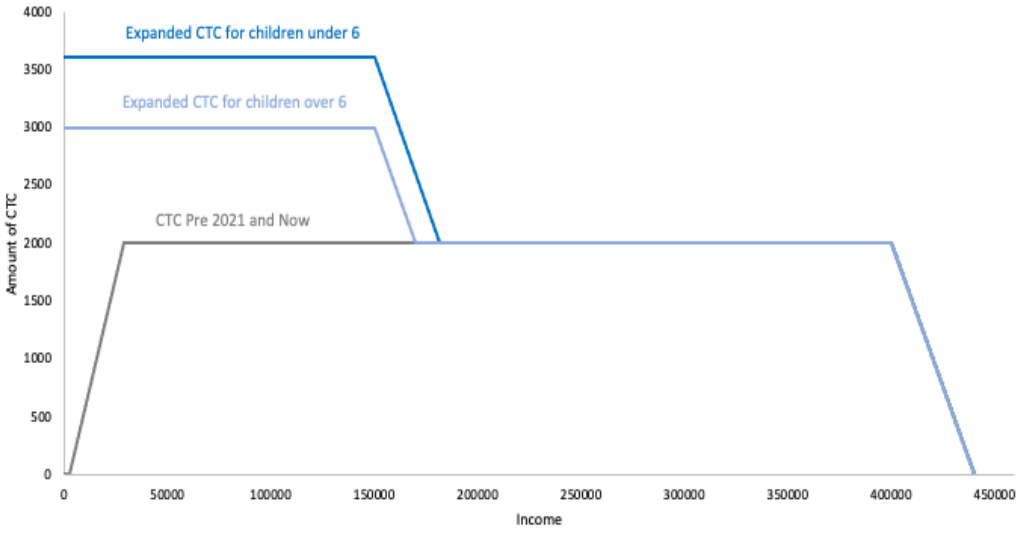

Figure 1. Comparison of CTC Before and After the ARP
Source: UBI Center, Peterson Foundation [5] [6]

Before the ARP expansion, critics of the CTC pointed out that the policy was regressive due to its partial refundability. For example, Goldin and Michelmore (2020) look at the distribution of CTC benefits across income levels and race. The authors find that benefits were not evenly allocated due to income inequality among different racial groups. As a result of the refundability limits, only half of Black and Hispanic children were eligible for the full tax credit. Additionally, they found that most people in the bottom decile of the United States income distribution were not even eligible for the CTC, meaning they received no money because they did not pay taxes. In comparison, almost all children in the top 50% of the income distribution were eligible for the full amount of the CTC. The authors suggest the ARP expansion would benefit 23 million children, many of whom are Black and Hispanic in the lowest income bracket.[7] However, one important aspect of the policy that Goldin and Michelmore (2020) do not discuss is the issue of non-filers and how the CTC will impact them. Sources such as the Center for Budget and Policy Priorities (CBPP) have estimated that the expanded CTC will reduce child

poverty by 40%, mostly due to full refundability. Again, this number does not include any consideration that non-filers may not receive the CTC.[8]

Basing welfare out of the IRS means that people who do not file their taxes will not automatically be sent the CTC/EITC as the IRS has minimal data on them. Tahk (2012) describes a recent shift toward the U.S. government writing more social programs into the tax code despite the IRS not originally being created as a welfare distribution organization.[9] However, it is unclear whether the IRS is the best service to base welfare on as not all people file taxes. The next section goes into more detail on who non-filers are. Even though the CTC no longer acted as a tax deduction under Biden's expansion, people still needed to file to receive it and for low-income non-filers, the income boost would likely lead to the greatest benefits, although these people are also the least likely to receive the CTC.

i. Non-Filers in the United States

A non-filer is someone who does not file a tax return. The IRS releases a filing cutoff each year for the maximum income level that someone does not have to file their taxes without potentially being subject to an IRS audit (see Table 1 below for more detail on these cutoffs) so lower-income individuals and families often have the option to not file their taxes.[10] After the expansion of the CTC, there was growing concern that people who did not file their taxes would not receive the CTC. This was not a large concern before the ARP as most non-filers did not make enough money to receive the full CTC payment or any money from the CTC (see Figure 1). However, after the expansion many of these non-filers were eligible for payments but unlike filers, they would not be automatically sent the CTC by the IRS since they were not in the IRS system.

Finding the demographic makeup of non-filers is difficult as there is minimal data on them but there have been multiple attempts by researchers and think tanks. An article by the CBPP that came out after the ARP was passed estimated that 12 million people would not receive automatic payments from the IRS because they did not submit a 2020 tax return. Of these 12 million people, the CBPP estimated that 3 million people were also not receiving other benefits such as SNAP or Medicaid, making them even harder to reach. Further, the CBPP reported that 27% of the 9 million people who did not file their taxes were Black and 19% were Latine, making communities of color more at risk of missing the CTC.[11] In 1998, the U.S. Treasury published "A Profile of Non-Filers" using the gold standard of data on non-filers by matching information from 1990 Federal tax returns to people in the Current Population Survey (CPS).[12] The profile found that people with a 10th-grade education or below are less likely to file, people of color are less likely to file than white people, and people without an earned income are also less likely to file.[13] Erard and Ho (2003) did not specifically focus on defining the population of non-filers but they used data from 1988 and found that the time burden of filing taxes and preparing tax returns was a deterrent for some families.[14]

More recent articles have attempted to understand who makes up the non-filer population as well. The study "Attaching the Left Tail: A New Profile of Income for Persons Who Do Not Appear on Federal Income Tax Returns" by Mortenson et al. (2009) used Statistics of Income data from 2003 to create a profile of non-filers. In their sample, 40% of non-filers were over 65 and the average income of all non-filers was $13,000. The article did not discuss any information on racial composition and provided limited demographic information.[15] Augustine et al. (2021) published an article with the California Policy Lab and tried to identify the people in California who might miss out on the CTC because they did not file their taxes. While the population of

California is not representative of the entire U.S. population, the research can still provide important insight into who non-filers are. The researchers found that the children most at risk of missing the CTC in California are a majority Hispanic (56%), many live in households where families do not speak English, and American Indian/Alaska Native communities are highly at risk of missing the credit. Many of these families also live in single-parent households and 81% of households at risk make less than $5,000 in wage earnings.[16]

Overall, the research on non-filers is sparse and could benefit from increased analysis. Past research has often focused on identifying non-filers to better address policy decisions that are based on data only including tax filers but does not aim to look at the impact of not filing.[17] [18] Other research focuses on the lack of tax compliance from those who are obligated by the IRS to file their taxes.[19] Despite a lack of clarity on the exact demographic breakdown, it is clear that a large portion of non-filers are low-income communities of color, making it especially important to ensure they are receiving CTC payments. Additionally, immigrants can get the CTC, even if they do not have a social security number (SSN). They can use an IRS Individual Taxpayer Identification Number (ITIN) instead.[20] However, their children must have an SSN for their parents to receive the CTC. Even if their children have an SSN, language, cultural, educational barriers, and fear of sharing information with the IRS are all problems, making undocumented immigrants less likely to receive money from the CTC as well.[21]

There are also barriers to filing that often make it difficult for individuals below the filing cutoff to make an immediate switch to filing their taxes. For example, New America conducted a qualitative profile of non-filers in which they talked to families who do not normally file taxes after the CTC expansion was passed (meaning participants were aware of the new changes).[22] New America found there were a variety of different ways people viewed filing. Some people

expressed that they did not think they were supposed to file if they did not make enough money or that there was no benefit to filing their taxes. Others did not necessarily understand how tax credits work or that they were now eligible for full payments.[23] Additionally, an analysis of the Biden Administration's 2021 strategy to help non-filers suggested that it was not as effective as hoped. The administration created a website through the IRS for non-filers to fill out a simplified tax filing form but 2 in 3 individuals trying to use the website were unable to do so, for reasons such as not having the necessary identification documents.[24]

Despite the variety of findings from the literature, it is unclear how many of the people will respond to the incentive of receiving $3000 – $3600 from the CTC and whether they will choose to file their taxes to get the CTC, especially once the payments become established for more than one year and knowledge of them is more widespread. Previously, people below the filing cutoff had little incentive to file their taxes to receive the CTC as they were not eligible for some or any money. Some people may have had the incentive to file for EITC as they could receive money from that credit (see Figure 5 for the phase-in/phase-out structure of the EITC) but the EITC has not been made fully available either so not all people below the filing threshold can benefit from it or receive the full payment. Understanding filing behavior and tax credit take-up will be especially important if the CTC is expanded more permanently. It will inform whether aggressive outreach is needed to reach filers, whether the IRS is the best service to distribute such a policy, and if the increased tax credit is enough incentive for most non-filers to claim the CTC.

ii. Literature on Tax Credit Benefits

This section summarizes the current literature on how getting a tax credit (either the CTC or EITC) impacts individuals and their children. This has been a popular topic for research and

there are a wide variety of articles looking at the impacts of tax credits, especially the EITC. Research on the effect of tax credits has overwhelmingly pointed to the positive effects of tax credits on a variety of different socioeconomic outcomes. The literature provides a further foundation for why the current paper is significant and the importance of considering whether the IRS is the correct system to distribute welfare benefits such as the CTC and EITC.

Dahl and Lochner (2012) look at the impact of receiving the EITC on children's educational outcomes. They find that a $1,000 increase in income is associated with a 6 percent of a standard deviation increase in children's math and reading scores.[25] An article by Braga et al. (2020) studied the impact of the EITC on child health outcomes. They find that if children are in families that receive the EITC when they are young, they are more likely to be healthy when they are older. More specifically, Braga et al. report that receiving an additional $100 from the EITC each year is associated with a 2.6% increase in the likelihood of reporting good health and a 4.1% decrease in obesity among children, especially those with single parents.[26] The EITC has also been found to have a positive impact on educational outcomes. Bastian and Michelmore (2018) find that a $1,000 increase in money received from the EITC (when a child is 13-18) is associated with an increased likelihood of completing high school, college, being employed, and making more money as an adult.[27] Manoli and Turner (2018) find that increased cash flow from tax credits in low-income households has a positive effect on the likelihood of college enrollment during a child's senior year.[28] Finally, an important article from the literature on the EITC examined the mechanism behind the positive impact of the EITC on mental health. Gangopadhyaya et al. (2020) found there was little association between EITC expansions and health insurance, and instead improved mental health came directly from the tax credit, potentially due to increased financial stability.[29] Not only do tax credits have a positive impact

on education, health, and employment outcomes, but they also lead to an overall reduction of financial stress in households.

In terms of the CTC, similar impacts have been found. In their article "New Evidence on the Long-Term Impacts of Tax Credits," Chetty et al. (2011) look at the impacts of the CTC/EITC on children in terms of achievement, specifically test scores. They find a $1,000 increase in tax credits is associated with a 6.2 percent of a standard deviation in reading test scores and 9.3 for math test scores. Higher test scores are correlated with an increased probability of college attendance, higher lifetime earnings, fewer teenage births, and better neighborhood quality in adulthood.[30] Additionally, there has been some recent literature looking at the impacts of the most recent expansion of the CTC under the Biden administration. One report by Parolin et al. (2021) finds that the expansion of the CTC in 2021 kept 3 million children out of poverty and would have been able to keep even more children out of poverty if it had been able to reach all children.[31] University of Michigan's Poverty Solutions find that families that received the CTC in 2021 reported finding the CTC somewhat to very useful in making ends meet. Survey results find that the expanded CTC was most used for paying bills/rent, buying food, or child-related expenses.[32] For people who received the expanded CTC in 2021, there is strong evidence that it reduced poverty and positively impacted a family's financial situation.

iii. Literature on Filing and Tax Credits

There is also a small body of literature on filing and tax credits. This is the research most related to the policy questions addressed in this paper. An article by Goldin et al. (2022) examines EITC/CTC take-up through the lens of tax filing using tax return data from 2017. They look at an initiative done by the IRS aimed to increase filing for individuals who did not file their

taxes. They find that the initiative was minimally successful and only increased filing rates by one percentage point. However, for those who did file, many claimed the EITC and CTC. The key takeaway of the study was that getting more people to file is difficult but a crucial way to increase tax credit take-up.[33]

Some articles look at how incentives to file taxes impact filing. Ramnath and Tong (2017) discuss a policy change in 2008 where the U.S. government said people who made at least $3,000 were eligible for a stimulus payment but only if they filed their tax returns. Utilizing a regression discontinuity looking at filing above and below incomes of $3,000, the researchers find that the incentive of the stimulus payments for eligible people was associated with a 2.2 percentage point increase in filing a tax return throughout demographic groups. Filing a return was also associated with an 83.1 percentage point increase in filing a tax return in the future, an increased likelihood of claiming the EITC in the future, and decreased likelihood of living in poverty.[34] Additionally, Alm et al. (2012) find that targeting tax credits to low-income individuals had a positive impact on the incentive to file.[35] [36] Interestingly, Linos et al. (2020) looked at results from field experiments and find that "nudges" to claim the EITC such as text messages and letters made no impact on filing taxes or claiming the EITC.[37] This suggests that not filing is not an information problem and instead people do not file because it is not worth it to them in terms of the time value of filing or that they are going to receive very little money from tax credits. Instead, previous literature suggests incentives such as policy changes and increased money availability are needed to motivate individuals to file their taxes/claim tax credits. These conclusions motivate my paper which looks at filing when the payoff of tax credits changes in value for people.

