

The Dynamics of Earned Income Tax Credit Eligibility

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Abstract

The Earned Income Tax Credit (EITC) has become one of the primary components of the U.S safety net for poor families, but very little is known about the dynamics and persistence of EITC eligibility. This paper uses data from the Panel Study of Income Dynamics (PSID) to measure persistence of eligibility for the EITC, paying particular attention to persistence across multiple spells of eligibility. We find that single-female headed households have extremely persistent eligibility for the EITC, with two-thirds of those families becoming eligible for the credit maintaining their eligibility for five or more years over the subsequent decade. When considering all household types beginning a spell of eligibility, we find that over half are eligible for more than five years over the next decade. These results point to substantially more persistence in EITC eligibility than shown in prior work using IRS administrative data. This is due to both our consideration of multiple spells of eligibility and to the ability to follow single parents across transitions in marriage and household structure in the PSID.

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In 1996, largely over concerns about long-term welfare use and the potential for dependency, the U.S. famously ended “welfare as we know it” with the passage of the Personal Responsibility and Work Opportunity Act of 1996, which transformed the Aid to Families with Dependent Children (AFDC) program into Temporary Assistance for Needy Families (TANF). Since that time, spending on the Earned Income Tax Credit (EITC) has more than doubled and the program has replaced welfare as the primary source of cash support for low-income families with children. In 1994, real federal spending on the EITC and AFDC were approximately equal, at around \$25 billion in 2011 dollars. By 2011, spending on the EITC had grown to more than \$60 billion, while federal spending on TANF remained around \$26 billion (Tax Policy Center, 2005).

Somewhat surprisingly, given the concerns over long-term welfare use that drove much of the enthusiasm for welfare reform, the duration of use and eligibility for the EITC have not been widely studied. Existing studies of the duration of EITC spells (Horowitz & Dowd, 2011; Horowitz, 2002; Heim and Lurie, 2012) have relied primarily on administrative tax data. While highly accurate in capturing actual EITC claiming, these studies have suffered from difficulties tracking families over time, particularly in light of marital changes, and the administrative data they use lacks details that may be of interest in terms of the broader demographic and economic circumstances of the families receiving EITC dollars. Importantly, these studies have also focused on single, contiguous-year spells of EITC claiming, which can dramatically understate the true duration of eligibility or use of the EITC over repeated spells.

The dynamics of EITC eligibility within households are difficult to predict with theory alone. The length of time that EITC recipients can benefit from the program depends on both program parameters and eligibility thresholds and on the rate of earnings and income mobility experienced by those at the bottom of the income distribution. For some families, the EITC may provide benefits over a fairly short time horizon as their earnings and employment stability begin to grow and move them through and beyond the range of taxable income that qualifies them for the EITC. For others, relatively stagnant earnings, or a pattern of less than full-year employment, may mean that their earnings and income keep them eligible for the EITC over a longer horizon. Eligibility for the EITC is contingent on having

positive earnings, so movements in and out of the labor force can lead to changes in eligibility for marginally attached workers. Changes in family structure such as marriage, childbirth, and aging children lead to changes in eligibility as well. In light of these many factors, the dynamics of EITC eligibility are an important subject for empirical study.

In this paper, we use longitudinal data from the Panel Study of Income Dynamics to build the first set of estimates of the duration of long-term eligibility for the EITC across multiple spells. We use the National Bureau of Economic Research's tax simulation model to predict household EITC eligibility based on earned income and family structure and employ a discrete-time hazard framework to model the dynamics of that eligibility over time for individual EITC recipient families. Specifically, we estimate exit rates from EITC eligibility, which allow us to study the distribution of single-spell lengths, and we separately estimate reentry hazards in order to examine how long families remain out of EITC eligibility once they exit from eligibility. Combining the estimated hazard rates from these two exercises in a series of simulations allows us to study longer-term eligibility dynamics, estimating the expected total number of years EITC-eligible out of the next ten years for newly-eligible individuals with different characteristics.

Our results for single spells of eligibility are generally consistent with those from previous studies, revealing that the majority of single spells are relatively short-lived. However, we show that, when re-entry into eligibility is considered, EITC eligibility is a persistent state for the majority of families. In fact, households beginning eligibility for the EITC will be eligible, on average, for more than five of the next ten years. As expected, more-disadvantaged groups, including households headed by those with no education beyond high school have longer periods of eligibility, as do black households. We also find that differences in wage levels across regions of the US lead to substantial differences in the length of eligibility for the EITC, with households in the relatively low-wage South having particularly long periods of eligibility.

As in other recent work (Jones, 2018), our results also illustrate the importance of marital status for women's EITC eligibility dynamics. We observe that 11 percent of EITC spells begin with a divorce

or separation, and 7 percent of exits from EITC eligibility are associated with marriage. We find that single women who begin an EITC spell maintain eligibility for much longer than married women, averaging nearly six years of eligibility over the course of a decade, compared with just over four years for married women. Not surprisingly, this difference expands further if we hold marital status fixed, assuming that single women remained single and married women remained married throughout a ten-year period. We also find that censoring observed eligibility spells for single women at marriage, as previous studies have done, leads to slight underestimation of spell length.

Our results make an important contribution to the literature on the Earned Income Tax Credit. Given the concerns over long-term welfare use noted above, it is remarkable that we have paid little thus far about the potential for long-term use of the EITC, which has replaced traditional welfare as the primary means of supporting low-income working families. EITC claiming, of course, differs from welfare use in that it is less likely (based on existing empirical evidence) to bring with it the negative effects of labor supply that prompted much of the concern about long-term welfare use. However, our results show that, for many families, the credit is a potential long-term source of cash support.

