

How do EITC recipients spend their refunds?

Andrew Goodman-Bacon and Leslie McGranahan

Introduction and summary

The earned income tax credit (EITC) is one of the largest sources of public support for lower-income working families in the U.S. The EITC operates as a tax credit that serves to offset the payroll taxes and supplement the wages of low-income workers. For tax year 2004, the EITC transferred over \$40 billion to 22 million recipient families (U.S. Internal Revenue Service, 2006b). Nearly 90 percent of program expenditures come in the form of tax refunds; the remaining 10 percent serve to reduce tax liability. While other income support programs distribute benefits fairly evenly across the calendar year, EITC payments are concentrated in February and March when tax refunds are received. Because the EITC makes one relatively large payment per year, it may provide low-income, credit-constrained households with a rare opportunity to make important big-ticket purchases.

Research on the EITC has tended to focus on the important labor supply effects of the program (Eissa and Liebman, 1996; Meyer and Rosenbaum, 2001; and Grogger, 2003). Relatively little is known about how recipient households actually use EITC refunds. In this article, we use data from the U.S. Bureau of Labor Statistics' *Consumer Expenditure Survey* (CES) over the period 1997–2006 to investigate how households spend EITC refunds.¹ Following the methodology of Barrow and McGranahan (2000), we rely on the particular timing of EITC payouts to identify the effects of the credit on expenditures. Barrow and McGranahan found that the EITC has a larger effect on spending on durable goods than on nondurable goods. In this article, we are particularly interested in determining what items within the durables and nondurables categories are purchased using the credit and whether these expenditures reinforce the EITC's prowork and prochild goals. Our primary finding is that recipient household spending in response to EITC payments is

concentrated in vehicle purchases and transportation spending. Given the crucial link between transportation and access to jobs, we believe this finding is consistent with the EITC's goals. In the next section, we present a brief history of the EITC and the key features of the program. We then review prior research on the uses of the EITC by recipient families. Next, we introduce the CES data and the methodology we use to investigate the data. Finally, we present our results and discuss their implications.

History and structure of the EITC

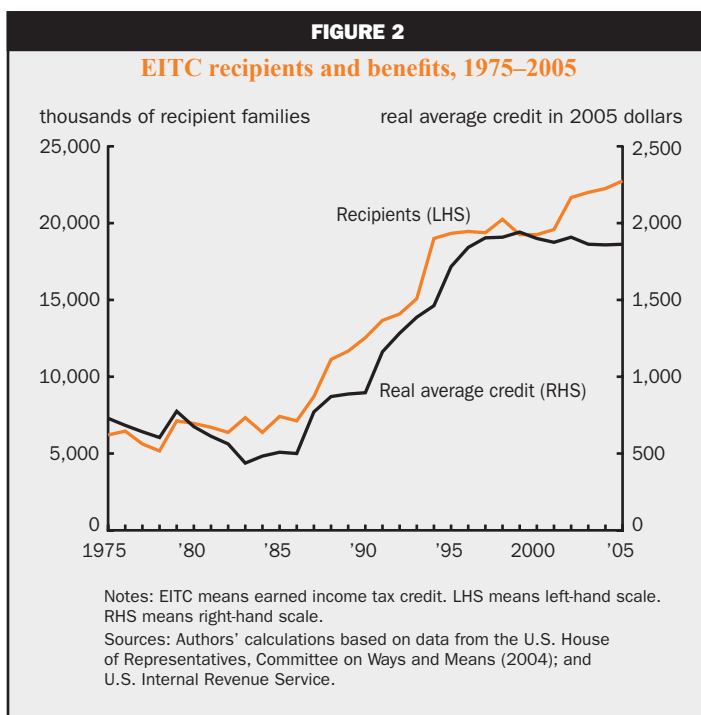
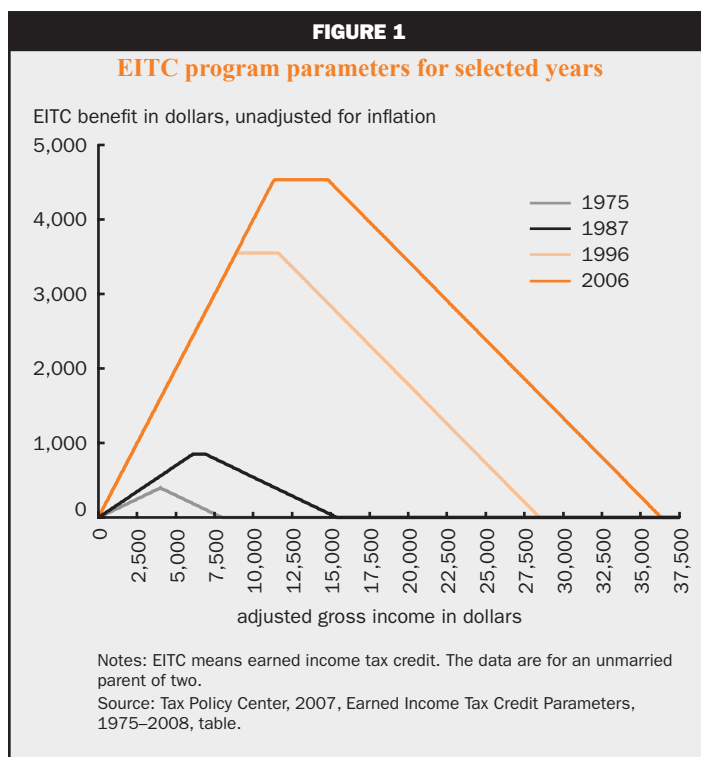
Congress created the EITC in 1975 to offset payroll taxes paid by low-income workers with children. The credit is structured as a supplement to earned income equaling a percentage of earnings up to a specific threshold (the "phase-in" range), at which point the credit amount stays constant for an additional amount of earnings (the "plateau" range). Then this maximum credit is reduced by a given percentage of earnings until it equals zero (the "phase-out" range). Income thresholds, the phase-in and phase-out rates, and, therefore, the credit amount also vary by the number of qualified children in a household and by marital status; and all these factors have varied over time.² Figure 1 graphs the EITC program parameters for selected years. The program is implemented as a part of the tax code, and recipients must file taxes in order to apply for the program. For tax year 2006, a single mother with two children earning between \$11,340 and \$14,810 would have received the maximum credit of \$4,536.

