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ABSTRACT

Using unique longitudinal administrative tax panel data for the District of Columbia (DC), we assess the combined effect of the DC supplemental earned income tax credit (EITC) and the federal EITC on poverty and income dynamics within Washington, DC, from 2001 to 2011. The EITC in DC merits investigation, as the DC supplement to the federal credit is the largest in the nation. The supplemental DC EITC was enacted in 2000, and has been expanded from 10 percent of the federal credit in 2001 to 40 percent as of 2009. To implement the study, we estimate least squares models with 0/1 dependent variables to estimate the likelihood of net-EITC income above poverty and near-poverty thresholds. We also estimate the likelihood of earnings growth and income stabilization from the EITC. To identify the effect of the EITC, we exploit variation in the EITC subsidy rate from 2008 to 2009, when an additional EITC bracket of 45 percent was added for workers with three or more dependent children, up from 40 percent in the previous year for workers with two or more children. We also estimate a model examining the impact of city-level changes to the EITC. The structure and richness of our data enable us to control for tax filer fixed effects, an important innovation from many previous EITC studies. Overall, we find that the combined EITC raises the likelihood of net-EITC income above poverty and near poverty by as much as 9 percent, with the largest consistent effects accruing to single-parent families.

JEL Classification Codes: I32, I38, H24, J38

Key Words: Poverty, Social Welfare Policy, Tax Expenditures, Labor Supply

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Twenty-five states and Washington, D.C. (DC), have supplemented the federal Earned Income Tax Credit (EITC) with their own state EITCs (Ben-Shalom, Moffitt, and Scholz 2012; Center on Budget and Policy Priorities 2015). The EITC is currently the nation's largest federal cash transfer program for low- and moderate-income working families, and the DC EITC, equal to 40 percent of the federal EITC, is the largest state or local supplement to the federal EITC in the country (Clark 2008); for DC participants, this translates to the largest total refundable EITC. As states and local jurisdictions consider policies to raise after-tax and transfer incomes among the working poor and near poor, there is limited information on the combined antipoverty effectiveness of local and federal EITCs (Guzman, Pirog, and Seefeldt 2013; Nichols and Rothstein, forthcoming), and no evidence on the impact of the EITC in DC on the longer-term poverty status or economic well-being of its residents.

To address this gap, our study uses DC administrative municipal tax data to examine the effect of the federal EITC combined with the DC supplemental EITC on poverty and income dynamics between 2001 and 2011. In DC, almost 20 percent of residents lived at or below poverty in 2011, well above the national poverty rate of approximately 15 percent (DeNavas-Walt and Proctor 2014). Adopting a definition of net-EITC income equal to federal adjusted gross income (FAGI) plus the DC and federal EITC, we find that the EITC lowers exposure to poverty and near poverty both one and two years after receipt. The EITC in DC also reduces negative income instability when income falls among residents, and city-level EITC expansions throughout the 2000s appear to have reduced poverty. Poverty reductions are strongest for single-parent households, raising their chances of remaining above 100, 125, and 150 percent of the poverty line by 2, 7, and 9 percent, respectively.

Single parents represent an important demographic group for poverty policy. Nationwide, throughout the 2000s roughly 30 percent of single parent, female-headed families are below poverty in any given year, and over 50 percent of poor children reside in single-parent, female-headed families (DeNavas-Walt and Proctor 2014). We identify the effect of the EITC within the city for single-parent and married-parent families by exploiting a policy change in the American Recovery and Reinvestment Act (ARRA), wherein a new EITC category for workers with three or more children was established at 45 percent in 2009. For working families with three or more children, this is a 5 percentage point increase from the 2001–2008 subsidy, when families with two or more dependent children shared the top phase-in earnings subsidy rate of 40 percent. The poverty results are robust for single-parent families and for married families up to 125 percent of the poverty line; the income instability results are robust for married families. Importantly, the structure and richness of our data enable us to control for tax filer fixed effects, an important innovation from many previous EITC studies.

OVERVIEW OF THE EITC

The federal EITC supplements a proportion of earnings through the tax system. Originally designed to reduce the tax burden facing low-income workers and their families in 1975, the program now operates as the nation’s largest cash transfer program for the poor and near poor. EITC refunds are calculated as a share of earnings up to an annually established maximum, with eligibility varying by marital status, adjusted gross income, and the number of child dependents (Marr et al. 2014; Nichols and Rothstein, forthcoming). The subsidy or “phase-in” rate replaces anywhere from 7 cents on each dollar earned for qualifying workers without children to 45 cents on each dollar earned for qualifying workers with three or more children as

of 2009. The DC EITC emerged as the largest supplement to the federal credit in the nation (Kerstetter 2008) after undergoing three rate increases, as well as eligibility expansions since enactment in 2000 (Lakin and Lazere 2002) (see Table 1), and is calculated as a fixed percentage of the federal EITC. Since 2009 the DC EITC is equivalent to 40 percent of the federal credit, and participation in both the DC and federal EITC has been on the rise since the early 2000s. Further elevating the importance of this program are persistently low and stagnant earnings among less-educated U.S. workers over the last 10 years or more (Autor, Katz, and Kearney 2008; Autor 2014; Berlin 2007; Blank 2008; Hardy, Smeeding, and Ziliak 2015; Nichols and Rothstein, forthcoming; Shaefer and Edin 2013).

Several studies estimate a range of social and economic benefits from EITC receipt. These include increased employment (Bishop, Heim, and Mihaly 2009; Bollinger, Gonzales, and Ziliak 2009; Chetty, Friedman, and Saez 2012; Eissa and Hoynes 2004; Hotz and Scholz 2003; Meyer 2002; Meyer and Rosenbaum 2001) and lowered welfare participation (Grogger 2004), improved educational achievement (Dahl and Lochner 2012), higher net income and liquidity (Bitler, Hoynes, and Kuka 2014; LaLumia 2013; Smeeding, Ross Phillips, and O'Connor 2000), and lowered poverty (Gundersen and Ziliak 2004; Neumark and Wascher 2001), particularly among families headed by single mothers. Many of these studies focus on policy changes and expansions to the federal EITC during the 1980s and 1990s, including the Tax Reform Act of 1986 as well as the Omnibus Budget Reconciliation Acts of both 1990 and 1993. No previous EITC studies have, to our knowledge, accounted for both state supplements (Cancian and Levinson 2006; Neumark and Wascher 2001) and the federal EITC to assess poverty using administrative tax data.

The program's design creates offsetting income and substitution effects, so that a given worker may respond to additional income from supplemented wages by working additional, fewer, or the same number of hours (Cancian and Levinson 2006). Regarding the relationship between the EITC and poverty in DC, ambiguous theoretical labor supply effects and stagnant wages among lower-skilled workers (Hardy, Smeeding, and Ziliak 2015; Grusky et al. 2013) make it unclear ex ante whether the combined DC and federal EITC raises or lowers the likelihood of poverty or near-poverty status on a longer-term basis (Scholz 1994).

LOCAL SPENDING AND DISTRIBUTIONAL IMPACTS OF THE EITC IN DC

DC's EITC policy is part of an income tax system that is among the most progressive in the nation, directing resources toward low-income residents to a greater degree than most other states and localities (Davis et al. 2015). Although the city experienced a financial crisis throughout the early to middle 1990s, municipal revenues have grown since the late 1990s, providing the flexibility to enact such a policy. This growth was spurred in large part by population growth from the late 1990s through 2013, including the arrival of roughly 1,000 new residents per month from 2007 to 2013. Accordingly, city spending rose alongside population and revenue growth over this period, from \$3.6 billion in 2002 to \$5.8 billion in 2011, slowed somewhat by the recession in 2007 (Gandhi, Spaulding, and McDonald, forthcoming). The DC supplemental EITC was enacted in 2000 at the onset of population and revenue growth, at 10 percent credit of the federal EITC. In Figure 1 we show that spending on the DC supplemental EITC doubled from \$21 million in 2001 to \$52 million by 2011, driven largely by increases to the size of the local credit as a function of the federal EITC, up to 25 percent in 2002, 35 percent in 2006, and 40 percent by 2009 (see Table 1). Distributionally, the largest proportion of the

city's EITC expenditure accrues to the third quintile of EITC recipients (see Figure 2), with mean earnings of approximately \$15,000. This is by design and consistent with the federal EITC schedule, within the range at which the EITC benefit reaches its maximum value. This raises policy implications regarding the possibilities and limitations for the program as an antipoverty strategy for workers with earnings closer to or further from the official poverty threshold. For example, residents experiencing jobless spells will not benefit from the EITC if their earnings are nonexistent throughout the calendar year.