An additional motivation for our work is to better understand the short- and longer-term effects of the EITC on families. A growing body of evidence shows that the EITC may have important long term, positive effects on families and children that receive income through the credit. For example, recent work (Dahl and Lochner, 2012, Hoynes, Miller, and Simon 2015, and Evans and Garthwaite, 2014) has shown that more generous EITC benefits can lead to improvements in academic achievement, infant health, and maternal health and stress levels. Thus far, it has been unclear whether these benefits have been achieved by the program working as a transitory (work-encouraging) safety net or as a continual source of income support.

Our results show that the EITC is received for longer durations for many families (and may be perceived by recipients as a semi-permanent benefit)—the program may deliver substantially more resources to families than is indicated by a single-year credit amount. This may be an especially important point given recent work focused on long-term effects of the credit (Bastien and Michelmore

2018, Neumark and Shirley 2018). In particular, an expectation of longer-term benefits may lead to different behavioral responses to the EITC than would be seen from increases in temporary assistance.

I. Previous Literature

An extensive literature has developed over the past two decades on the effects of the Earned Income Tax Credit on labor supply and families' and children's well-being. Most of this work has focused on understanding the effects of the EITC on labor supply (Eissa and Liebman, 1996, Eissa and Hoynes, 2004) though, as noted above, recent work has also begun to explore the effects of EITC receipt on the short- and long-term outcomes of recipients and their families. The majority of research on the EITC has viewed the program in a single-year framework. Eligibility, program parameters, or credit claiming behavior are measured at a single point in time and implications of those annual markers are explored.

A somewhat separate literature has considered the dynamics of EITC claiming, primarily using longitudinal administrative tax data from the Internal Revenue Service. Horowitz and Dowd (2011) use an IRS panel data set of individual returns to measure the length of spells of EITC receipt. Their overall conclusion is that "most EITC recipients claimed the EITC for short period." They show that most recipients, 61% ended spells of receipt within two years. These authors acknowledge that, because selection into the panel was based on the Social Security number of the primary taxpayer, their sample oversamples men and results in the censoring of single women's spells if they marry and stop being the primary taxpayer. The study also focuses on tracking and summarizing durations of receipt based on single spells, which may substantially understand the overall persistence of EITC claiming over multiple spells with short breaks.

Heim and Lurie (2012) also use the IRS panel and acknowledge the problem of single mothers being dropped from the data when they marry. They find very high continuation rates on EITC among single mothers, with continuation rates on EITC receipt of 74 to 80%. Heim and Lurie (2012) do not report summary measures of long-term persistence of EITC receipt, but the one-year continuation rates

they report are consistent with long average spells of receipt. Jones (2017) uses a competing risk framework to study the determinants of EITC gain and loss during the Great Recession for different groups, finding that the most disadvantaged groups (less-educated single mothers, in particular) were at increased risk of losing EITC eligibility due to a yearlong lack of earnings during the Great Recession. Jones' study emphasizes the reason for exit from eligibility rather than spell duration, and like the studies mentioned above, focuses on single spells of eligibility.

II. Data and Empirical Approach

To better follow individuals over time, particularly over periods in which they may change their family relationships, headship status, and the associated tax filing status, we turn to longitudinal survey data for this study. Specifically, we use the Panel Study of Income Dynamics (PSID), which spans a long time frame and has both detailed coverage of family and headship circumstances and changes and extensive information on family and individual income and earnings. We use PSID waves covering the years 1987 through 2015, beginning a few years prior to the expansion of the EITC in 1993 and continuing through the Great Recession.

While the PSID has limitations for studying tax-related programs and for looking across many years, we believe that it offers the best possibility for capturing detailed earnings information over the past several decades, from which we can impute EITC eligibility. One challenge with using the PSID over our chosen time period is that, beginning in 1997, the PSID moved from annual interviews to every-other-year interviews. Given our use of duration-based hazard models for this analysis, this change in the data collection structure is particularly challenging. Below, we explore this change in the structure of the longitudinal data collection and show that our results are not sensitive to our treatment of this issue. Another limitation of relying on the PSID data is that we can track EITC eligibility, but not actual claiming behavior. By contrast, earlier work based on administrative panel data tracks EITC claiming. As we show below, the ability to track individuals across changes in marital status and household composition clearly offers an important advantage over existing work, and so we view this as a necessary

tradeoff. At the same time, eligibility is itself of interest, since it illustrates the potential for long-term EITC claiming, even if that potential is not currently (or was not at the time) realized.

To construct the key variables for our analysis, we use the National Bureau of Economic Research's tax simulation model (TAXSIM) to estimate federal tax liability and EITC eligibility and amounts for our sample of Families from the PSID. From this we impute EITC eligibility for our sample of PSID respondents for each year that we observe them. Once we have predicted EITC eligibility, we turn to measuring the dynamics of that eligibility, using an exit-rate, or hazard, framework. This approach follows that of earlier work on EITC dynamics (Heim & Lurie 2012, Horowitz and Dowd 2011), as well as work on dynamics of poverty and welfare receipt (Bane and Ellwood, 1986, Stevens, 1999, 2012).