Overall, the research on filing and tax credit take-up mostly focuses on the difficulty of getting individuals to file. However, once people file, it appears to lead to large increases in tax credit take-up, future filing, and financial stability. Based on research from Ramnath and Tong, policy changes that offer money to people if they file are successful in increasing filing rates.[38] This current paper adds to the existing literature by looking at the most recent change in tax credits and the expansion of the CTC under Biden in 2021. It utilizes a regression discontinuity to examine behavior around the filing cutoff to determine whether distance from the cutoff motivates filing behavior, which has not been done in previous research. I aim to build off the literature on filing and tax credits to provide a better picture of whether the IRS is an adequate agency to distribute welfare. Given the concerns about the expanded CTC missing the people who would benefit most from it, this is a topical and important question.

III. Data

The data used in all analyses are from the United States Census Survey of Income and Program Participants (SIPP) data. SIPP is a data set collected by the U.S. Census focusing on topics such as income, employment, social/welfare program participation, and demographics. As stated by the user guide, "the main objective of SIPP has been ... to provide accurate and comprehensive information about the income and program participation of individuals and households in the United States."[39] The first SIPP data set was created in 1983 and has been redesigned multiple times since then. This allows for opportunities to create stacked cross-section data and follow individuals across time as well as analyze trends across multiple years of SIPP data. SIPP includes individual-level data with a wide variety of information.

The data for this study uses the 2018, 2019, 2020, and 2021 SIPP datasets. These years were chosen as they are the most recent years of SIPP data and contain recent policy changes.

Specifically, during this time there was an important change in the CTC at the end of 2018 and the data for these years provides potential to study the impacts of this change. SIPP 2018 data covers January through December 2017, SIPP 2019 data covers January through December 2018, and so on. SIPP data is also longitudinal, as it includes panel data with households interviewed multiple times a year. This study uses data from the 2018 panel which spans the SIPP 2018, 2019, 2020, and 2021 datasets as it is the most recent comprehensive panel available.

SIPP data provides a rare opportunity to look at those who file their taxes and those who do not. Data on filers is sparse given tax filing information is private and the IRS data is confidential. Non-filers are especially hard to collect data on given that the government and IRS already do not have as much data on them as people who file their taxes. The U.S. Department of the Treasury has some data on non-filers, but it is publicly aggregated to the zip code level which makes it impossible to look at individual information.[40] Aggregated data is not useful for this study as this research aims to look at the individual behavior of filers and non-filers on either side of the tax filing cutoff. Consequently, the study requires not only whether someone files their taxes and whether they receive a tax credit, but also their individual incomes to determine whether they are above or below the filing threshold. As a result, any kind of aggregated data is not useful. Information on filing status that is not also linked to individual income can also not be used. SIPP data has limitations. For example, it only includes a variable for whether someone receives the EITC, not the CTC. It also contains a disproportionate number of people who did not receive the EITC or have missing information for this variable. However, SIPP is still the best dataset for looking at the policy question guiding this study because it provides public individual-level data across multiple years with income, filing status, and whether someone

claimed the EITC. While it may not be the perfect dataset, it is the only public data set containing the necessary information.

i. Constructing the Data Samples

I created two different samples from the SIPP data. One is used for the regression discontinuity analysis and combines all data from 2017-20. The other data sample creates a panel data sample using the SIPP 2018 panel. The construction of the two samples is discussed in further detail below.

a) Combined Data from 2017-20

Using the combined data from all four years of SIPP data, I created a smaller sample focusing on individuals near the filing cutoff. Each year the IRS releases the income cutoff for filing taxes, so the cutoff is unique for both year and the filing status (joint, single, widowed, etc.). For each year, I limited the sample to observations for people whose income was $500 above or below their specific filing cutoff. Table 1 shows the filing cutoff for all possible categories in the data by year. For example, the filing cut-off for single people under 65 in 2020 is $12,400, thus for 2020 I include all observations with an income between $11,900 and $12,900. I chose $500 as the size of income as it balances the need to have a small enough difference between incomes to ensure there are no major differences in the incomes of people above and below the cutoff that would lead to different characteristics as well as ensuring there are enough people in the sample.[41]

	Single	Married (Joint Return)	Widower/Surviving Spouse
2020 (under 65)	$12,400	$24,800	$24,800
2020 (over 65)	$14,050	$27,400	$26,100
2019 (under 65)	$12,200	$24,400	$24,400
2019 (over 65)	$13,850	$27,000	$25,700
2018 (under 65)	$12,000	$24,000	$24,000
2018 (over 65)	$13,600	$26,600	$25,300
2017 (under 65)	$10,400	$20,800	$16,750
2017 (over 65)	$11,950	$23,300	$18,000

Table 1. IRS Tax Filing Cutoffs for Different Filing Statuses from 2017 – 2020
Source: IRS Publication 501[42]

Within SIPP data, multiple variables measure income. The income variable used in this study is defined by the SIPP codebook as the "sum of monthly earnings and income received by household members aged 15 and older, as well as SSI payments received by children under age 15."[43] This variable is used for consistency as people are identified within the data by their household. Additionally, if a couple is separated and living in different households, they would be more likely to file by household (single) instead of by family (joint filing). Other variations of the income variable include looking at income by family members instead of household or including income from people who have moved away (Type 2 person). A more detailed description of all five income variables is shown in Appendix A Table 1. Robustness checks using other income variables are discussed further in Section V and Appendix C. Based on these robustness checks, there does not appear to be any major differences between any of the income variables that would change the results.

Once the smaller sample was created all people who are not eligible to receive the EITC or very unlikely to receive it were dropped. This included children, dependents, and people who

are not citizens.[44] An individual's filing status was determined by the married variable in the SIPP data. This variable contains six values: (1) Married/spouse present (2) Married/spouse absent (3) Widowed (4) Divorced (5) Separated (6) Never married. Those who are divorced, never married, or separated are assumed to file as single on their tax returns. Those who are married with their spouse present or absent are categorized as filing as married (joint return).[45] Finally, people classified as widowed are placed in the widower/surviving spouse category. Unfortunately, this variable is not a perfect representation of how people file. There is one variable in the SIPP data that shows how people filed but it is only applicable to individuals in the data who filed, excluding any non-filers. Consequently, to maintain consistency and accuracy, I only use the marriage indication variable to determine filing status. It is unlikely that using the marriage variable is so inaccurate that it would completely change the results of the study. Table 2 in Appendix A checks this assumption. In terms of the two largest groups in the sample (people who are married with a spouse present and people who have never been married make up almost 80% of individuals), Table 2 demonstrates that filing status and marital status line up well. 91% of people who are married with a spouse present file a joint return and 92% of people who have never been married file as single. While there is not perfect correlation, there is not enough discrepancy to cause concern.

Additionally, all data was collapsed so there is only one data point for each individual every year. The SIPP data is broken down into monthly data points for individuals in the sample. However, there are multiple problems with the monthly data. First, people only file once a year so there should not be variation month-to-month in filing.[46] Second, not all individuals have all 12 months of data while others do. This could potentially give more weight to people in the sample who have more monthly data recorded. Third, there is not a lot of variation by month

(i.e., a person is unlikely to change their marital status, number of children they have, etc. throughout the year). Finally, collapsing monthly data (by maximum value) allows for the correct number of degrees of freedom in the data.

b) *Panel Data*

The sample with panel data was created similarly, using the filing cutoff and filtering only those in the dataset with an income that was $1,000 above or below the cutoff. The income for this dataset was changed to $1,000 to increase the number of people in the dataset as there was not enough data in the panel for only people who were $500 above or below. The sample size increased from 2,918 people to 4,770 people after the change. Additionally, whether someone is above or below the filing cutoff is not as important in the analysis using the panel data. Since this is panel data, there is less concern about unobservables because of the individual fixed effects so increasing the distance of income from the filing cutoff is not a major concern. The data combines all four years of SIPP data. However, it drops anyone who is not in the 2018 panel, limiting the data to only people who have been tracked by the Census across 2017 – 2020. I also collapse all data entries in the panel data by year and individual so there is only one observation for each person in every year instead of data for each month. Keeping monthly data in the panel dataset adds unnecessary noise. If someone has filed their taxes in the first half of the year, their filing status will not change for the rest of the year so adding the granularity of the monthly data is not helpful.

IV. Summary Statistics

i. Regression Discontinuity Sample

Table 2 shows summary statistics from the final SIPP sample of people close to the filing cutoff. The key variables in the table are whether someone filed their taxes, if they received the

EITC, and whether they are above or below the filing threshold. In the sample, it is more likely that someone filed their taxes as the mean is 0.81 meaning 81% of the people in the dataset filed their taxes during the year. For the EITC, only 7% of people in the sample received the EITC.[47] There are also a significantly lower number of observations for the EITC (3,277 compared to the total of 4,325 in the data), which indicates many missing values for individuals. Any individual with missing EITC data is not included in the regression analysis. The variable *Above* indicates whether an individual is above the tax filing cutoff or not. 54% of individuals in the sample are above the cutoff so the divide is relatively even.

The demographic breakdown of the sample is as follows. Sex in the sample is evenly divided, with exactly half of the sample being male. 88% of people in the data sample were born in the United States. Regarding race, 66% of the sample is white, 10% is Black, 14% is Spanish, Hispanic, or Latine, 7% is Asian, and 2% is another race. The average age of the sample is 39.93 years with ages ranging from 18 to 89. Most of the sample is between 20 and 60 years old. While most parents of children are in this range, it is also important to note that grandparents who are legal guardians can also claim the CTC.

The main variables describing family structure in Table 2 are the number of people in a household, married, and children. There is an average of 3.07 people in each household in the data. Single people are 72% of the sample, which includes people who have never been married, people who are divorced, and people who are separated. Individuals who are married compose the other 28% of the sample. This percentage includes married couples with a spouse present, married couples with their spouse absent, and widowed people. The variable for children only includes people who have children under 18. While there are other people in the sample who have older children, only people with children under 18 are included as that is the age at which

parents can receive the CTC/EITC for their children. The majority of people in the sample do not have children under 18 (82%). 7% have one child under 18, 7% have two children under 18, and 3% have three children under 18. Only 5% of the sample has not finished high school; 23% of people have finished high school, 18% have completed some college, and 36% have an associate or bachelor's degree. Finally, 17% of people have a master's, doctorate, or specialized degree.