We begin our assessment of the EITC in DC by conducting a set of “point-in-time” estimates of poverty reduction from the federal and DC EITC, shown in Table 2. In this exercise, we depict the percent reduction in poverty and near poverty, examining the proportion of DC tax filers reporting FAGI at or below 100, 125, and 150 percent of the federal poverty threshold. Next, we recalculate this number and share after accounting for net-EITC income, equal to total federal and DC EITC benefits received in addition to FAGI. Moving across Table 2, we find that the percent reduction in poverty is 37 percent for single filers and 16 percent for married filers when accounting for the “full” DC and federal EITC together. An intermediate definition of near-poverty, 125 percent of the poverty threshold, yields net-EITC poverty reductions of 25 percent for single filers and nearly 10 percent for married filers. We then observe that a second near-poverty rate, at or below 150 percent of the federal poverty threshold, is reduced by 16 percent for single parents and 5 percent for married families filing jointly. Data on the DC and federal EITC allow us to demonstrate the immediate antipoverty effect, or lack thereof, from a significantly larger net-EITC benefit driven by the largest local EITC in America. Although this point-in-time exercise suggests meaningful poverty reductions, it leaves unanswered a larger

policy question: do significantly larger EITCs yield *longer-term* antipoverty benefits beyond immediate income maintenance?

ESTIMATING THE EFFECT OF THE EITC

To estimate the longer-term antipoverty effects of the combined DC and federal EITC, we exploit a policy change in the 2009 ARRA. The size of the Great Recession and financial crisis motivated the ARRA, an \$833 billion fiscal stimulus of spending programs and tax cuts (Congressional Budget Office 2012). In 2009, the recovery act established a new federal EITC phase-in rate for families with three or more children of 45 percent, a 5 percentage point increase from the 2001–2008 subsidy for this group, when families with two *or more* dependent children shared the top phase-in subsidy rate of 40 percent (Tax Policy Center 2014). This jump in the EITC rate for families with three or more children introduces variation in the size of the EITC benefit over time by family size, both across the country and for DC residents. This variation in the level of benefits over time allows for estimation of a plausibly causal effect of the EITC on the margin (Hotz and Scholz 2003; Ziliak 2013). Across married and head of household filers, eligibility for the EITC is determined by income level and the number of child dependents; the natural experiment design arises from the above-mentioned 2009 ARRA policy change. Together, these three indicators identify the effect of the combined DC and federal EITC. This differences-in-differences-in-differences (DDD) estimator (Gruber 1994) is appropriate in scenarios like the one presented by the ARRA, where government policy is altered in a way that is unlikely to be anticipated by program participants given the complexity of the tax code (Meyer 1995; Tach and Halpern-Meehin 2014; Yelowitz 1995). We use least squares to estimate the

effects of the combined DC and federal EITC on the probability of net-EITC income above poverty, income growth, and income stabilization. More formally,

$$(1) \quad Y_{it} = \alpha + \beta_k \sum_{k=1}^{k=3} D_{ik} + \gamma E_{it} + \delta ARRA + \mu ARRA \times E_{it} \\ + \rho E_{it} \times \sum_{k=1}^{k=3} D_{ik} + \sigma D_{i3} \times E_{it} \times ARRA + \tau \mathbf{X}_t + \varphi_i + e_{it},$$

where Y_{it} is a 0/1 dichotomous dependent variable reflecting net-EITC income (FAGI plus federal EITC plus DC EITC) above poverty in either year $t + 1$ or years $t + 1$ and $t + 2$, or income dynamics. We estimate separate regression models for tax filing units that are either married filing jointly or head of household, referring to married filing jointly as “married” and head of household as “single” parents (Smeeding, Ross Phillips, and O’Connor 2000). With respect to income dynamics, earnings growth is a 0/1 indicator for whether or not the increased combined EITC induces higher earnings, and income instability is a 0/1 indicator for whether or not negative year-over-year percent FAGI changes are buffered after accounting for net-EITC income. E_{it} indicates EITC eligibility for tax filer i in year t as defined by the Internal Revenue Service (IRS)–published adjusted gross income thresholds for the program; $ARRA$ represents the time period of the ARRA and beyond spanning 2009 to 2011; $\sum_{k=1}^{k=3} D_{ik}$ are a set of separate indicator variables for tax filer i with one, two, or three or more dependents as of 2008, with tax filers reporting zero dependents as the omitted group; $ARRA \times \sum_{k=1}^{k=3} D_{ik}$ depicts three separate interactions of the recovery act time period with the aforementioned indicators for tax filers reporting one to three dependents, respectively; $ARRA \times E_{it}$ is the interaction of the recovery act time period with EITC eligibility status; $E_{it} \times \sum_{k=1}^{k=3} D_{ik}$ depicts three separate interactions of EITC eligibility status for tax filer i in time t with indicators for tax filers reporting one to three dependents; and, $D_{i3} \times E_{it} \times ARRA$ represents the main policy variable of interest, capturing the effect of the combined DC and federal EITC via the interaction of tax filers reporting three or

more dependent children as of 2008 with EITC eligibility during the 2009–2011 recovery act period. \mathbf{X}_t represents the following vector of city-level time varying economic and policy variables: unemployment rate, food insecurity, gross state product, family-size specific combined welfare cash and Food Stamp benefits, and the level of the city’s minimum wage. φ_i accounts for tax filer fixed effects to compensate for the dearth of demographic data within the administrative tax panel. e_{it} is a random error term for tax filer i in year t . Finally, we cluster standard errors on tax filer identifiers.

DISTRICT OF COLUMBIA ADMINISTRATIVE TAX DATA

The data used in this study come from individual income tax (IIT) records for DC tax filers between 2001 and 2011. The tax data include all information regarding income, taxes, exemptions, and other tax-related variables for individuals who filed in a given year. We use unique identifiers for tax filers across years, and in the course of constructing the IIT panel data we discovered that a small share of filers submit multiple tax returns within a year, creating duplicates in the data. In order to facilitate construction of a panel data set, we drop all tax returns for each filer after the first observed return, dropping 3,485 duplicate observations. All dollar denominated values in the analysis are adjusted using the personal consumption expenditures deflator (PCE) for 2010.

Eligibility for the EITC is determined by comparing FAGI to IRS income thresholds for EITC eligibility based on marital status and the number of dependent children. U.S. federal poverty thresholds are determined in a similar manner, based on overall family size and number of dependent children. To link this external data to our tax file, we use the number of dependents along with information on whether the filer is defined as married filing jointly, indicating a two-

parent household, or head of household, indicative of a single-parent household, to construct a measure of family size. We then use this family size variable to link the tax data with annual weighted average poverty thresholds from the U.S. Department of Health and Human Services (HHS), and we use number of dependents and filing status to merge IRS data containing EITC thresholds. We use number of dependents as a proxy for child dependents, and the use of weighted average poverty thresholds is an acknowledgement that the “number of dependents” variable does not provide information on the age distribution of dependents within the family unit. To at least partially assuage concerns regarding the proper measure of poverty (Couch and Pirog 2010), we incorporate the standard income-based threshold used by the U.S. government and supplement it by using near-poverty thresholds for 125 percent of poverty, equal to $1.25 \times$ poverty threshold, and 150 percent of poverty, $1.5 \times$ poverty threshold. City-level variables for DC unemployment rate, food insecurity, gross state product, family-size specific combined welfare cash and Food Stamp benefit, and the level of the city’s minimum wage supplement the tax data and are drawn from the University of Kentucky Center for Poverty Research (UKCPR) National Welfare Database. As mentioned in the previous section, we stratify the sample for married “joint” filers as well as head of household filers, referred to in the tables and subsequent text as “single parents.” We then restrict the data sample to tax filers reporting positive, nonmissing FAGI and earnings (wages, salaries, and tips) in each year of the 11-year panel. However, we do allow tax filers to drop out of the sample if they change filing status. We also drop observations with negative or missing values for wages or adjusted gross income. Whereas the full tax panel without balancing on positive FAGI and wages over 11 consecutive years contains 698,997 unique records, of which 86,131 are married filers and 162,393 are single-parent filers, we are left with a sample of 63,365 unique tax filers, inclusive of all tax filing

types. Upon subsetting the data to married-filing jointly and household head tax filers, the data contain 16,354 unique married-filing jointly tax filers and 22,214 household head, or “single” tax filers.