In the hazard model, once an individual or household becomes eligible for the EITC, they enter the pool of those at risk for exiting the eligible state. This is represented as a simple logit, discrete-time hazard in which the probability that a spell of EITC eligibility experienced by individual i in year t ends after exactly d years is given by

$$(1) \quad \lambda_{idt} = \frac{\exp(y_{idt})}{1 + \exp(y_{idt})} \quad \text{where} \quad y_{idt} = \alpha_d + \beta X_{it}.$$

In this setup, the duration of the spell of EITC eligibility is represented by the series of dummy variables, α_d , and other controls are included in the vector X . Typically, X will include calendar year dummies, which can account for economy-wide changes in earnings levels that affect EITC eligibility, or for changes in EITC parameters that alter patterns of eligibility. Individual characteristics such as demographics or family structure can also be included. Estimation of this discrete logit hazard provide estimates of exit rates from eligibility, which can then be used to calculate the distribution of spell lengths.

Once individuals have ended their spells of eligibility, as noted above, they are at risk for returning to EITC eligibility. We thus estimate, in a parallel way, rates of return to EITC eligibility, as

$$(2) \quad \gamma_{idt} = \frac{\exp(z_{idt})}{1 + \exp(z_{idt})} \quad \text{where } z_{idt} = \alpha'_d + \delta W_{it}.$$

This allows us to calculate how long individuals remain out of EITC eligibility before returning, and to simulate longer-term eligibility dynamics.

We choose to focus on years 1987 through 2015, and estimate exit rates from EITC eligibility for 1991 through 2015. Because the major expansion of the EITC occurs in 1993 this allows a compromise between including many years of data and focusing on a period which reflects the “modern,” and expanded, version of the credit. We utilize years 1987 through 1990 to measure lagged eligibility for the EITC, and thus to calculate a duration measure beginning in 1992, a key element in the hazard models we estimate. This approach has been used in earlier work—see Stevens (1999) and Stevens (2006) for a comparison of alternative approaches for dealing with left-censored spells in similar settings. We include dummy variables for duration of one through four years and five or more years (we have tested models with more flexible duration specifications and find very similar results). Age of the household head is also included as dummy variables for five-year age groups. We focus primarily on heads and wives from the PSID between the ages of 18 and 62, but examine results based on family composition and number of children as well.

The vectors X and W include controls for a variety of individual and household characteristics. Initially, we include a very limited set of controls, to calculate patterns of exit from and re-entry to EITC eligibility for the broad sample of those ever eligible. We also include calendar year dummies in all specifications of the hazard rate models. These capture changes in EITC parameters and generosity over time, as well as changes in the level of real earnings over time. In addition, the year dummies after 1997 capture the effects of the change in the PSID survey design from every year to every-other year interviewing.

Results

a. Summary Statistics

Table 1 shows summary statistics for the sample used in our hazard rate estimation and simulations. Our main sample consists of PSID household heads and spouses between the ages of 18 and 62. We focus on the typical working age population since the EITC cannot be claimed by those out of the labor force. Our sample also differs from a typical sample of EITC filing units used in earlier studies based on IRS administrative data by separately following spouses. The ability to follow individuals across household transitions is one of the advantages of using survey data rather than data from within the tax system, but it also complicates the comparison of our results with earlier work.

Over the entire period of our analysis sample, 1990 to 2015, 13.5 percent of our sample are estimated to be EITC eligible on an annual basis. Looking at the final year of our sample, 2015, nearly 18 percent are eligible, reflecting several expansions in the credit over our sample period. Almost half, 46%, of individuals are eligible for the EITC at some point during our sample period.

In the lower portion of Table 1, we present sample characteristics for both the initial year of an individual's (observed) eligibility and for all years combined. The two distributions may differ substantially since those with longer periods of eligibility will appear as eligible in multiple years. As expected, the characteristics averaged over all years of eligibility give a somewhat-different characterization of the EITC-eligible population than the single year characteristics, with lower educational attainment, and fewer whites, although both earnings and adjusted gross income are slightly higher. Focusing on the column for all years of eligibility, the average age of EITC eligible (adult) individuals is 36.6 years. Head's earnings are approximately \$16,000 per year (in 2015 \$) and the adjusted gross income of the household is approximately \$20,000. The average amount of EITC eligibility (among those eligible) is \$1,685, or roughly 8% of adjusted gross income. Finally, considering the average characteristics of ever-eligible individuals across all years in the sample (eligible or not) in the third column of the bottom panel of Table 1 shows that years of EITC eligibility are years in which individuals were younger, more likely to be single, more likely to have kids in the households, and years in which they had substantially lower income.

b. Duration of Initial Eligibility Spells

We next estimate simple logit transition rates out of EITC eligibility from among the sample of individuals who are ever eligible for the program. We include dummies for calendar years and for duration of the spell between one to four years, and five years or more. This simple specification for duration captures patterns well, and is consistent with earlier work showing relatively high exit rates in the initial year of a spell that decline quickly and then stabilize (Horowitz & Dowd, 2011). Age and calendar year effects are also included and show the expected patterns. After just one or two years of eligibility, we estimate that the probability of ending eligibility for the EITC is 52%; this falls to 35% by five or more years of eligibility.

Table 2 shows the estimated distribution of EITC eligibility spell lengths for our full sample. We also show spell lengths estimated using only data from 1990 to 1997, the period prior to the PSID change to every-other-year surveys. For the sake of interpretation, the results in Table 2 hold the calendar year effects constant at the 1995 value. This allows us to interpret the estimated probabilities as single-year probabilities of exiting EITC eligibility, since the calendar year effects after 1997 will pick up the switch to two-year transition probabilities.