Variable	N	Mean	SD	Min	Max
EITC	3277	0.07	0.26	0.00	1.00
Filed Taxes	4013	0.81	0.39	0.00	1.00
Born in the US	4325	0.88	0.32	0.00	1.00
Female	4325	0.50	0.50	0.00	1.00
White	4323	0.66	0.47	0.00	1.00
Black	4323	0.10	0.31	0.00	1.00
Latine	4323	0.14	0.35	0.00	1.00
Asian	4323	0.07	0.26	0.00	1.00
Other	4323	0.02	0.15	0.00	1.00
No Children	4325	0.82	0.38	0.00	1.00
One Child	4325	0.07	0.26	0.00	1.00
Two Children	4325	0.07	0.26	0.00	1.00
Three + Children	4325	0.03	0.18	0.00	1.00
No High School	4325	0.05	0.23	0.00	1.00
High School	4325	0.23	0.42	0.00	1.00
Some College	4325	0.18	0.39	0.00	1.00
College	4325	0.36	0.48	0.00	1.00
Grad Degree	4325	0.17	0.37	0.00	1.00
Single	4325	0.72	0.45	0.00	1.00
Married	4325	0.28	0.45	0.00	1.00
2017	4325	0.31	0.46	0.00	1.00
2018	4325	0.18	0.38	0.00	1.00
2019	4325	0.23	0.42	0.00	1.00
2020	4325	0.28	0.45	0.00	1.00
# of People in House	4325	3.07	1.83	1.00	13.00
Age	4325	39.93	15.84	18.00	89.00
Income	4325	15067.98	5422.15	9904.00	27838.00
ID	4325	1996.09	1152.67	1.00	3995.00
Above Filing Cutoff	4325	0.54	0.50	0.00	1.00

Table 2. Summary Statistics for Regression Discontinuity Data Sample

Overall, there are 2,378 households and 3,995 individuals in the data sample across all four years. All individuals are within $500 of their respective tax filing cutoff. The breakdown of data from each year is as follows: 31% of the data comes from 2017, 18% from 2018, 23% from 2019, and 28% from 2020.

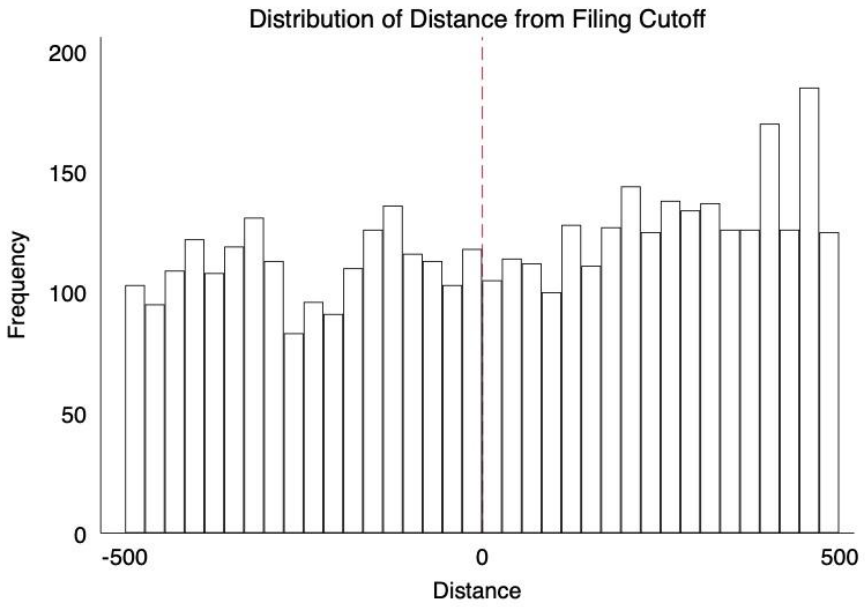

Figure 2. Distribution of Income Distance from Filing Cutoff

Figure 2 provides a detailed picture of the distance variable. Distance measures the difference between a person's income and the filing cutoff for their assumed filing status. A negative distance indicates they are below the filing cutoff and a positive distance indicates they are above it. As seen in Figure 2, the distribution of distances from the filing cutoff is relatively even on both sides. There are slightly more people above the cutoff (the average distance is 28.81) but there is not a concerningly large skew towards one side. There are two spikes of people close to the distance of $500. However, overall, there do not appear to be any major problems in the distribution of distance that would point to a pattern, people trying to manipulate their income, or an outside variable impacting the distribution.

Table 1 in Appendix B shows a balance table of summary statistics for those below and above the filing cutoff. Part of the theory behind a regression discontinuity model is that the people on each side of the cutoff should be very similar in terms of characteristics given their income is all within $1,000 so the only difference is whether they fall above or below the filing cutoff. Table 1 shows a comparison of the mean for all independent variables of individuals above and below the filing cutoff. Most variables show no major discrepancies.

ii. Panel Data

Table 3 shows the summary statistics for the panel data sample. In this data set, there are 4,770 unique individuals. Most numbers are somewhat similar to those described above. Only 7% of the sample received the EITC and 81% of the sample filed their taxes. A majority (89%) of the sample was born in the US. 83% of people have no children under 18 (although of these people, some have children that are older than 18) and 17% have at least one child under 18. In terms of marriage, 72% of the sample is not married and 28% is married or widowed.

Variable	N	Mean	SD	Min	Max
EITC	4306	0.07	0.25	0.00	1.00
Filed Taxes	5284	0.81	0.40	0.00	1.00
Born in the US	5561	0.89	0.32	0.00	1.00
Female	5561	0.50	0.50	0.00	1.00
White	5555	0.66	0.47	0.00	1.00
Black	5555	0.11	0.31	0.00	1.00
Latine	5555	0.14	0.35	0.00	1.00
Asian	5555	0.07	0.25	0.00	1.00
Other	5555	0.02	0.15	0.00	1.00
No Children Under 18	5561	0.83	0.37	0.00	1.00
Children Under 18	5561	0.17	0.37	0.00	1.00
No High School	5561	0.06	0.23	0.00	1.00
High School	5561	0.22	0.42	0.00	1.00
Some College	5561	0.19	0.39	0.00	1.00
College	5561	0.36	0.48	0.00	1.00
Grad Degree	5561	0.17	0.38	0.00	1.00
Single	5561	0.72	0.45	0.00	1.00
Married	5561	0.28	0.45	0.00	1.00
2017	5561	0.42	0.49	0.00	1.00
2018	5561	0.19	0.39	0.00	1.00
2019	5561	0.19	0.40	0.00	1.00
2020	5561	0.19	0.40	0.00	1.00
# of People in House	5561	3.06	1.81	1.00	14.00
Age	5561	40.48	15.99	18.00	90.00
Income	5561	14829.85	5330.87	9400.00	28272.00
ID	5561	2377.26	1380.28	1.00	4770.00
Post CTC Change	5561	0.58	0.49	0.00	1.00

Table 3. Summary Statistics for Panel Data Sample

The demographic features of individuals in the sample are also similar to those of the first data sample. Sex is divided evenly with 50% of people being male. A majority of people are white (66%) while Black people make up 11%, Latine people 14%, Asian people 7%, and other races 2%. The average age of people in the data is 40.48. In terms of education, only 6% of people have not finished high school, 22% have only a high school degree, 19% have some college education, 36% have finished some sort of college, and 17% have a graduate degree.

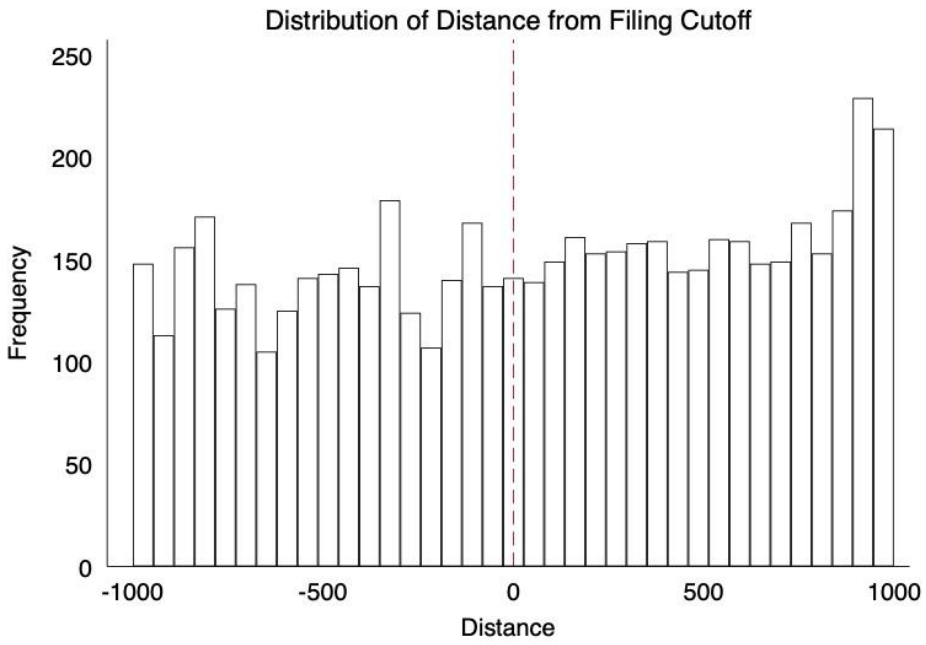

Figure 3. Distribution of Income Distance from Filing Cutoff

Figure 3 shows the distribution of the distance variable for the panel data. The distance is relatively even although there appear to be more people who are above the filing cutoff (those with a positive distance), especially people who have an income around $900 – $1,000 greater than the filing cutoff. However, overall, there do not appear to be any concerning patterns in the distribution of income in the panel dataset. Additionally, Table 2 in Appendix B shows a balance table for the panel data sample comparing summary statistics for individuals above and below the filing cutoff. There do not appear to be any major discrepancies in the table suggesting a lack of bias between the two sides.

V. Sharp Regression Discontinuity

To examine whether there is a difference in EITC uptake on either side of the filing cutoff, I run a regression discontinuity. I hypothesize that there is a connection between filing taxes and receiving the EITC. As a result, I begin by running a first-stage regression discontinuity looking at the relationship between distance from the filing cutoff and filing rate.

Theoretically, I expect there to be fewer people filing below the filing cutoff as they are not legally required to do so and would choose not to do so due to the time and difficulty of filing taxes. The equation for the first stage regression discontinuity linear probability model is shown below where individual i is a unique person in the sample, $Filed_i$ is the outcome variable for whether someone files their taxes or not, $Distance_i$ is how far someone's income is from the filing cutoff, $\tau_1 I$ is the income distance from the filing cutoff for individuals above the cutoff, and $\tau_2 I$ is the income distance from the filing cutoff for individuals under the cutoff.

$$Filed_i = \alpha + \tau_1 I(Distance_i > 0) + \tau_2 I(Distance_i < 0) + \epsilon_i$$

Figure 4 shows the results from the first stage regression discontinuity. There is no strong difference in filing above and below the cutoff. People with an income below the filing cutoff do not appear to file at a lower rate and seem to file at a slightly higher rate right at the cutoff. On the other side of the cutoff, there is little difference between the filing rate when individuals are above the cutoff and there is no statistical significance.

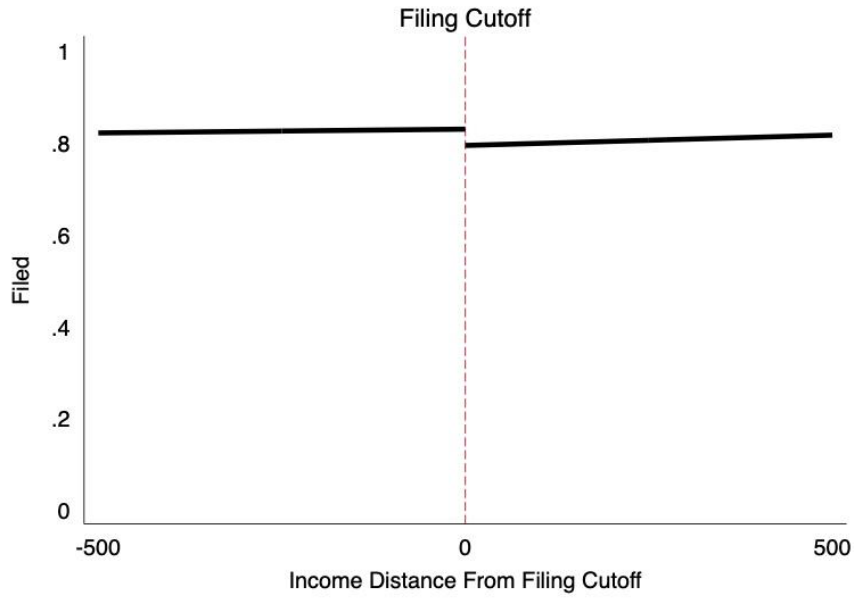

Figure 4. Linear First Stage Regression Discontinuity for Tax Filing Rate and Distance

As a robustness check, I recreate this regression discontinuity using other variations of the income variable found in the SIPP data. Figures 1 – 4 in Appendix C show the results of these regressions. The four other variations of income yield similar results, with no significant difference between filing rates for those above and below the filing cutoff. Figure 4 and the figures in the Appendix suggest that being $500 above or below the filing cutoff has little impact on actual filing rates.