Table 3 reports summary statistics for the full data sample. The full sample of DC tax filing residents is relatively affluent, with mean earnings of \$72,136 and FAGI equal to \$124,919. The standard deviations for earnings (reported as wages in Table 3) and FAGI—\$475,800 and \$1,076,240, respectively—provide a view of the dispersion of earnings and incomes throughout the sample. We also find that the average DC EITC recipient (federal EITC greater than zero in any year) has mean earnings and FAGI of \$22,000 to \$23,000 and a combined mean EITC receipt of over \$3,000. The data include geocodes for tax filers, providing location information for the tax record including address, census block, census tract, neighborhood, and ward. Using this finer level of detail, we supplement the tax data with census tract-level data from the American Community Survey to better understand the demographic profile of census tracts where tax filers reside.¹ The average recipient resides in a census tract that has higher poverty, lower marriage rates, a higher proportion of black residents, and lower educational attainment. In Figure 2 we compute the FAGI distribution for 2011 EITC recipients in DC, shown by quintile. Mean FAGI statistics by quintile are as follows: \$4,748 in quintile 1; \$9,899 in quintile 2; \$14,241 in quintile 3; \$21,208 in quintile 4; and \$31,414 in quintile 5. The largest combined EITCs are refunded to persons with FAGIs in the third and fourth quintiles of EITC recipients, and mean FAGI from 2001 to 2011 in the third and fourth quintiles ranges from roughly \$15,000 to \$25,000. With respect to the geographic distribution of benefits, Appendix

¹ Beginning in 2010, the U.S. Census Bureau released ACS five-year estimates for all geographic areas down to census tract and block levels. Multiyear estimates released in consecutive years consist mostly of overlapping years and shared data. Based on ACS data, we created demographic variables for each DC census tract. We assign the 2005–2009 ACS data to IIT years 2006 and 2007, 2006–2010 ACS data to IIT year 2008, 2007–2011 ACS data to IIT year 2009, and the 2008–2012 ACS data to IIT years 2010 and 2011.

Figure 1 examines EITC participation by ward, a political grouping of DC neighborhoods. As expected, Appendix Figure 1 reveals that EITC recipients cluster disproportionately in and around the eastern wards, historically the poorest in the city (Cowell and Mayer, forthcoming). As shown in Appendix Table 1, there is very little change between 2001–2008 and 2009–2011 FAGI. It is noteworthy that earnings actually decline in the 2009–2011 period for the full sample relative to the 2001–2008 period, reflecting post-ARRA unemployment and the lagged economic contraction in and around the DC metropolitan area after 2009. Federal and DC EITC benefits rose, as did city-level measures of economic hardship.

RESULTS

Poverty and Near Poverty

In Tables 4–6, we examine the effect of the combined federal and DC EITC on poverty. These tables depict the full set of results, where the coefficients on *Three+ Dep. × Eligible × ARRA* depict the triple difference estimation strategy. The dependent variable compares net-EITC income to the weighted average family-size adjusted poverty threshold. The first set of models (columns 1 and 2) estimates shorter-term poverty effects by examining the effect of a year t EITC increase on the likelihood of net-EITC income above poverty in year $t + 1$. The last two columns estimate the likelihood of net-EITC income above poverty in both years $t + 1$ and $t + 2$ after a year t EITC increase. We view columns 3 and 4 as tests of a longer-term behavioral response, consistent with the literature on positive labor-supply effects from the EITC.

Beginning with Table 4, for married and single family tax filers, the marginal effect of additional EITC yields no discernable effects on the likelihood of net-EITC income above poverty one year after the EITC increase. However, on a longer-term, two-year basis, we find that the combined

federal-DC EITC increase leads to a 1.7 percent higher likelihood of net-EITC income above the weighted average poverty threshold for single-parent filers. Most, if not all, of our independent variables fall within the unit interval, and our models are focused on the partial effect of the EITC (Wooldridge 2010).

In Tables 5–6 we estimate the effect of a larger EITC on the likelihood of net-EITC income above 125 and 150 percent of the weighted average poverty threshold, respectively. As a point of reference, the 2011 weighted-average poverty threshold for a family of three equals \$17,916, 125 percent of poverty equals \$22,395, and 150 percent of poverty equals \$26,874. Figure 2 shows that, depending on family size, the third to fifth EITC quintiles include some workers with low income *above* the poverty line. In Table 5 we find that, like 100 percent of the poverty threshold, there is no effect on married families. However, single parent filers are 2.4 percent more likely to have net-EITC income above 125 percent of poverty one year after the increased EITC, and 7.3 percent more likely over a two-year continuous basis following the increased EITC. The near-poverty effects of the EITC are larger than at 100 percent of poverty, illuminating the importance of examining the effectiveness of this policy using definitions of poverty *and* near poverty. In Table 6, we examine the likelihood of net EITC income above 150 percent of the poverty threshold. Consistent with the models examining poverty at 125 percent of the poverty line, single-parent filers are about 2.4 percent more likely to have net EITC income above 150 percent of the poverty threshold one year out. From here, the antipoverty effects of the EITC become larger. Net EITC income among married filers is approximately 4 percent more likely to be above 150 percent of the poverty threshold and 9.0 percent more likely among single-parent filers two years out. To put these effects into context, for a family of three in 2009, identification occurs off of a marginal increase of \$600 from the federal EITC and \$251 from the

DC EITC, where the comparison is the \$0.45 per dollar earned up to \$5,657 under the newly formed EITC category of three or more dependent children versus \$5,028 of federal EITC available under the previous top category for families, now applicable for those with 2 dependent children.

Income Dynamics

Table 7 presents two sets of results on income dynamics. The first models (columns 1 and 2) estimate the likelihood of earnings growth over a one year period. This is not only a direct exploration into earnings growth, but also an inquiry into the possibility of an hours worked effect from a larger EITC, given that hourly earnings among lower-skilled and less-educated workers appear stagnant over the 1990s and 2000s (Autor 2014; Autor, Katz, and Kearney 2008; Hardy, Smeeding, and Ziliak 2015). The dependent variable for these models indicates whether or not year $t + 1$ earnings are greater than earnings in year t , and we find no evidence of earnings growth via larger EITCs.

The second set of models in Table 7 (columns 3–4) estimate whether the year t EITC increase lowers the size of negative percent changes in year t adjusted gross income. Workers whose earnings fall between years should have their after-tax income supplemented in a progressive tax system, and if they fall into range, via the EITC (Hardy 2015; Hardy and Ziliak 2014; Kniesner and Ziliak 2002). The dependent variable is conditioned for tax filers experiencing a one-year decline in FAGI, and columns 5–6 test the robustness of this result to using a lagged value of the EITC, to test whether last year's $t - 1$ EITC, received in year t , reduces the absolute value of a negative FAGI percent change between years. We find that the both the current and previous year larger EITC raise the probability that the credit reduces a negative percent change in FAGI, approximately 6 percent more likely for married filers using

the current and previous years EITC, and 10.5 percent for single filers using the previous year EITC.

City-level demographics are not of primary importance to the study, but a few general patterns emerge. First, the city's unemployment rate is negatively associated with net-EITC income above poverty or near poverty, and larger welfare and Food Stamp benefits are positively associated with net-EITC income above poverty, though the magnitudes are small. Food insecurity is associated with lowered poverty, whereas minimum wages are associated with higher poverty.

Isolating a Separate DC EITC Relationship

Throughout our discussion, identification has hinged on the one-time addition of a new EITC category for three or more children. This approach does not account for important, city-level variation in the combined federal and local EITC over the 2000s occurring within DC. As depicted in Table 1, the DC EITC was enacted in 2000 at 10 percent of the federal credit, undergoing rate increases as a share of the federal credit equal to 25 percent in 2002, 35 percent in 2006, and 40 percent in 2009. To account for this variation over time, we estimate a linear probability model of net-EITC income above 100 percent of poverty, Y_{it} , similar to the estimates depicted in Table 4. Here, we group tax filers into categories based upon their eligibility for the EITC, and whether the city's EITC was either 10–25 percent, 35 percent, or 40 percent. These “rate” variables are in fact dichotomous variables based on the level of the DC EITC at a particular point in time. We define the 2001–2005 time period as our baseline omitted group, when the local credit was enacted for one year at 10 percent of the federal credit and quickly increased to 25 percent the next year. The relevant estimates derive from the interaction of credit level and eligibility. Our estimating model is as follows:

$$(2) \quad Y_{it} = \alpha + \gamma E_{it} + \delta Credit_{35} + \vartheta Credit_{40} + \mu E_{it} \times Credit_{35} + \\ + \rho E_{it} \times Credit_{40} + \tau \mathbf{X}_t + \varphi_i + e_{it}.$$

As with Equation (1), we control for city-level economic and demographic variables via \mathbf{X}_t as well as tax filer fixed effects φ_i , measured with random error e_{it} . As shown in Table 8, we find that residents eligible for the EITC when the DC EITC is 35 percent of the federal credit are approximately 3 percent more likely to have net-EITC income above poverty, relative to the time period during which the DC credit equals 10–25 percent of the federal EITC. This holds for single parents one year out and both married and single parents two years out. During the 40 percent DC EITC period, eligible residents are 7.7 (married) to 5.3 (single) percent more likely to have net-EITC income above poverty one year out, and 26.4 (married) to 15.3 (single) percent more likely to have net-EITC income above poverty two years out. The results here are consistent with those in our main poverty and near-poverty models in Tables 4–6, suggesting that increasingly generous EITC benefits are associated with lowered poverty.

