THE CAUSAL EFFECT OF INCOME ON RELIGIOUS PARTICIPATION

by

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DEDICATION

This thesis is dedicated to the memory of Barb Bixel, Sarah Gay, and Bill Silveus, who I assume always tithed 10%.

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ABBREVIATIONS

2SLS:	Two-Stage Least Squares
EITC:	Earned Income Tax Credit
FE:	Fixed Effects
NLSY79:	National Longitudinal Survey of Youth 1979
NLSCYA:	National Longitudinal Survey of Youth 1979 Children and Young Adults
OLS:	Ordinary Least Squares
PSID:	Panel Study of Income Dynamics

ABSTRACT

Religion is an important factor influencing outcomes at both the individual and societal level. Participation in religious activities involves both time and money. As such, individuals who make decisions about whether to be religious and the intensity of participation are making decisions concerning these scarce resources. This paper examines how income changes for low-income individuals affect religious giving and attendance decisions. Change in the Earned Income Tax Credit across states, over time, and by number of children is used as an exogenous source of variation in income. Using an instrumental variables strategy, I find evidence that positive changes in income reduce religious participation for low-income individuals and households. To the extent that religious behaviors and institutions constitute net benefits to society, policymakers should be careful to include reduction in religious behaviors as a possible cost to public cash transfer programs.

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INTRODUCTION

> "Dad's church offered something desperately needed by people like me. For alcoholics, it gave them a community of support and a sense that they weren't fighting addiction alone. For expectant mothers, it offered a free home with job training and parenting classes. When someone needed a job, church friends could either provide one or make introductions. When Dad faced financial troubles, his church banded together and purchased a used car for the family. In the broken world I saw around me—and for the people struggling in that world—religion offered tangible assistance to keep the faithful on track."
>
> J.D. Vance, *Hillbilly Elegy: A Memoir of Family and Culture in Crisis, 2016, p. 94.*

Over the past few years, economists and other social scientists have pointed to a decline in social capital as the source of a variety of troubling trends among low income Americans. One of these trends is the apparent decrease in the ability of those at the bottom of the income distribution to climb out of poverty. Chetty et al. (2016) find that in the United States, the percentage of children who earn more than their parents has dropped from roughly 90% for children born in 1940 to 50% for children born during the 1980s. In their descriptive analysis of the determinants of income mobility, Chetty, Hendren, Kline, and Saez (2014) provide evidence that strong social networks may explain why some geographical regions have higher levels of income mobility than others. In particular, they find that the share of religious adherents in a population is strongly correlated with positive intergenerational mobility. The order of magnitude for this correlation is similar to those found for average standardized test scores and the high school dropout rate, lying within the 95% confidence interval of both. The increase in mortality for uneducated, non-Hispanic whites is another

disturbing trend. Case and Deaton (2017) show that this trend is driven by "deaths of despair," or fatalities caused by alcohol-related disease, drug overdose, and suicide. This trend is not easily explained by economic conditions. Case and Deaton (2017) note that if economic factors such as unemployment and low wages are responsible, "they work through their effects on family, on spiritual fulfillment, and on how people perceive meaning and satisfaction in their lives in a way that goes beyond material success." Putnam (2016) also underscores the importance of religion as a source of social structure, noting that young people who participate in religious organizations are more likely to excel academically and to finish school. Further, parental attendance is associated with child enrollment in college. Religion is a part of life for roughly 220 million people in the United States,[1] and appears to have substantial positive benefits for low-income individuals. Even so, little is understood about the dynamics at play between income and religious participation.

Although a growing body of literature within economics has explored the outcomes of being religious at both the individual and macro level, few studies have focused on the economic determinates of religious behaviors. This paper investigates how income changes for low earners affect religious participation decisions. While Chen (2010) and Buser (2015) study the causal effect of income on religious involvement in Ecuador and Indonesia, this paper is the first to investigate this relationship in the context of a developed nation.

The key problem when estimating the relationship between income and religiosity is that income and religious behaviors are likely determined simultaneously. For instance, the decision to attend weekly services most likely changes with variations in

[1] According to Pew Research Center, in 2014 36% of Americans attended religious services weekly, while another 33% attended "once or twice a month" or "a few times a year." Put another way, less than one third of Americans report seldom or never attending religious services (Pew Research Center, 2015).

an individual's budget constraint. An increase in income may cause a family to take more weekend trips or attend Sunday afternoon sporting events. Hungerman (2014) finds evidence that activities such as gambling are economic substitutes for religious service attendance. Higher income may also discourage religious behavior because of the increased opportunity cost to religious participation (Lipford & Tollison, 2003a).

On the other hand, involvement in religious activities may cause higher income. For example, religious people may have access to social networks unavailable to the those who attend less frequently. A handful of papers explore heterogeneity in returns to human capital to individuals with various religious upbringings (Chiswick, 1983a, 1983b, 1993; Steen, 1996, 2004; Tomes, 1983, 1984, 1985), and finds a relationship between religion (or variables correlated with religion) and income. These papers generally report positive coefficients for religious upbringing relative to secular upbringing.[2] A case may also be made for religion's negative effect on income. Lipford and Tollison (2003a) find evidence that religious participation may discourage higher income through altering preferences and through time commitments.

Further, it is possible that some other unobserved characteristics influence both income and religion. For example, perhaps a person's natural discipline allows them to both attend religious services regularly and to miss fewer days of work during a given year. To the extent that religious behaviors stem from unobserved variables correlated with income, traditional OLS estimates will be biased away from zero.

This paper investigates the effect of income on religious service attendance using the NLSY79 Children and Young Adult Surveys (NLSCYA) and the effect of income on religious giving using the Panel Study of Income Dynamics (PSID). Variation in

[2]A number of variables influence both income and religious behaviors. Research has shown religious behaviors to be correlated with positive health outcomes (Hummer, Rogers, Nam, & Ellison, 1999), marriage stability (Gruber, 2005), and decreased substance abuse (Califano Jr. et al., 2001). These outcomes are also likely correlated with income.

the maximum Earned Income Tax Credit (EITC) amount across state, time, and number of children is used to handle the issue of unobserved variables and reverse causation between income and religiosity. These variations in maximum EITC result in substantial changes in income for households in the sample, but are not determined by the religious behaviors of the household.

Using this instrumental variables strategy, the findings in this paper indicate a strong positive bias in OLS estimation of the effect of income on religious participation. Positive changes in income are found to reduce religious attendance among low-income individuals. For individuals who attend, two-stage least squares results indicate an income elasticity of demand for religious services of -0.31. This indicates that a 10% change in income causes a decrease in attendance of about 3%. The negative income elasticity appears to be most concentrated among relatively infrequent attenders. Additionally, little evidence is found that increases in income changes either the occurrence or amount of contributions to religious organizations. Overall, these findings are consistent with economics literature that shows religion provides adherents with a form of insurance against adverse economic conditions.

REVIEW OF LITERATURE

The economics of religion is a small but quickly growing area research within economics. Existing literature has made theoretical predictions about the effect of income on religious participation, and found evidence for positive effects of religion on pro-social outcomes correlated with income. However, empirical economists have struggled to separate the bi-causal relationship of income on religious participation. In particular, little is understood about the effect of income on religious participation in wealthy countries. This chapter highlights the current literature surrounding religion and income and explains my contributions to it.

Theory

Azzi and Ehrenberg (1975) propose a utility model that has both "lifetime" and "afterlife" consumption. Religious behaviors (church attendance, financial contributions, etc.) are inputs in the afterlife production function. This model yields several testable and ostensibly valid predictions, such as the increase in religious behavior later in life and greater religious participation for those with lower opportunity cost. The model predicts that if afterlife consumption is a normal good, religious participation should increase as non-wage income increases.

A second theoretical model treats religion as a form of social insurance. The canonical economic model of religion, introduced by Iannaccone (1992), treats religion as a club good with positive returns to "participatory crowding." In this model, a greater number of active participants corresponds with greater value to the club good. Because the value of the good increases only with active participants, religious groups have an incentive to reduce free riding. Efforts to overcome free riding are

used to explain such practices as diet and clothing restrictions, prohibition on certain activities, and sabbath observances.[1]

One element of the club good provided to members by religious groups is insurance against adverse economic situations. Dehejia, DeLeire, and Luttmer (2007) document that after experiencing negative income shocks, those who make donations to religious organizations report lower consumption decreases than those who make no donations, and those who attend religious services report lower decreases in self-reported happiness. Hungerman (2005) and Gruber and Hungerman (2007) provide evidence for religious provision of social insurance by reporting decreases in charitable expenditures in response to increases in government spending on anti-poverty programs. Berman (2000) uses the club good provision of mutual insurance to explain puzzling behaviors of Isreali Ultra-Orthodox Jews. In particular, he highlights that Ultra-Orthodox Jews respond to the free rider problem by requiring high levels of commitment from their adherents.

The insurance function of religious groups is well documented, and the club good model of religiously provided social insurance implies religious groups will require commitment in order to overcome the free rider problem. If the insurance is provided ex post (insurance provided after some information about risk has been revealed), individuals will respond to economic distress by signaling commitment to religious groups. Chen (2010) finds evidence for this behavior in Indonesian Islamic communities. This paper tests whether this relationship is symmetrical. In other words, in response to a positive income shock, do individuals reduce behaviors that signal religious commitment? Assuming that attendance and contributions are signals

[1]For further discussion of insurance provided by religious involvement, see Scheve and Stasavage (2006) and Clark and Lelkes (2006).

of commitment, the model predicts that individuals will attend and contribute less in response to positive income shocks.[2]

Religion and Pro-Social Outcomes

At the macro level, economists have identified religion as an important determinant of economic growth and per capita income (Crain & Lee, 1999; Glahe & Vorhies, 1989; Lipford & Tollison, 2003a; McCleary & Barro, 2006a). In particular, McCleary and Barro (2006b) and Barro and McCleary (2003) find that religious beliefs are positively associated with economic growth, while religious attendance negatively corresponds with growth. Mangeloja (2005) also finds support that religious beliefs positively affect economic growth, but finds little evidence of a relationship between religious attendance and economic growth. The interplay between religion and macroeconomic variables are complex, and the channels are not yet understood. It is clear though that the religious devotion and beliefs of a country have a significant influence on growth and national income.

On an individual level, religion has been shown to influence physical health (Hummer et al., 1999; Levin, 1994; Levin & Vanderpool, 1987), rates of mental illness (Becker & Woessmann, 2015; Chiswick & Mirtcheva, 2013; Cooley Fruehwirth, Iyer, & Zhang, 2016), incidence of crime (Hull & Bold, 1995; Lipford & Tollison, 2003b), income (Chiswick, 1983a, 1993; Cornwell, Tinsley, & Warren, 2003; Steen, 1996, 2004; Tomes, 1983, 1984, 1985), and well-being (Gruber, 2005; Hout & Greeley, 2003). Economists have struggled to address concerns that religious right-hand-side variables are uncorrelated with the error term of the outcome in question. As a

[2]Anecdotal evidence also supports the connection between attendance and informal insurance. The Salvation Army, for example, has been known to require homeless individuals to listen to sermons before accessing an otherwise free meal (Iannaccone, 1992).

solution, economists must resort to novel identification strategies. For example, Gruber (2005) uses the area religious density of ancestral groups that share a religion with an individual's ancestral group as an instrument for religious participation. He finds a positive relationship between religious participation and education, income, and marriage, and a negative relationship between religious participation and welfare receipt, disability, and divorce. A valid instrument for religion must affect the outcome variable of interest only through its effect on religion. In general, factors that are thought to determine religious participation such as family background, peer groups (Cooley Fruehwirth et al., 2016), and legal status of vice (Gerber, Gruber, & Hungerman, 2008) are also correlated with outcomes of interest. The lack of sources for exogenous variation in religion has made it difficult to causally identify the effect of religion on society.

The Effect of Religion on Income

Few papers have attempted to handle the endogenous relationship of religion on income. Several notable papers that do attempt to estimate this causal relationship are Lipford and Tollison (2003b), McCleary and Barro (2006a), and Bettendorf and Dijkgraaf (2010). Lipford and Tollison (2003b) and McCleary and Barro (2006a) estimate simultaneous equations for religion and income at the state and country level respectively. Bettendorf and Dijkgraaf (2010) simultaneously estimates equations for religious membership and income at the individual level, identifying religious membership with a dummy for whether spouse is the breadwinner and income with a dummy for households without children. These first two papers do not address behavior at the micro level, and the third still suffers from endogeneity if the instruments are not validly excluded from the structural equations (for example, if not having children affects income through channels other than religious membership).

The Effect of Income on Religion

Chen (2010) identifies the causal effect of economic distress on "religious intensity" by exploiting the differential effect of the 1997 Indonesian financial crisis on wetland owners and government workers. He finds that economic distress increases the likelihood of participation in group Koran study and sending children to Islamic schools. Chen (2010) does not examine the effect of income shocks per se, but rather consumption shocks. His results are consistent with a model that treats religion as ex post insurance. Buser (2015) exploits a 2010 change in the eligibility criteria for a monthly Ecuadorian cash transfer as an exogenous source of variation in income for poor families. He finds a positive relationship between non-labor income and religious participation. This result seems to support the theory posited by Azzi and Ehrenberg (1975).