The results from the first stage robust regression demonstrate that a sharp regression discontinuity is not the best method to use when looking at filing due to the different values of filing for people. While theoretically, there seem to be reasons for a jump to appear at the cutoff there are multiple reasons that the sharp regression discontinuity does not yield a statistically significant result. For one, it is likely that the income variable from the SIPP data is not completely accurate because measuring someone's exact income in a survey is difficult and may not yield precise results. Second, there are outside factors not controlled for in this regression that could be more influential than whether someone is above or below the filing cutoff. These factors likely make people within $500 of their respective cutoffs very different from each other due to factors such as the difference in the value of filing for people with children compared to people without children. The next section implements a fuzzy regression discontinuity to examine the impact of variables such as marriage and children on filing.

VI. Fuzzy Regression Discontinuity

This section discusses the fuzzy regression discontinuity using the variable *Above* as an indicator of whether someone is above the tax filing cutoff. The first stage regression includes a second attempt at looking at the impact of the filing cutoff on whether an individual files their

taxes or not. The second stage examines the relationship between being above or below the filing threshold and receiving the EITC.

Figure 5 shows the EITC distribution structure and how the tax credit phases in and out. The graph shows data from 2018 but the structure is the same for all four years of SIPP data. People who do not make any money do not receive any payment from the EITC. As shown by Figure 5, the number of children a person has and whether they are married plays a large role in how much money they get for the EITC. For example, a single or married person would receive less than $1,000 if they do not have children which is around 7 times less than a person with one child would receive. People with three children can receive over $6,000. Consequently, Figure 5 would suggest that there is more incentive for people with children, especially with two or more children, to file their taxes and claim the EITC. Figure 5 also provides further explanation for why the sharp regression discontinuity was not statistically significant. Due to the much higher payment of the EITC for people with children, there is a higher value for people with children to file, irrespective of the filing cutoff.

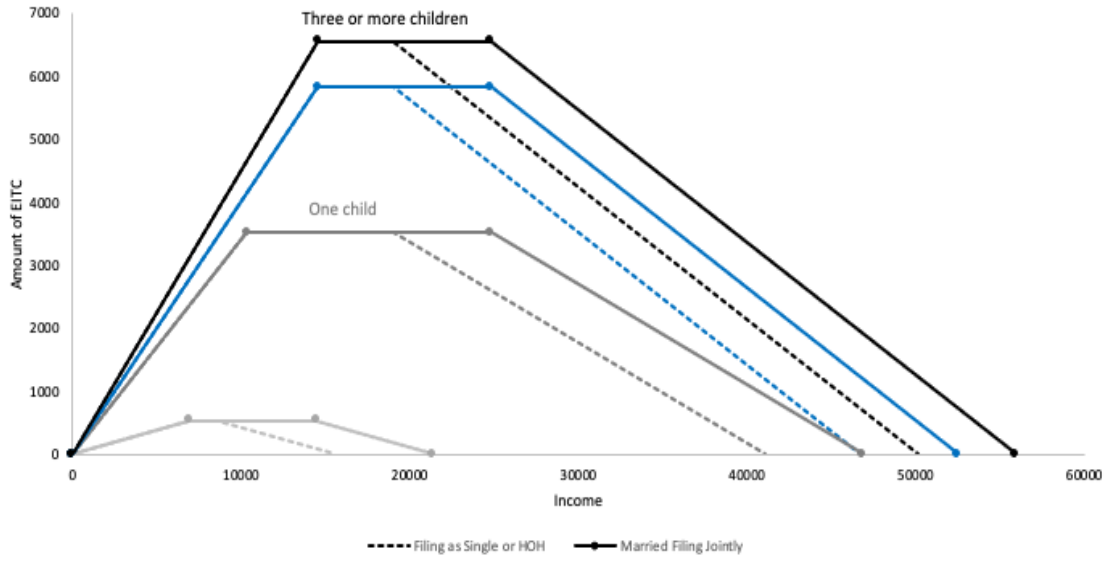

Figure 5. EITC Phase-in and Phase-Out for 2018
Source: Tax Foundation [48]

Figure 6 shows the same phase-in and phase-out structure as Figure 5 but with the addition of filing cutoffs. The bright red line to the left shows the filing cutoff for people who are single. As shown by the graph, the people included in the constructed data set who are $500 above or below the single filing cutoff will all receive at least some money from the EITC. People filing with no children will not receive the full amount of the EITC available to them and instead receive around half (~$250) of the maximum amount ($529). Any individual filing as single with one child will get the full amount of the EITC that is available to them ($3526). Those who have two or three children will not receive the full amount of the EITC available to them and receive less than anyone who filed as married.

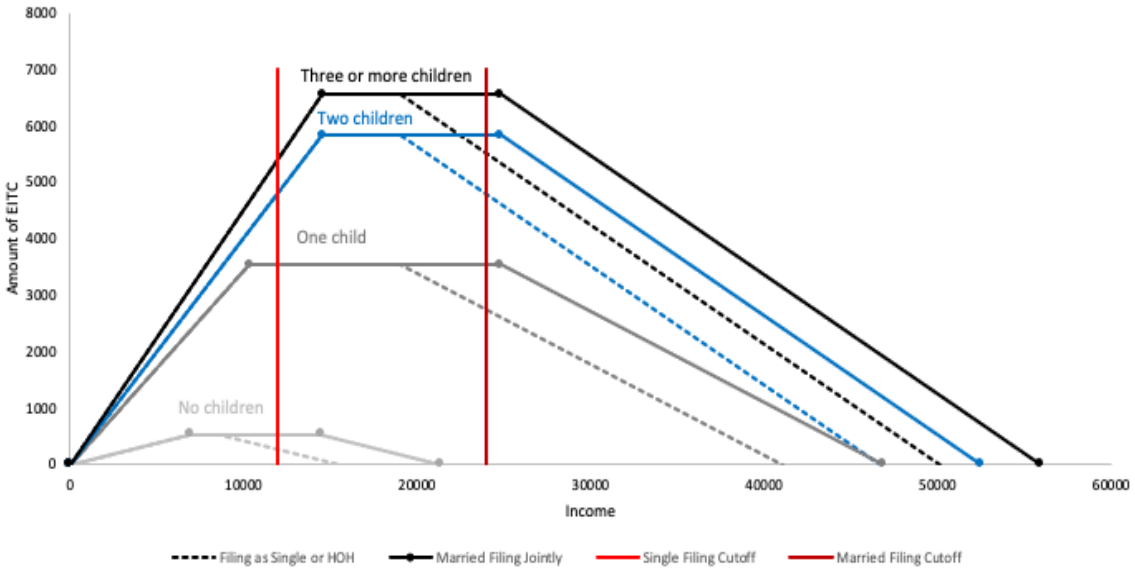

Figure 6. EITC Phase in and Phase Out for 2018 with Tax Filing Cutoffs
Source: Tax Foundation[49]

Everyone in the data sample who filed as married with a joint return (shown by the darker red line to the right in Figure 6) can receive the maximum amount of the EITC available to them, except for people with no children. Married couples without any children in the data will not receive any money from the EITC as it phases out at a lower income than for people who have children. This figure further emphasizes that the people in the dataset have the incentive to file

their taxes and claim the EITC even if they are below the tax filing cutoff. This is mainly true for people with children, especially for married people with children. As a result, filing holds very different values for people depending on their marital status and the number of children they have. For example, filing would hold the most value for married people with three children, then married couples with two children, then single people with three children, etc. This is true whether someone is above or below the filing cutoff, suggesting that a person's income in relation to the filing cutoff is not the most important feature of whether someone files or not. This further explains why the simple regression discontinuity model was not a good fit since the filing cutoff does not matter as much as other factors.

i. First Stage Regression

The equation for the first stage regression is shown below where variables retain meaning from the regression equation in Section V, $Above_i$ is an indicator of whether someone is above the tax filing cutoff, and X_i is a vector of covariates (including variable interactions).

$$Filed_i = \alpha + \beta_1 Above_i + \beta_2 X_i + \epsilon_i$$

Table 4 shows the results of the linear regression with two-way cluster-robust standard errors, clustered on an ID variable identifying each person in the panel.[50] The outcome variable of the regression is whether an individual in the data filed their taxes or not. The first regression is a simple regression of whether an individual is above or below the filing cutoff on filing. The results show a negative coefficient and no statistical significance. Given that the sharp regression discontinuity showed no significant results, this is not unexpected. The second regression adds variables controlling for sex, year, marital status, children, race, and education. The variable *Above* remains statistically insignificant. None of the variables for race are statistically significant except for Asian and other, meaning that relative to being white, there is no difference

in filing for people who are Black or Latine. However, relative to being white, people who are Asian are 5.73 percentage points less likely to file their taxes. Additionally, relative to being white, people in the other category (which includes American Indian/Alaska Native, Hawaiian/Pacific Islander, or 2+ races) are 8.6 percentage points less likely to file.[51]

Based on this regression, the other main factors on whether someone files or not appear to be sex, marital status, children, and education. Relative to men, women are 3.3 percentage points less likely to file their taxes. In terms of marital status, relative to being single (including divorced and separated), being married or widowed is associated with a 12.5 percentage point increase in the likelihood of filing taxes. Having children under 18 also has a statistically significant impact on the likelihood of filing. Looking at the second column in Table 4 relative to not having a child under 18, having a child under 18 is associated with a 5.8 percentage point increase in the likelihood of filing taxes. The third regression shows a more detailed breakdown of the impact of children. Having one child under 18 is associated with a 5.1 percentage point increase in the likelihood of filing relative to not having any children under 18. Having two children is associated with a 4.7 percentage point increase in the likelihood of filing taxes. Having three children under 18 is associated with a 9.9 percentage point increase in the likelihood of filing which is larger than the coefficient for having one or two children, suggesting that people with three children are more incentivized to file their taxes, potentially for the larger amount of money they can get from the CTC and EITC. Basing assistance around filing does not seem to be a major problem given that people who are eligible for tax credits are filing at higher rates, at least for individuals around the tax filing cutoff.