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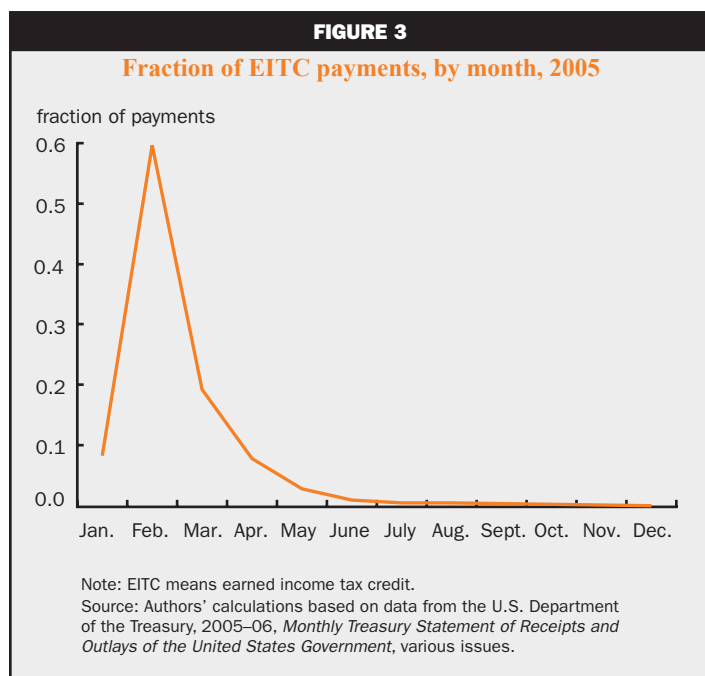
The EITC began as a small program, but its generosity and coverage have expanded frequently in its 30-year history as is shown in figures 1 and 2. Particularly large expansions enacted in 1986 and 1993 led to rapid program growth. In 1994, childless families started to receive a small credit. In 1975, the EITC represented 3.1 percent of federal means-tested transfers and 9.7 percent of federal means-tested cash transfers; by 2002, these proportions had increased by three times and four and a half times, respectively, and the EITC was the second largest means-tested cash transfer program behind Supplemental Security Income (SSI). In figure 2, we graph the average credit and number of recipient families by year. As the figure shows, the size of the EITC was relatively constant in its first decade, but between 1986 and 2005, both the number of recipient families and the real average credit amount grew by more than three times, increasing real federal expenditures on the program by almost 12 times. In 1986, just over 7 million families received earned income tax credits averaging \$501 in 2005 dollars. By 2002, over 20 million families received credits averaging \$1,911 in 2005 dollars (U.S. House of Representatives, Committee on Ways and Means, 2004).

Unlike other transfer programs that have monthly benefits, the EITC pays out a lump sum once per year. The EITC does permit recipients to receive some portion of payments monthly prior to tax filing in the form of the advance earned income tax credit, but in 2004 only 0.6 percent of recipient households received any credit in this manner, representing just 0.2 percent of payments (U.S. Internal Revenue Service, 2006b).

Figure 3 shows the distribution of refundable EITC payments from the U.S. Internal Revenue Service by month for 2005—a year with a payment pattern typical of recent years. As the figure shows, nearly all EITC payments are made in February and March, and most of these come in February. The modal month of EITC payments has changed over time, but since 1997 more payments have been made in February than in any other month.