Contribution to Literature

This paper presents a substantial contribution to the literature on the effects of income on religion. It is one of very few papers to examine this causal effect. The papers that do attempt to isolate the causal impacts of income on religion (Buser, 2015; Chen, 2010) do so in the context of Third World countries and may not generalize to developed countries such as the United States. Bettendorf and Dijkgraaf (2010) suggests that the effects of income on religion is heterogeneous across high and low income countries. Therefore, the absence of causal studies of income on religion in wealthier nations presents a large gap in the literature. This paper fills that gap by being the first to identify the causal effect of income on religious participation in the context of a developed nation.

EMPIRICAL FRAMEWORK: EARNED INCOME TAX CREDIT AND ITS USE AS AN INSTRUMENT FOR INCOME

The primary obstacle when estimating the impact of income on religiosity is the endogenous relationship between the two. The issue of reverse causality is perhaps the most obvious way in which an econometric model regressing income on religious behavior is likely to be biased. In fact, the majority of the academic literature investigating the relationship between income and religion uses income as the dependent variable. Further, religious participation is thought to be positively correlated with a variety of outcomes that are also associated with higher incomes. Even if the direction of causality was unambiguous, these unobservable characteristics are likely to influence both income and religious behaviors. It is possible, for example, that the desire and ability to attend religious teaching once a week corresponds with the discipline needed to achieve high levels of incomes.

Because of the endogeneity issue, the search for an exogenous source of variation in religious behaviors has been a focus for economists studying the economics of religion.[1] I seek to identify the causal impact of income on religion, therefore only variation in income that is exogenous to religious behaviors is necessary for identification. The likely candidate is change in public policy affecting income. This paper uses changes in maximum Earned Income Tax Credit benefits that vary by state, time, and number of children as an exogenous source of income variation. In doing so, it is the first paper exploring the impact of income on religious behaviors in the United states using an instrumental variables approach.

[1]For a review of the economics of religion literature and attempts at finding exogenous sources of variation in religious behaviors, see Iannaccone (1998) and Iyer (2016).

The federal Earned Income Tax Credit began as a part of the Tax Reduction Act of 1975. Through expansions in 1986, 1990, 1993, 2002, and 2009, it has grown to be the second-largest means tested transfer program in the United States, surpassed in total expenditures only by the Supplemental Nutrition Assistance Program (SNAP). As of 2013, there were 26.7 million recipients of the federal EITC, with total expenditures amounting to $63 billion. The EITC functions as a wage subsidy for low income workers, with benefits initially increasing with income, plateauing, and then tapering off. The basic EITC benefit schedule has three distinct ranges: the phase-in range, the maximum-credit range, and the phase-out range. The benefit schedule is defined separately for married and unmarried households,[2] households with no children, households with two children, and (beginning in 2009) households with three children.[3,4] Figure 3.1 displays these schedules for households with no children, with one child, and with two children. For a family with two children in 2008, credit is given at a rate of 40% of family earnings to a maximum of $4,824. Households receive this amount until family income reaches $15,740, at which point the credit is reduced at a rate of 21.06% for every dollar earned until family earnings reach $38,646, when the credit is completely phased out. Beginning in 2009, a separate schedule was implemented for families with three or more children (shown in figure 3.2). Figure 3.3 shows the expansion of the federal EITC over time. The most important expansions of the federal income tax credit occured in 1994 and 2009. Because the data used

[2]Beginning in 2002, the EITC phase-out range for married households filing jointly began at higher income levels. In all years, the phase-in range, maximum EITC, and phase-out rate is identical for married and unmarried households.

[3]Eligible children are under 19 (or disabled) and include biological children, adopted children, foster children, siblings, and descendants of any of these. To be eligible, these children must also live in the household for more than half the year.

[4]Unless otherwise noted, this paper uses "children," "eligible children," and "dependents" interchangeably to refer to children eligible for EITC calculation.

in this paper does not contain years before 1994, the 2009 expansion is especially important.

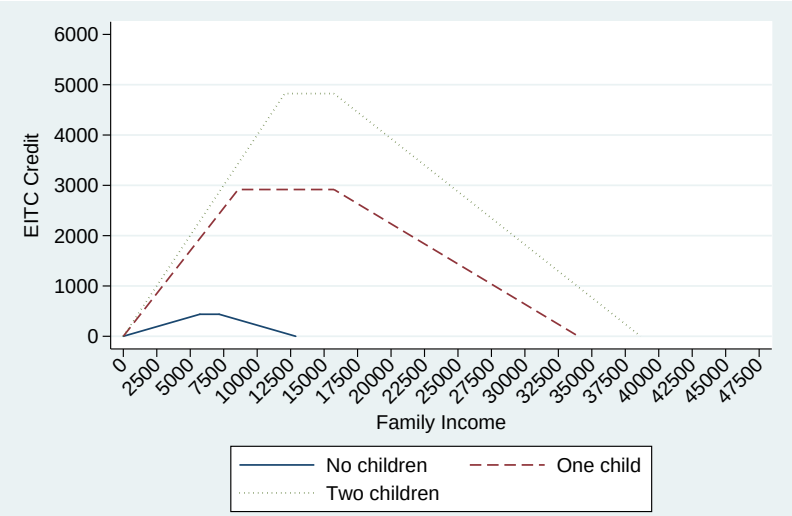
Along with variation in EITC generosity across years and numbers of children, a third source of variation comes from differences in state matching of the federal EITC. From 1984 to 2015, 24 states and the District of Columbia offered state credits to residents as a percentage of EITC benefits given. These policies were instituted at varying times and with varying generosity. In 2015 these percentages range from 3.5% in Louisiana to 40% in the District of Columbia. In other words, a two child tax unit in the District of Columbia eligible for the maximum federal EITC of $5,572 would receive an additional $2,219 in matching credit. In contrast, the equivalent tax unit in Louisiana would receive $194 from the state. Combining federal and state credit benefits, figure 3.4 shows one standard deviation around the mean maximum EITC benefit by year and number of children.

To test the effect of income shocks on religious participation, it would be ideal to implement a randomized controlled trial. For each individual, the rate of attendance and monetary contributions to religious organizations would be measured. Then, individuals would be assigned a positive or negative income shock. Attendance, membership, and contributions of each individual would then be measured and compared. Although this experiment is not possible to implement, changes in the maximum EITC across states, time, and number of children provide a plausibly exogenous source of variation. While not related to religious affiliation or intensity of participation, the variation in maximum EITC provides a shock to income for low-income Americans that is similar to the ideal experiment.

Empirical evidence suggests that the EITC increases income through labor force participation for most individuals (Hotz & Scholz, 2006), although married women may face a negative incentive to join the labor force (Eissa & Hoynes, 2006). Even with

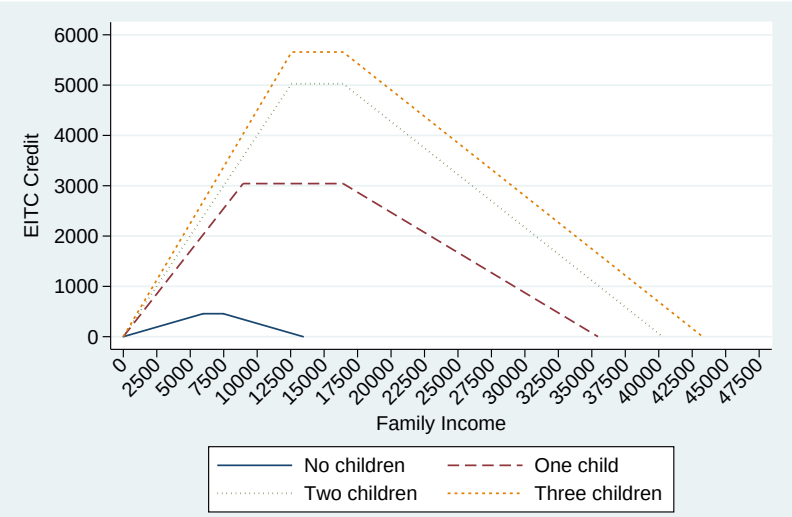
this plausibly exogenous source of income variation, my analysis differs from the ideal experiment in three important ways. First, although changes in the state and federal EITC are arguably exogenous to the individual, this instrumental variables strategy uses variations in the maximum EITC allowed in each state based on the number of dependents in a household. This is a concern because state level characteristics certainly correlate with individual religious participation. Similarly, the number of children in a household may be related to religious participation or proclivity. In order to handle unobserved heterogeneity in states and number of dependents, state fixed effects and number of dependents in a household are included in the analyses. Similarly, unobserved characteristics may exist for each year in the data used. Year fixed effects are included in the empirical specification to handle this.

Second, because the empirical strategy relies on the maximum level of state EITC in a given year, the empirical strategy only allows for estimating the so-called local average treatment effect, or L.A.T.E., of income on religious participation. Therefore, only the effect of income shocks on individuals who receive EITC benefits can be measured. However, it would be reasonable to expect the social insurance impact of religion to be greatest for these individuals at the low end of the income distribution. The ability to only estimate the local average treatment effect is therefore not a concern.



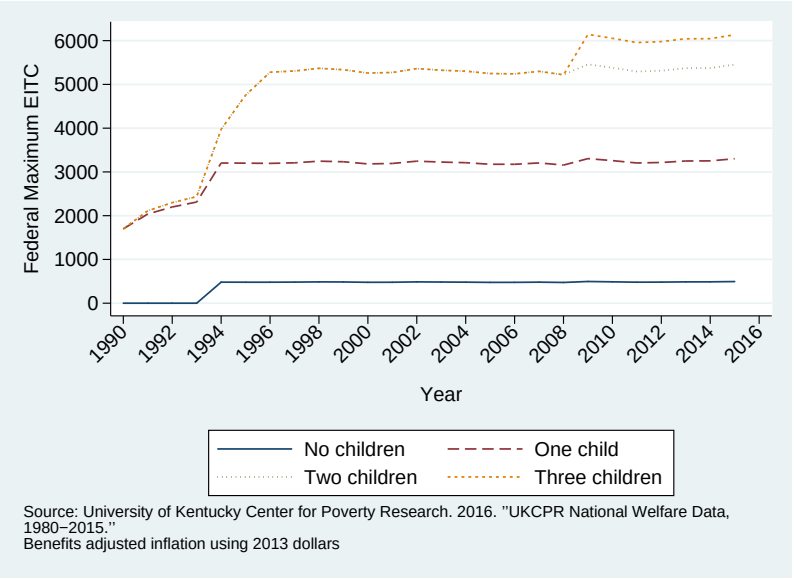
Source: Tax Policy Center, A Joint Project of the Urban Institute & Brookings Institution. 2017 "Historical EITC Parameters"

Figure 3.1: EITC Benefit Schedule: 2008



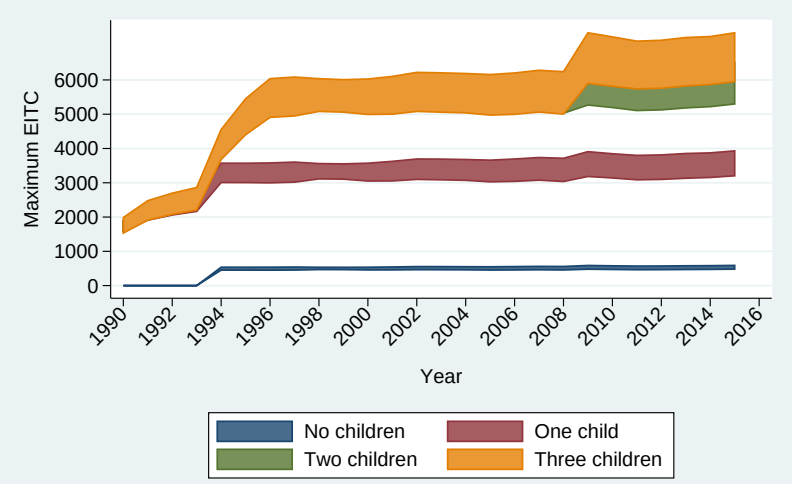
Source: Tax Policy Center, A Joint Project of the Urban Institute & Brookings Institution. 2017 "Historical EITC Parameters"

Figure 3.2: EITC Benefit Schedule: 2009



Source: University of Kentucky Center for Poverty Research. 2016. "UKCPR National Welfare Data, 1980–2015."
Benefits adjusted inflation using 2013 dollars

Figure 3.3: Maximum Federal EITC



Filled areas represent one standard deviation above and below the mean state maximium EITC.
Source: University of Kentucky Center for Poverty Research. 2016. "UKCPR National Welfare Data, 1980–2015."
Benefits adjusted inflation using 2013 dollars

Figure 3.4: State Variation in Maximum EITC

EXOGENOUS INCOME SHOCKS AND RELIGIOUS ATTENDANCE: INSTRUMENTAL VARIABLE APPROACH USING THE NLSCYA

The goal of this chapter is to identify the impact of income on participation in religious services, particularly among low-income individuals. Any empirical strategy estimating the effect of income on religious participation must take into account the issues of reverse causality and omitted variable bias. Therefore, this paper uses the instrumental variable strategy outlined in chapter 3 to causally identify the effect of religious service attendance on religious behavior. In order to exploit the time variation in the EITC for the instrumental variable strategy, the data must also span over years. Preferably, these data would span periods of expansion in the EITC program. The Young Adult surveys of the National Longitudinal Study of Youth (NLSCYA) fit this criteria. The NLSCYA is a longitudinal survey of young adults of age 15 and older beginning in 1994 and designed to track labor market activity and family dynamics. The NLSCYA follows the biological children of women in the original 1979 National Longitudinal Survey of Youth 1979 (NLSY79) cohort. Waves of the NLSCYA were conducted biennially through 2012. The NLSCYA survey was modeled after the NLSY79 questionnaires, and contains both income and demographic variables necessary for estimating the empirical model. However, the NLSCYA is distinct from the NLSY79 in that survey respondents are asked questions about religious service attendance. Despite the fact that relatively few datasets contain both income and religious information, this paper is the first to measure the relationship between income and religiosity using these data. This paper uses a dataset constructed by pooling the cross sections of the NLSCYA from years 1994 to 2012. The population most likely to be affected by the EITC are those earning less than $45,000 in 2013 dollars and those who are of working age. Therefore, the

sample is trimmed to include only those with reported income less than $45,000 (in 2013 dollars) and who are 18 years of age or older. This trimmed sample has a total of 24,009 observations with 7,039 unique individuals. Figure 4.1 shows the increase in observations with each cross section as individuals in the NLSCYA attain 18 years of age. The mean age for all years is 23, with the youngest individual being age 18 and the oldest age 42. The average maximum EITC available to the individuals in the sample is $1,672, and the average income is $12,306.