VARIABLES	(1) Filed	(2) Filed	(3) Filed	(4) Filed	(5) Filed
Above	-0.0197	-0.000615	-0.000975	-0.000614	-0.000445
	(0.0124)	(0.0113)	(0.0113)	(0.0113)	(0.0113)
Female		-0.0329***	-0.0332***	-0.0319**	-0.0335***
		(0.0116)	(0.0116)	(0.0133)	(0.0116)
2019		0.0105	0.0104	0.0106	0.00920
		(0.0163)	(0.0163)	(0.0163)	(0.0163)
2020		0.0184	0.0183	0.0184	0.0189
		(0.0151)	(0.0151)	(0.0151)	(0.0151)
2021		0.0427***	0.0431***	0.0427***	0.0430***
		(0.0145)	(0.0145)	(0.0145)	(0.0145)
Married		0.125***	0.125***	0.125***	0.147***
		(0.0102)	(0.0102)	(0.0102)	(0.0116)
One Child			0.0511**		
			(0.0210)		
Two Children			0.0470***		
			(0.0161)		
Three + Children			0.0994***		
			(0.0227)		
Black		-0.0281	-0.0278	-0.0282	-0.0308
		(0.0211)	(0.0211)	(0.0211)	(0.0211)
Latine		-0.00719	-0.00697	-0.00715	-0.00845
		(0.0193)	(0.0193)	(0.0193)	(0.0193)
Asian		-0.0555**	-0.0573**	-0.0556**	-0.0524**
		(0.0246)	(0.0246)	(0.0246)	(0.0246)
Other		-0.0861*	-0.0857*	-0.0860*	-0.0865*
		(0.0448)	(0.0449)	(0.0449)	(0.0446)
High School		0.247***	0.247***	0.247***	0.248***
		(0.0378)	(0.0378)	(0.0378)	(0.0377)
Some College		0.310***	0.310***	0.310***	0.311***
		(0.0381)	(0.0382)	(0.0382)	(0.0380)
College		0.458***	0.458***	0.458***	0.461***
		(0.0357)	(0.0357)	(0.0357)	(0.0355)
Grad Degree		0.480***	0.480***	0.479***	0.486***
		(0.0359)	(0.0359)	(0.0359)	(0.0357)
Children Under 18		0.0583***		0.0611***	0.102***
		(0.0129)		(0.0176)	(0.0211)
Female * Children				-0.00558	
				(0.0251)	
Married * Children					-0.102***
					(0.0239)
Constant	0.824***	0.414***	0.414***	0.414***	0.407***
	(0.00899)	(0.0376)	(0.0376)	(0.0377)	(0.0375)
Observations	4,013	4,011	4,011	4,011	4,011
R-squared	0.001	0.167	0.168	0.167	0.170

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. Fuzzy Regression Discontinuity Analysis First Stage Part 1

Finally, the third regression shows education level has the largest impact on whether someone files their taxes or not. Relative to not finishing high school, being a high school graduate is associated with a 24.7 percentage point increase in the likelihood of filing taxes. Having some college education is associated with a 31.0 percentage point increase in filing likelihood, getting an associate degree or bachelor's degree is associated with a 45.8 percentage point increase, and getting a master's, Ph.D., or professional school degree is associated with a 48.0 percentage point increase in filing likelihood, all relative to not having a high school degree. These results indicate a strong relationship between education and filing. This outcome aligns with previous research. In their study on the CTC, the University of Michigan found an "education gradient" where households with higher education were more likely to file their taxes as well as receive the CTC.[52] Further, filing taxes is expensive and complicated, with many different forms and additional complications.[53] Due to the many barriers to filing taxes, it is possible that having more education makes it easier and more accessible for individuals to file their taxes.

The fourth regression in the table adds an interaction between an individual's sex and the number of children they have. The interaction is not statistically significant, suggesting there is no difference in filing between men and women who have children or who do not have children. The fifth regression in Table 4 adds the interaction between marital status and whether someone has children or not. It is statistically significant. Relative to being single and having no children, people who are single and have children are 10.22 percentage points more likely to file their taxes. Individuals who are married without children are 14.67 percentage points more likely to file their taxes while those who are married with children are 14.68 percentage points more likely to file their taxes, all relative to being single with no children. Overall, people who are married

are more likely to file their taxes, and individuals who are not married and do not have children are much less likely to file than any other group.

The next two regressions analyze whether interacting variables with *Above* show any relationship between different variables and the filing cutoff, seen in Table 5. While the *Above* variable is not statistically significant, there appears to be a relationship between other variables and filing so columns 6 and 7 analyze whether any relationship exists. Regression 1 in Table 5 shows the addition of an interaction between children and the filing cutoff. The variable is not statistically significant which suggests there is no difference in people with children and the rate of filing above and below the filing cutoff. Although people with children are more likely to file, there does not appear to be any impact of the tax filing cutoff on the children variable (the variable is close to statistical significance though and in the correct direction). The next regression in Table 5 (column 2), adds an interaction with the *Married* and *Above*. This variable is also statistically insignificant. There does not appear to be any relationship between having children or marital status, the filing cutoff, and whether someone files their taxes.

Finally, the last two regressions in Table 5 aim to see whether there was a difference in filing rates after a policy change was made to the CTC to increase the amount people received.[54] Both regressions are statistically insignificant. The initial results suggest an individual's decision to file was not influenced by the increase in the CTC. This relationship is discussed and analyzed in greater depth in Section VII.

VARIABLES	(1) Filed	(2) Filed	(3) Filed	(4) Filed
Above	-0.00654	-0.00559	-0.000975	-0.000744
	(0.0130)	(0.0158)	(0.0113)	(0.0113)
Female	-0.0329***	-0.0329***	-0.0332***	-0.0330***
	(0.0116)	(0.0116)	(0.0116)	(0.0116)
2019	0.0104	0.0104	0.0104	0.0184
	(0.0163)	(0.0163)	(0.0163)	(0.0201)
2020	0.0183	0.0183	0.0183	0.0261
	(0.0151)	(0.0151)	(0.0151)	(0.0192)
2021	0.0428***	0.0427***	0.0431***	0.0511***
	(0.0145)	(0.0146)	(0.0145)	(0.0190)
Married	0.125***	0.127***	0.125***	0.146***
	(0.0102)	(0.0146)	(0.0102)	(0.0173)
One Child			0.0511**	
			(0.0210)	
Two Children			0.0470***	
			(0.0161)	
Three + Children			0.0994***	
			(0.0227)	
Black	-0.0283	-0.0283	-0.0278	-0.0284
	(0.0211)	(0.0211)	(0.0211)	(0.0211)
Latine	-0.00745	-0.00743	-0.00697	-0.00686
	(0.0193)	(0.0193)	(0.0193)	(0.0193)
Asian	-0.0549**	-0.0549**	-0.0573**	-0.0558**
	(0.0246)	(0.0246)	(0.0246)	(0.0246)
Other	-0.0862*	-0.0861*	-0.0857*	-0.0857*
	(0.0449)	(0.0449)	(0.0449)	(0.0448)
High School	0.248***	0.248***	0.247***	0.247***
	(0.0378)	(0.0378)	(0.0378)	(0.0378)
Some College	0.310***	0.310***	0.310***	0.310***
	(0.0382)	(0.0382)	(0.0382)	(0.0382)
College	0.458***	0.458***	0.458***	0.458***
	(0.0357)	(0.0357)	(0.0357)	(0.0357)
Grad Degree	0.480***	0.480***	0.480***	0.479***
	(0.0359)	(0.0359)	(0.0359)	(0.0359)
Children Under 18	0.0410**	0.0405**		0.0541**
	(0.0187)	(0.0190)		(0.0225)
Children * Above	0.0330	0.0339		
	(0.0243)	(0.0250)		
Married * Above		-0.00373		
		(0.0200)		
CTC * Children				0.00633
				(0.0267)
CTC * Married				-0.0305
				(0.0209)
Constant	0.417***	0.416***	0.414***	0.409***
	(0.0378)	(0.0382)	(0.0376)	(0.0385)
Observations	4,011	4,011	4,011	4,011
R-squared	0.167	0.167	0.168	0.167

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Fuzzy Regression Discontinuity Analysis First Stage Part 2

In conclusion, the fuzzy regression discontinuity from Table 4 and Table 5 provides important information on tax filing behaviors for low-income individuals. Similar to the results from the sharp regression discontinuity, these regression results suggest that there is no association between the tax filing cutoff and filing rates. Instead, other variables appear to be the major drivers of who files their taxes and who does not. Being married makes people more likely to file their taxes and having children also makes people more likely to file their taxes. More educated people are much more likely to file their taxes. Women are also less likely than men to file taxes. Individuals who are Asian or American Indian/Alaska Native/Pacific Islander are less likely to file as well. These results align with Figure 6 and the amount of money people receive from the EITC seen above, as people who are married (with children) and anyone who has children get more money from the EITC, and these people are also slightly more likely to file.[55] Consequently, these results demonstrate the lack of importance of the filing cutoff on whether someone files or not, at least those who have an income that is close to the cutoff. These results point to support for continuing to base tax credits through the IRS as people do not seem to be deterred from filing if they are below the cutoff.

ii. Second Stage Regression

This section discusses the results from the second stage regression discontinuity with two-way cluster-robust standard errors. The equation for the second stage is shown below where variables retain meaning from above and $EITC_i$ is an indicator of whether an individual received the EITC.

$$EITC_i = \alpha + \beta_1 Above_i + \beta_2 X_i + \epsilon_i$$

Table 6 shows the regression results. The first column shows a simple regression only including the variable indicating whether someone is above the tax filing cutoff. There is no statistical

significance, so it does not appear that there is a difference in EITC take-up for people who are above or below the filing cutoff. Given that the first-stage regression did not show a difference in people filing above or below the filing cutoff, this result aligns with the first-stage regression. Based on the first and second-stage regression results, it appears that being $500 above or below the filing cutoff makes no difference in receiving the EITC, even when other variables are controlled for.

The next columns in Table 6 add control variables for sex, year, marital status, children, race, and education. Again, the coefficient for *Above* is statistically insignificant. Most variables for race and education are statistically significant. However, people who are Hispanic/Spanish/Latine are 2.96 percentage points more likely to receive the EITC, relative to white people. In terms of education, those who are more educated are less likely to receive the EITC. Relative to not finishing high school, people who finished college are 6.11 percentage points less likely to receive the EITC and people with a graduate degree are 8.87 percentage points less likely. The variable for sex is also statistically significant. Relative to men, being a woman is associated with a 4.49 percentage point increase in the likelihood of receiving the EITC. Additionally, having children under 18 is associated with a 9.16 percentage point increase in the likelihood of receiving the EITC (column 2).

VARIABLES	(1) EITC	(2) EITC	(3) EITC	(4) EITC	(5) EITC	(6) EITC
Above	0.00850	0.00441	0.00404	0.00431	0.00459	0.0172
	(0.00912)	(0.00887)	(0.00886)	(0.00886)	(0.00885)	(0.0120)
Female		0.0453***	0.0449***	0.0350***	0.0448***	0.0452***
		(0.00915)	(0.00912)	(0.00930)	(0.00912)	(0.00915)
2019		0.0236*	0.0236*	0.0227*	0.0222*	0.0236*
		(0.0133)	(0.0133)	(0.0133)	(0.0133)	(0.0133)
2020		-0.000200	-0.000407	0.000109	0.000434	-6.28e-05
		(0.0112)	(0.0113)	(0.0112)	(0.0112)	(0.0112)
2021		0.0196	0.0199*	0.0194	0.0199*	0.0194
		(0.0121)	(0.0120)	(0.0120)	(0.0120)	(0.0121)
Married		-0.0687***	-0.0687***	-0.0687***	-0.0503***	-0.0601***
		(0.00878)	(0.00869)	(0.00877)	(0.00791)	(0.0130)
One Child			0.0862***			
			(0.0226)			
Two Children			0.0822***			
			(0.0192)			
Three + Children			0.124***			
			(0.0334)			
Black		0.00161	0.00202	0.00253	-0.00112	0.00205
		(0.0170)	(0.0171)	(0.0170)	(0.0171)	(0.0170)
Latine		0.0294*	0.0296*	0.0291*	0.0285*	0.0301*
		(0.0170)	(0.0170)	(0.0169)	(0.0170)	(0.0170)
Asian		-0.00407	-0.00570	-0.00387	-0.00145	-0.00438
		(0.0172)	(0.0169)	(0.0171)	(0.0170)	(0.0171)
Other		0.00488	0.00524	0.00392	0.00321	0.00423
		(0.0353)	(0.0354)	(0.0349)	(0.0351)	(0.0353)
High School		-0.0188	-0.0186	-0.0181	-0.0161	-0.0188
		(0.0381)	(0.0381)	(0.0380)	(0.0381)	(0.0380)
Some College		-0.0225	-0.0220	-0.0222	-0.0198	-0.0220
		(0.0384)	(0.0384)	(0.0383)	(0.0384)	(0.0383)
College		-0.0617*	-0.0612*	-0.0610*	-0.0563	-0.0607
		(0.0371)	(0.0371)	(0.0370)	(0.0372)	(0.0370)
Grad Degree		-0.0896**	-0.0887**	-0.0888**	-0.0821**	-0.0884**
		(0.0373)	(0.0373)	(0.0372)	(0.0373)	(0.0372)
Children Under 18		0.0916***		0.0658***	0.132***	0.110***
		(0.0143)		(0.0175)	(0.0244)	(0.0214)
Female * Children				0.0520*		
				(0.0274)		
Married * Children					-0.0866***	
					(0.0278)	
Children * Above						-0.0346
						(0.0281)
Married * Above						-0.0175
						(0.0166)
Constant	0.0691***	0.0921**	0.0919**	0.0967***	0.0824**	0.0845**
	(0.00649)	(0.0373)	(0.0372)	(0.0372)	(0.0373)	(0.0375)
Observations	3,277	3,276	3,276	3,276	3,276	3,276
R-squared	0.000	0.055	0.056	0.056	0.059	0.056

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Fuzzy Regression Discontinuity Analysis Second Stage

Column 3 shows a more specific breakdown of having children. Relative to not having children, having one child is associated with an 8.62 percentage point increase in the likelihood of receiving the EITC, 8.21 percentage points for two children, and 12.40 percentage points for three children. Having three children has the largest coefficient, which makes sense as people with three children under 18 will receive the most money for both the EITC and CTC. In terms of marriage, relative to not being married, being married or widowed is associated with a 6.87 percentage point decrease in the likelihood of receiving the EITC. Since people in this dataset who are married without children cannot receive any money from the EITC, this is a logical result.