The distribution of completed spell durations in Table 2 are calculated from the implied exit rates from the logit, and using the formula used in seminal work by Bane and Ellwood (1987) to describe the dynamics of poverty spells. The distribution of the length of completed spells gives the fraction of individuals just starting a spell of eligibility who will eventually have a completed spell of t years ($D(t)$), which is itself a function of exit probabilities at each duration, t , represented by $p(t)$:

$$(3) \quad D(t) = p(t)[1 - \sum_{j=1}^{t-1} D(j)]$$

This formula provides the distribution of the length of single spells of EITC eligibility for individuals just beginning a spell of eligibility.

Focusing on the column including data for years 1990 to 2015, we estimate that more than half of EITC eligibility spells (52%) end after just a single year of eligibility. More than 80% of EITC

eligibility spells end within three years, suggesting that the EITC provides fairly short-term assistance on average, at least when considering only single spells. For comparison, we show results from Dowd and Horowitz (2011) for EITC claiming. There are a number of reasons this distribution should differ from our results. First, Dowd and Horowitz study EITC claiming, while we focus on eligibility. We know of no work that considers the connection between length of eligibility and claiming, but we would hypothesize that individuals who are eligible but do not claim the EITC are more likely to be those for whom EITC eligibility is an unusual and potentially transitory status. This would suggest that eligibility counts might include more very short spells, as we find. On the other hand, Dowd and Horowitz note that their data systematically undercount EITC claiming among women, since women who are (or become) secondary taxpayers cannot be followed in the administrative panel data. Because women have lower earnings on average, they are likely to remain in the EITC earnings range for longer, and so undercounting women who marry during their eligibility spells should tend to produce shorter spells of EITC claiming.

We have also attempted to replicate the type of censoring of eligibility spells around a change in marital status that occurs in the administrative tax panel data. Specifically, we re-estimated the transition rates for women, and then artificially censored those spells in progress if the woman changed marital status (to approximate a potential change in primary taxpayer status). The censoring exercise produces an average spell length that is slightly shorter than when we follow women across marital status changes.

The initial column of Table 2 shows that exit rates are roughly similar if we limit the sample to years 1990 to 1997, prior to the PSID survey structure changes. The sample based on the earlier years does suggest somewhat shorter duration, driven by higher exit rates after two or three years. This could reflect genuinely lower exit rates in the later years of the full sample, which could be expected given changes in the generosity of the EITC parameters over time. Specifically, both credit amounts and phase out periods have been expanded, sometimes differentially depending on the number of kids. This is likely to reduce exit rates by increasing the range of earnings over which some individuals will remain eligible.

Despite changes in the survey, the estimated year effects may be of interest. Abstracting from any data or survey issues, the estimated calendar year dummies in the logit model should reflect changes over time in the likelihood, conditional on duration of eligibility, of exiting eligibility. As the maximum credit rises, or as the range of income over which the maximum credit applies increases, we would expect exit rates to decline, all else constant. Our analysis is complicated by the fact that the PSID moves from surveying respondents every year, to surveying them every other year after the 1997 survey. This means that the calendar year dummies are picking up both changes in transitions out of eligibility (which themselves depend on multiple factors, including the level and structure of the EITC tax parameters) and the transition to every-other year surveys.

One way to avoid the complications of the change in survey structure is to drop alternate years in the earlier part of the sample and estimate the same logit model on this sample with observations only every two years. Figure 1 shows these results and suggests a decline in the probability of exiting the EITC in the final few years of our sample. The figure also shows the calendar year effects from our full analysis sample, in which the year effects after 1997 reflect both the change in survey design and changes in exit rates over time.

c. Return to Eligibility

In order to gain an accurate picture of the duration of eligibility for the EITC, and in particular whether the program is a source of long-term income support for families, it is important not only to consider the duration of single spells but also to consider the probability of returning to eligibility after eligibility is lost. We next consider whether the exits from the initial EITC eligibility spell are lasting. Specifically, Table 3 shows our estimates of the likelihood of *returning* to EITC eligibility after a given number of years of ineligibility.

As expected, we find that the rates of return to eligibility are quite high for several years, and so the cumulative likelihood of returning to eligibility are also high. Approximately 28 percent of those ending a spell of EITC eligibility for one year again become eligible one year later. Return probabilities

are 22 and 14 percent two and three years after ending a spell. Importantly, the cumulative effect of these high return probabilities means that single spell lengths tell us relatively little about the long-term persistence of EITC eligibility. By four years after the initial spell ending, 60 percent of households have again become eligible to claim the EITC. This provides a picture of the dynamic incidence of the EITC that suggests much longer-term involvement with the credit for a typical eligible family. Dowd and Horowitz (2011) find substantially higher rates of return to EITC claiming after one year of not claiming, but they condition their sample on having a child in the household. They report 45 percent of individuals returning to EITC claiming after a single year of not claiming.

d. Simulations of total time eligible

A more complete way to characterize time spent eligible for the EITC is to combine the exit and re-entry probabilities through simple simulations. These allow for both exit and re-entry into eligibility at the estimated rates, and allow us to construct the distribution of years eligible for the EITC over a given time horizon. We conduct such simulations for a cohort of those eligible for the credit in an initial year, and simulate EITC status over the next ten years. For the simulations, we allow exit and entry for an initial cohort of eligible individuals to occur with probabilities predicted by the estimated hazard model coefficients, and allow age to increment each year. This exercise, summarized in Table 4, illustrates the importance of considering multiple spells of EITC eligibility. These distributions are based on exit rates for a head of household age 30, and with exit rates fixed at 1995 levels. In the first column, we show that just 19% of those initially eligible experience two or fewer years of eligibility over a decade. In contrast, more than half, 51 percent, are eligible for five years or more. Thus, for many families, the EITC provides fairly long-term income support. Average time spent eligible for the EITC over the next decade is nearly 5 years. The second column shows the same calculation if we ignore repeated spells. This leads to a distribution of spell lengths heavily concentrated in short spells of eligibility, and an average spell length of just 2.4 years.