This pattern is a result of the timing of tax filing. Taxes can be filed anytime after W-2s (employee wage report forms) are received (by January 31), and refunds are received within six weeks.³



The lump sum payment structure also means that EITC refunds represent a relatively large share of recipients' income in the month when they are received. For tax year 2004, the average EITC refund for recipient families with children was \$2,113, or 12 percent of their annual average adjusted gross income (AGI) of \$16,981. Assuming income was earned evenly across the calendar year, the average recipient household's income would be approximately two and a half times its usual monthly value in the month when the EITC payment was received.⁴

For comparison, the mean overpayment refund for non-EITC recipients in tax year 2004 was \$1,692, or 2.9 percent of annual average AGI among nonrecipients.⁵ Overpayment refunds are less concentrated in the first quarter of the year than EITC refunds. While 87 percent of EITC refunded dollars for 2004 were distributed in the first quarter, 47 percent of non-EITC refunded dollars were distributed in the first quarter, and an additional 42 percent were distributed in the second quarter (U.S. Internal Revenue Service, 2006c). It is worth noting that the *Consumer Expenditure Survey*, the data set used for our analysis, provides additional evidence to show that EITC refunds are concentrated earlier in the year than other tax refunds. Among families who made an expenditure on "accounting services," including tax preparation, 43 percent of EITC eligible families did so in January or February, versus 29 percent of noneligible families.

The one-time EITC average refund of \$2,113 among families with children in 2004 is also large when compared with the average monthly payments to recipient families in other transfer programs in 2004, such as SSI (\$429); Temporary Assistance to Needy Families, or TANF (\$397); the Food Stamp Program (\$200); and unemployment insurance (\$1,141).⁶

Use of EITC refunds

The majority of research on the EITC and expenditure patterns has relied on surveys of EITC recipients about how they spent or planned to spend refunds. The consensus from these surveys is that the primary use of EITC refunds is to pay bills. Sixty-three percent of respondents in a survey of participants in the University of Georgia's Consumer Financial Literacy Program reported that they planned to use most of their refund to pay or catch up on bills or debts (Linnenbrink et al., 2006).

Similarly, 44 percent of mothers in a study tracking the well-being of rural families indicated that they used their refund to pay bills (Mammen and Lawrence, 2006). Using surveys of free tax preparation clients in Chicago, Smeeding, Phillips, and O'Connor (2000) report that tax filers who anticipate an EITC refund most often plan to use it to pay bills. These studies also find that recipients used their refunds to purchase or repair cars and buy other durables, such as home furnishings. Some families also report buying children's clothing and going on vacation. Very few families planned to save their refund for a rainy day or for retirement.

In contrast to these studies, Barrow and McGranahan (2000) use the nationally representative *Consumer Expenditure Survey* to investigate expenditure uses of EITC refunds. They rely on the unique seasonal pattern of EITC refunds to determine whether EITC eligible households have expenditure patterns that differ from those of noneligible households. They find that EITC eligible households have higher expenditures on durable goods in February, the modal month of EITC receipt, relative to noneligible households. They attribute this increased spending on durables to the EITC. Barrow and McGranahan do not measure health care, housing, or utility expenditures, so they do not measure much of what other studies categorize as "bills."

Here we use CES data over the period 1997–2006 to build upon the work of Barrow and McGranahan (2000). We investigate on which goods, particularly

within the durable goods category, the EITC recipient households spend more. We also look at both the extensive and intensive margin of expenditure. In other words, we ask both whether households are more likely to make any expenditure and whether they make larger expenditures, given that they make a purchase.

We focus on those goods that have been identified in the literature as either those that recipients report that they plan to purchase or those that further the EITC program's goals of "strengthen[ing] the incentive to work," "help[ing] low-wage working families make ends meet," and promoting the well-being of children (Frost, 1993). Vehicle expenditures fall into both of these categories. They have been mentioned by recipients as an intended use of the EITC credit and are particularly supportive to work. According to a Brookings Institute report, 88 percent of low-income Americans commute in a personal vehicle (Blumenberg and Waller, 2003). In fact, other antipoverty and income support programs explicitly recognize the link between car ownership and employment through more lenient limits on cars than on other forms of assets. For example, the federal SSI program exempts one vehicle from its resource limit. Similarly, most states exclude the value of one or more vehicles from resource limits used to determine eligibility for the Food Stamp Program and TANF Program. In addition to vehicles, we focus on expenditures on household furnishings and home electronics, as well as on children's clothing. We do not look at bill paying because the nature of the CES data precludes such an analysis.

Our primary contribution is to provide evidence on detailed actual expenditures, using nationally representative survey data. Time-series variation in EITC payments over the year and cross-sectional variation in imputed eligibility allow us to identify the EITC's impact. Similar to Barrow and McGranahan (2000), we find that receiving EITC refunds increases household expenditures on both durable and nondurable goods, but more so for durables. Eligible households are more likely both to purchase big-ticket items in February and to spend more on them, given that they make any expenditure. Within durables, the strongest patterns are found for vehicles, confirming the responses given in surveys. Eligible households also spend slightly more on all other major subcategories of durables—household goods, appliances, and home electronics. Within nondurables, the strongest patterns are found for transportation expenses, such as car repairs.⁷

Data

We create a monthly household-level data set of expenditure, income, and family structure, using the

CES's interview survey data covering the period 1997–2006. Households, which are called consumer units (CUs) in the data, are interviewed five times for the survey.⁸ The first interview provides baseline asset information. The second through fifth interviews cover detailed expenditure information for the three months prior to the interview date. These interviews occur three months apart. As a result, in the absence of attrition, a full year of expenditure data is collected for each household. Households enter and exit the survey each month. Information on income in the 12 months leading up to the survey date is collected in the second and fifth interviews. Demographic information is updated every interview.