Column 4 in Table 6 adds an interaction between children under 18 and a parent's sex, similar to the first-stage regression. The variable is statistically significant. Relative to being a male with no children, being a male with children is associated with a 6.57 percentage point increase in the likelihood of receiving the EITC. Being a woman with no children is associated with a 3.5 percentage point increase in receiving the EITC and being a woman with children is associated with a 15.28 percentage point in the likelihood of filing taxes, all relative to being a male with no children. Overall, women with children are more likely to receive the EITC than any other group. Column 5 adds an interaction between marital status and children, also seen in the first-stage regressions. This variable is statistically significant meaning there is a relationship between marital status, children, and EITC take up. Relative to being single without children, people who are single with children are 13.21 percentage points more likely to get the EITC. People who are married without children are 5.03 percentage points less likely to get the EITC and individuals who are married and have children are 0.48 percentage points less likely to get

the EITC, both relative to single individuals without children. Single parents with children are by far the most likely group to receive the EITC.

Finally, Column 6 adds two interaction variables to look at the relationship between the filing cutoff and control variables. These include interacting *Above* with *Children* and with *Married*. Both are statistically insignificant, suggesting the filing cutoff does not impact the likelihood of people with children or people who are married filing their taxes. The results from Table 6 suggest that there is no impact of the filing cutoff on whether someone gets the EITC or not. Like the first stage regression, other variables appear to be more important in determining who gets the EITC. These include sex, marital status, and having children under 18. Again, people with children are getting the EITC at the highest rate, which makes sense given they get more money from the EITC (see Figure 6). Additionally, it appears that more vulnerable groups are receiving the EITC at higher rates. For example, single parents with children and women are both more likely to get the EITC. This suggests potential success in how the EITC is being distributed or who is being targeted to claim the EITC. Further, this regression shows that there do not appear to be huge issues with basing income support through the tax system as people below the filing cutoff are not receiving the EITC at lower rates, and groups who would benefit most from the EITC are receiving it.

VII. Impacts of Changes in CTC with Panel Data

The next section of this paper focuses on changes in the CTC and how individuals around the filing cutoff respond to an increase in the CTC. It examines whether changes in the CTC incentivize people to file their taxes or whether individuals are unresponsive to changes in the CTC (potentially due to lack of motivation, continued inability to file taxes due to barriers, lack of knowledge about the CTC, etc.). Both regression discontinuity models were overwhelmed by

the value of the tax credits and individual factors. Using panel data helps to control for all constant, individual factors that might be correlated with filing allowing a clearer picture of how filing changed before and after the policy change. Further, there is always a possibility of unobserved differences among individuals that are adding bias to the data given the variability of people in the SIPP data set. Panel data eliminates the problem of any individual fixed effects among people in the data. As discussed in Section II, previous research has shown a positive response to increases in tax credits or stimulus payments in terms of tax filing and take-up. This supports a hypothesis that there will be an increase in filing and CTC take up after the policy change at the end of 2017. Unfortunately, due to limitations of the SIPP data, there is no CTC variable so only filing behavior can be analyzed.

On December 22, 2017, former President Donald Trump enacted the Tax Cuts and Jobs Act (TCJA) of 2017. While the act was mostly known for giving large tax cuts to those in the top 1% of the U.S. income distribution, it also made changes to the CTC. The TCJA doubled the amount of the CTC, changing it from $1,000 per child to $2,000 per child under 17. It also greatly expanded who could get the CTC, increasing the income cutoff from $110,000 to $400,000 so that much wealthier families could receive the CTC.[56] Figure 7 below shows the changes in the CTC, with a huge increase in the amount of money being distributed, although much of the increase goes towards higher-income families. The two red lines show where the tax filing cutoff is relative to the phase-in and phase-out points of the CTC. Both before and after the TCJA went into effect, individuals $1,000 above or below the filing cutoffs were able to receive at least some of the CTC amount for each child. The bright red line to the left shows the filing cutoff for individuals filing as single. As seen in Figure 7, there is only a small increase for people at this filing cutoff. The darker red line to the right in Figure 7 shows the filing cutoff for

people who are married. While their increase is not as large as some people (who could go from getting $0 to $2,000) they still receive a larger monetary increase from the policy change than single people in this data sample. The TCJA made no changes to the EITC.[57]

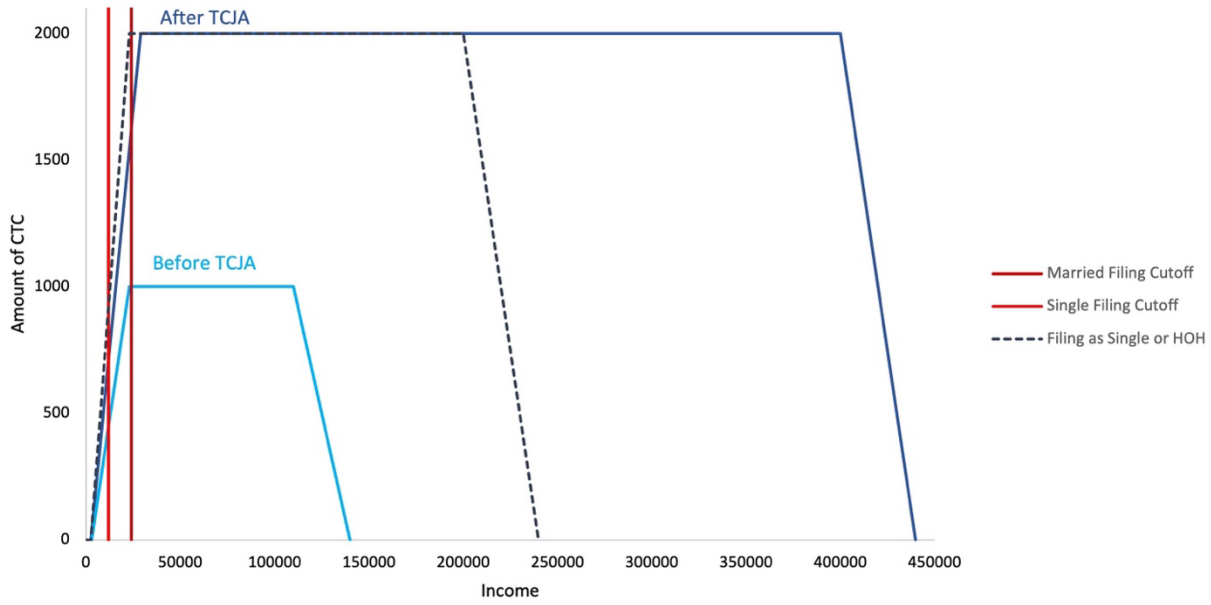

Figure 7. Difference in CTC before and after the TCJA with Filing Cutoffs
Source: Tax Foundation, New York Times [58] [59]

It is important to note that while the expansion greatly increased the amount of money distributed by the CTC, this was not necessarily felt by those in the lowest income brackets, as highlighted in Figure 7. An analysis by the CBPP showed the smaller impact of the CTC change for lower-income individuals. For example, the top one percent of the U.S. population saw a 2.9% increase in their after-tax incomes while the lowest fifth only saw a 0.4% increase. Additionally, for someone who makes $14,500 a year, they would only see a $75 increase in the amount of the CTC they could receive.[60] Consequently, it is possible the individuals in this sample will not be as incentivized to change their filing behavior to receive the CTC given the increase is not up to the full $2,000, especially people who are around the single filing threshold.

To examine whether the change in CTC amount from $1,000 to $2,000 had an impact on the filing rate, I ran a fixed effects regression analysis. The equation for the regression is shown below where variables retain their meaning from above and $PostCTCchange_{it}$ is a time indicator with zero marking the year (2017) before the change in the CTC was put in place and one marking the three years after the change (2018, 2019, 2020). Individual fixed effects are shown by α_i and time fixed effects are shown by μ_t.

$$Filed_{it} = \alpha_i + \beta_1 PostCTCchange_{it} + \beta_2 X_{it} + \mu_t + \epsilon_{it}$$

Table 7 shows this regression. The regression aims to look at any changes in filing rates after the policy change and who was changing their filing behavior.

VARIABLES	(1) Filed	(2) Filed	(3) Filed	(4) Filed	(5) Filed
Post CTC Change	0.0407**	0.0538***	0.0577***	0.0596***	0.0761***
	(0.0163)	(0.0187)	(0.0199)	(0.0200)	(0.0291)
Children Under 18		0.0517	0.0438	0.0461	0.0432
		(0.0408)	(0.0428)	(0.0428)	(0.0430)
Married			0.0788	0.0741	0.0775
			(0.0797)	(0.0798)	(0.0800)
CTC * Children		-0.0574	-0.0503	-0.0514	-0.0496
		(0.0454)	(0.0472)	(0.0472)	(0.0473)
CTC * Married			-0.0252	-0.0216	-0.0232
			(0.0413)	(0.0414)	(0.0415)
Above				0.0200	0.0413
				(0.0188)	(0.0332)
CTC * Above					-0.0305
					(0.0390)
Constant	0.783***	0.769***	0.749***	0.738***	0.726***
	(0.00964)	(0.0143)	(0.0264)	(0.0284)	(0.0322)
Observations	5,284	5,284	5,284	5,284	5,284
R-squared	0.008	0.011	0.013	0.014	0.015
Number of ID	4,551	4,551	4,551	4,551	4,551

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7. Fixed Effects Regression of Pre/Post CTC Change on Filed

As seen in Table 7, 4,551 individuals were in the panel across all four years. The first column in Table 7 shows a simple regression looking at the filing rates before and after the CTC change. Holding all else fixed, there was a 4.07 percentage point increase in the tax filing rate in the three years after the CTC policy change was signed, relative to before the policy change. This result is promising as there is an increase in filing before and after the policy change. However, since the policy only applied to people with children and was mostly impactful on people who were married, it is also important to examine whether these groups were more likely to file their taxes after the policy change. Column 2 in Table 7 adds a variable for children and an interaction variable of having children under 18 and time before/after the CTC. The interaction is statistically insignificant as well as the children variable. Column 3 does the same for marriage and both coefficients are also statistically insignificant. Columns 4 and 5 add variables to look at whether there is any difference in filing changes for people above or below the filing cutoff. The coefficients are all statistically insignificant so there does not appear to be any different. However, in Column 7 the coefficient for *Post CTC Change* increases to 7.61 meaning that holding all else fixed, the filing rate in the years after the policy change increases by 7.61 percentage points.

While this coefficient is statistically significant and suggests that there was an increase in filing after the CTC change, it is not possible to attribute it to individuals feeling incentive from the increased amount of money. This is due to the statistical insignificance of other variables in the regression, suggesting there was no difference in filing change for people with or without children. Since the CTC is only available to people with children, there should be a larger increase in filing for people with children. This does not mean there is no chance of the policy change acting as an incentive for people to file as it is possible other parts of the TCJA

incentivized filing unrelated to the CTC. However, the results suggest further investigation with more detailed data to obtain more precise results.

VIII. Limitations and Future Analysis

There are multiple limitations to discuss that can help improve future studies on the topic of filing and tax credits. The largest limitation of this research was the SIPP dataset. While this was the best possible publicly available dataset to use in this study, there were multiple issues. For one, the data did not contain a CTC variable, so it was not possible to measure any changes in the CTC or do a sharp RD analysis with the CTC variable. The EITC variable worked well as a replacement for this study but was not perfect. There were few people in the study who reported getting the EITC and many missing values of people who did not answer the survey question at all. Additionally, as will likely be an issue with most data, measuring precise income is difficult and leaves room for errors and missed sources of income. For this study, having exact income was extremely important as I was looking at an overall difference in income of $1,000 which leaves little room for error. Consequently, it is always possible that not all income values in the data are completely accurate or the same amount of money people would list on their tax returns.