Table 4.1 provides summary statistics for the full sample, those without a college degree, those who attend religious services, and those who attend religious services once a month or more. The percentage of those attending religious services is high. For the full sample and for those with a college degree, a little more than 70% attend at least one service a year. However, 55% of these individuals report attending religious services only "several times a year or less." Mean levels of religious service attendance for these two groups is about 18 services per year. The sample has a mean rate of attendance of 24.7 services a year, conditional on attending at all, and 36.8, conditional on attending once a month or more. In general, summary statistics look similar across groups. Those attending once a month earn about a thousand dollars less on average than the full sample and are slightly more likely to be currently enrolled in school. Mean personal incomes are low and consistent across groups, averaging about $12,000 annually.

To measure levels of religious participation, respondents were asked: "In the past year, about how often have you attended religious services?" Respondents chose from six responses: "More than once a week," "About once a week," "Two or three times a month," "About once a month," "Several times a year or less," and "Not at all." Using the discrete measure of attendance, four outcome variables are constructed to identify the level of religious attendance. First is a binary variable equal to one if

the respondent attends at all. Regression coefficients on this variable show to what degree changes in income affect the extensive margin of attendance. Next, the number of religious services attended is inferred from the discrete measure available in the data. Responses indicating "More than once a week" or "About once a week" are interpreted as 52 religious services attended, "About once a month" as 12 religious services, "Several times a year or less" as 6, and "Not at all" as 0. Figure 4.2 shows the sample distribution of the discrete measure of religious attendance. Coefficients on this variable are interpreted as measures of change on the intensive margin of attendance.

Approximately half (56%) of the sample attends religious services approximately less than once a month (or not at all), while the remaining 44% attend once a month or more. Because of this sharp divide, the binary variable "Low attender" is defined to be equal to one if the individual attends religious services less than once a month (or not at all), and zero otherwise. The distribution of this variable may be found in figure 4.3. Lastly, figure 4.4 shows the distribution of the binary variable "devout", defined to be one for those who attend "About once a week" or "More than once a week." These variables measure whether high and low attenders respond heterogeneously to income changes.

To investigate the effect of income on religious intensity, these four measures of religious service attendance are used as dependent variables (R_{it}) in the following equation:

$$R_{ist} = \alpha_0 + \alpha_1 Income_{ist} + \alpha_2 X_{ist} + \alpha_3 W_{st} + \delta_t + \sigma_s + u_{ist} \tag{4.1}$$

$Income_{ist}$ is defined as individual wage and tip income in thousands of dollars for individual i in state s in year t. A set of individual controls, X_{it}, includes dummies

for race, sex, married, urban or rural, current school enrollment, whether lives with parents, and college degree attainment. Number of children (biological, adopted, or foster) and years of education are also included in X_{ist}. The unemployment rate for state s in year t is W_{st}. Lastly, δ_t is a vector of year fixed effects and σ_s is a vector of state fixed effects. If the error term, u_{ist}, is correlated with both income and religious giving, then the estimate of α_1 will be biased. To address this concern, I use the maximum amount of Earned Income Tax Credit available for individual i according to the year, state, and number of EITC-eligible children belonging to i to instrument for income.[1] Maximum EITC amounts come from the University of Kentucky Center for Poverty Research National Welfare Data. The effect of income from the EITC is provided through incentives to increasing labor supply with the strongest impact on low-skilled workers. For this reason, individuals who do not have a college degree are examined separately. Like Kenkel, Schmeiser, and Urban (2014), the sample is reduced to those with a total family income of $45,000 (2013 dollars). Those with total income greater than $45,000 should not be affected by the EITC.

In order for the maximum EITC to be a valid instrument, it must be exogenous to the religiosity of a given household in the sample, and it must be highly correlated with income. First stage estimates for β_1 in the first stage equation 4.2 are available in the appendix. For each sample group, an increase of $1,000 in the maximum EITC corresponds with roughly a $500 increase in income. First-stage F statistics are 13 for The full sample and 16.3 for those with no college. Estimates for those who attend and for those who attend once a month or more are also strongly significant, with F statistics of 9.6 and 4.7 respectively.

[1] Children are counted as eligible if they are living in $i's$ household and are a biological, adopted, or foster child of i or of $i's$ partner.

$$Income_{ist} = \beta_0 + \beta_1 Max\_EITC_{ist} + \beta_2 X_{ist} + \delta_t + \sigma_s + v_{ist} \tag{4.2}$$

Maximum EITC is strongly correlated with income in the sample. The primary groups used in this analysis are those with no college education, those who attend any religious services annually, and those who attend more than once a month. Those with no college education are more likely to be impacted by the EITC, and examining those who attend religious services will allow for insight into heterogeneity in income response across those who attend with different frequencies.[2] Table 4.2 shows the results of the fixed effects and two-stage least squares regressions for the full sample and for those with no college degree. Column 1 and column 4 show the coefficients on income (in thousands of dollars) from the state and year fixed effects equation 4.1. Results from these regressions show that income has a small but significant negative impact on religion, with similar coefficients for both the full sample and the sample with no college. These regressions indicate that a $1,000 increase in income decreases religious attendance by 0.05 services a year, suggesting the impact is economically insignificant. Estimates of the effect of income on the probability of attending at all, attending once a week, and attending a few times a year or less are statistically significant but economically insignificant.

These estimates ignore the possibility of individual level characteristics that are associated with both income and religious participation. For example, an individual's innate discipline and social aptitude may be both fixed over time and correlated with church attendance and income. Individual fixed effects are added to the regressions to

[2] Also, single women are believed to be a group likely to be greatly affected by the EITC (Eissa & Liebman, 1996; Hotz & Scholz, 2006; Liebman, 1998; Meyer & Rosenbaum, 2001). In this analysis, the coefficient from regressing maximum EITC benefits on income is positive, but not statistically significant. First stage maximum EITC coefficients in this analysis for married women are negative and statistically significant, possibly because these women are facing a negative incentive to enter the labor force identified by Eissa and Hoynes (2004).

control for potential bias from these unobserved variables. Columns 2 and 5 display these results, which do not differ from the results found in the state and year fixed effects model. This indicates that state fixed effects control for much of the time constant individual effects.[3] Even with the inclusion of state, year, and individual fixed effects, the results are potentially biased in the presence of reverse causality. For example, if religion has a positive influence on earnings through network connections, results from fixed effects regressions will be upwardly biased. Therefore, the preferred specification is the two-stage least squares model.

The variation in income used in the 2SLS identification strategy comes from differences in year, numbers of children, and state residence. The first stage regression does not sufficiently predict income when individual fixed effects are included, because individuals in the sample have children and change states relatively infrequently. However, columns 2 and 5 in table 4.2 indicate that the inclusion of individual fixed effects only slightly alters coefficients from models including only year and state fixed effects. Even so, the absence of individual fixed effects in the 2SLS model raises the concern that error terms for an individual may be correlated across time. Standard errors for the 2SLS regressions are therefore clustered at the individual and state level. Adjusting standard errors in this way corrects for errors correlated within individuals and within states over time.[4] Results from the 2SLS regressions are reported in columns 3 and 6. As with the fixed effects regressions, coefficients remain negative. However, the 2SLS coefficients increase substantially in magnitude. For a $1,000 increase in income, these estimates suggest a decrease of 1.5 religious services per

[3]The sample is relatively immobile. Less than 15% have lived in more than one state, and less than 2% have lived in more than two states.

[4] Using NLSY79 data, Acemoglu and Pischke (2003) cluster at the individual level and state by year level in place of individual fixed effects. Petersen (2009) clusters standard errors at the firm and year level to address error correlation both across firms and within firms over time. For an overview of the use of two-way clusters in empirical economics, see Cameron and Miller (2015).

year for the full sample and 1.2 religious services for the sample with no college education. These estimates are substantial relative to the mean of 18 services per year. Further, a $1,000 increase in income corresponds with a 2.8 and 2.1 percentage point increase in the likelihood of attending less than once a month for the full sample and those with no college respectively. The same change in income corresponds with a decrease in the likelihood of attending once a week or more by 3.5 percentage points for the full sample and 3 percentage points for those with no college. The effects on religion indicated by these results are of magnitudes found to be important in the empirical literature. For example, Cooley Fruehwirth et al. (2016) suggest that an increase of just one religious service in a year decreases the probability of depression among high school females by 3%.

Most Americans attend religious services at least once a year, but not are not necessarily frequent attenders. Pew Research estimates that 69% of Americans attend services at least once a year, while only 33% attend once a week (Pew Research Center, 2015). If individuals gain access to informal insurance by signaling commitment, attending once a year does not appear to be an effective way of doing so. In other words, change in attendance in response to income would be expected to occur along the intensive rather than extensive margin. Consistent with this reasoning, coefficients on whether the individual attends religious services are not statistically different from zero. This indicates that change in income does not affect the probability that an individual attends, but rather affects attendance on the intensive margin.

Table 4.3 shows the fixed effects and two-stage least squares regressions results for those in the sample who attend religious services and for those who attend once a month or more. Results from the state and year fixed effects regressions are significant, but only slightly larger in magnitude than those found in table 4.2. Columns 1 and 4 show that a $1,000 increase in income corresponds with a decrease of about 0.1

religious services for those who attend at all, and about .09 religious services for those who attend once a month or more. Again, estimates of the effect of income on the probability of attending once a week and attending only a few times a year or less are all economically insignificant. The results from the state, year, and individual fixed effects specification (shown in columns 3 and 6) are within the 95% confidence interval of the state, year, and individual fixed effects coefficients in table 4.2.

Again, the two-stage least squares estimates shown in columns 3 and 6 increase substantially in magnitude. Among those who attend, a $1,000 increase in income corresponds to a decrease of 1.7 religious services annually (about one service per year for those who attend at least once a month). For both groups, a $1,000 increase in income corresponds with about a 4 percentage point decrease in the likelihood of attending once a week or more, and a 3 percentage point increase in the likelihood of only attending a few times a year or less.

The difference between the coefficients estimated by the fixed effects regressions and by the two-stage least squares estimates suggests that models not taking into account the endogenous relationship between income and religion are upwardly biased. One potential explanation for this bias is the possible positive effect of religion on income. In this case, the causal effect of income on religion works in the opposite direction as the effect of religion on income, biasing OLS regressions toward zero. This would be the case if religiosity has a positive causal effect on income (or is correlated with other outcomes positively related to income).[5,6]

[5]It is possible that other expansions in the social safety net in the 1990s had an influence on both religion and income. Many programs saw dramatic changes in 1996, for example. As shown in 4.1, few of the observations in this sample come from the 1990s. In order to address any remaining concerns, these regressions are rerun on only years after 2000. The coefficients are similar to the results appearing here. Secondly, results are similar when the sample is restricted to those making $30,000 instead of $45,000.

[6]Separate regressions for blacks and whites were run in order to test for heterogeneity in response across races. Coefficients are similar in magnitude to main results reported in tables 4.2 and 4.3, but imprecisely estimated.

Table 4.4 shows estimates for the income elasticity of religious service for the full sample and for those with no college using a log-log specification. Column 1 shows that the income elasticity of demand for service attendance for the full sample is -.205 (significant at the 10% confidence level). This indicates that a 10% change in income leads to a 2% decrease in service attendance. The group with no college has a smaller elasticity of -0.128. If the number of services attended is signal of commitment, those who attend less often may be expected to have higher income elasticities than those who attend more often. To test for this, table 4.5 displays results from the log-log specification for those who attend any number of religious services, those who attend services once a month or more, and those who attend twice a month or more. As expected, all elasticities are negative, and the income elasticity for those who attend any amount is the greatest in magnitude. In fact, the magnitude of the elasticity for those who attend any amount (-0.314) is about twice as large as for those who attend once a month (-0.141) and more than four times larger than for the group that attends twice a month or more (-0.071). These results suggest that those who attend the least may be those most likely to be affected by marginal changes in income.