We begin with the 1997 data because February has been the modal month of EITC payouts since 1997. This consistency in payments across time allows us to focus on the February expenditures of recipient households. In most years prior to 1997, March was the modal month of EITC payments.⁹

We consider a CU to belong to the calendar year in which we observe February expenditure (or would have observed it if the household had responded). Since 1997, this is when the CU is most likely to have received the previous tax year's EITC refund payment. Therefore, data over the period 1997–2006 allow us to consider EITC policies in place during tax years 1996–2005. The average number of observations in our 120 month-year cells is 4,888, and in total we have 589,568 observations.

Information on EITC receipt is not provided in the CES, so we use the income and family structure variables to impute EITC eligibility and the magnitude of EITC payments. Because of our reliance on the income data, we delete those with incomplete income reports from the analysis. We assume all households without children are not eligible for the EITC despite the small credit for childless families that has been available since 1994.¹⁰ The CUs may contain more than one tax filing unit (TU). We impute EITC payments and eligibility for each TU within the CU and combine these to determine CU eligibility and EITC amount. Ideally, we would observe the income and family structure of each TU for the year preceding their February interview. However, we lack information on TU composition and on tax year income. To generate our best guess of income for the year preceding the February interview, we use the income information in the second and fifth interviews. For some individuals, our best guess of tax year income is the reported income from the second interview; for others, we compute a weighted average of the two income reports where

the weights depend on the number of months for which the year covered by the income report and tax year overlap.

To assign adults to TUs and generate TU income, we use sex, marital status, relationship to reference person, and individual income information. To assign children to TUs for the purpose of the EITC computation, we use the EITC eligibility rules in place during the year before their February interview. Before 2001, EITC rules assigned all qualifying children in a *family* to the TU with the highest income, but since 2001, families have been free to choose which TU claimed qualifying children. Thus, before 2001 we give all children to the highest-income TU, and after 2001 we give all qualifying children to the TU for which they generate the largest EITC refund.¹¹

Because of this imputation, we are measuring EITC eligibility rather than EITC receipt. Two issues may affect the accuracy of these imputations. First, some households that are eligible for the EITC may not take it up. According to a study by the U.S. Government Accounting Office (2001), approximately 85 percent of eligible households with children participate in the EITC program. Second, we may be incorrectly imputing that eligible households are ineligible or that ineligible households are eligible because either child or income information is incorrect in the CES. There is some underreporting of income in the CES, so we may be assigning eligibility to some households that

are in fact beyond the maximum income for EITC receipt. We also may be assigning some children to an incorrect TU. These issues make it harder for us to find an effect of the EITC on consumption. As a result, our estimates represent a lower bound on the effect of the EITC on recipient consumption patterns.

Table 1 gives variable means for the demographic, income, and EITC variables for all families and by imputed EITC eligibility. In the full sample, 13 percent of household-months (shown as 0.13 in the first column, fourth row of table 1) were eligible for an average credit of \$2,116 in the February in which we observed them. These percentages and values change over time in keeping with the changes in eligibility and refund amounts presented in figure 2 (p. 18). When we compare the EITC eligible and noneligible populations, we find differences that are consistent with the program rules. For example, EITC eligible households earn approximately 60 percent of what noneligible households earn on average, and have more children. In addition, EITC eligible households are also less likely to have a white household head, are more likely to be headed by a single parent, and are less educated than noneligible households. These additional findings are not related explicitly to the program rules, but result from patterns of earnings in the U.S., and are consistent with the attributes of participants in other income support programs.

TABLE 1
Summary statistics

	All	Non-EITC	EITC
Median real income (2004 dollars)	32,346	36,590	22,548
Mean real income (2004 dollars)	44,130	46,468	28,599
EITC amount (2004 dollars)	277	—	2,116
EITC eligible	0.13	0.00	1.00
Number of children	0.71	0.52	1.97
White household head	0.84	0.85	0.75
Household head's highest educational attainment:			
Some high school	0.13	0.12	0.22
High school diploma	0.25	0.24	0.34
Some college	0.20	0.20	0.23
College degree	0.42	0.45	0.22
Family type:			
Husband, wife, and own kids	0.27	0.25	0.37
Single parent	0.06	0.03	0.25
Single person	0.28	0.32	0.00
Other family type	0.39	0.40	0.39
Observations (family months)	589,568	512,405	77,163
Observations (distinct families)	59,595	51,824	7,771

Note: EITC means earned income tax credit.

Source: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey*.