Finally, the SIPP data was collected before the Biden administration's CTC expansion was put into place. Consequently, I use the results from my analysis of the SIPP data to try and understand how individuals would react to the CTC expansion as well as a more permanent CTC expansion that might happen in the future. In the next few years, more data from 2021 and 2022 will be available to analyze the questions in this paper in more detail with more concrete answers. Further, this paper only focuses on the population of people whose income is within $500 of the filing cutoff. As a result, it is possible that the behavior of individuals whose income

is well below the filing cutoff may respond differently to tax credit incentives or be less likely to file. Despite these limitations, this paper provides important insight into filing, tax credits, and the IRS with the available SIPP data. There were no major limitations encountered that would create concern about the overall validity of the research. The next section discusses the policy implications of the results.

IX. Policy Implications

This paper analyzes the relationship between filing taxes and tax credits. It explores whether the IRS is an adequate institution to distribute welfare and whether the people who benefit most from the CTC will actually receive the CTC if the policy is fully expanded again. The results from the analysis in Sections VI–VII as well as previous work on similar topics shed light on the policy implications of this research. All three sections show that, in general, individuals respond to tax credit incentives suggesting a continuation of the CTC/EITC being based through the IRS and that lack of information is not as large of a problem as lack of incentives. This is not without caveat though, as previous literature, recent data analysis, and this research suggest that aggressive outreach is still needed to educate people about tax credits and help with tax filing for those who are not filing or receiving tax credits.

More specifically, in the sharp RD, fuzzy RD, and panel estimation, the variable for whether an individual was above the filing cutoff or not was never statistically significant. This suggests that at least for individuals near the filing cutoff, the cutoff is not a major factor in their decision to file or not. It appears that the value for people to file is driven by how much money they can receive from tax credits and the filing cutoff plays an insignificant role. For example, having children under 18 increased the likelihood of filing and receiving the EITC. People with three or more children, the group who can receive the most money from the CTC/EITC, are 9.94

percentage points more likely to file relative to people without children and more likely to file than people with one or two children. Additionally, women with children, single people with children, and Latine people are more likely to receive the EITC. It appears that the people who might benefit from the cash transfer the most (single parents, people of color, women, etc.) are receiving the EITC at higher rates. Further, both the panel analysis and the study from Ramnath and Tong show that there is an increase in tax filing after a tax credit policy change.[61] All of these results suggest a positive response to incentives from tax credits and a correlation between the value of a tax credit to someone and their likelihood to file. Tahk (2012) has also suggested the IRS is more effective than other institutions in making people aware of benefits as they are often able to notify people through filing software.[62] Consequently, these results show support for continuing to base cash transfers through the IRS.

However, it is also important to note that the fuzzy regression analyses on filing show concerning results for those who are not filing, specifically in terms of education. People with a college or graduate degree are over 40 percentage points more likely to file their taxes than people who did not finish high school and almost twice as likely to file their taxes as people who only have a high school degree. Further, people who are Asian, American Indian/Alaska Native, or Hawaiian/Pacific Islander are also less likely to file their taxes relative to white people. These results suggest that people who might benefit most from a cash transfer are filing at lower rates and would potentially miss the expanded CTC. Consequently, there is also a need for increased outreach and assistance with tax filing, especially for people with low levels of education. Multiple policies can help target those not receiving the CTC such as increasing Volunteer Income Tax Assistance (VITA) and simplifying the process to claim a tax credit or file taxes.[63]

Further, if the CTC is expanded and the IRS continues to be a distributor of not just tax relief, but also welfare benefits, the IRS needs to receive more funding as it takes on a new role as a welfare agency. Since 2010, the budget of the IRS has been cut by 19% and staff is down by 31% all while facing an increasing workload. The CBPP reported that the agency can now only respond to 1 in 4 taxpayer calls to answer questions.[64] For the IRS to expand programs such as VITA, have more people available to assist individuals trying to file or claim their tax credits, and get people to go into communities with low CTC/EITC uptake rates and help people file their taxes it needs more money to fund these jobs and programs.

Putting resources into the distribution of the CTC is extremely important and if done effectively, could help reduce child poverty by 40 percent.[65] The Biden administration's expansion of the CTC showed how effective cash transfers are in terms of reducing poverty but also highlighted the importance of understanding the behavior of non-filers and who is most vulnerable to missing the CTC. This paper concludes that overall, the IRS can be an effective way to distribute welfare such as the CTC/EITC. However, to improve its outreach, more funding and resources need to be directed towards reaching less educated individuals and families to help with tax filing assistance.

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[34] Shanthi P. Ramnath and Patricia K. Tong, "The Persistent Reduction in Poverty from Filing a Tax Return," *American Economic Journal: Economic Policy* 9, no. 4 (November 1, 2017): 367–94, https://doi.org/10.1257/pol.20150486.

[35] This study was an experimental study done on college students/staff at a public university and is not based on actual data from the IRS. Therefore, the external validity of the answers is questionable and may be less representative of low-income communities than actual administrative data.

[36] James Alm et al., "Social Programs as Positive Inducements for Tax Participation," *Journal of Economic Behavior & Organization* 84, no. 1 (September 1, 2012): 85–96, https://doi.org/10.1016/j.jebo.2012.07.009.

[37] Elizabeth Linos et al., "Can Nudges Increase Take-up of the EITC?: Evidence from Multiple Field Experiments," Working Paper, Working Paper Series (National Bureau of Economic Research, November 2020), https://doi.org/10.3386/w28086.

[38] Ramnath and Tong, "The Persistent Reduction in Poverty from Filing a Tax Return."

[39] US Census Bureau, "SIPP Users' Guides," Census.gov, accessed March 27, 2023, https://www.census.gov/programs-surveys/sipp/guidance/users-guide.html.

[40] "Opportunities and Limitations of Using Data to Reach Non-Filers with the CTC," New America, accessed December 13, 2021, http://newamerica.org/new-practice-lab/blog/data-and-non-filers/.

[41] Tables 1 and 2 in Appendix B show a balance table for both data samples and confirm that there are no major differences in individuals above and below the tax filing cutoff.

[42] "Prior Year Forms and Instructions | Internal Revenue Service," accessed April 23, 2023, https://www.irs.gov/prior-year-forms-and-instructions.

[43] "SIPP Codebook," accessed March 5, 2023, https://www.census.gov/data-tools/demo/uccb/sippdict?s_topic=&s_keyword=&s_year=&s_variablelist=.

[44] Since only people who are U.S. citizens or resident immigrants can get the EITC, I excluded those who are not citizens from the sample as it is unlikely that they will file or receive the EITC regardless of their income.

[45] Not included in this table is the option to file as married with a separate return or file as the head of household. Unfortunately, there is no way to determine whether people choose these options to file from the married variable, but I assume very few people choose to file this way.

[46] Taxes are due in April, so it is possible that there is variation within the year of how people file their taxes. For example, someone who filed the previous year but then decided to not file their tax returns for the current year could cause issues with collapsing the data by a traditional January through December year. To check if this is the case, I also collapse the data by minimum value to see if there are discrepancies in the data or a need to sort the years from April to April. Since there were no major differences in the regression analyses when collapsing the data by minimum values, I concluded that there was no need to change the way each year of data is structured.

[47] The take-up of the EITC in this sample is well below the national average. This may be because the data is not representative of the national EITC take up. However, it is also likely due to many people in the sample being single without children and within the incomes in the data set, these people are unable to claim a substantial amount of money from the EITC.

[48] "Earned Income Tax Credit (EITC): A Primer," *Tax Foundation* (blog), May 21, 2019, https://taxfoundation.org/earned-income-tax-credit-eitc/.

[49] "Earned Income Tax Credit (EITC): A Primer."

[50] The two-way cluster-robust standard errors are included to account for the four years of SIPP data including a 2018 panel, 2019 panel, 2020 panel, and 2021 panel. As a result of the data being structured in a panel, people will show up in the data up to four times so to control for this, I created a double cluster using Houseid and Personid to identify each person and control for multiple appearances.

[51] The *Other* race category was very small (making up 2% of the sample) so results may also be impacted by the lack of a robust sample size.

[52] "Receipt and Usage of Child Tax Credit Payments Among Low-Income Families."

[53] Monica Prasad, "Filing Your Taxes Is an Expensive Time Sink. That's Not an Accident.," The Atlantic, April 4, 2019, https://www.theatlantic.com/ideas/archive/2019/04/american-tax-returns-dont-need-be-painful/586369/.

[54] *CTC* was omitted due to collinearity with the variables for year.

[55] The results of the regression do not perfectly align with the expected values from Figure 6 but show a general correlation with the values.

[56] Crandall-Hollick, Margot L, and Library of Congress. Congressional Research Service. n.d. The Child Tax Credit: Legislative History. Congressional Research Service. Accessed March 20, 2023. https://sgp.fas.org/crs/misc/R45124.pdf.

[57] "Fundamentally Flawed 2017 Tax Law Largely Leaves Low- and Moderate-Income Americans Behind | Center on Budget and Policy Priorities," February 27, 2019, https://www.cbpp.org/research/federal-tax/fundamentally-flawed-2017-tax-law-largely-leaves-low-and-moderate-income.

[58] "The Child Tax Credit: Primer," *Tax Foundation* (blog), April 14, 2020, https://taxfoundation.org/child-tax-credit/.

[59] Claire Cain Miller and Alicia Parlapiano, "Congress Is Considering Financial Help for Parents. Here Are Details.," *The New York Times*, December 15, 2022, sec. The Upshot, https://www.nytimes.com/2022/12/15/upshot/child-tax-credit.html.

[60] "Fundamentally Flawed 2017 Tax Law Largely Leaves Low- and Moderate-Income Americans Behind | Center on Budget and Policy Priorities."

[61] Ramnath and Tong, "The Persistent Reduction in Poverty from Filing a Tax Return."

[62] Tahk, "Everything is Tax."

[63] "Code for America and GetYourRefund.org Non-filer Learnings and Recommendations," Code for America, April 15, 2021,

https://files.codeforamerica.org/2021/06/16174016/filerlearnings-and-recommendations-april-2021.pdf.

[64] "Chart Book: The Need to Rebuild the Depleted IRS | Center on Budget and Policy Priorities," July 2, 2021, https://www.cbpp.org/research/federal-tax/the-need-to-rebuild-the-depleted-irs.

[65] "House COVID Relief Bill Includes Critical Expansions of Child Tax Credit and EITC | Center on Budget and Policy Priorities," February 9, 2021, https://www.cbpp.org/research/federal-tax/house-covid-relief-bill-includes-critical-expansions-of-child-tax-credit-and.