Robustness Checks Using Two Dependents

To test the robustness of our triple differences findings, we reestimate the empirical models in Tables 4–7 and impose the ARRA policy change on families with two dependents. If the recovery act expansion uniquely impacts families with three or more children, we can confirm that spillover effects or other secular policies did not impact other family types. In Appendix Tables 2–5, *Two dep. × Eligible × ARRA* displays the coefficient of interest. Testing the probability of net-EITC income above poverty, we find no evidence of antipoverty effects from the ARRA expansion for families with two children. In all of our robustness checks, families with three or more dependents are the omitted group. We proceed in Appendix Tables 3–5 to test near-poverty effects and income dynamics for families with 2 dependents. At 125

percent of the weighted average poverty threshold (Appendix Table 3), we again find no evidence of any net-EITC effect on poverty for married or single filer families in the two child control sample. In Appendix Table 4, evidence emerges to suggest EITC near-poverty effects at 150 percent of poverty are not robust for married filer families, where married filers with two dependents are anywhere from 5.5 to 3.9 percent *more* likely to have net-EITC income above poverty one and two years out, respectively. Importantly, our main estimates do appear to be robust for single-parent filers, and we initially find no evidence of antipoverty effects among married filers in Tables 4–6. This is an important result, as single parents display the largest near-poverty reduction from the EITC via Tables 5 and 6 and are a focal demographic group of concern in discussions of poverty alleviation (Currie 2006), given their overrepresentation among the poor (DeNavas-Walt and Proctor 2014).

The \$833 billion ARRA directed significant resources to America’s families in the form of expanded and extended unemployment insurance, which count as FAGI, as well as large expenditures via the Departments of Education, Transportation, and Health and Human Services for spending inclusive of K–12 education, highway maintenance, and Medicaid (Wilson 2012). There were also tax expenditures concurrent with EITC policy changes described here that impacted moderate income families. For example, in 2009 the Additional Child Tax Credit provides \$1,000 for families, phasing out at \$75,000 for single parents and \$110,000 for married families that file taxes jointly. It is possible that, at 150 percent of poverty and beyond, these elements of the ARRA begin to take hold for moderate income married families as the EITC phases out (Altshuler et al. 2009; Sherman 2011). On the question of income stabilization, Appendix Table 5 suggests that current-year EITC income stabilization is robust among married

filer families (column 3), but that otherwise increased EITCs do not yield unique stabilization effects.

Conclusion

Using rich administrative tax data and controlling for fixed effects, we find that the combined federal and DC EITC raise the likelihood of net EITC income above poverty and near poverty one and two years after an exogenous increase. Robust, large EITC antipoverty effects occur among single parents over a two-year period, ranging from a 2 (100 percent of poverty) to 9 (150 percent of poverty) percent higher likelihood of net EITC income above poverty or near-poverty. In our one-year models, we find a consistent 2 percent likelihood of net-EITC income above 125 and 150 percent of poverty for single-parent families. The determinants and underlying causes of shorter versus longer-term poverty spells may differ. Respectively, these can include temporary labor market shocks or less malleable individual-specific employment barriers related to job skills, discrimination, and networks (Berlin 2007; Bertrand and Mullainathan 2004; Darity et al. 2012; Duncan and Rodgers 1988). With many individuals and families experiencing poverty over spells of two years or more (Bane and Ellwood 1986; Hokayem and Heggeness 2014), it is in this context that the two-year results are encouraging. They are consistent with the empirical literature on the EITC, suggesting positive labor supply effects, and qualitative research documenting recipient perceptions of the consumption and asset accumulation benefits of the EITC (Sykes et al. 2014). The antipoverty effects are robust for single filers from 100 through 150 percent of poverty. There is reason to believe that, at 150 percent of poverty among married filers, other ARRA-era policies take hold, including unemployment insurance, state-level spending stimulus, and middle-class tax expenditures. The EITC reduces the magnitude of annual FAGI declines, though this result is only robust for

married families. Still, this may have important consequences for individual household consumption choices and is consistent with work examining the income volatility-reducing role of the EITC and other social welfare programs (Bitler, Hoynes, and Kuka 2014; Hardy 2015; Hardy and Ziliak 2014).

The EITC has wide appeal because it increases extensive-margin work incentives on the phase-in range. Our evidence demonstrates that a large local EITC alongside the federal EITC can be an effective antipoverty intervention for the working poor. As with most policies, the EITC has limits to its effectiveness. With respect to poverty reduction, tax credits operating as wage subsidies do not supplement the incomes of jobless individuals, and some adults face structural and personal barriers that disconnect them from the labor market and, accordingly, refundable credits (Ben-Shalom, Moffitt, and Scholz 2012; Darity et al. 2014). Still, the large effects on poverty shown via a large supplement to the federal EITC merit consideration as part of a local poverty reduction plan. While it remains to be seen if the results in DC generalize, U.S. regions with similar economic, demographic, and income tax structures could consider such a policy, given nationwide take-up rates of 70–80 percent (Blumenthal, Erard, and Ho 2005; Jones 2014) and the large impact on poverty described here.

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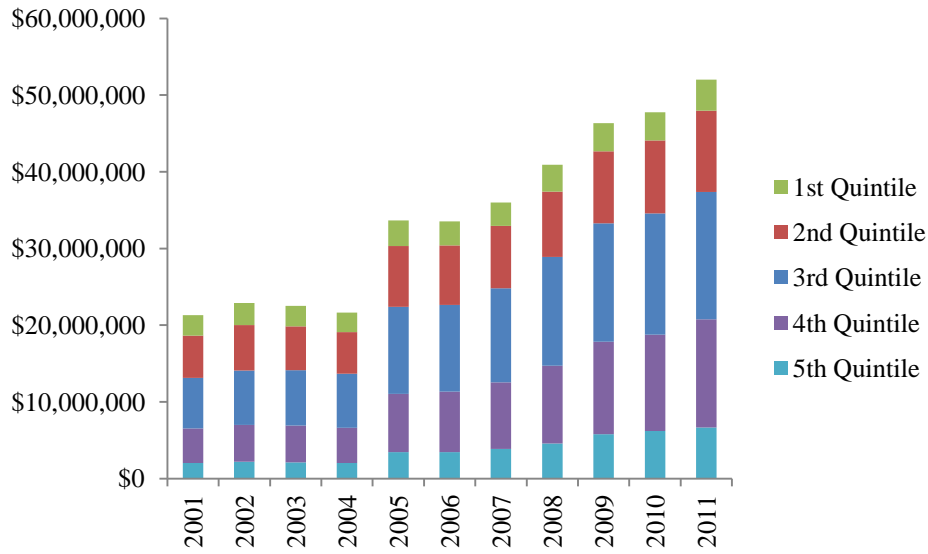
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Figure 1 DC EITC Expenditures by Recipient Quintile, 2001–2011



Source: Author tabulations of internal DC tax data.

Figure 2 EITC Levels by Recipient Quintiles, 2011

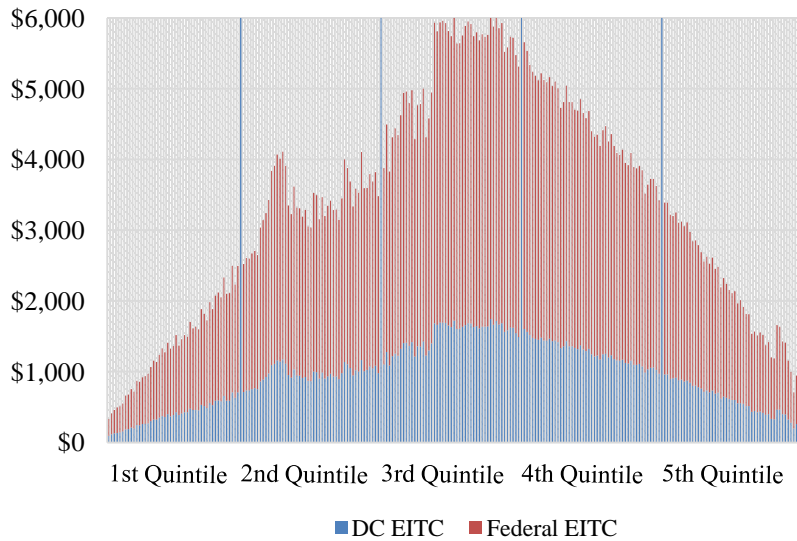


Table 1 DC Refundable Earned Income Credit Policy Changes, 2000–2011

Year	Match rate/policy change
2000	Legislative approval of refundable DC EITC
2001	DC EITC initiated; level at 10% of federal credit
2002	DC EITC level at 25% of federal credit
2006	Expansion of EITC to noncustodial parents
2006	DC EITC level at 35% of federal credit
2009	DC EITC level at 40% of federal credit

SOURCE: DC Tax Facts, 2012.