Our next goal is to generate monthly expenditure data. We combine all available interviews for each CU. Sixty-three percent of CUs have 12 months of data, and the average CU has 9.9 months of data. The CES contains very detailed information on expenditures, which we distill into durable goods and nondurable goods, as well as subcategories of those groups. Durable goods includes household goods (such as furniture, linens, and carpets); appliances (such as dishwashers, silverware, and kitchen electronics); electronics (such as televisions and computers); and new and used vehicle purchases. Nondurables includes food, alcohol, and tobacco; apparel; trips (out-of-town travel and expenditure while traveling); transportation expenses (except vehicle purchases); entertainment; child support, alimony, and charity; and pensions, insurance, and social security payments. We do not measure expenditure on items that we do not consider to be durable or nondurable goods. In particular, we exclude utilities, rent, education expenses, and health care. These obligations may be difficult for households to alter on a month-to-month basis. In addition, the rent and utility variables reported on the survey capture the amount owed in a given month rather than the amount paid, making it impossible to assess whether households are spending money to catch up on overdue payments or prepay obligations.¹²

Table 2 provides summary statistics on expenditures in all of our categories as calculated from the CES. It provides three different measures of expenditure for each category. The first set of three columns presents expenditure that occurs on the goods category in the average month as a percent of total annual expenditures on durable and nondurable goods. The entry for durable goods in the first column indicates that in the average month, a household spends 1.5 percent of its total annual durable and nondurable goods expenditures on durable goods. The second set of three columns reports the probability that a household makes any expenditure in a category in an average month. In the average month, 84.5 percent of households purchase a durable good. The third set of three columns reports the proportion of total annual expenditure for durable and nondurable goods in that category in a month, given that some expenditure was made. Among households purchasing durables in a given month, the average household spends 1.8 percent of total annual durable and nondurable goods expenditures on durables. Table 3 reports the average dollar amount (in 2004 dollars based on the Personal Consumption Expenditures deflator) spent per month conditional on expenditure.

As seen in table 2, average monthly expenditure shares are fairly consistent for EITC and non-EITC families with a few exceptions. The EITC families spend a high share on food and on children's clothing. The higher expenditure share on food is consistent with the general finding that food expenditure shares are higher for lower-income households in the U.S. The higher expenditure share on children's clothing arises from our restriction that all EITC eligible households have children, while many noneligible households do not. From the second group of columns in table 2, we observe that EITC families are generally less likely than non-EITC families to make expenditures in almost every category in an average month. As shown in table 3, in dollar terms, conditional on nonzero expenditure, EITC families spend less on everything except for tobacco, food, and gasoline. Our analysis continues by examining the effect of EITC eligibility on spending in the nondurables category and the nondurable goods subcategories of children's clothing and transportation, and then we focus our analysis on durable goods expenditures and specifically on expenditures for vehicles and consumer electronics.

Methodology

We measure expenditure by household i in month t on category j in three ways: the proportion of annual

expenditure in each month $\left(\frac{X_{it}^j}{X_{i,Annual}^j} \right)$, the probability

of making any expenditure $\left(P(X_{it}^j > 0) \right)$, and the proportion of annual expenditure conditional on making

an expenditure $\left(\frac{X_{it}^j}{X_{i,Annual}^j} \mid X_{it}^j > 0 \right)$.¹³

We estimate clustered probit models for the discrete measure of expenditure and generalized least squares (GLS) regression models for the expenditure proportion variables. Letting X be one of the three dependent variables, we estimate the following equation:

$$1) \quad X_{it}^j = \alpha + \gamma_t M_t + \phi EITC_i + \lambda_t (EITC_i \times M_t) + \beta C_i + \varepsilon_{it},$$

where M is a vector of month dummies, $EITC$ is a dummy variable equal to 1 if the household is imputed to be EITC eligible, and C is a vector of household-level controls—year of first quarter interview; income, race, sex, and education of household head; family size; number of children; family type; and region (all rural households are the omitted “region”).