We use a similar simulation to examine the duration of EITC eligibility by household structure and individual characteristics. Individual and family characteristics that alter earnings levels and growth, along with the structure of EITC parameters should produce variation across household types in the persistence of eligibility over time. Because there are different EITC schedules for married versus single tax filers and the credit varies substantially with the presence and number of children, marital status will be an important predictor of duration. The earnings levels at which the credit goes to zero, for example, are higher for married households in which there may be multiple earners, but are well below twice the comparable level for single households. In 2016, for example, a married tax filing unit with two qualifying children could have earnings of approximately \$50,000 before EITC eligibility ended, but a single filer could earn more than \$45,000.

Columns 1 and 2 of Table 5 illustrate the effects of marital status at the start of a spell in predicting the total time eligible over the next ten years. Marital status matters both because it predicts the level and growth of household earned income over time, and also because, beginning in 2000, the income level at which the credit began to be phased out was made longer for married filers. The net result is that single individuals with kids (and, to a lesser extent, single individuals without kids) remain eligible for the EITC for longer. In columns 1 and 2 of Table 5, we show that single filers have an average eligibility period of 5.6 years, compared with 4.5 for their married counterparts, holding constant age and number of children.

In additional results, shown in the appendix, we explore the importance of marital status and changes in marital status for females starting a spell of EITC eligibility. For females, we find that the disparity in eligibility durations between singles and married individuals is even larger than for the full sample—single women starting a spell of eligibility will be eligible for nearly 6 years, of the next 10, and married women will be eligible for only 4.2 out of the next ten years. Using controls for marital status in the underlying exit rate and entry rate models, we repeat the simulation of total years eligible with a different thought experiment in mind. Columns 2 and 4 of the table show the distribution of years eligible holding constant marital status over the entire period. Single mothers who remain unmarried have total

eligibility roughly 10 percent higher, at 6.5 years out of ten, compared to all those starting spells as single mothers. Eligibility for married parents who remain married over time falls to 3.7 years out of ten.

Because EITC eligibility and schedules, unlike many traditional safety net programs, are set as part of federal tax policy, they do not account for regional differences in wage and earnings levels. This means that there will be differences in the rate of EITC eligible across higher- and lower-wage parts of the US, as well as differences in the duration of eligibility across these regions. Regions in which substantial mass in the wage and earnings distribution lies within the EITC maximum credit range are likely to display much more persistence in EITC eligibility, since moving through a larger section of the earnings distribution will be consistent with continued eligibility for the credit. To illustrate the potential differences in duration of eligibility across regions, the columns 3 and 4 of Table 5 show the distribution of eligibility duration for the South (with relatively low wages) and the West (a higher wage region).

As expected, focusing on the Southern region of the U.S. produces greater persistence of eligibility. Average total years of eligibility out of the next ten in the South for those just becoming eligible for the credit is more than six years. For reference, the 25th and median hourly wages in the South in 2016 were \$10.98 and \$16.80 (BLS, 2016). Notably, more than 6% of households in the South becoming eligible for the EITC will remain eligible for all of the next 10 years and more than a third are eligible for more than five years. In contrast, the next column shows the distribution of eligibility time for households in the West, where the 25th percentile of hourly wages was \$12.95 and the median was \$19.79 (BLS, 2016). As expected, EITC eligibility is much shorter-term in the Western region. The average stay over a decade is 3.8 years and just 23 percent of those becoming eligible will remain eligible for more than half the decade. Of course, EITC eligible households in the South and West differ on other dimensions as well, but differences in the average level of earnings in the two regions likely plays a major role in these differences in persistence.

Average wage levels also differ in the US by the level of education of earners and by race. The remaining columns of Table 5 illustrate patterns of EITC persistence by race and education of the household head. Among households where the head has only a high school education or less, the average

time spent eligible for the EITC over a decade is 4.8 (whites) to 5.5 years (blacks). Even conditioning on education of the household head, along with marital status and number of children, blacks are more likely to remain eligible for the EITC. Among those attending college, there are also differences by race, but total eligibility is under four or the next ten years for both blacks and whites.

e. Events determining exit and entry into eligibility

The simple exit and entry rates summarized here do not fully reflect the complexity of transitions into and out of EITC eligibility. Unlike many traditional safety net programs, eligibility for the EITC can end either because income rises (including cases in which additional earners join the household), or because earned income falls to zero (including cases in which a primary earner leaves the household). The multiple factors that can drive transitions into and out of EITC eligibility can be understood by following the literature on poverty and welfare dynamics and asking what demographic or labor market events are typically associated with transitions into and out of EITC eligibility. To do this, we code a primary reason or event occurring in the year in which a given household moves out of EITC eligibility. To make these events mutually exclusive, we (somewhat arbitrarily) give priority to changes in the head of the household or their marital status, followed by changes in the number of eligible dependents. Next, we consider large changes in the head of households' earnings, or in the earnings of others in the household, without any change in family structure or composition. Finally, we also consider exits from eligibility that occur when earnings fall to zero, and re-entry that occurs when positive earnings are restored.