Table 2 Percent Lifted Above Poverty and Near-Poverty after DC and Federal EITC, 2001–2011

	Percent poverty reduction				Percent near-poverty reduction (125% of FPL)				Percent near-poverty reduction (150% of FPL)			
	<u>Single filers</u>		<u>Married filers</u>		<u>Single filers</u>		<u>Married filers</u>		<u>Single filers</u>		<u>Married filers</u>	
	DC	Full	DC	Full	DC	Full	DC	Full	DC	Full	DC	Full
2001	6.70	34.20	2.30	17.20	4.60	25.20	1.70	9.00	2.50	16.10	1.00	3.10
2002	6.30	33.60	3.00	18.30	4.80	25.50	1.40	9.60	2.90	17.40	0.90	4.70
2003	6.70	33.00	2.20	17.20	4.60	25.90	1.00	8.40	2.70	16.60	0.60	4.30
2004	6.70	33.30	2.60	16.80	4.30	25.40	1.10	8.20	2.60	16.30	0.80	4.40
2005	8.90	36.00	3.50	16.20	5.80	25.50	2.50	10.70	3.40	16.70	0.90	4.40
2006	9.00	36.00	3.20	12.40	5.20	25.10	1.60	8.20	3.10	15.40	0.60	4.00
2007	8.20	35.90	2.90	13.10	5.50	24.30	1.70	7.70	3.40	16.00	1.40	4.70
2008	9.70	37.60	3.10	13.00	6.30	25.30	2.10	8.60	3.70	16.30	0.80	4.20
2009	10.30	38.90	4.20	15.30	6.70	27.30	2.90	11.40	4.10	17.90	1.40	6.90
2010	10.90	42.90	4.10	16.60	5.90	26.90	3.00	11.10	3.50	15.40	1.20	6.50
2011	10.50	42.50	4.80	17.30	5.50	25.80	2.90	11.60	3.20	14.50	1.20	5.90
Average	8.50	36.70	3.30	15.80	5.40	25.70	2.00	9.50	3.20	16.20	1.00	4.80

Table 3 Summary Statistics, 2001–2011

Variables	<u>All filers</u>		<u>EITC recipients</u>	
	Mean	SD	Mean	SD
Tax-filer characteristics				
Wages, salaries, tips (wages)	72,136.84	475,800.67	22,051.34	21,781.35
FAGI	124,919.30	1,076,240.67	22,844.00	9,392.15
DC EITC	99.15	309.41	754.73	482.81
Federal EITC	307.03	936.70	2,280.68	1,430.88
Single tax filer	0.25	0.43	0.81	0.39
Number of dependents	0.66	1.03	1.78	0.95
City-level characteristics				
D.C. unemployment rate	7.44	0.00	7.44	0.00
Food insecure	13.55	0.00	13.55	0.00
Gross state product	89,602.27	0.00	89,602.27	0.00
TANF-SNAP benefit	928.64	174.13	827.32	182.83
Minimum wage	7.08	0.00	7.08	0.00
American Community Survey tract-level characteristics, 2006–2011				
Below poverty	0.15	0.11	0.24	0.13
Married	0.54	0.20	0.40	0.15
Black	0.51	0.38	0.77	0.26
Hispanic	0.09	0.09	0.09	0.12
Under 35 years old	0.48	0.10	0.52	0.10
High school or less	0.23	0.15	0.35	0.10
Female	0.53	0.05	0.54	0.05

SOURCE: Summary statistics are inflation adjusted using personal consumption expenditures deflator for 2010. Census tract socio-economic characteristics are derived from geocoded American Communities Survey using tract-level data from 2005–2009, 2006–2010, 2007–2011, and 2008–2012. Summary statistics for EITC recipients are constructed on condition that observation reports positive values for DC EITC. District of Columbia economic indicators compiled from UKCPR National Welfare Data (UKCPR 2014).

Table 4 OLS Probability of FAGI plus EITC above Poverty Threshold

	<u>Above poverty one year out</u>		<u>Above poverty two years out</u>	
	Married	Single	Married	Single
One dep.	-0.4767*** (0.012)	-0.9671*** (0.021)	1.1836*** (0.014)	2.3054*** (0.026)
Two dep.	-0.9469*** (0.022)	-1.4190*** (0.031)	2.2949*** (0.027)	3.3921*** (0.038)
Three + dep.	-0.9459*** (0.023)	-1.8677*** (0.040)	2.3017*** (0.028)	4.3970*** (0.050)
Eligible	-0.1456*** (0.014)	-0.1949*** (0.022)	-0.0904*** (0.015)	-0.1256*** (0.020)
ARRA	0.8644*** (0.010)	0.9617*** (0.011)	0.1996*** (0.010)	-0.1004*** (0.011)
ARRA × one dep.	-0.1113*** (0.006)	-0.1533*** (0.008)	0.2323*** (0.007)	0.3062*** (0.009)
ARRA × two dep.	-0.1907*** (0.007)	-0.2460*** (0.009)	0.4627*** (0.008)	0.5221*** (0.010)
ARRA × three + dep.	-0.1972*** (0.007)	-0.3310*** (0.011)	0.4655*** (0.009)	0.7434*** (0.012)
ARRA × eligible	0.0851*** (0.010)	0.0390*** (0.004)	0.2610*** (0.011)	0.1445*** (0.004)
One dep. × eligible	0.0738*** (0.017)	0.1317*** (0.022)	-0.0150 (0.017)	0.0522*** (0.020)
Two dep. × eligible	0.1153*** (0.018)	0.1659*** (0.022)	0.0167 (0.018)	0.0572*** (0.020)
Three + dep. × eligible	0.0682*** (0.022)	0.1522*** (0.022)	-0.0016 (0.024)	0.0433** (0.021)
Three + dep. × eligible × ARRA	0.0127 (0.022)	0.0113 (0.008)	-0.0079 (0.025)	0.0167* (0.009)
City-level characteristics				
Unemployment rate	-0.1544*** (0.002)	-0.1538*** (0.001)	-0.1070*** (0.002)	-0.1078*** (0.002)
Food insecurity	0.4788*** (0.002)	0.4709*** (0.002)	0.2147*** (0.002)	0.2174*** (0.001)
Gross state product	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)
TANF-SNAP benefit	0.0025*** (0.000)	0.0023*** (0.000)	-0.0059*** (0.000)	-0.0053*** (0.000)
State minimum wage	-0.5864*** (0.006)	-0.5648*** (0.005)	-0.0502*** (0.006)	-0.0906*** (0.004)
Observations	16,354	22,214	16,354	22,214
R ²	0.558	0.439	0.593	0.487

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

Table 5 OLS Probability of FAGI plus EITC above 125 Percent of Poverty Threshold

	<u>Above poverty one year out</u>		<u>Above poverty two years out</u>	
	Married	Single	Married	Single
One dep.	-0.4979*** (0.013)	-1.0802*** (0.025)	1.1344*** (0.015)	2.2832*** (0.030)
Two dep.	-0.9966*** (0.024)	-1.5730*** (0.037)	2.2032*** (0.029)	3.3382*** (0.043)
Three + dep.	-1.0187*** (0.025)	-2.1151*** (0.048)	2.1878*** (0.030)	4.2676*** (0.056)
Eligible	-0.1084*** (0.009)	-0.0560*** (0.004)	-0.1449*** (0.010)	-0.1091*** (0.004)
ARRA	0.8059*** (0.012)	0.8255*** (0.013)	0.2189*** (0.011)	0.0046 (0.013)
ARRA × one dep.	-0.1164*** (0.007)	-0.1764*** (0.009)	0.2152*** (0.008)	0.2726*** (0.009)
ARRA × two dep.	-0.1985*** (0.008)	-0.2822*** (0.010)	0.4466*** (0.009)	0.5028*** (0.011)
ARRA × three+ dep.	-0.2005*** (0.008)	-0.3713*** (0.012)	0.4598*** (0.010)	0.7496*** (0.014)
ARRA × eligible	0.1308*** (0.011)	0.0627*** (0.004)	0.3917*** (0.011)	0.2336*** (0.005)
One dep. × eligible	-0.0584** (0.027)	-0.0703*** (0.008)	0.1918*** (0.025)	0.0570*** (0.009)
Two dep. × eligible	-0.0960*** (0.027)	-0.0806*** (0.007)	0.2999*** (0.025)	0.2134*** (0.008)
Three + dep. × eligible	-0.1244*** (0.033)	-0.1229*** (0.012)	0.2954*** (0.030)	0.3480*** (0.013)
Three + dep. × eligible × ARRA	0.0111 (0.023)	0.0237** (0.009)	0.0257 (0.024)	0.0725*** (0.009)
City-level characteristics				
Unemployment rate	-0.1476*** (0.002)	-0.1347*** (0.002)	-0.1096*** (0.002)	-0.1196*** (0.002)
Food insecurity	0.4597*** (0.002)	0.4448*** (0.002)	0.1950*** (0.002)	0.1827*** (0.002)
Gross state product	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)
TANF-SNAP benefit	0.0026*** (0.000)	0.0027*** (0.000)	-0.0057*** (0.000)	-0.0052*** (0.000)
State minimum wage	-0.5621*** (0.006)	-0.5106*** (0.005)	-0.0535*** (0.006)	-0.1186*** (0.005)
Observations	16,354	22,214	16,354	22,214
R^2	0.489	0.345	0.544	0.404

NOTE: *** p < 0.01, ** p < 0.05, * p < 0. Robust standard errors in parentheses.