With around two thirds of Americans attending religious services with some frequency, a substantial amount of time is spent on religious participation. Results presented in this chapter suggest that for low-income individuals, an exogenous increase in income leads to a negative response in religious service attendance. This relationship is on the order of one to two religious services per year for every $1,000 increase in income. Evidence from the log-log specification suggests that for attenders, a 10% increase in income results in about a 3% decrease in attendance.

Table 4.1: Summary Statistics

	Full sample	No college degree	Attends religious services	Attends religious services once a month or more
	mean/sd	mean/sd	mean/sd	mean/sd
Attends religious services	0.733	0.725	1.000	1.000
	(0.442)	(0.447)	(0.000)	(0.000)
Religious services per year	18.091	17.738	24.682	36.861
	(20.059)	(19.936)	(19.654)	(16.193)
Attends once a week or more	0.218	0.212	0.298	0.492
	(0.413)	(0.409)	(0.457)	(0.500)
Attends several times a year or less	0.556	0.563	0.395	0.000
	(0.497)	(0.496)	(0.489)	(0.000)
Income (thousands of dollars)	12.306	11.285	12.214	11.401
	(12.641)	(12.099)	(12.551)	(12.224)
Logged income	7.282	7.091	7.374	7.210
	(3.821)	(3.868)	(3.724)	(3.768)
Maximum EITC	1671.947	1675.654	1647.245	1626.737
	(1944.658)	(1946.303)	(1921.821)	(1917.919)
Urban	0.768	0.766	0.764	0.749
	(0.422)	(0.423)	(0.425)	(0.433)
Age	23.392	23.077	23.286	23.114
	(4.060)	(4.048)	(4.065)	(4.119)
Black	0.486	0.489	0.495	0.500
	(0.500)	(0.500)	(0.500)	(0.500)
White	0.370	0.364	0.367	0.369
	(0.483)	(0.481)	(0.482)	(0.482)
Hispanic	0.222	0.226	0.217	0.206
	(0.416)	(0.419)	(0.412)	(0.404)
Other race	0.114	0.116	0.110	0.106
	(0.317)	(0.320)	(0.313)	(0.308)
Enrolled in school	0.353	0.361	0.391	0.425
	(0.478)	(0.480)	(0.488)	(0.494)
Binary for over 18 (or over 23 if in school)	0.699	0.674	0.668	0.634
	(0.459)	(0.469)	(0.471)	(0.482)
Female	0.515	0.498	0.536	0.560
	(0.500)	(0.500)	(0.499)	(0.496)
Number of EITC eligible children in household	0.530	0.536	0.521	0.521
	(0.988)	(0.998)	(0.978)	(0.998)
Binary for any EITC eligible children	0.292	0.293	0.288	0.282
	(0.455)	(0.455)	(0.453)	(0.450)
Married	0.138	0.122	0.142	0.150
	(0.345)	(0.328)	(0.349)	(0.357)
Years of education	12.424	12.016	12.559	12.567
	(4.289)	(4.147)	(4.171)	(3.753)
Associate's degree or higher	0.113	0.000	0.122	0.126
	(0.316)	(0.000)	(0.328)	(0.332)
Observations	24009	21307	17601	10655

Source: National Longitudinal Study of Youth Children and Young Adults. 1994-2012. Sample restricted to those between 18 and 65 years of age (inclusive) and making less than $45,000 dollars a year (in 2013 dollars).

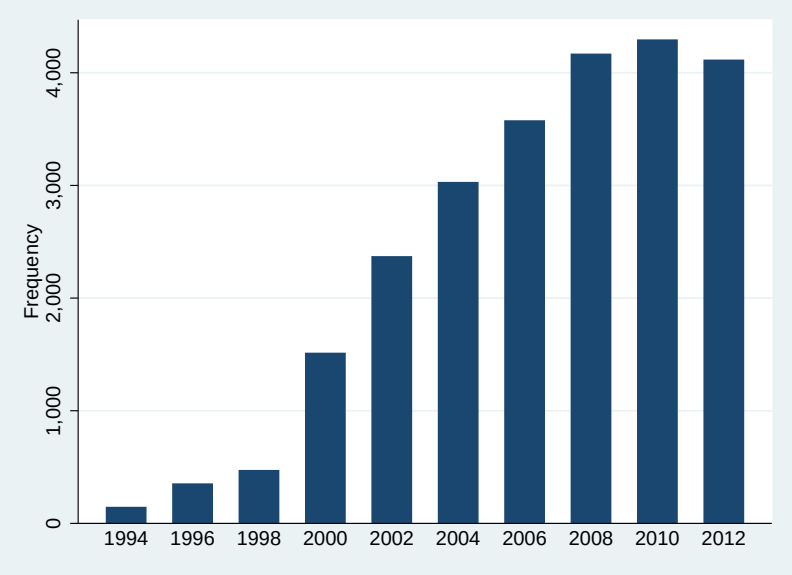


Figure 4.1: Sample Distribution by Year

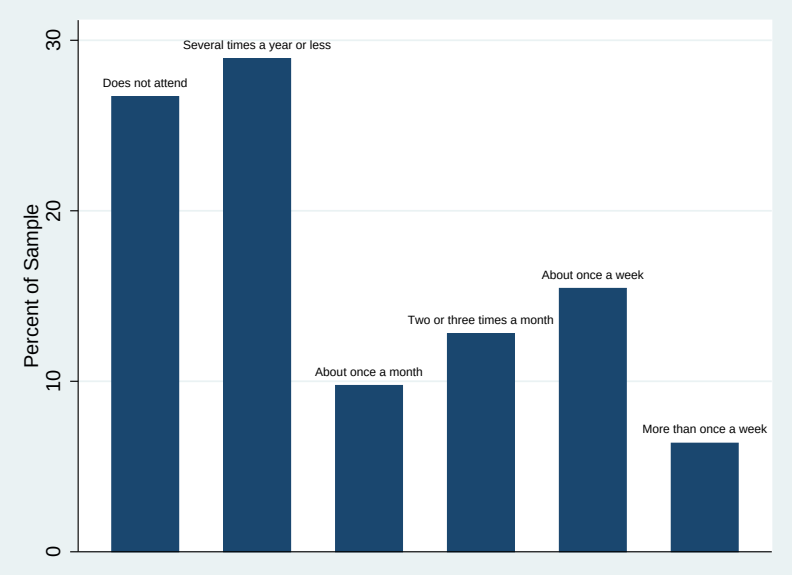


Figure 4.2: Religious Attendance: Discrete Measure

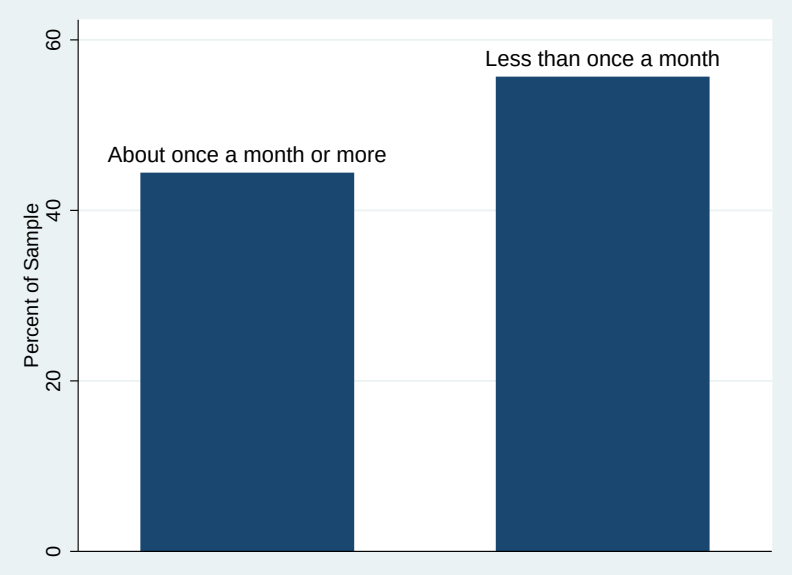


Figure 4.3: Religious Attendance: High vs. Low or Not at All

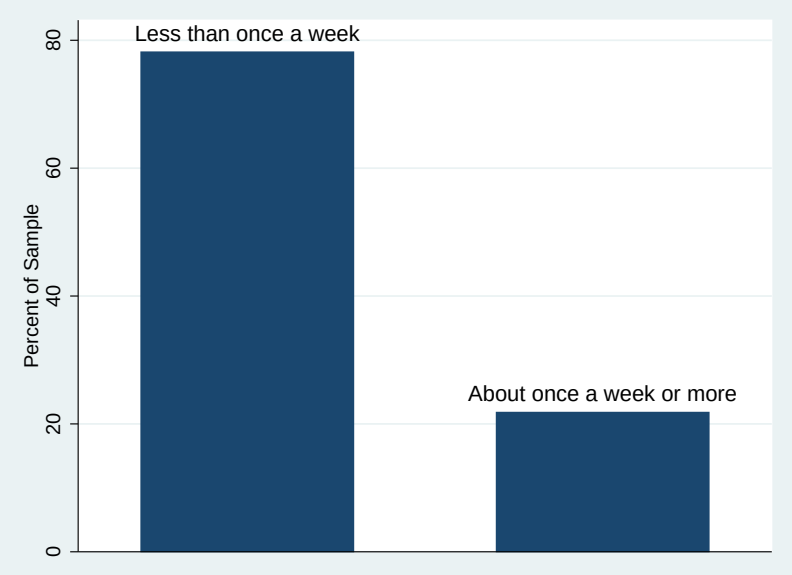


Figure 4.4: Religious Attendance: Devout

Table 4.2: Full Sample and Those with No College Degree

	Full Sample			No College		
Dependent Variable	OLS	Individual Fixed Effects	2SLS	OLS	Individual Fixed Effects	2SLS
Attendance	-0.058***	-0.048***	-1.478**	-0.052***	-0.048***	-1.214**
	(0.014)	(0.015)	(0.591)	(0.017)	(0.019)	(0.503)
Attends once a week or more	-0.002***	-0.001***	-0.034***	-0.002***	-0.001***	-0.030***
	(0.000)	(0.000)	(0.013)	(0.000)	(0.000)	(0.011)
Attends a few times a year or less	0.001**	0.001**	0.028**	0.001	0.001*	0.021**
	(0.000)	(0.000)	(0.012)	(0.000)	(0.001)	(0.010)
Whether attends	0.001***	0.000	0.001	0.001**	0.000	0.004
	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.010)
N	24009	24009	24009	21307	21307	21307
State Fixed Effects	Y	Y	Y	Y	Y	Y
Individual Fixed Effects	N	Y	N	N	Y	N
Year Fixed Effects	Y	Y	Y	Y	Y	Y

Each cell represents the coefficient on income from a separate regression. Standard errors for OLS regressions clustered at the state level. Standard errors for 2SLS regressions clustered at the individual and state level. Standard errors are reported in parenthesis. Asterisks denote significance levels (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Source: NLSY79 Children and Young Adult Surveys. 1994-2012. Sample trimmed to include those who are between 18 and 65 years of age and those with income (in 2013 dollars) less than $45,000.

Table 4.3: Attends Religious Services

	Full Sample			No College		
Dependent Variable	OLS	Individual Fixed Effects	2SLS	OLS	Individual Fixed Effects	2SLS
Attendance	-0.112***	-0.055***	-1.724**	-0.089***	-0.034	-1.051
	(0.017)	(0.018)	(0.794)	(0.015)	(0.026)	(0.668)
Attends once a week or more	-0.003***	-0.001**	-0.040**	-0.003***	-0.001	-0.037*
	(0.000)	(0.000)	(0.017)	(0.000)	(0.001)	(0.020)
Attends a few times a year or less	0.002***	0.001**	0.033**	-	-	-
	(0.000)	(0.001)	(0.016)	-	-	-
N	17601	17601	17601	10655	10655	10655
State Fixed Effects	Y	Y	Y	Y	Y	Y
Individual Fixed Effects	N	Y	N	N	Y	N
Year Fixed Effects	Y	Y	Y	Y	Y	Y

Each cell represents the coefficient on income from a separate regression. Standard errors for OLS regressions clustered at the state level. Standard errors for 2SLS regressions clustered at the individual and state level. Standard errors are reported in parenthesis. Asterisks denote significance levels (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Source: NLSY79 Children and Young Adult Surveys. 1994-2012. Sample trimmed to include those who are between 18 and 65 years of age and those with income (in 2013 dollars) less than $45,000.

Table 4.4: 2SLS estimates: Religious service income elasticities

Dependant variable	(1) Full sample	(2) No college degree
Number of religious services (logged)	-0.205* (0.110)	-0.129 (0.086)
N	24009	21307
First Stage Results		
Maximum EITC (logged)	0.201*** (0.068)	0.231*** (0.073)
F Statistic (First stage test of instrument)	8.615	10.024

Each cell represents the coefficient on income from a separate 2SLS regression with state and year fixed effects. Standard errors clustered at the state and individual level and reported in parenthesis. Asterisks denote significance levels (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Source: National Longitudinal Study of Youth Children and Young Adults. 1994-2012. Sample trimmed to include those who are between 18 and 65 years of age and those with income (in 2013 dollars) less than $45,000.