Table 6 summarizes the frequency of the events associated with exits from EITC eligibility. We consider the role of marital changes, but note that it is quite possible for low earning individuals to marry and remain eligible for the EITC. For example, a single parent of two children in 2016 with earnings of \$18,000 would be eligible for the maximum credit of \$5572. If that parent married an individual with the same level of earnings for total household earnings of \$36,000, their EITC eligibility would fall to just \$2985. If the new spouse had earnings of \$32,000, the joint EITC eligibility would be eliminated. This

suggest that marital changes may not end EITC eligibility that frequently, and we confirm this, finding that 7% of eligibility spells end when the head of household marries. A more common demographic event that is associated with the ending of EITC eligibility is when children age out of EITC qualifying range. Roughly 18% of all spells of EITC eligibility end when the number of dependents falls (without a change in marital status).

As noted, EITC eligibility can also end with either a substantial rise in earnings, or when earnings drop to zero. Here, we see that 37% of all spells of EITC eligibility end as the result of a substantial (more than \$5000) increase in earnings of the head. Spells ending with smaller earnings increases are included in our “other” category, given the difficulty of distinguishing routine, gradual earnings growth from more substantial increases. An additional 5% of spells end when someone other than the head has a substantial earnings increase. Most of these exits due to increased earnings are driven by substantial increases in hours of work (29%, out of the 42% of exits attributed to increased earnings). The opposite type of earnings “event”, reduction of annual earnings to zero is responsible for 12% of EITC eligibility spell endings.

Given the large fraction of EITC eligibility accounted for by single parent households, Table 6 also shows exit events only for those households who are headed by a single parent at the end of their spell of eligibility. This asks, assuming single headship continues (thus eliminating exits due to marriage), what is the composition of events associated with spell endings. Among these single parent households, exits due to children aging out of the eligibility range are more common, at 24 percent of exits. Earnings improvements account for 35% of exits among single parents, and earnings falling to zero account for roughly one-fifth of exits for this group.

We characterize events associated with beginning spells of EITC in a similar manner in Table 7 and find largely parallel results. In this case, 11 percent of spells begin with a divorce or separation, and 13% begin with the addition of an eligible child to the household. Most of the remaining spell beginnings (40 percent) are driven by earnings changes, in this case substantial earnings drops for the head or others, and 13 percent occur when earnings increase from zero. A final category that applies to beginning spells

of eligibility are increases in the generosity (in terms of qualifying earned income) of the EITC, which is associated with 7% of initial eligibility, and nearly a quarter of initial eligibility for single parents. These event tabulations are consistent with many of our findings regarding duration; the levels, distribution of, and growth in earnings are driving factor that keeps households within the EITC range (or not) over time.

f. Combining persistence and credit amounts

Our final section of analysis uses the durations that we estimate with our hazard models to understand the amount of additional income received by eligible families over time and the distribution of that spending across long- and shorter-term eligibility. This may be important as we think about the effects the credit may have on poor families, and in interpreting some of the growing body of research on effects of the EITC. It is also crucial to conversations about the allocation of resources and the targeting of types of earners and families implicit in the EITC parameters.

Given our focus on duration, we first calculate simple average EITC eligibility amounts by individuals' (observed) total years of eligibility. Our expectation is that those with relatively long spells will also have higher average credit amounts. This reflects the fact that those close to the phase-out ranges may be particularly likely to receive the credit for short periods of time, as small variations in earnings can move them into and out of the region of EITC eligibility. On the other hand, individuals whose earnings place them in the maximum credit range are likely to remain eligible for several years, given that earnings typically grow relatively slowly. Finally, working against this tendency is the fact that many low wage workers also have highly volatile hours of work. Low earners whose hours fall may temporarily lose eligibility, limiting the positive correlation between credit amounts and persistence.

The first two columns of Table 8 show that the average amount of the credit does rise with total years eligible. Individuals who maintain eligibility for only one or two years out of the next ten are eligible for less than \$1000 of EITC on average (per year). In contrast, individuals who remain eligible persistently, for nine or ten out of the next ten years, are eligible for close to double that amount in each year. Given the importance of the EITC to single parents, we repeat this calculation in column 2 where

we calculate average credit amounts only among single parents by their total time eligible. Among single parents, credit amounts are slightly higher, around \$1200 per year even for those with just one or two years of eligibility, but the average amount grows among those eligible for many years.

The increase in the amount of the credit with years of eligibility means that the total received by those eligible over many years will grow by more than just the multiple of their years eligible. Put another way, this pattern generates an unusually wide dispersion in the total resources received by individuals who ever benefit from the EITC. Long-term EITC eligible receive amounts that are 10 to 20 times greater than those eligible for just a year or two.

Finally, these tabulations, combined with the distribution of years of total eligibility from our simulation results, allow us to estimate the distribution of total EITC dollars across recipients with different eligibility dynamics. This is done by taking the relative frequency of different total years of eligibility (from Table 4) and multiplying that by expected EITC dollars conditional on total years of eligibility. The sum of this gives us an estimate of total EITC resources spent, and we can calculate the fraction of that spending going to those with varying years of eligibility. Columns five and six of Table 8 show that most EITC spending goes to individuals who receive the credit for more than seven out of ten years. Among single parent families, more than half of spending is accounted for by those receiving the credit for more than six years.

While safety-net and other resources always go disproportionately to long-term recipients, this fact has been little appreciated in the case of the EITC. Welfare reform was largely motivated out of concern over long-term spells of welfare receipt, but long-term EITC eligibility has very different implications. The bulk of EITC dollars are going to long-term recipients, who are necessarily workers with both persistent attachment to the labor force, and persistently low wages.