TABLE 2
Expenditure patterns, by expenditure category and EITC eligibility

	Monthly expenditure/ annual expenditure			Probability of expenditure			Monthly expenditure/ annual expenditure, conditional on nonzero expenditure		
	All	Non-EITC	EITC	All	Non-EITC	EITC	All	Non-EITC	EITC
Total	0.084	0.084	0.083	1.000	1.000	1.000	0.084	0.084	0.083
Durable goods	0.015	0.015	0.015	0.845	0.848	0.822	0.018	0.018	0.019
Household goods	0.003	0.003	0.002	0.285	0.291	0.248	0.010	0.010	0.009
Furniture	0.001	0.001	0.001	0.048	0.048	0.048	0.027	0.028	0.024
Drapes, linens, and floor coverings	0.000	0.001	0.000	0.098	0.098	0.094	0.005	0.005	0.004
Miscellaneous household equipment	0.001	0.001	0.001	0.210	0.216	0.169	0.005	0.005	0.004
Appliances	0.001	0.001	0.001	0.101	0.102	0.100	0.009	0.009	0.008
Major appliances	0.001	0.001	0.001	0.031	0.031	0.032	0.022	0.023	0.019
Minor appliances	0.000	0.000	0.000	0.076	0.076	0.074	0.003	0.003	0.003
Electronics	0.004	0.004	0.004	0.809	0.813	0.783	0.005	0.005	0.005
Vehicle purchases	0.007	0.007	0.008	0.024	0.022	0.034	0.302	0.316	0.244
Nondurables	0.068	0.068	0.068	0.999	0.999	1.000	0.068	0.068	0.068
Food, alcohol, and tobacco	0.030	0.030	0.034	0.997	0.997	0.998	0.030	0.030	0.035
Food	0.023	0.022	0.028	0.992	0.991	0.994	0.023	0.022	0.028
Alcohol	0.001	0.001	0.001	0.350	0.363	0.265	0.002	0.002	0.002
Tobacco	0.002	0.002	0.002	0.257	0.244	0.341	0.007	0.007	0.007
Food away from home	0.005	0.005	0.004	0.808	0.813	0.772	0.006	0.007	0.005
Apparel	0.006	0.005	0.007	0.647	0.643	0.674	0.009	0.009	0.010
Trips	0.003	0.003	0.002	0.186	0.196	0.119	0.017	0.017	0.014
Transportation	0.017	0.016	0.017	0.939	0.938	0.949	0.018	0.018	0.018
Gasoline	0.006	0.006	0.007	0.893	0.894	0.891	0.007	0.007	0.008
Other vehicle expenses	0.010	0.010	0.009	0.671	0.673	0.660	0.014	0.015	0.014
Public transportation	0.001	0.001	0.001	0.134	0.133	0.135	0.005	0.005	0.005
Entertainment	0.006	0.006	0.005	0.901	0.908	0.858	0.007	0.007	0.005
Fees, admissions, toys, and sports	0.004	0.004	0.003	0.670	0.675	0.635	0.006	0.006	0.005
Personal care services	0.001	0.001	0.001	0.734	0.749	0.635	0.002	0.002	0.002
Reading	0.001	0.001	0.000	0.587	0.611	0.428	0.001	0.001	0.001
Other nondurables	0.006	0.007	0.004	0.534	0.554	0.404	0.012	0.012	0.009
Child support, alimony, and charity	0.005	0.005	0.002	0.456	0.475	0.330	0.010	0.011	0.007
Pensions, insurance, and social security	0.002	0.002	0.001	0.189	0.196	0.142	0.009	0.009	0.008
Children's clothing	0.001	0.001	0.003	0.199	0.171	0.386	0.006	0.005	0.008
Children's clothing only among families with children	0.003	0.002	0.003	0.411	0.425	0.386	0.006	0.006	0.008

Notes: EITC means earned income tax credit. For each column, the subcategories may not total because of rounding. Children's clothing is a portion of the apparel subcategory. Source: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey*.

TABLE 3

Expenditure amounts, by EITC eligibility, conditional on expenditure

	All	Non-EITC	EITC
	(- - - - - 2004 dollars - - - - -)		
Total	1,788.78	1,822.02	1,568.02
Durable goods	475.38	484.59	414.21
Household goods	73.36	77.29	47.30
Furniture	34.27	35.81	24.02
Drapes, linens, and floor coverings	12.24	12.94	7.60
Miscellaneous household equipment	26.85	28.54	15.68
Appliances	20.24	20.97	15.38
Major appliances	14.97	15.52	11.32
Minor appliances	5.27	5.45	4.07
Electronics	79.38	80.87	69.47
Vehicle purchases	302.40	305.47	282.05
Nondurables	1,313.40	1,337.43	1,153.81
Food, alcohol, and tobacco	491.73	487.31	521.08
Food	349.55	341.46	403.29
Alcohol	15.00	15.66	10.60
Tobacco	26.19	24.80	35.42
Food away from home	101.00	105.40	71.77
Apparel	119.46	119.98	115.99
Trips	77.85	83.91	37.57
Transportation	323.12	326.16	302.99
Gasoline	109.67	108.25	119.06
Other vehicle expenses	201.27	205.32	174.40
Public transportation	12.19	12.59	9.53
Entertainment	144.07	151.83	92.53
Fees, admissions, toys, and sports	104.97	110.84	65.97
Personal care services	25.22	26.08	19.52
Reading	13.88	14.91	7.04
Other nondurables	157.15	168.23	83.63
Child support, alimony, and charity	119.03	127.82	60.63
Pensions, insurance, and social security	38.13	40.40	23.00
Children's clothing	25.20	22.12	45.68
Children's clothing only among families with children	55.31	60.62	45.68

Notes: EITC means earned income tax credit. For each column, the subcategories may not total because of rounding. Children's clothing is a portion of the apparel subcategory.

Source: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey*.

We allow for correlation among errors (ε) within a consumer unit over time.