Table 4.5: 2SLS estimates: Religious service income elasticities for those attending religious services

Dependant variable	(1) Attends any amount	(2) Attends about once a month or more	(3) Attends two times a month or more
Number of religious services (logged)	-0.314***	-0.141**	-0.0721*
	(0.116)	(0.065)	(0.032)
N	17601	10655	8312
First Stage Results			
Maximum EITC (logged)	0.252***	0.324***	0.329***
	(0.070)	(.101)	(0.131)
F Statistic (First stage test of instrument)	12.820	10.319	6.334

Each cell represents the coefficient on income from a separate 2SLS regression with state and year fixed effects.
Standard errors clustered at the state and individual level and reported in parenthesis. Asterisks denote significance levels (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).
Source: National Longitudinal Study of Youth Children and Young Adults. 1994-2012. Sample trimmed to include those who are between 18 and 65 years of age and those with income (in 2013 dollars) less than $45,000.

EXPLORATION OF INCOME CHANGES ON RELIGIOUS GIVING USING THE PANEL STUDY OF INCOME DYNAMICS

Another important measure of religiosity is religious giving. Several papers have estimated a positive relationship between religious giving and attendance.[1] Less is known about the causal effect of income on religious giving. Because religious giving is often anonymous, it is unlikely that individuals use contributions to gain access to insurance provided by religion. On the other hand, increases in income may cause increases in giving if religious donations are a normal good. This chapter uses the 2001 through 2013 waves of the Panel Study of Income Dynamics to provide evidence that changes in income has virtually no effect on religious giving among low-income Americans.

The Panel Study of Income Dynamics (PSID) is a longitudinal survey of heads of households originating in 1968 designed to track income, health, and demographic information. Waves of the PSID were conducted annually from 1968 to 1998 and biennially since 1999. Few panel datasets are available with information on financial contributions that are specifically religious in nature. Beginning in 2001, however, the PSID began to include information on participant household level religious contributions as a part of the Philanthropy Panel Study module. In addition to dollar amounts for religious giving, the PSID contains the appropriate demographic information for the estimation of the empirical model. Although the PSID is a useful dataset for the study of the interaction between income and religious giving,

[1] A number of economists have documented a positive relationship between religious giving and religious attendance (Dahl & Ransom, 1999; Forbes & Zampelli, 1997; Iannaccone, 1997; Kim, 2013; Lunn, Klay, & Douglass, 2001; Olson & Caddell, 1994; Yörük, 2013). In contrast, Gruber (2004) finds evidence for a negative relationship, suggesting religious monetary contributions and attendance are substitutes.

economists have not used it in great number.[2] The dataset used for this analysis uses the 2001 through 2013 survey waves, and follows individuals who were a head of household in 2013. The sample is trimmed to include only individuals with reported family income less than $45,000 (in 2013 dollars) and whose head of household is between 18 and 65 years of age (inclusive). This trimmed sample has a total of 22,495 observations with 6,011 individuals.

Table 5.1 contains summary statistics for the main groups used for analysis. These groups are the full trimmed sample, households headed by someone with no college degree, households whose head or spouse of the head attends any religious services, and households with no religious attendance. Households with less than a college education are chosen because they are most likely to be affected by EITC. Households with members that attend religious services are chosen in order to isolate the behavioral response of income on religious giving for religious people. Lastly, household with no religious attendance are included to observe whether any effect of income on religious giving occurs even in the absence of attendance. Summary statistics look remarkably similar across groups. Notably, those who attend religious services donate only slightly more on average than the full sample and no college sample.

The following is a naive approach to estimating the relationship between religious giving and income:

$$R_{ist} = \alpha_0 + \alpha_1 Income_{ist} + \alpha_2 X_{ist} + \delta_t + \sigma_s + \eta_i + u_{ist} \tag{5.1}$$

[2]Yörük (2013) is a notable exception, which uses PSID to estimate the cross-price elasticity of religious attendance with respect to the tax-price of charitable contributions.

To investigate both the intensive and extensive margins for religious giving, equation 5.1 is estimated for two measures of religious giving, R_{it}, for person i in year t. First is a binary variable for whether any donations were made from person i's household in the previous year. The coefficient on income in this specification measures the effect of a \$1000 change in income on the likelihood of giving any amount to a religious organization. Next is the dollar amount of donations reported to be given from any member of person i's household during the previous year. This regression is run first for every individual (if a household did not donate to a religious organization, R_{it} is 0), and then for those individuals for whom a household member donated a nonzero dollar amount to a religious organization.

Total household wage income, $Income_{it}$, is measured in thousands of dollars, following Dahl and Lochner (2012), Schmeiser (2009), and Schmeiser (2012).[3] X_{it} is a vector of controls for the head of household that includes Beale code (a measure of a location along the urban-rural continuum), age, race, sex, number of children, previous year employment status, marriage dummy, education level, and a dummy variable for a college degree. Year, state, and individual fixed effects are represented by δ_t, σ_s, and η_i respectively.

As previously discussed, estimates from equation 5.1 are biased if income is endogenous, as is probable. To address this concern, the IV strategy discussed in chapter 3 is used. Like Kenkel et al. (2014), the sample is reduced to those with a total family income of \$45,000 (2013 dollars). Those with total family income greater than \$45,000 should not be affected by the EITC. In order for the maximum EITC to be a valid instrument, it must be exogenous to the religiosity of a given household

[3] An alternative specification using logged income was also used. This specification does not yield statistically significant OLS or 2SLS coefficients for income.

in the sample and it must be highly correlated with income. First stage estimates for β_1 in the first stage equation 5.2 are reported in the appendix.

$$Income_{ist} = \beta_0 + \beta_1 Max\_EITC_{ist} + X_{ist} + \delta_t + \sigma_s + v_i st \tag{5.2}$$

For every group, the maximum EITC benefit amount is strongly correlated with income. First stage regressions results are available in the appendix. The previous chapter described a weak instrument problem when individual fixed effects regressions were included in the first stage regression. This sample does not have the same problem. Even with the inclusion of individual fixed effects, there is sufficient variation in the number of EITC-eligible children per household.

Table 5.2 shows the OLS estimates for subsamples. State, year, and individual fixed effects are included in these regressions. Estimates for each group are positive and significant with the exception of families who do not attend religious services. The first row presents estimates of the effect of income on the probability of making any donation to a religious organization. For all groups except for those who do not attend religious services, a $1000 increase in income is associated with only a 0.2 percentage point decrease in the likelihood of donating. The results also indicate a small positive relationship with income and the amount of religious giving. The estimates suggest a $1000 change in income corresponds with a $5 increase in giving for the full sample, a $4 increase for those with no college, and a $5 increase for those who attend. Conditional on giving any amount, these estimates change to $15, $19, and $15 respectively. If omitted variables impact both income and religious giving, then these estimates are biased. In particular, if characteristics such as discipline or cooperation vary over time and are correlated with religious giving income, then the

OLS estimates will be biased. Because of this concern, the instrumental variables strategy described in chapter 3 is the preferred model specification.

To be a valid instrument, the maximum Earned Income Tax credit must affect the religious giving only through income. Scheve and Stasavage (2006) find that higher measures of religiosity are negatively correlated with state spending on various welfare measures and social programs. This raises the concern that the maximum Earned Income Tax Credit could be correlated with state-level religiosity. In this case, household-level religious giving could be related to the maximum Earned Income Tax Credit through a channel other than income. To account for this, state fixed effects are included, which control for time invariant properties such as long-held cultural attitudes. A second concern is that government generosity may influence an individual's decision to donate to religious organizations. Hungerman (2005) shows evidence for a crowd-out effect for church member donations in relationship to government welfare expenditures. If government generosity crowds out religious contributions made by low-income families, then increases in generosity of the EITC would tend to have a negative effect on religious giving for the families in the sample. This concern is lessened by the fact that the reduced form estimates for the coefficients on EITC are insignificant, suggesting that changes in EITC generosity across state, time, and number of children affect religious contributions only through their effect on income. It is therefore reasonable to assume that the maximum EITC is a valid instrument when measuring the effect of income on religious giving.

Table 5.3 shows the results of the two-stage least squares regressions. The first row shows the estimates for the impact of income on the likelihood of making a religious contribution. Across groups, estimates indicate that income may have a slight effect on the probability of making a religious contribution. These effects are quite small. An increase of $1000 causes an increase in probability of donating by

roughly one percentage point. Also, estimates on the effect of income on the dollar amount of religious contributions increase only slightly from the fixed effects estimates and are only significant for the full sample and those who attend religious services. It is clear from both model specifications that the effect of income on religious giving is close to zero. Therefore, if individuals signal commitment to gain access to religious insurance, it does not appear they do with religious contributions.

Table 5.1: Summary Statistics

	Full sample	No college degree	Attends religious services	Does not attend religious services
	mean/sd	mean/sd	mean/sd	mean/sd
Whether donate	0.217	0.196	0.233	0.024
	(0.412)	(0.397)	(0.423)	(0.155)
Donation amount	200.108	171.471	216.030	4.539
	(807.017)	(770.747)	(837.115)	(45.798)
Donation amount (if any)	971.225	922.964	977.451	205.592
	(1553.198)	(1582.556)	(1557.820)	(234.752)
Number of religious services	25.531	24.771	30.974	0.000
	(48.522)	(46.798)	(51.843)	(0.000)
Income	25167.051	24552.752	25197.992	24782.683
	(12652.531)	(12644.486)	(12671.386)	(12413.208)
Maximum EITC	2.755	2.894	2.754	2.777
	(2.283)	(2.290)	(2.282)	(2.295)
Age	38.468	38.638	38.588	36.990
	(12.303)	(12.259)	(12.342)	(11.717)
White	0.375	0.343	0.363	0.526
	(0.484)	(0.475)	(0.481)	(0.499)
Black	0.551	0.579	0.564	0.396
	(0.497)	(0.494)	(0.496)	(0.489)
Hispanic	0.089	0.095	0.091	0.053
	(0.284)	(0.293)	(0.288)	(0.223)
Other race	0.032	0.031	0.031	0.042
	(0.175)	(0.174)	(0.173)	(0.201)
Female	0.512	0.507	0.516	0.464
	(0.500)	(0.500)	(0.500)	(0.499)
Children under 18 in family unit	1.133	1.217	1.130	1.170
	(1.387)	(1.422)	(1.384)	(1.429)
Observations	22496	19547	20820	1676

Source: Panel Study of Income Dynamics. 2001-2013. Sample restricted to those between 18 and 65 years of age (inclusive) and making less than $45,000 dollars a year (in 2013 dollars).

Table 5.2: Fixed Effects Estimates for the Effect of Income on Religious Giving

	(1) Full sample	(2) No college	(3) Attends religious services	(4) Does not attend
Whether donated	0.002***	0.001***	0.002***	0.001
	(0.000)	(0.000)	(0.000)	(0.003)
N	21540	18683	19949	1591
Donation amount	4.669***	4.089***	5.167***	0.166
	(0.860)	(0.941)	(0.928)	(0.258)
N	21540	18683	19949	1591
Donation amount	14.580**	19.018**	14.736**	-
(conditional on giving)	(5.689)	(7.427)	(5.733)	-
N	4433	3459	4398	-

Each cell represents the coefficient on income from a separate regression with state, year, and individual fixed effects. Standard errors are clustered at the state level and reported in parenthesis. Asterisks denote significance levels (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).
Source: Panel Study of Income Dynamics. Sample trimmed to include those who are between 18 and 65 years of age and those with income (in 2013 dollars) less than $45,000.

Table 5.3: 2SLS Estimates For the Effect of Income on Religious Giving

	(1) Full sample	(2) No college	(3) Attends religious services	(4) Does not attend
Whether dontated	0.009**	0.008*	0.010**	-0.007
	(0.004)	(0.004)	(0.005)	(0.006)
N	21540	18683	19949	1591
Donation amount	12.666*	9.426	14.479*	-0.644
	(6.954)	(6.734)	(8.002)	(0.586)
N	21540	18683	19949	1591
Donation amount (conditional on giving)	60.020	13.625	59.228	
	(93.750)	(90.413)	(94.423)	
N	4433	3459	4398	

Each cell represents the coefficient on income from a separate regression with state, year, and individual fixed effects. Standard errors are clustered at the state level and reported in parenthesis. Asterisks denote significance levels (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).
Source: Panel Study of Income Dynamics. Sample trimmed to include those who are between 18 and 65 years of age and those with income (in 2013 dollars) less than $45,000.

CONCLUSION

Religion remains an important part of life for a large portion of Americans. Economists studying religion have recently concentrated on the role that religion plays in insuring against adverse economic conditions and providing financial support to poor members. A few studies have attempted to measure how low-income individuals change religious behaviors in response to exogenous income shocks in Third World countries. By using data from the United States and exploiting changes in maximum Earned Income Tax Credit benefits across states, years, and numbers of children, this paper is the first to measure such an effect in the context of a developed nation.

Using an instrumental variables strategy and data from the NLSCYA, this paper finds that increases in income causes substantial decreases in religious attendance for poor Americans. Results from the preferred specification indicate that a $1,000 increase in income causes an individual to reduce religious attendance by one and a half services a year. Relative to the mean of 18 religious services, this represents roughly an 8% decrease. This magnitude appears to be important for mental health. Cooley Fruehwirth et al. (2016) find that an increase of just one religious service in a year decreases the probability of depression among high school females by 3%. The negative effect persists when the sample is conditioned on individuals who do not hold a college degree, those who attend any amount, and those who attend once a month or more. Estimations from a log-log model specification indicate that income elasticities of demand are larger in magnitude for those who attend less, implying that the person most likely to be influenced by a marginal change in income is one who is already attending relatively infrequently. To measure the effect of income on religious giving, an instrumental variables strategy is used with data from the PSID. In contrast with the result for religious attendance, no effect of income on religious giving is found.