III. Conclusion

This paper uses longitudinal survey data to examine the persistence of eligibility for the Earned Income Tax Credit, one of the major components of the nation's safety net for low-wage workers. Our

findings address certain shortcomings in earlier work on EITC persistence based on administrative data from the IRS, although we focus on eligibility rather than observed EITC claiming. First, earlier work has not followed individuals who are not primary taxpayers or as marital status (and tax-filing status) changes, and this may create significant undercounts of women and single parents. We show that single parents have particularly persistent EITC eligibility, and that failure to track individuals across marital status changes can lead to substantial understatement of spell lengths for single mothers.

Second, and more important to our overall conclusions about EITC persistence, the high probabilities that individuals who end eligibility will return in the next few years mean that statements about the persistence of EITC eligibility (or claiming) based on single spell durations can be misleading. We show that, while nearly two-thirds of eligibility spells end within two years, the average total time eligible for those initiating an eligibility spell is more than five years out of ten. Single parents, blacks, and those with low education have, as expected, even longer than average total years of eligibility.

Third, persistence of eligibility for the EITC depends on the permanent level of wages and earnings available to recipients. Here, we highlight the implications of this fact for geographic variation in patterns of EITC eligibility dynamics. Low-wage regions, such as the South, where a single earner with close to median wages will maintain some eligibility for the EITC, have distributions of years of eligibility that include significant fractions with near permanent eligibility.

Because the EITC now serves as both a safety-net program and a subsidy for low-wage workers, these facts about its potential persistence point to unique policy implications. On one hand, the EITC is a program that disproportionately benefits a subset of individuals who remain eligible for many years. On the other hand, these are, by necessity, individuals who show continuous attachment to the workforce and persistently low wages. The EITC provides long-term support to those who face low wages over time, and should thus draw attention to this part of the labor force requiring on-going support at current wage rates.

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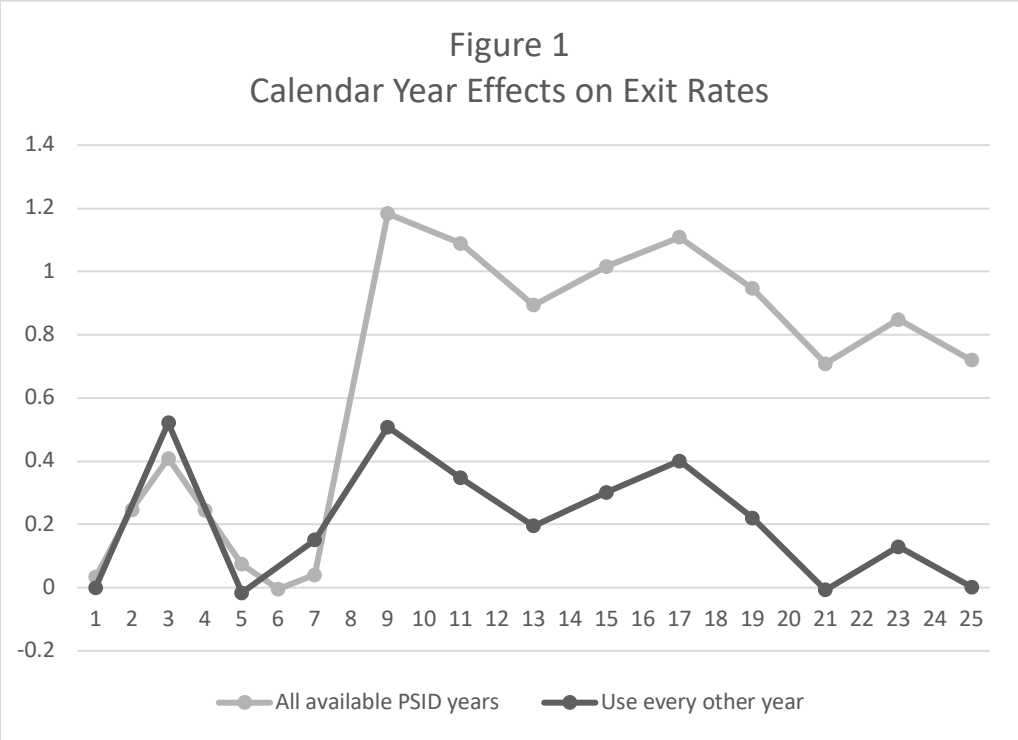
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Note: Both series are relative to 0 in initial year (1990). This means that "all available years" shows the effects of the change in survey structure after 1997.

Table 1: Characteristics of EITC Eligibles: 1990-2015
(Heads and Wives Ages 18 to 62)

	1990-2015	2015	
EITC eligible current year	13.5%	17.8%	
Ever EITC eligible		45.7%	
	Initial Year of Eligibility	All Years of Eligibility	All Years (Those Ever Eligible)
Age	36.9	36.6	38.9
Head's Earnings (\$2015)	\$14,977	\$16,245	\$32,620
Single	55%	55%	47%
# Kids	1.3	1.5	1.2
Black	19%	23%	18%
White	63%	59%	66%
HS or less education	47%	52%	47%
EITC Eligible Amount	\$1,316	\$1,685	
Adjusted Gross Income	\$19,062	\$20,075	\$45,120
N	10,918	29,402	73,271

Table 2: Distribution of EITC Eligibility Spell Length
(adults beginning a spell of eligibility)