Table 6 OLS Probability of FAGI Plus EITC Above 150 Percent of Poverty Threshold

	<u>Above poverty one year out</u>		<u>Above poverty two years out</u>	
	Married	Single	Married	Single
One dep.	-0.5124*** (0.014)	-1.0550*** (0.027)	1.0347*** (0.016)	1.7616*** (0.031)
Two dep.	-1.0253*** (0.026)	-1.5532*** (0.040)	2.0047*** (0.031)	2.5578*** (0.044)
Three + dep.	-1.0505*** (0.027)	-2.1351*** (0.052)	1.9928*** (0.032)	3.2298*** (0.058)
Eligible	-0.1278*** (0.010)	-0.0915*** (0.004)	-0.1565*** (0.010)	-0.1403*** (0.004)
ARRA	0.7648*** (0.013)	0.7421*** (0.014)	0.1878*** (0.011)	-0.0048 (0.014)
ARRA × one dep.	-0.1216*** (0.007)	-0.1876*** (0.009)	0.1913*** (0.008)	0.1672*** (0.010)
ARRA × two dep.	-0.2053*** (0.008)	-0.2864*** (0.011)	0.4020*** (0.009)	0.3588*** (0.012)
ARRA × three + dep.	-0.1977*** (0.010)	-0.3424*** (0.013)	0.4219*** (0.011)	0.5900*** (0.014)
ARRA × eligible	0.1713*** (0.010)	0.1178*** (0.005)	0.4487*** (0.010)	0.3253*** (0.005)
One dep. × eligible	-0.0172 (0.026)	-0.0516*** (0.009)	0.1769*** (0.024)	0.0649*** (0.009)
Two dep. × eligible	-0.1055*** (0.027)	-0.0579*** (0.008)	0.2607*** (0.023)	0.1933*** (0.009)
Three + dep. × eligible	-0.1355*** (0.031)	-0.1334*** (0.013)	0.2775*** (0.027)	0.2855*** (0.012)
Three + dep. × eligible × ARRA	-0.0130 (0.021)	0.0238** (0.010)	0.0398* (0.021)	0.0902*** (0.009)
City-level characteristics				
Unemployment rate	-0.1432*** (0.002)	-0.1267*** (0.002)	-0.1041*** (0.002)	-0.1079*** (0.002)
Food insecurity	0.4372*** (0.003)	0.4009*** (0.002)	0.1807*** (0.002)	0.1629*** (0.002)
Gross state product	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)
TANF-SNAP benefit	0.0027*** (0.000)	0.0027*** (0.000)	-0.0052*** (0.000)	-0.0039*** (0.000)
State minimum wage	-0.5358*** (0.007)	-0.4668*** (0.006)	-0.0388*** (0.006)	-0.1194*** (0.005)
Observations	16,354	22,214	16,354	22,214
R^2	0.437	0.269	0.499	0.328

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

Table 7 OLS Probability of Wage Growth and Income Stabilization

	P(Earnings growth)		P(EITC income stabilization)			
	Married	Single	Current year EITC		One year EITC lag	
			Married	Single	Married	Single
One dep.	-0.1812*** (0.025)	-0.3775*** (0.036)	-0.0005 (0.007)	0.1515*** (0.020)	-0.1522*** (0.011)	-0.1885*** (0.023)
Two dep.	-0.3353*** (0.046)	-0.5604*** (0.052)	0.0066 (0.014)	0.2309*** (0.029)	-0.3109*** (0.020)	-0.2735*** (0.034)
Three + dep.	-0.3447*** (0.048)	-0.7233*** (0.068)	0.0080 (0.015)	0.3003*** (0.037)	-0.2916*** (0.020)	-0.3456*** (0.044)
Eligible	0.1284*** (0.013)	0.2133*** (0.019)	-0.0134** (0.006)	0.0035 (0.013)	-0.1020*** (0.008)	-0.1225*** (0.015)
ARRA	0.2836*** (0.021)	0.1645*** (0.019)	-0.0547*** (0.006)	-0.2652*** (0.009)	-0.2977*** (0.008)	-0.3077*** (0.010)
ARRA × one dep.	-0.0911*** (0.012)	-0.0699*** (0.012)	0.0170*** (0.004)	0.0213*** (0.005)	-0.0143*** (0.005)	-0.0288*** (0.006)
ARRA × two dep.	-0.1252*** (0.014)	-0.1164*** (0.015)	0.0022 (0.005)	0.0555*** (0.007)	-0.0404*** (0.006)	-0.0404*** (0.008)
ARRA × three + dep.	-0.1246*** (0.018)	-0.1560*** (0.018)	0.0175*** (0.005)	0.1077*** (0.009)	-0.0480*** (0.007)	-0.0781*** (0.010)
ARRA × eligible	0.0265** (0.011)	0.0686*** (0.006)	0.0773*** (0.010)	0.1430*** (0.004)	0.1101*** (0.010)	0.1336*** (0.004)
One dep. × eligible	0.0235 (0.017)	-0.0432** (0.019)	0.1103*** (0.011)	0.0592*** (0.013)	0.0684*** (0.011)	0.0678*** (0.015)
Two dep. × eligible	0.0211 (0.018)	-0.0356* (0.020)	0.1274*** (0.012)	0.1087*** (0.013)	0.0716*** (0.012)	0.0889*** (0.015)
Three + dep. × eligible	0.0657*** (0.023)	-0.0362* (0.021)	0.1510*** (0.016)	0.1318*** (0.014)	0.0665*** (0.016)	0.0816*** (0.016)
Three + dep. × eligible × ARRA	-0.0671** (0.029)	-0.0273** (0.011)	0.0623** (0.029)	-0.0026 (0.011)	0.0665** (0.027)	0.1047*** (0.011)
City-level characteristics						
Unemployment rate	-0.0660*** (0.004)	-0.0547*** (0.003)	0.0069*** (0.001)	0.0355*** (0.002)	0.0315*** (0.001)	0.0466*** (0.001)
Food insecurity	0.1687*** (0.003)	0.2134*** (0.002)	-0.0142*** (0.001)	-0.0703*** (0.002)	-0.1293*** (0.002)	-0.1299*** (0.002)
Gross state product	-0.0000*** (0.000)	-0.0000*** (0.000)	0.0000*** (0.000)	0.0000*** (0.000)	-0.0000*** (0.000)	0.0000*** (0.000)
TANF-SNAP benefit	0.0009*** (0.000)	0.0008*** (0.000)	-0.0000 (0.000)	-0.0004*** (0.000)	0.0008*** (0.000)	0.0005*** (0.000)
State minimum wage	-0.1736*** (0.012)	-0.1450*** (0.008)	0.0167*** (0.003)	0.0743*** (0.005)	0.2146*** (0.005)	0.1597*** (0.005)
Observations	16,354	22,214	16,354	22,214	16,354	22,214
R ²	0.081	0.130	0.056	0.071	0.104	0.057