The coefficients in the vector γ_t measure the common seasonal pattern of expenditure for all households relative to September (the omitted month). For the equation measuring the percentage of total expenditure, γ_t indicates the fraction of total expenditure on good j in month t relative to the fraction of total expenditure in September. The coefficient ϕ measures the constant difference in the fraction of expenditures between EITC eligible and noneligible households. Our coefficients of interest are the elements of the vector λ_t , which measure the monthly differences in expenditure (the different seasonality) between eligible and noneligible households. If all households perfectly smoothed their consumption across months, γ_t would be 0 and

the difference in expenditures between EITC eligible and noneligible households would be constant and entirely captured by ϕ . We interpret the coefficient on the $EITC \times February$ interaction (λ_{Feb}) as an indicator of whether the EITC changes the expenditure patterns of recipients and report p values for a test of the hypothesis that $\lambda_{Feb} = 0$.

Our identification strategy relies on two sources of variation: cross-sectional differences in eligibility and the particular timing of EITC refunds. We have no reason to believe, a priori, that unobserved factors such as prices or preferences influence February expenditure among low-income, working families with children differently than other families.¹⁴ Thus, we feel confident interpreting our λ_{Feb} as the impact of the EITC.

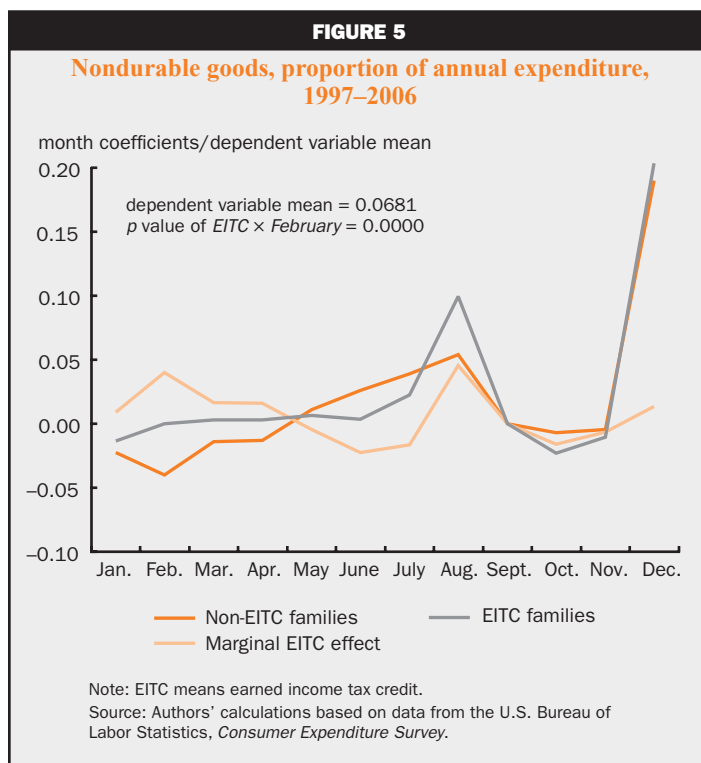
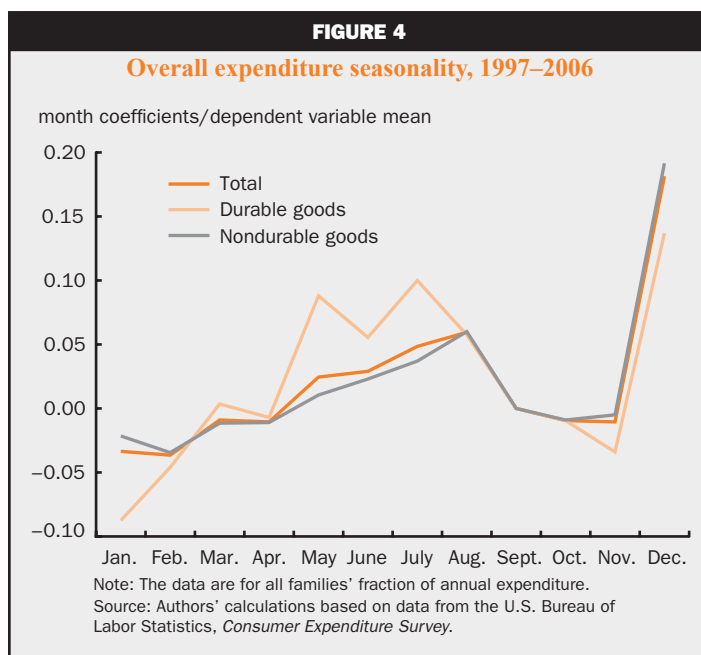
Results

Figure 4 shows overall expenditure seasonality relative to September. There are a number of notable patterns in the data. High expenditure in December due to the holiday season dominates expenditure patterns. We also observe high durable goods expenditures in the summer months when many individuals buy cars and household items. There is also an increase in nondurable goods expenditures in August in part because of back-to-school shopping. Finally, expenditure is low in February, the shortest month of the year.