Year	PSID 1990-1997	PSID 1990-2015	Dowd & Horowitz (2011) spells of claiming EITC
1	0.51	0.52	0.42
2	0.16	0.25	0.19
3	0.11	0.09	0.12
4	0.06	0.06	0.08
5	0.03	0.03	0.05
6	0.03	0.02	0.04
7	0.02	0.01	0.02
8	0.02	0.01	0.02
9	0.01	0.01	0.01
10	0.05	0.01	0.05

Table 3: Probabilities of Return to Eligibility
(adults beginning a spell of eligibility)

Year	Probability (return to EITC eligibility)	Cumulative fraction returning
1	0.28	0.28
2	0.22	0.44
3	0.14	0.52
4	0.17	0.60
5	0.09	0.64
6 or more	0.09	0.67

Table 4: Years of EITC Eligibility Over Next Decade
(adults beginning a spell of eligibility)

Year	Multiple Spells	Single Spells
1	7.0%	48.1%
2	11.5%	24.9%
3	14.3%	8.9%
4	15.7%	5.7%
5	15.3%	2.9%
6	12.9%	2.3%
7	9.4%	1.7%
8	6.6%	1.3%
9	4.1%	1.0%
10	3.1%	3.1%
Mean Years	4.8	2.4

Table 5: Years of EITC eligibility over next decade, by group
(adults beginning a spell of eligibility)

	Married	Single	South	West	Black (high school only)	White (high school only)	Black (some college)	White (some college)
Year	1	2	3	4	5	6	7	8
1	9.3%	4.3%	9.6%	20.6%	4.8%	8.3%	13.3%	19.5%
2	13.8%	7.8%	13.8%	20.0%	8.3%	12.5%	17.8%	22.1%
3	15.4%	10.6%	15.0%	15.2%	11.0%	14.2%	18.0%	18.9%
4	15.1%	12.5%	14.0%	12.0%	12.9%	14.6%	16.0%	14.8%
5	13.3%	13.6%	11.9%	8.9%	13.7%	13.2%	12.3%	10.0%
6	11.0%	13.5%	10.1%	7.1%	13.5%	11.5%	9.0%	6.4%
7	8.3%	12.1%	8.0%	5.3%	11.8%	9.2%	6.0%	3.9%
8	6.2%	10.4%	6.8%	4.5%	10.1%	7.2%	3.8%	2.4%
9	4.1%	7.7%	4.9%	2.9%	7.2%	4.8%	2.2%	1.3%
10	3.6%	7.4%	6.0%	3.5%	6.6%	4.4%	1.6%	0.9%
Mean Years	4.5	5.6	4.7	3.8	5.5	4.8	3.9	3.3

Table 6: Events Ending EITC Eligibility

Primary Event	Percent of exits associated with event	
	All adults	Single Parents
Marriage	7%	--
Reduction in Dependents	18%	24%
Head's earnings increase >\$5000	37%	35%
Joint earnings increase >\$5000	5%	--
Hours increase (subset of earnings increases)	29%	23%
Zero Earnings	12%	20%
Other	20%	21%

Table 7: Events Beginning EITC Eligibility

Primary Event	Percent of entries associated with event	
	All adults	Single Parents
Divorced or Separated	11%	--
Increase in EITC Dependents	13%	16%
Head's earnings decrease >\$5000	35%	33%
Joint earnings decrease >\$5000	5%	--
Earnings decrease +hours increase	33%	27%
Increase earnings above zero	13%	7%
EITC Expansion	7%	24%
Other	16%	20%

Table 8: Distribution of EITC Amounts by Years Eligible
(adults beginning a spell of eligibility)

	Average EITC Amount, by Total Years Eligible		Total EITC Over 10 Years, by Total Years Eligible		% of Total EITC Spending Over 10 Years, by Total Years Eligible	
	All	Single Parents	All	Single Parents	All	Single Parents
1	\$ 977	\$ 1,230	\$ 977	\$ 1,230	2%	1%
2	\$ 967	\$ 1,118	\$ 1,934	\$ 2,236	3%	2%
3	\$ 1,123	\$ 1,436	\$ 3,369	\$ 4,308	5%	4%
4	\$ 1,251	\$ 1,339	\$ 5,004	\$ 5,356	7%	6%
5	\$ 1,289	\$ 1,464	\$ 6,445	\$ 7,320	8%	9%
6	\$ 1,390	\$ 1,628	\$ 8,340	\$ 9,768	11%	14%
7	\$ 1,465	\$ 1,571	\$ 10,255	\$ 10,997	13%	16%
8	\$ 1,194	\$ 1,253	\$ 9,552	\$ 10,024	11%	13%
9	\$ 1,868	\$ 1,943	\$ 16,812	\$ 17,487	19%	19%
10	\$ 1,947	\$ 1,805	\$ 19,470	\$ 18,050	21%	15%

Appendix – Additional Results

Table A1. Distribution of Years Eligible by Marital Status at Start of Spell and Marital Status Persistently
(women beginning a spell of eligibility, over next 10 years)

Total years eligible	Single at start of spell	Single at start & remain single	Married at start of spell	Married at start of spell & remain married
	1	2	3	4
1	0.2	0	3.7	8.5
2	1	0.7	10.2	16.8
3	3.2	2.6	18.3	22.3
4	8.5	7.7	24.7	22.4
5	16.7	16.3	23.7	17
6	22.8	23.2	12.7	8.4
7	21.2	21.8	4.5	3
8	14.6	15.2	1.5	1.1
9	3	8.5	0.5	0.4
10	3.6	3.9	0.2	0.2
Average years	5.943	6.504	4.225	3.694