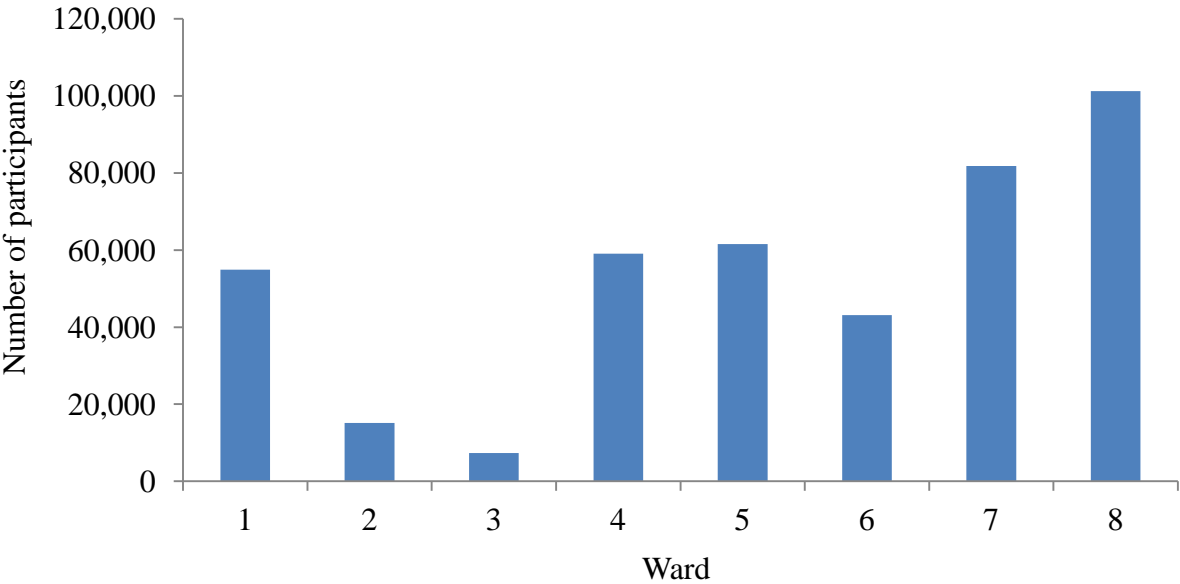
NOTE: *** p < 0.01; ** p < 0.05; * p < 0.1. Robust standard errors in parentheses.

Table 8 OLS Probability of FAGI plus EITC above Poverty Threshold Using DC EITC Variation

Variables	Above poverty one year out		Above poverty two years out	
	Married	Single	Married	Single
Eligible	-0.0913*** (0.010)	-0.0659*** (0.003)	-0.0808*** (0.011)	-0.0708*** (0.004)
35% DC credit	0.1210*** (0.005)	0.0928*** (0.004)	0.0710*** (0.005)	0.0317*** (0.004)
40% DC credit	0.7631*** (0.010)	0.7329*** (0.008)	0.2344*** (0.009)	0.1931*** (0.007)
35% DC credit × eligible	-0.0093 (0.012)	0.0320*** (0.004)	0.0272** (0.013)	0.0341*** (0.005)
40% DC credit × eligible	0.0773*** (0.011)	0.0531*** (0.004)	0.2641*** (0.012)	0.1532*** (0.004)
City-level characteristics				
Unemployment rate	-0.0967*** (0.003)	-0.1015*** (0.002)	-0.1054*** (0.002)	-0.1128*** (0.002)
Food insecurity	0.4446*** (0.002)	0.4400*** (0.001)	0.2829*** (0.002)	0.2774*** (0.001)
Gross state product	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)
TANF-SNAP benefit	0.0001*** (0.000)	0.0001*** (0.000)	-0.0002*** (0.000)	0.0000 (0.000)
State minimum wage	-0.4758*** (0.005)	-0.4675*** (0.004)	-0.2233*** (0.005)	-0.2373*** (0.004)
Observations	16,354	22,214	16,354	22,214
R^2	0.549	0.432	0.548	0.454

NOTE: *** p < 0.01; ** p < 0.05; * p < 0.1. Robust standard errors in parentheses.

Appendix Figure 1 EITC Participation by DC Ward: 2001-2011



Appendix Table 1 Mean Statistics Before and After 2009 ARRA

Variables	<u>All filers</u>		<u>Married EITC filers</u>		<u>Household head EITC filers</u>	
	2001–2008	2009–2011	2001–2008	2009–2011	2001–2008	2009–2011
Tax filer characteristics						
Wages, salaries, tips (wages)	72,226.70	71,897.24	22,695.81	22,658.79	22,888.64	23,621.44
FAGI	123,574.40	128,505.80	24,789.93	25,900.15	23,283.81	24,454.38
DC EITC	94.44	111.72	714.79	1083.20	701.04	973.20
Federal EITC	317.23	279.83	2,340.88	2,698.75	2,346.18	2,438.45
Single tax filer	0.26	0.23	0.00	0.00	1.00	1.00
Number of dependents	0.66	0.65	1.95	2.02	1.85	1.98
City-level characteristics						
Unemployment rate	6.48	10.00				
Food insecure	13.11	14.72				
Gross state product	83,297.63	106,468.68				
TANF-SNAP benefit	857.30	1,077.17				
Minimum wage	6.64	8.25				

SOURCE: Summary statistics are inflation adjusted using personal consumption expenditures deflator for 2010. Summary statistics for EITC recipients are constructed on condition that observation reports positive values for DC EITC. District of Columbia economic indicators compiled from UKCPR National Welfare Data (UKCPR 2014).

Appendix Table 2 Robustness Check of FAGI plus EITC above the Poverty Threshold

	Above poverty one year out		Above poverty two years out	
	Married	Single	Married	Single
Zero dep.	0.9467*** (0.023)	1.8712*** (0.040)	-2.3022*** (0.028)	-4.3928*** (0.050)
One dep.	0.4701*** (0.012)	0.9031*** (0.020)	-1.1187*** (0.015)	-2.0883*** (0.024)
Two dep.	0.0013 (0.005)	0.4518*** (0.010)	-0.0076 (0.008)	-1.0029*** (0.013)
Eligible	-0.0732*** (0.016)	-0.0404*** (0.005)	-0.0940*** (0.018)	-0.0801*** (0.006)
ARRA	0.6712*** (0.012)	0.6360*** (0.009)	0.6633*** (0.013)	0.6480*** (0.010)
ARRA × zero dep.	0.1936*** (0.008)	0.3257*** (0.010)	-0.4637*** (0.010)	-0.7486*** (0.012)
ARRA × one dep.	0.0829*** (0.008)	0.1724*** (0.006)	-0.2314*** (0.010)	-0.4440*** (0.007)
ARRA × two dep.	-0.0015 (0.007)	0.0762*** (0.006)	0.0000 (0.009)	-0.2256*** (0.007)
ARRA × eligible	0.0807*** (0.010)	0.0386*** (0.004)	0.2611*** (0.011)	0.1484*** (0.004)
Zero dep. × eligible	-0.0704*** (0.020)	-0.1544*** (0.022)	0.0036 (0.021)	-0.0464** (0.020)
One dep. × eligible	0.0024 (0.018)	-0.0227*** (0.006)	-0.0114 (0.020)	0.0058 (0.007)
Two dep. × eligible	0.0381** (0.017)	0.0102** (0.005)	0.0215 (0.020)	0.0121** (0.006)
Two dep. × eligible × ARRA	0.0292 (0.021)	0.0077 (0.006)	-0.0065 (0.022)	-0.0072 (0.007)
City-level characteristics				
Unemployment rate	-0.1544*** (0.002)	-0.1537*** (0.001)	-0.1070*** (0.002)	-0.1078*** (0.002)
Food insecurity	0.4788*** (0.002)	0.4708*** (0.002)	0.2147*** (0.002)	0.2174*** (0.001)
Gross state product	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)
TANF-SNAP benefit	0.0025*** (0.000)	0.0023*** (0.000)	-0.0059*** (0.000)	-0.0053*** (0.000)
State minimum wage	-0.5864*** (0.006)	-0.5648*** (0.005)	-0.0502*** (0.006)	-0.0907*** (0.004)
Observations	16,354	22,214	16,354	22,214
R ²	0.558	0.439	0.593	0.487

NOTE: *** p < 0.01; ** p < 0.05; * p < 0.1. Robust standard errors in parentheses.