This result suggests that those responding to income by changing religious behavior are not doing so on the religious donation margin. While other mechanisms cannot be ruled out, the results in this paper are consistent with religious groups providing insurance and social services to poor individuals and families.

Previous literature estimating the causal effects of religion have found religious participation to increase happiness measures, improve mental health, and increase marriage stability. To the extent that religion provides positive benefits to society, policymakers should be careful to take into account religious participation when analyzing the costs and benefits of reforming the social safety net. Much is still unknown about the causal effects of religion. Further research should seek to understand the effects of religion on other important outcomes such as income mobility and physical health measures.

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APPENDIX

SUPPLEMENTARY TABLES AND FIGURES

Table A.1: First Stage: NLSCYA

Dependent Variable: Income (in thousands)	(1) Full sample	(2) No college degree	(3) Attends religious services	(4) Attends religious services once a month or more
Maximum EITC	0.499***	0.551***	0.591***	0.635**
	(0.138)	(0.136)	(0.191)	(0.292)
Urban	0.095	0.072	0.172	0.180
	(0.317)	(0.328)	(0.351)	(0.392)
Age	1.000***	0.984***	1.043***	1.022***
	(0.048)	(0.051)	(0.054)	(0.075)
White	0.255	0.223	0.192	-0.452
	(0.221)	(0.232)	(0.258)	(0.277)
Hispanic	0.185	0.182	0.133	0.139
	(0.360)	(0.358)	(0.290)	(0.478)
Other Race	0.074	-0.078	0.399	0.248
	(0.393)	(0.423)	(0.401)	(0.481)
Enrolled in school	-2.609***	-2.484***	-2.685***	-2.640***
	(0.258)	(0.240)	(0.283)	(0.293)
Lives in same house as parents	-3.338***	-3.133***	-3.220***	-3.148***
	(0.224)	(0.244)	(0.259)	(0.254)
Female	-2.272***	-2.498***	-2.205***	-2.012***
	(0.237)	(0.222)	(0.230)	(0.257)
Number of EITC eligible children in household	-2.619***	-2.586***	-2.795***	-2.858***
	(0.220)	(0.229)	(0.286)	(0.430)
Unemployment rate	-0.321***	-0.278***	-0.236**	-0.112
	(0.093)	(0.099)	(0.117)	(0.134)
Married	2.403***	2.896***	2.509***	2.206***
	(0.309)	(0.327)	(0.310)	(0.425)
Years of education	0.143**	0.156**	0.149**	0.131
	(0.057)	(0.064)	(0.068)	(0.091)
Associate's degree or higher	5.077***	0.000	4.832***	4.529***
	(0.367)	(.)	(0.366)	(0.557)
F Statistic (test for weak instrument)	13.035	16.309	9.594	4.746
N	24009	21307	17601	10655

Each column represents a separate regression. Standard errors clustered at the state level and reported in parenthesis.
*, significant at the 10% level;** significant at the 5% level;***, significant at the 1% level
Source: National Longitudinal Study of Youth Children and Young Adults. 1994-2012.Sample trimmed to include those who are who have reached 18 years of age and those with income (in 2013 dollars) less than $45,000.

Table A.2: First Stage: PSID

Dependent Variable: Income (in thousands)	(1) Full sample	(2) No college	(3) Head or wife attends religious services	(4) No religious service attendance
Maximum EITC	0.919***	0.964***	0.876***	1.569***
	(0.085)	(0.088)	(0.088)	(0.268)
Beale code	-0.171***	-0.187***	-0.165***	-0.305*
	(0.040)	(0.042)	(0.040)	(0.162)
Age	0.143***	0.162***	0.139***	0.099***
	(0.009)	(0.010)	(0.009)	(0.029)
Black	-1.695***	-2.025***	-1.612**	-5.713**
	(0.634)	(0.674)	(0.656)	(2.639)
White	0.519	0.672	0.531	-1.596
	(0.568)	(0.596)	(0.592)	(2.512)
Hispanic	1.049**	0.643	1.081**	-2.483
	(0.514)	(0.561)	(0.523)	(2.355)
Other Race	0.389	0.555	0.394	-2.458
	(0.877)	(0.946)	(0.902)	(3.173)
Sex	-3.262***	-3.960***	-3.110***	-4.156***
	(0.276)	(0.302)	(0.282)	(0.769)
Employed	4.808***	4.634***	4.929***	4.996***
	(0.203)	(0.214)	(0.212)	(0.763)
Children under 18 in family unit	-0.842***	-0.856***	-0.763***	-2.337***
	(0.136)	(0.137)	(0.142)	(0.355)
Married	4.257***	4.191***	4.403***	3.780***
	(0.299)	(0.322)	(0.307)	(0.977)
Education	0.596***	0.635***	0.605***	0.651***
	(0.056)	(0.058)	(0.056)	(0.178)
College graduate	2.211***	0.000	2.289***	-0.119
	(0.360)	(.)	(0.365)	(1.379)
F Statistic (test for weak instrument)	117.486	120.169	99.829	34.378
N	21748	18880	20157	1591

Each column represents a separate regression. Standard errors clustered at the state level and reported in parenthesis.
*, significant at the 10% level;** significant at the 5% level;***, significant at the 1% level
Source: Panel Study of "Income Dynamics. 2001-2011. Sample trimmed to include those who are between 18 and 65 years of age and those with income (in 2013 dollars) less than $45,000.

Table A.3: Maximum state EITC by year (2013 $)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Alabama																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Alaska																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Arizona																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Arkansas																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
California																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Colorado																					
No Dependants	481	480	480	482	487	526	525	527	487	484	481	476	476	481	474	496	488	481	482	487	537
One Dependant	3204	3201	3195	3208	3246	3508	3502	3513	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3577
Two Dependants	3974	4754	5280	5306	5368	5789	5786	5799	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5910
Three Dependants	3974	4754	5280	5306	5368	5789	5786	5799	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6649
Connecticut																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	625	627	633	635
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	4166	4180	4225	4228
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	6882	6907	6984	6985
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	7743	7770	7857	7858
Delaware																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	571	577	569	595	586	577	578	584	586
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3809	3847	3787	3965	3910	3845	3859	3900	3903
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	6290	6358	6263	6552	6456	6353	6375	6446	6447
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	6290	6358	6263	7371	7264	7147	7173	7253	7254
District of Columbia																					
No Dependants	481	480	480	482	487	485	525	599	609	605	601	643	643	649	663	695	684	673	675	682	683
One Dependant	3204	3201	3195	3208	3246	3233	3502	3992	4057	4032	4014	4287	4285	4327	4419	4626	4562	4486	4502	4550	4553
Two Dependants	3974	4754	5280	5306	5368	5336	5786	6590	6702	6655	6629	7085	7076	7153	7307	7644	7532	7412	7438	7521	7522
Three Dependants	3974	4754	5280	5306	5368	5336	5786	6590	6702	6655	6629	7085	7076	7153	7307	8600	8474	8338	8368	8462	8463
Florida																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045

Source: University of Kentucky Center for Poverty Research. 2016. "UKCPR National Welfare Data, 1980-2015." Gatton College of Business and Economics, University of Kentucky, Lexington, KY. http://www.ukcpr.org/data

Table A.4: Maximum state EITC by year (2013 $)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Georgia																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Hawaii																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Idaho																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Illinois																					
No Dependants	481	480	480	482	487	485	501	503	511	508	505	500	500	505	498	521	513	500	506	511	537
One Dependant	3204	3201	3195	3208	3246	3233	3342	3353	3408	3387	3372	3334	3333	3366	3314	3469	3421	3332	3376	3413	3577
Two Dependants	3974	4754	5280	5306	5368	5336	5523	5536	5630	5590	5568	5511	5504	5564	5481	5733	5649	5506	5578	5641	5910
Three Dependants	3974	4754	5280	5306	5368	5336	5523	5536	5630	5590	5568	5511	5504	5564	5481	6450	6356	6194	6276	6346	6649
Indiana																					
No Dependants	481	480	480	482	487	485	478	479	487	513	510	504	505	510	502	541	532	509	511	516	532
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3419	3404	3366	3365	3398	3346	3602	3552	3397	3408	3445	3545
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5643	5621	5563	5556	5617	5533	5951	5864	5612	5631	5694	5856
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5643	5621	5563	5556	5617	5533	6696	6598	6313	6336	6407	6589
Iowa																					
No Dependants	512	511	511	513	519	517	509	510	519	515	512	507	507	515	507	531	522	514	516	521	556
One Dependant	3412	3409	3403	3416	3457	3443	3390	3401	3456	3435	3420	3382	3381	3430	3377	3536	3487	3429	3440	3478	3708
Two Dependants	4232	5063	5623	5651	5717	5683	5602	5615	5710	5670	5648	5590	5582	5670	5585	5842	5757	5665	5685	5748	6125
Three Dependants	4232	5063	5623	5651	5717	5683	5602	5615	5710	5670	5648	5590	5582	5670	5585	6573	6477	6373	6396	6467	6891
Kansas																					
No Dependants	481	480	480	482	536	534	525	527	560	556	553	547	547	563	554	581	576	567	569	575	571
One Dependant	3204	3201	3195	3208	3570	3556	3502	3513	3732	3709	3693	3652	3650	3750	3693	3866	3845	3781	3794	3835	3805
Two Dependants	3974	4754	5280	5306	5905	5870	5786	5799	6166	6122	6098	6036	6028	6199	6107	6388	6349	6247	6269	6339	6286
Three Dependants	3974	4754	5280	5306	5905	5870	5786	5799	6166	6122	6098	6036	6028	6199	6107	7187	7143	7028	7053	7132	7073
Kentucky																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Louisiana																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	491	514	505	497	499	504	505
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3267	3420	3372	3316	3328	3364	3366
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5402	5651	5568	5480	5499	5560	5561
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5402	6358	6265	6164	6186	6256	6257
Maine																					
No Dependants	481	480	480	482	487	485	501	503	511	508	505	500	500	505	498	521	513	505	506	511	512
One Dependant	3204	3201	3195	3208	3246	3233	3342	3353	3408	3384	3369	3334	3333	3366	3314	3469	3421	3365	3376	3413	3415
Two Dependants	3974	4754	5280	5306	5368	5336	5523	5536	5630	5586	5564	5511	5504	5564	5481	5733	5649	5559	5578	5641	5641
Three Dependants	3974	4754	5280	5306	5368	5336	5523	5536	5630	5586	5564	5511	5504	5564	5481	6450	6356	6254	6276	6346	6347

Source: University of Kentucky Center for Poverty Research. 2016. "UKCPR National Welfare Data, 1980-2015." Gatton College of Business and Economics, University of Kentucky, Lexington, KY. http://www.ukcpr.org/data

Table A.5: Maximum state EITC by year (2013 $)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Maryland																					
No Dependants	722	720	719	723	536	534	549	555	565	571	577	571	571	577	592	620	610	601	602	609	610
One Dependant	4805	4801	4793	4812	3570	3556	3661	3705	3765	3806	3854	3810	3809	3847	3945	4130	4073	4005	4019	4063	4065
Two Dependants	5961	7131	7920	7960	5905	5870	6049	6116	6219	6282	6363	6298	6290	6358	6524	6825	6725	6618	6641	6715	6716
Three Dependants	5961	7131	7920	7960	5905	5870	6049	6116	6219	6282	6363	6298	6290	6358	6524	7678	7566	7445	7472	7555	7556
Massachusetts																					
No Dependants	481	480	480	530	536	534	525	551	560	556	553	547	547	553	545	571	561	553	554	560	561
One Dependant	3204	3201	3195	3528	3570	3556	3502	3673	3732	3709	3693	3652	3650	3686	3630	3800	3747	3685	3698	3738	3740
Two Dependants	3974	4754	5280	5837	5905	5870	5786	6063	6166	6122	6098	6036	6028	6093	6002	6279	6187	6088	6110	6178	6179
Three Dependants	3974	4754	5280	5837	5905	5870	5786	6063	6166	6122	6098	6036	6028	6093	6002	7064	6961	6849	6874	6951	6952
Michigan																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	521	595	586	509	511	516	517
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3472	3965	3910	3397	3408	3445	3447
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5742	6552	6456	5612	5631	5694	5695
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5742	7371	7264	6313	6336	6407	6408
Minnesota																					
No Dependants	553	552	552	554	609	607	635	637	648	643	640	633	633	640	630	660	649	639	641	648	649
One Dependant	3684	3681	3674	3689	4057	4041	4234	4248	4316	4290	4271	4223	4222	4263	4198	4395	4334	4262	4277	4323	4325
Two Dependants	4570	5467	6072	6102	6710	6670	6996	7012	7131	7081	7053	6980	6971	7047	6942	7261	7156	7041	7066	7145	7146
Three Dependants	4570	5467	6072	6102	6710	6670	6996	7012	7131	7081	7053	6980	6971	7047	6942	8170	8051	7921	7950	8039	8040
Mississippi																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Missouri																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Montana																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Nebraska																					
No Dependants	481	480	480	482	487	485	478	479	487	522	519	514	514	519	521	546	537	529	530	536	537
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3483	3468	3429	3428	3462	3472	3635	3584	3525	3537	3575	3577
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5750	5727	5668	5661	5723	5742	6006	5918	5824	5844	5909	5910
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5750	5727	5668	5661	5723	5742	6757	6659	6552	6575	6648	6649
Nevada																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
New Hampshire																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045