[66] "SIPP Codebook"

XI. Appendices

APPENDIX A: DATA

Variable	Definition
Income	Sum of monthly earnings and income received by household members aged 15 and older, as well as SSI payments received by children under age 15
Income2	Sum of monthly earnings and income received by family members aged 15 and older, as well as SSI payments received by children under age 15
Income3	Sum of monthly earnings and income received by family members aged 15 and older, as well as SSI payments received by children under age 15 (including Type 2 persons)
Income4	Sum of monthly earnings and income received by household members aged 15 and older, as well as SSI payments received by children under age 15 (including Type 2 persons)
Income5	Sum of personal monthly earnings and income for people age 15 and older, as well as children under age 15 who received SSI payments

Table 1. Income Variables within SIPP Data
Source: SIPP Codebook [66]

	Married (present)	Married (absent)	Widowed	Divorced	Separated	Never Married	Total
Single	4	29	74	67	19	92	56
Married (jointly)	91	57	14	7	50	1	33
Married (separate)	4	10	0	1	8	0	2
Head of Household	2	5	11	25	24	7	9
Total	100	100	100	100	100	100	100

Table 2. Breakdown of Filing Status and Marital Status (percentage)

APPENDIX B: SUMMARY STATISTICS

Variable	N (Below)	Mean (Below)	Min (Below)	Max (Below)	N (Above)	Mean (Above)	Min (Above)	Max (Above)
EITC	1563	0.07	0.00	1.00	1714	0.08	0.00	1.00
Filed Taxes	1884	0.82	0.00	1.00	2129	0.80	0.00	1.00
Born in the US	1992	0.89	0.00	1.00	2333	0.88	0.00	1.00
Female	1992	0.49	0.00	1.00	2333	0.51	0.00	1.00
White	1991	0.67	0.00	1.00	2332	0.65	0.00	1.00
Black	1991	0.09	0.00	1.00	2332	0.11	0.00	1.00
Latine	1991	0.15	0.00	1.00	2332	0.13	0.00	1.00
Asian	1991	0.07	0.00	1.00	2332	0.07	0.00	1.00
Other	1991	0.02	0.00	1.00	2332	0.03	0.00	1.00
No Children	1992	0.82	0.00	1.00	2333	0.83	0.00	1.00
One Child	1992	0.08	0.00	1.00	2333	0.07	0.00	1.00
Two Children	1992	0.07	0.00	1.00	2333	0.07	0.00	1.00
Three + Children	1992	0.03	0.00	1.00	2333	0.03	0.00	1.00
No High School	1992	0.04	0.00	1.00	2333	0.06	0.00	1.00
High School	1992	0.23	0.00	1.00	2333	0.24	0.00	1.00
Some College	1992	0.19	0.00	1.00	2333	0.18	0.00	1.00
College	1992	0.36	0.00	1.00	2333	0.36	0.00	1.00
Grad Degree	1992	0.18	0.00	1.00	2333	0.16	0.00	1.00
Single	1992	0.69	0.00	1.00	2333	0.74	0.00	1.00
Married	1992	0.31	0.00	1.00	2333	0.26	0.00	1.00
2017	1992	0.30	0.00	1.00	2333	0.31	0.00	1.00
2018	1992	0.20	0.00	1.00	2333	0.16	0.00	1.00
2019	1992	0.24	0.00	1.00	2333	0.23	0.00	1.00
2020	1992	0.26	0.00	1.00	2333	0.30	0.00	1.00
# of People in House	1992	3.01	1.00	9.00	2333	3.11	1.00	13.00
Age	1992	40.65	18.00	87.00	2333	39.32	18.00	89.00
Income	1992	15134	9904	27376	2333	15011	10405	27838
ID	1992	1971.98	1.00	3995.00	2333	2016.67	5.00	3993.00
Above Filing Cutoff	1992	0.00	0.00	0.00	2333	1.00	1.00	1.00

Table 1. Balance Table of Summary Statistics Above and Below the Filing Cutoff

Variable	N (Below)	Mean (Below)	Min (Below)	Max (Below)	N (Above)	Mean (Above)	Min (Above)	Max (Above)
EITC	2065	0.07	0.00	1.00	2241	0.07	0.00	1.00
Filed Taxes	2481	0.82	0.00	1.00	2803	0.79	0.00	1.00
Born in the US	2589	0.88	0.00	1.00	2972	0.89	0.00	1.00
Female	2589	0.50	0.00	1.00	2972	0.50	0.00	1.00
White	2584	0.66	0.00	1.00	2971	0.66	0.00	1.00
Black	2584	0.10	0.00	1.00	2971	0.11	0.00	1.00
Latine	2584	0.15	0.00	1.00	2971	0.13	0.00	1.00
Asian	2584	0.06	0.00	1.00	2971	0.07	0.00	1.00
Other	2584	0.03	0.00	1.00	2971	0.02	0.00	1.00
No Children Under 18	2589	0.83	0.00	1.00	2972	0.84	0.00	1.00
Children Under 18	2589	0.17	0.00	1.00	2972	0.16	0.00	1.00
No High School	2589	0.05	0.00	1.00	2972	0.06	0.00	1.00
High School	2589	0.22	0.00	1.00	2972	0.23	0.00	1.00
Some College	2589	0.19	0.00	1.00	2972	0.19	0.00	1.00
College	2589	0.35	0.00	1.00	2972	0.36	0.00	1.00
Grad Degree	2589	0.18	0.00	1.00	2972	0.16	0.00	1.00
Single	2589	0.70	0.00	1.00	2972	0.73	0.00	1.00
Married	2589	0.30	0.00	1.00	2972	0.27	0.00	1.00
2017	2589	0.42	0.00	1.00	2972	0.42	0.00	1.00
2018	2589	0.20	0.00	1.00	2972	0.17	0.00	1.00
2019	2589	0.19	0.00	1.00	2972	0.20	0.00	1.00
2020	2589	0.18	0.00	1.00	2972	0.21	0.00	1.00
# of People in House	2589	2.98	1.00	12.00	2972	3.14	1.00	14.00
Age	2589	41.26	18.00	88.00	2972	39.80	18.00	90.00
Income	2589	14475	9400	27363	2972	15138	10405	28272
ID	2589	2355.28	1.00	4768.00	2972	2396.41	7.00	4770.00
Post CTC Change	2589	0.58	0.00	1.00	2972	0.58	0.00	1.00

Table 2. Balance Table of Summary Statistics Above and Below the Filing Cutoff for Panel Sample

APPENDIX C: REGRESSION DISCONTINUITY

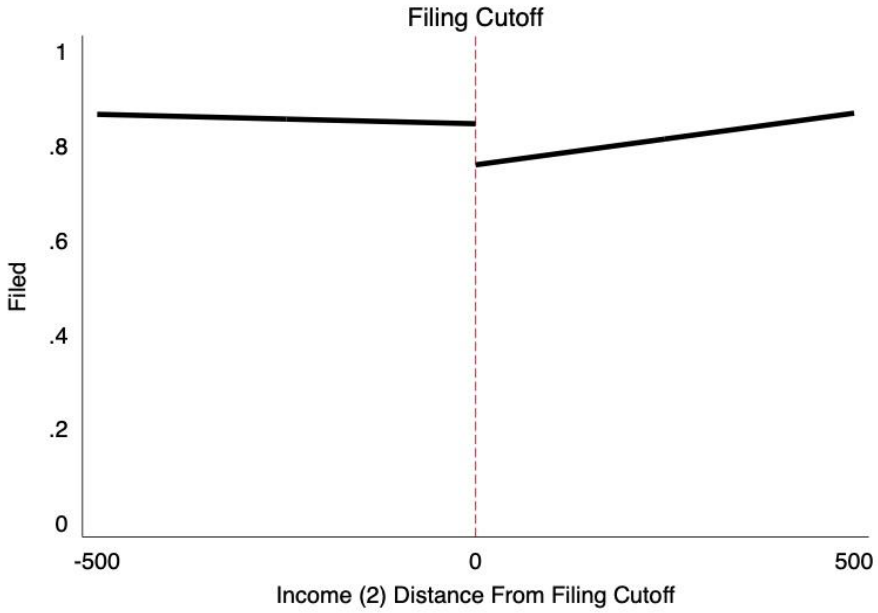

Figure 1: Regression Discontinuity for Income Variable 2

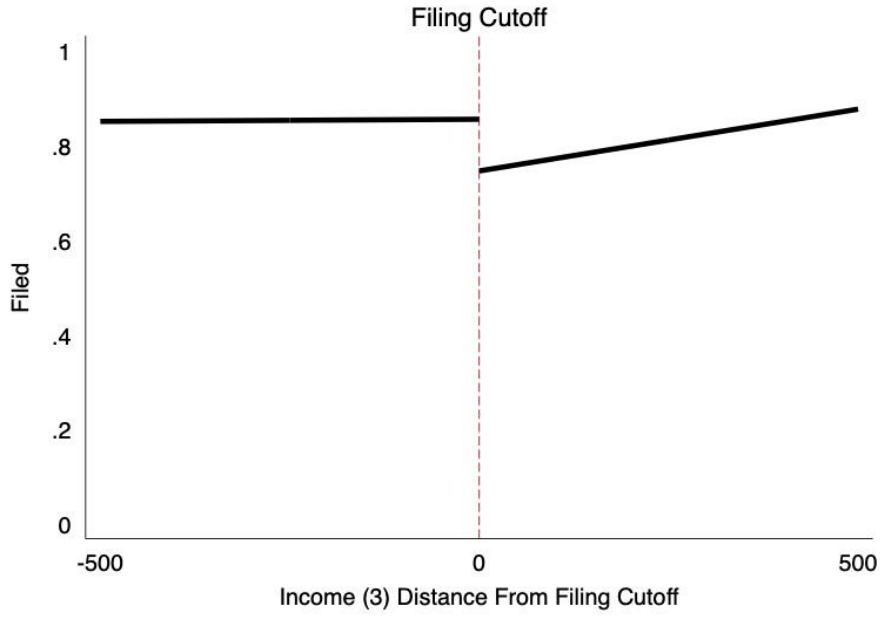

Figure 2: Regression Discontinuity for Income Variable 3

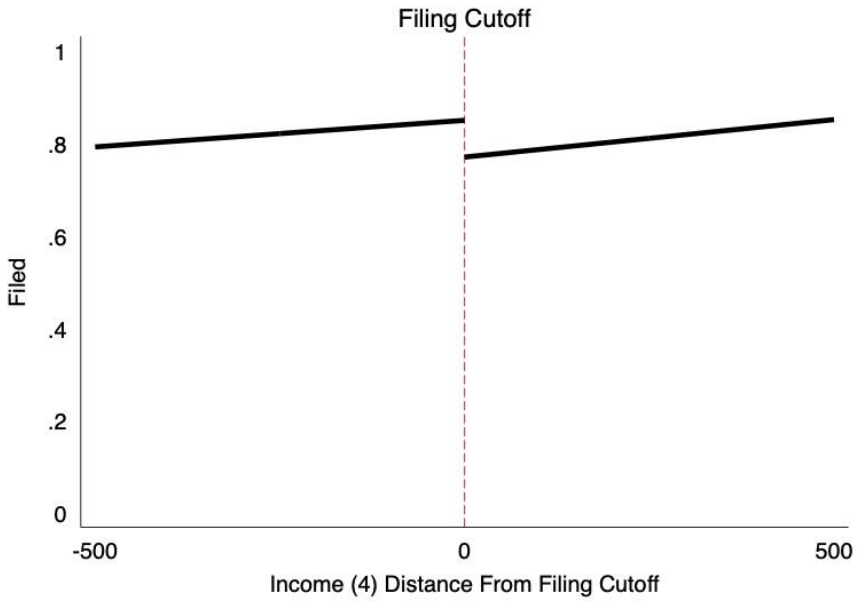

Figure 3: Regression Discontinuity for Income Variable 4

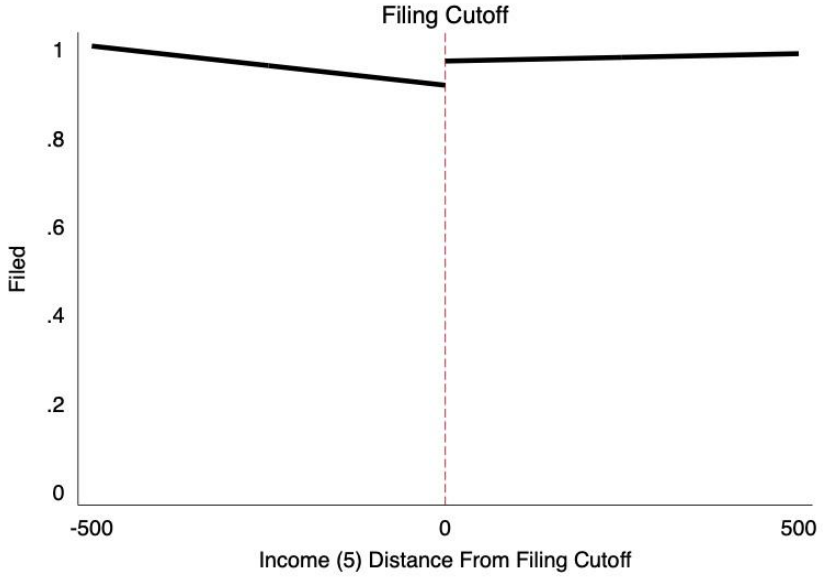

Figure 4: Regression Discontinuity for Income Variable 5