Appendix Table 3 Robustness Check of FAGI plus EITC above 125% of Poverty Threshold

	<u>Above poverty one year out</u>		<u>Above poverty two years out</u>	
	Married	Single	Married	Single
Zero dep.	0.9681*** (0.026)	1.8775*** (0.047)	-2.0826*** (0.031)	-3.5688*** (0.055)
One dep.	0.4871*** (0.014)	0.9167*** (0.023)	-1.0070*** (0.017)	-1.6756*** (0.027)
Two dep.	0.0094 (0.007)	0.4664*** (0.012)	0.0044 (0.008)	-0.7918*** (0.014)
Eligible	-0.1455*** (0.018)	-0.0811*** (0.006)	-0.1796*** (0.019)	-0.1087*** (0.007)
ARRA	0.6366*** (0.014)	0.5678*** (0.011)	0.6136*** (0.014)	0.5348*** (0.011)
ARRA × zero dep.	0.1853*** (0.009)	0.3095*** (0.012)	-0.4391*** (0.010)	-0.6290*** (0.013)
ARRA × one dep.	0.0714*** (0.009)	0.1524*** (0.007)	-0.2383*** (0.010)	-0.4108*** (0.008)
ARRA × two dep.	-0.0092 (0.008)	0.0562*** (0.007)	-0.0226** (0.009)	-0.2275*** (0.007)
ARRA × eligible	0.1418*** (0.011)	0.0758*** (0.005)	0.3595*** (0.011)	0.2209*** (0.005)
Zero dep. × eligible	-0.0002 (0.022)	-0.1135*** (0.021)	0.1000*** (0.021)	-0.0178 (0.019)
One dep. × eligible	0.0573*** (0.020)	0.0104 (0.007)	0.0535*** (0.021)	0.0263*** (0.008)
Two dep. × eligible	0.0556*** (0.019)	0.0353*** (0.006)	0.0450** (0.020)	0.0302*** (0.007)
Two dep. × eligible × ARRA	0.0296 (0.022)	0.0116 (0.008)	0.0037 (0.023)	-0.0090 (0.008)
City-level characteristics				
Unemployment rate	-0.1497*** (0.002)	-0.1444*** (0.002)	-0.1036*** (0.002)	-0.0999*** (0.002)
Food insecurity	0.4576*** (0.002)	0.4382*** (0.002)	0.2007*** (0.002)	0.1992*** (0.002)
Gross state product	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)
TANF-SNAP benefit	0.0025*** (0.000)	0.0024*** (0.000)	-0.0053*** (0.000)	-0.0043*** (0.000)
State minimum wage	-0.5641*** (0.006)	-0.5265*** (0.005)	-0.0469*** (0.006)	-0.0913*** (0.005)
Observations	16,354	22,214	16,354	22,214
R ²	0.489	0.344	0.541	0.398

NOTE: *** p < 0.01; ** p < 0.05; * p < 0.1. Robust standard errors in parentheses.

Appendix Table 4 Robustness Check of FAGI plus EITC above 150% of Poverty Threshold

	<u>Above poverty one year out</u>		<u>Above poverty two years out</u>	
	Married	Single	Married	Single
Zero dep.	0.9969*** (0.028)	1.8636*** (0.051)	-1.8986*** (0.033)	-2.6604*** (0.057)
One dep.	0.5058*** (0.015)	0.9269*** (0.025)	-0.9155*** (0.018)	-1.2276*** (0.028)
Two dep.	0.0146* (0.008)	0.4794*** (0.013)	0.0047 (0.009)	-0.5689*** (0.015)
Eligible	-0.1827*** (0.019)	-0.1600*** (0.007)	-0.1892*** (0.018)	-0.1641*** (0.008)
ARRA	0.5965*** (0.014)	0.5021*** (0.012)	0.5566*** (0.015)	0.4038*** (0.012)
ARRA × zero dep.	0.1821*** (0.009)	0.2785*** (0.013)	-0.4090*** (0.010)	-0.5019*** (0.014)
ARRA × one dep.	0.0667*** (0.010)	0.1093*** (0.008)	-0.2288*** (0.011)	-0.3825*** (0.008)
ARRA × two dep.	-0.0191** (0.009)	0.0226*** (0.007)	-0.0382*** (0.010)	-0.2301*** (0.008)
ARRA × eligible	0.1662*** (0.010)	0.1311*** (0.005)	0.4124*** (0.010)	0.3175*** (0.005)
Zero dep. × eligible	0.0639*** (0.022)	-0.0192 (0.020)	0.1094*** (0.021)	0.0473*** (0.018)
One dep. × eligible	0.0608*** (0.021)	0.0700*** (0.008)	0.0452** (0.020)	0.0573*** (0.008)
Two dep. × eligible	0.0471** (0.020)	0.0800*** (0.007)	0.0270 (0.020)	0.0484*** (0.008)
Two dep. × eligible × ARRA	0.0555** (0.022)	0.0035 (0.008)	0.0397* (0.020)	-0.0104 (0.008)
City-level characteristics				
Unemployment rate	-0.1450*** (0.002)	-0.1343*** (0.002)	-0.0986*** (0.002)	-0.0897*** (0.002)
Food insecurity	0.4353*** (0.003)	0.3948*** (0.002)	0.1859*** (0.002)	0.1770*** (0.002)
Gross state product	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)	-0.0000*** (0.000)
TANF-SNAP benefit	0.0026*** (0.000)	0.0024*** (0.000)	-0.0049*** (0.000)	-0.0032*** (0.000)
State minimum wage	-0.5375*** (0.007)	-0.4784*** (0.006)	-0.0330*** (0.006)	-0.0932*** (0.005)
Observations	16,354	22,214	16,354	22,214
R ²	0.437	0.269	0.497	0.324

NOTE: *** p < 0.01; ** p < 0.05; * p < 0.1. Robust standard errors in parentheses.

Appendix Table 5 Robustness Check of OLS Probability of Wage Growth and Income Stabilization

	P(Earnings growth)		P(EITC income stabilization)			
	Married	Single	Current year EITC		One year EITC lag	
			Married	Single	Married	Single
Zero dep.	0.3399*** (0.048)	0.7159*** (0.068)	-0.0036 (0.015)	-0.3029*** (0.037)	0.2961*** (0.020)	0.3762*** (0.044)
One dep.	0.1589*** (0.026)	0.3401*** (0.033)	-0.0042 (0.008)	-0.1503*** (0.018)	0.1439*** (0.012)	0.1800*** (0.021)
Two dep.	0.0067 (0.013)	0.1583*** (0.018)	0.0007 (0.003)	-0.0752*** (0.009)	-0.0120* (0.006)	0.0961*** (0.011)
Eligible	0.1819*** (0.018)	0.1729*** (0.008)	0.1486*** (0.014)	0.1325*** (0.005)	-0.0181 (0.014)	-0.0220*** (0.006)
ARRA	0.1484*** (0.026)	-0.0012 (0.018)	-0.0279*** (0.009)	-0.1640*** (0.011)	-0.3297*** (0.010)	-0.3420*** (0.011)
ARRA × zero dep.	0.1366*** (0.017)	0.1659*** (0.018)	-0.0283*** (0.007)	-0.1014*** (0.009)	0.0323*** (0.007)	0.0337*** (0.010)
ARRA × one dep.	0.0484*** (0.016)	0.0978*** (0.011)	-0.0141* (0.008)	-0.0833*** (0.007)	0.0183** (0.009)	0.0020 (0.007)
ARRA × two dep.	0.0082 (0.016)	0.0515*** (0.010)	-0.0222*** (0.007)	-0.0332*** (0.007)	-0.0184** (0.008)	-0.0290*** (0.007)
ARRA × eligible	0.0086 (0.012)	0.0648*** (0.006)	0.0953*** (0.010)	0.1519*** (0.005)	0.1069*** (0.010)	0.1373*** (0.005)
Zero dep. × eligible	-0.0452** (0.021)	0.0413** (0.020)	-0.1703*** (0.014)	-0.1310*** (0.013)	-0.0824*** (0.015)	-0.1015*** (0.015)
One dep. × eligible	-0.0253 (0.021)	-0.0019 (0.009)	-0.0563*** (0.016)	-0.0719*** (0.005)	-0.0150 (0.016)	-0.0335*** (0.006)
Two dep. × eligible	-0.0345 (0.021)	0.0054 (0.009)	-0.0317* (0.017)	-0.0159*** (0.005)	-0.0242 (0.016)	-0.0190*** (0.006)
Two dep. × eligible × ARRA	0.0329 (0.025)	0.0016 (0.009)	-0.0365 (0.023)	-0.0375*** (0.009)	0.0637*** (0.024)	0.0387*** (0.009)
City-level characteristics						
Unemployment rate	-0.0659*** (0.004)	-0.0548*** (0.003)	0.0069*** (0.001)	0.0355*** (0.002)	0.0315*** (0.001)	0.0467*** (0.001)
Food insecurity	0.1687*** (0.003)	0.2135*** (0.002)	-0.0142*** (0.001)	-0.0702*** (0.002)	-0.1293*** (0.002)	-0.1303*** (0.002)
Gross state product	-0.0000*** (0.000)	-0.0000*** (0.000)	0.0000*** (0.000)	0.0000*** (0.000)	-0.0000*** (0.000)	0.0000*** (0.000)
TANF-SNAP benefit	0.0009*** (0.000)	0.0008*** (0.000)	-0.0000 (0.000)	-0.0004*** (0.000)	0.0008*** (0.000)	0.0005*** (0.000)
State minimum wage	-0.1736*** (0.012)	-0.1449*** (0.008)	0.0167*** (0.003)	0.0742*** (0.005)	0.2146*** (0.005)	0.1597*** (0.005)
Observations	16,354	22,214	16,354	22,214	16,354	22,214
R ²	0.081	0.130	0.056	0.071	0.104	0.057

NOTE: *** p < 0.01; ** p < 0.05; * p < 0.1. Robust standard errors in parentheses.