Source: University of Kentucky Center for Poverty Research. 2016. "UKCPR National Welfare Data, 1980-2015." Gatton College of Business and Economics, University of Kentucky, Lexington, KY. http://www.ukcpr.org/data

Table A.6: Maximum state EITC by year (2013 $)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
New Jersey																					
No Dependants	481	480	480	482	487	485	525	551	572	580	577	571	571	577	581	620	586	577	578	584	586
One Dependant	3204	3201	3195	3208	3246	3233	3502	3673	3813	3870	3854	3810	3809	3847	3866	4130	3910	3845	3859	3900	3903
Two Dependants	3974	4754	5280	5306	5368	5336	5786	6063	6300	6388	6363	6298	6290	6358	6394	6825	6456	6353	6375	6446	6447
Three Dependants	3974	4754	5280	5306	5368	5336	5786	6063	6300	6388	6363	6298	6290	6358	6394	7678	7264	7147	7173	7253	7254
New Mexico																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	519	521	546	537	529	530	536	537
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3462	3472	3635	3584	3525	3537	3575	3577
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5723	5742	6006	5918	5824	5844	5909	5910
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5723	5742	6757	6659	6552	6575	6648	6649
New York																					
No Dependants	517	528	575	578	585	582	585	599	621	629	625	619	619	625	616	645	635	625	627	633	635
One Dependant	3444	3521	3834	3849	3895	3879	3899	3992	4138	4193	4175	4128	4127	4167	4103	4296	4236	4166	4180	4225	4228
Two Dependants	4272	5229	6336	6368	6442	6403	6443	6590	6836	6921	6894	6823	6814	6888	6785	7098	6994	6882	6907	6984	6985
Three Dependants	4272	5229	6336	6368	6442	6403	6443	6590	6836	6921	6894	6823	6814	6888	6785	7986	7869	7743	7770	7857	7858
North Carolina																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	491	521	513	505	506	511	512
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3267	3469	3421	3365	3376	3413	3415
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5402	5733	5649	5559	5578	5641	5641
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5402	6450	6356	6254	6276	6346	6347
North Dakota																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Ohio																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	512
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3415
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5641
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6347
Oklahoma																					
No Dependants	481	480	480	482	487	485	478	479	511	508	505	500	500	505	498	521	513	505	506	511	512
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3408	3387	3372	3334	3333	3366	3314	3469	3421	3365	3376	3413	3415
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5630	5590	5568	5511	5504	5564	5481	5733	5649	5559	5578	5641	5641
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5630	5590	5568	5511	5504	5564	5481	6450	6356	6254	6276	6346	6347
Oregon																					
No Dependants	481	480	480	506	512	509	501	503	511	508	505	500	500	505	502	526	518	509	511	516	517
One Dependant	3204	3201	3195	3368	3408	3395	3342	3353	3408	3387	3372	3334	3333	3366	3346	3503	3454	3397	3408	3445	3447
Two Dependants	3974	4754	5280	5572	5636	5603	5523	5536	5630	5590	5568	5511	5504	5564	5533	5787	5703	5612	5631	5694	5695
Three Dependants	3974	4754	5280	5572	5636	5603	5523	5536	5630	5590	5568	5511	5504	5564	5533	6511	6416	6313	6336	6407	6408
Pennsylvania																					
No Dependants	481	480	480	482	487	485	478	479	487	484	481	476	476	481	474	496	488	481	482	487	488
One Dependant	3204	3201	3195	3208	3246	3233	3183	3194	3245	3225	3211	3175	3174	3205	3156	3304	3258	3204	3215	3250	3252
Two Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	5460	5380	5294	5313	5372	5373
Three Dependants	3974	4754	5280	5306	5368	5336	5260	5272	5362	5324	5303	5248	5242	5299	5220	6143	6053	5956	5977	6044	6045
Rhode Island																					
No Dependants	613	612	611	614	619	614	602	601	609	605	601	595	595	601	592	620	610	601	602	609	610
One Dependant	4085	4081	4074	4090	4122	4090	4011	4008	4057	4032	4014	3969	3968	4007	3945	4130	4073	4005	4019	4063	4065
Two Dependants	5067	6061	6732	6766	6817	6750	6627	6617	6702	6655	6629	6560	6552	6623	6524	6825	6725	6618	6641	6715	6716
Three Dependants	5067	6061	6732	6766	6817	6750	6627	6617	6702	6655	6629	6560	6552	6623	6524	7678	7566	7445	7472	7555	7556

Source: University of Kentucky Center for Poverty Research. 2016. "UKCPR National Welfare Data, 1980-2015." Gatton College of Business and Economics, University of Kentucky, Lexington, KY. http://www.ukcpr.org/data

Table A.7: Maximum state EITC by year (2013 $)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
South Carolina																					
No Dependants	306	314	323	332	341	347	353	364	376	382	390	399	412	428	438	457	457	464	475	487	496
One Dependant	2038	2094	2152	2210	2271	2312	2353	2428	2506	2547	2604	2662	2747	2853	2917	3043	3050	3094	3169	3250	3305
Two Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5028	5036	5112	5236	5372	5460
Three Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5657	5666	5751	5891	6044	6143
South Dakota																					
No Dependants	306	314	323	332	341	347	353	364	376	382	390	399	412	428	438	457	457	464	475	487	496
One Dependant	2038	2094	2152	2210	2271	2312	2353	2428	2506	2547	2604	2662	2747	2853	2917	3043	3050	3094	3169	3250	3305
Two Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5028	5036	5112	5236	5372	5460
Three Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5657	5666	5751	5891	6044	6143
Tennessee																					
No Dependants	306	314	323	332	341	347	353	364	376	382	390	399	412	428	438	457	457	464	475	487	496
One Dependant	2038	2094	2152	2210	2271	2312	2353	2428	2506	2547	2604	2662	2747	2853	2917	3043	3050	3094	3169	3250	3305
Two Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5028	5036	5112	5236	5372	5460
Three Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5657	5666	5751	5891	6044	6143
Texas																					
No Dependants	306	314	323	332	341	347	353	364	376	382	390	399	412	428	438	457	457	464	475	487	496
One Dependant	2038	2094	2152	2210	2271	2312	2353	2428	2506	2547	2604	2662	2747	2853	2917	3043	3050	3094	3169	3250	3305
Two Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5028	5036	5112	5236	5372	5460
Three Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5657	5666	5751	5891	6044	6143
Utah																					
No Dependants	306	314	323	332	341	347	353	364	376	382	390	399	412	428	438	457	457	464	475	487	496
One Dependant	2038	2094	2152	2210	2271	2312	2353	2428	2506	2547	2604	2662	2747	2853	2917	3043	3050	3094	3169	3250	3305
Two Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5028	5036	5112	5236	5372	5460
Three Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5657	5666	5751	5891	6044	6143
Vermont																					
No Dependants	383	393	404	415	426	434	466	480	496	504	515	527	544	565	578	603	603	612	627	643	655
One Dependant	2548	2618	2690	2763	2839	2890	3106	3205	3308	3362	3437	3514	3626	3766	3850	4017	4026	4084	4183	4290	4363
Two Dependants	3160	3888	4445	4570	4695	4770	5132	5291	5465	5549	5676	5808	5988	6225	6368	6637	6648	6748	6912	7091	7207
Three Dependants	3160	3888	4445	4570	4695	4770	5132	5291	5465	5549	5676	5808	5988	6225	6368	7467	7479	7591	7776	7978	8109
Virginia																					
No Dependants	306	314	323	332	341	347	353	364	376	382	390	399	494	514	526	548	548	557	570	584	595
One Dependant	2038	2094	2152	2210	2271	2312	2353	2428	2506	2547	2604	2662	3296	3424	3500	3652	3660	3713	3803	3900	3966
Two Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	5443	5659	5789	6034	6043	6134	6283	6446	6552
Three Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	5443	5659	5789	6788	6799	6901	7069	7253	7372
Washington																					
No Dependants	306	314	323	332	341	347	353	364	376	382	390	399	412	428	438	457	457	464	475	487	496
One Dependant	2038	2094	2152	2210	2271	2312	2353	2428	2506	2547	2604	2662	2747	2853	2917	3043	3050	3094	3169	3250	3305
Two Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5028	5036	5112	5236	5372	5460
Three Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5657	5666	5751	5891	6044	6143
West Virginia																					
No Dependants	306	314	323	332	341	347	353	364	376	382	390	399	412	428	430	457	457	464	475	487	496
One Dependant	2038	2094	2152	2210	2271	2312	2353	2428	2506	2547	2604	2662	2747	2853	2917	3043	3050	3094	3169	3250	3305
Two Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5028	5036	5112	5236	5372	5460
Three Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5657	5666	5751	5891	6044	6143
Wisconsin																					
No Dependants	318	327	336	345	355	361	367	379	391	397	406	415	428	445	456	475	475	483	494	506	516
One Dependant	2120	2178	2238	2298	2362	2404	2447	2525	2606	2649	2708	2768	2857	2967	3034	3165	3172	3218	3296	3380	3437
Two Dependants	2932	3608	4054	4168	4282	4350	4432	4569	4720	4793	4902	5016	5171	5376	5499	5732	5741	5674	5812	5963	6061
Three Dependants	3792	4665	5085	5228	5371	5457	5560	5731	5920	6012	6149	6292	6486	6744	6898	8090	8102	7706	7894	8099	8232
Wyoming																					
No Dependants	306	314	323	332	341	347	353	364	376	382	390	399	412	428	438	457	457	464	475	487	496
One Dependant	2038	2094	2152	2210	2271	2312	2353	2428	2506	2547	2604	2662	2747	2853	2917	3043	3050	3094	3169	3250	3305
Two Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5028	5036	5112	5236	5372	5460
Three Dependants	2528	3110	3556	3656	3756	3816	3888	4008	4140	4204	4300	4400	4536	4716	4824	5657	5666	5751	5891	6044	6143

Source: University of Kentucky Center for Poverty Research. 2016. "UKCPR National Welfare Data, 1980-2015." Gatton College of Business and Economics, University of Kentucky, Lexington, KY. http://www.ukcpr.org/data

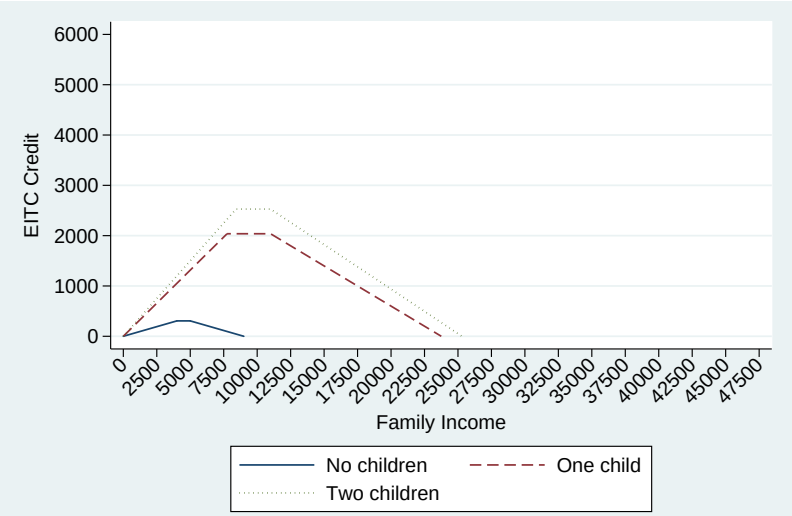

Figure A.1: EITC Benefit Schedule: 1994

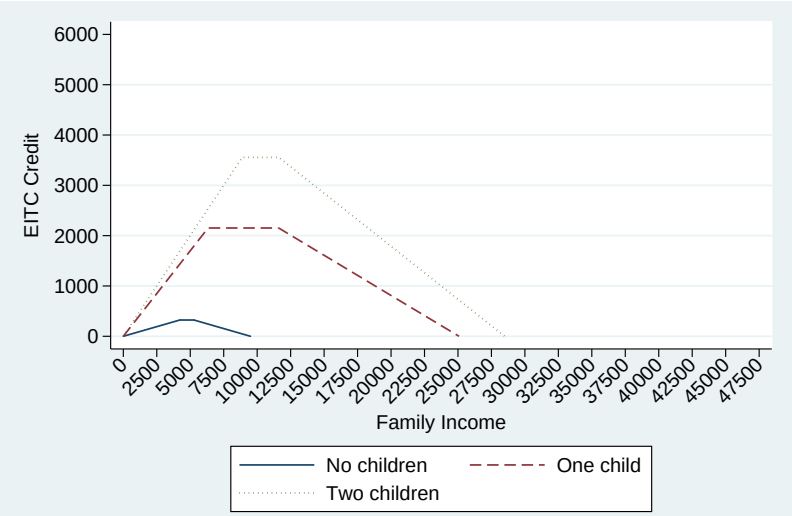

Figure A.2: EITC Benefit Schedule: 1996

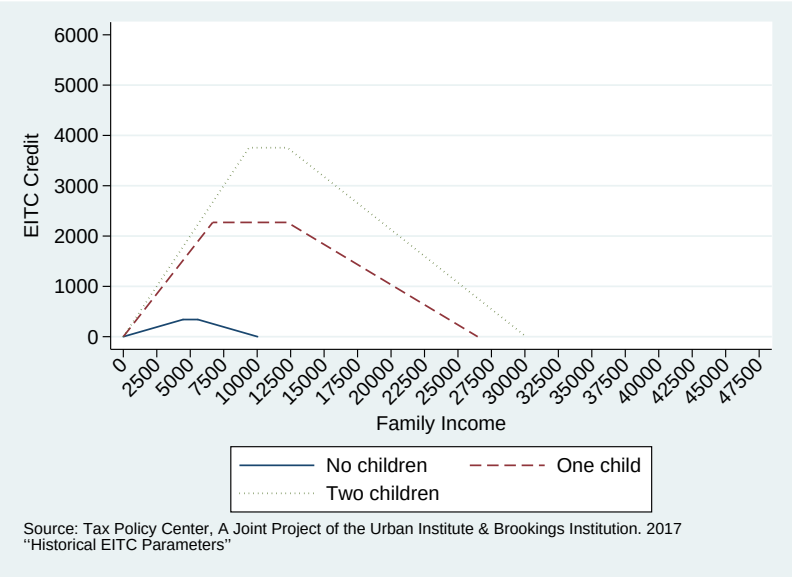

Figure A.3: EITC Benefit Schedule: 1998

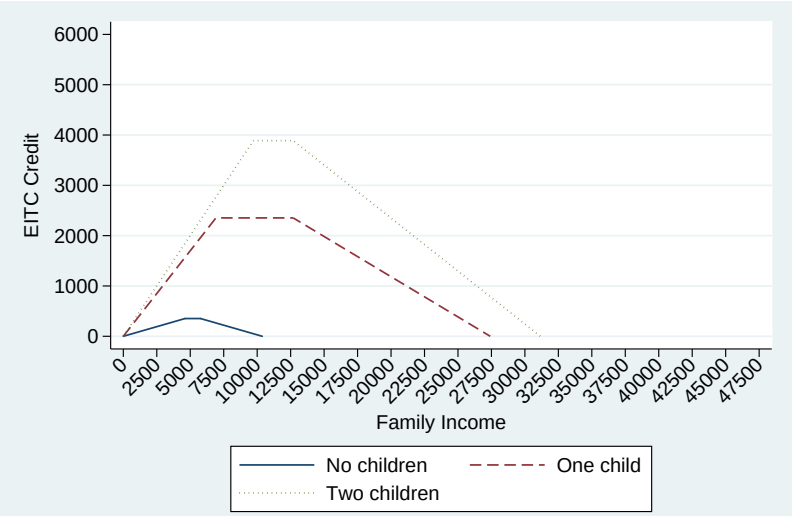

Figure A.4: EITC Benefit Schedule: 2000

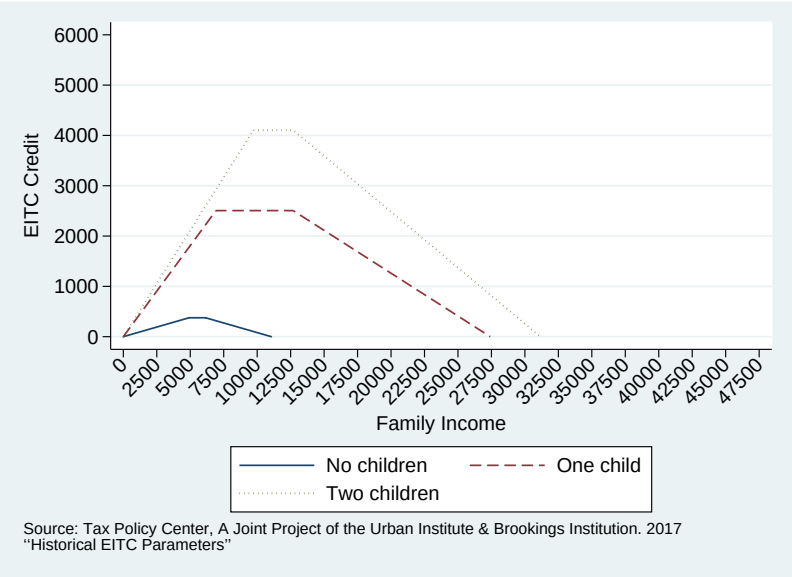

Figure A.5: EITC Benefit Schedule: 2002

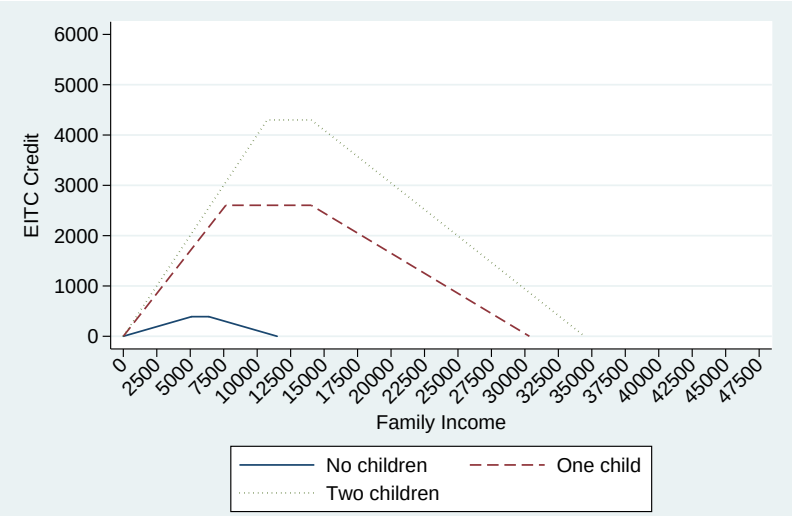

Figure A.6: EITC Benefit Schedule: 2004

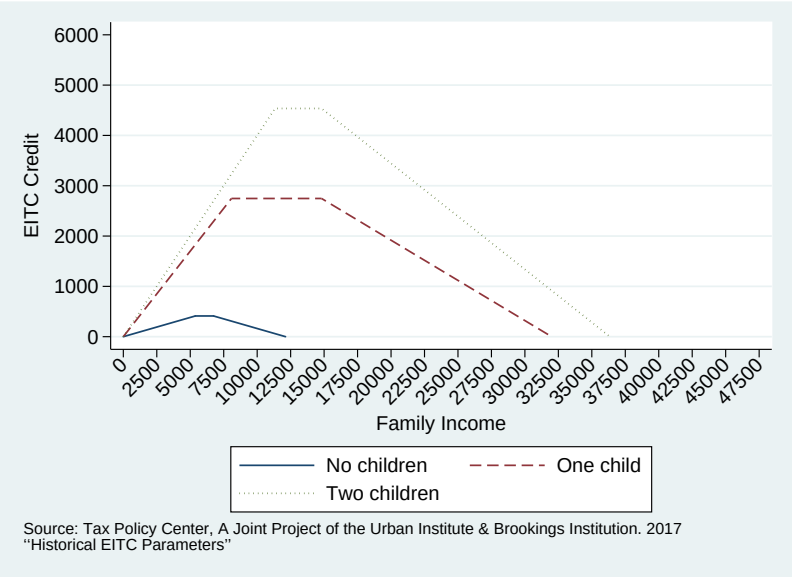

Figure A.7: EITC Benefit Schedule: 2006

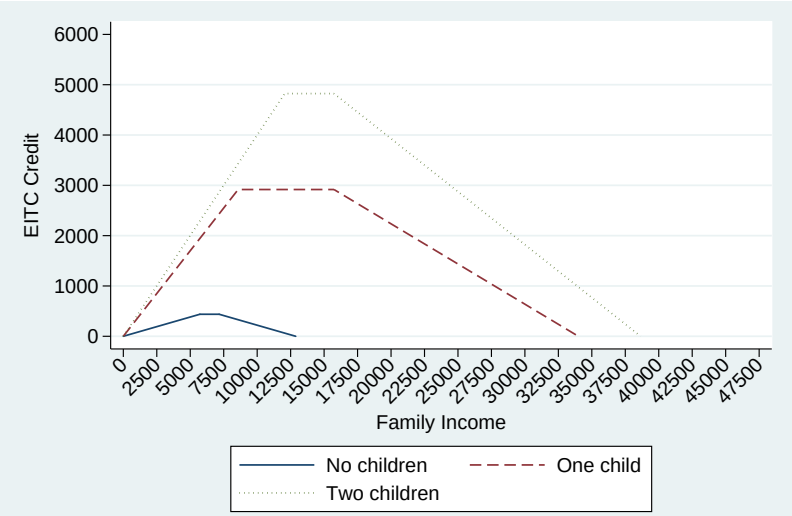

Figure A.8: EITC Benefit Schedule: 2008

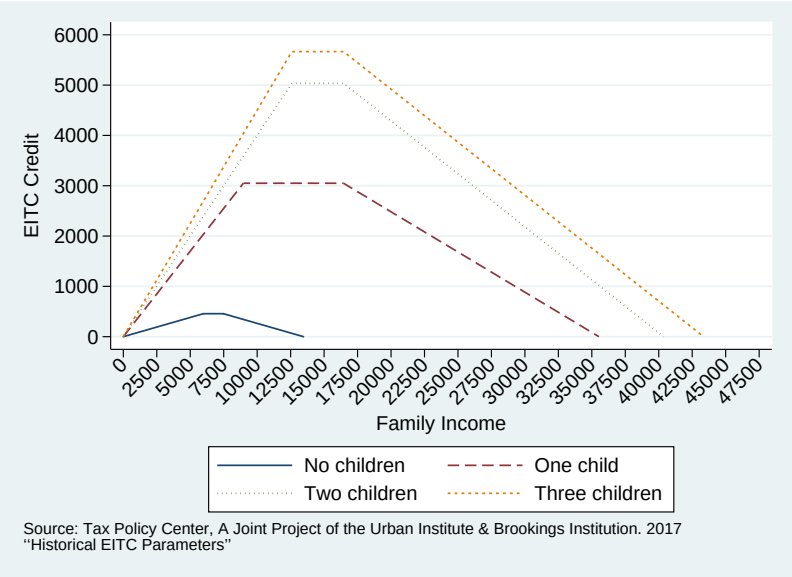

Figure A.9: EITC Benefit Schedule: 2010

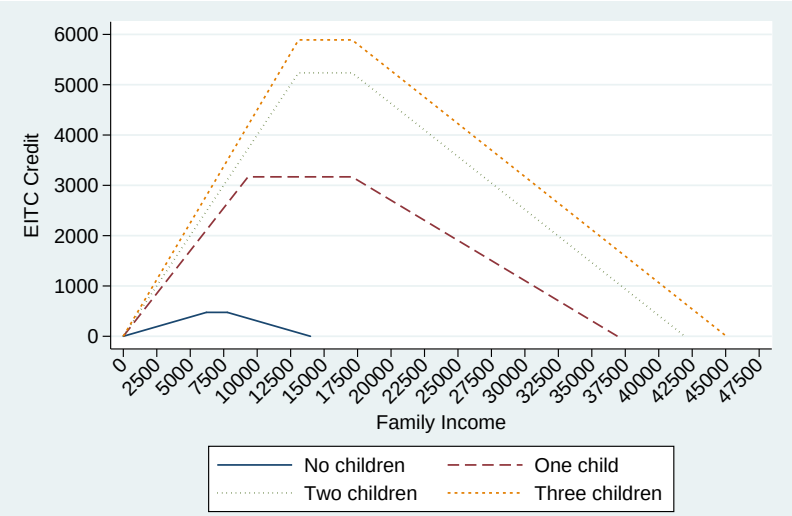

Figure A.10: EITC Benefit Schedule: 2012

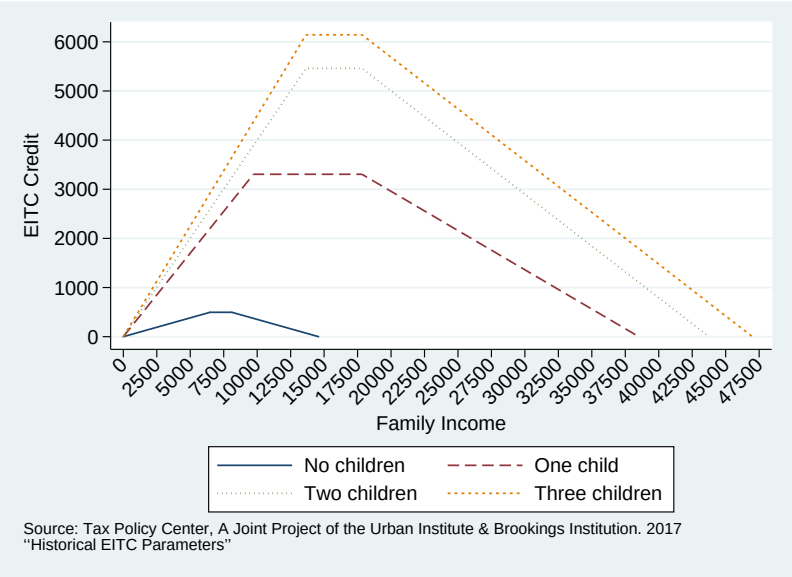

Figure A.11: EITC Benefit Schedule: 2014