Table 4 presents estimates of λ_{Feb} and the associated p value for the two continuous specifications of equation 1 and marginal effects based on λ_{Feb} and the associated p value for the probit model. We present these results for total durable and nondurable expenditure and for numerous subcategories of expenditure. Figures 5–10 graph the coefficients γ_t , λ_p , and $(\gamma_t + \lambda_p)$ —labeled “Non-EITC families,” “Marginal EITC effect,” and “EITC families,” respectively, in the legend—for the three different specifications of equation 1 and for selected expenditure categories. Since we omit September and do not graph ϕ , the “Non-EITC families” and “EITC families” lines represent deviations from their respective September expenditure measures. “Marginal EITC effect” is the difference between these two lines. In order to facilitate comparison between goods, for the continuous variables, the figures scale the estimated coefficients by the dependent variable mean (the average monthly expenditure on that good). For the probit model, we divide the coefficient by the estimated probability of expenditure. The denominators are listed in each figure panel, along with the p value for a test of the hypothesis that $\lambda_{Feb} = 0$. If $\lambda_{Feb} = 0$, then we cannot reject the hypothesis that the EITC does not affect expenditure on that good.

Nondurable goods

Figure 5 depicts seasonal expenditure patterns for nondurable goods expenditures by EITC eligibility status.



As shown in the figure, we find a small, but statistically significant and positive, February effect on unconditional expenditures for EITC families (p value = 0.000). While noneligible families spend about 4 percent less on nondurables in February

TABLE 4

Effects of EITC eligibility on February expenditures

	Unconditional expenditure		Conditional expenditure		Discrete expenditure	
	Feb. coefficient	p value	Feb. coefficient	p value	Feb. marginal effect	p value
Total	0.0067	0.0000	0.0067	0.0000		
Durable goods	0.0039	0.0004	0.0043	0.0012	0.0144	0.0023
Household goods	0.0009	0.0001	0.0024	0.0087	0.0312	0.0002
Furniture	0.0008	0.0000	0.0050	0.1133	0.0195	0.0000
Drapes, linens, and floor coverings	0.0000	0.7757	-0.0008	0.2527	0.0205	0.0004
Miscellaneous household equipment	0.0001	0.2578	0.0001	0.9176	0.0238	0.0020
Appliances	0.0003	0.0125	0.0003	0.8035	0.0304	0.0000
Major appliances	0.0001	0.1710	-0.0021	0.4006	0.0094	0.0069
Minor appliances	0.0001	0.0020	0.0013	0.0336	0.0212	0.0001
Electronics	0.0005	0.0067	0.0005	0.0176	0.0091	0.0854
Vehicle purchases	0.0023	0.0332	0.0004	0.9844	0.0092	0.0008
Nondurables	0.0027	0.0000				
Food, alcohol, and tobacco	0.0009	0.0007	0.0009	0.0008	0.0001	0.5506
Food	0.0007	0.0035	0.0007	0.0063	0.0011	0.1427
Alcohol	0.0000	0.5658	0.0000	0.8426	-0.0052	0.4628
Tobacco	0.0001	0.1492	0.0000	0.7804	0.0083	0.0847
Food away from home	0.0001	0.1018	0.0001	0.5328	0.0138	0.0136
Apparel	-0.0002	0.3891	-0.0004	0.2278	0.0140	0.0763
Trips	0.0008	0.0000	0.0020	0.1402	0.0243	0.0024
Transportation	0.0011	0.0003	0.0011	0.0006	0.0022	0.2173
Gasoline	0.0002	0.0427	0.0002	0.0358	0.0007	0.7920
Other vehicle expenses	0.0008	0.0047	0.0009	0.0187	0.0122	0.0918
Public transportation	0.0001	0.0177	0.0004	0.2704	0.0135	0.0061
Entertainment	0.0000	0.8229	0.0000	0.8136	-0.0024	0.5228
Fees, admissions, toys, and sports	0.0000	0.9810	-0.0001	0.7525	0.0057	0.4336
Personal care services	0.0000	0.1728	0.0001	0.1741	0.0052	0.4177
Reading	0.0000	0.9818	0.0000	0.5927	0.0063	0.4132
Other nondurables	0.0001	0.6995	-0.0001	0.7713	0.0068	0.3439
Child support, alimony, and charity	0.0002	0.1614	0.0002	0.6355	0.0143	0.0436
Pensions, insurance, and social security	-0.0001	0.1145	-0.0004	0.4439	-0.0154	0.0120
Children's clothing only among families with children	0.0002	0.1490	-0.0007	0.0197	0.0415	0.0000

Notes: EITC means earned income tax credit. Children's clothing is a portion of the apparel subcategory.

Source: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey*.

than in September, EITC families spend about the same in February and September. We do not investigate conditional or discrete expenditure because the probability of making nondurable goods expenditure is nearly 1 in a given month.

In figure 6, we present results for a subset of nondurables that is particularly relevant to the EITC's goals: expenditures on children's clothes. We estimate these models only for families with children so that the non-EITC control group is not dominated by childless families. Overall seasonal patterns between EITC families with children and non-EITC families with children are very similar, exhibiting a large increase in expenditures before school starts in September and during the holiday season (panel A). The EITC families are more likely to buy children's clothes in February than non-EITC families (panel B), but since they spend a slightly lower proportion of their total annual expenditure conditional on buying children's clothes (panel C), we do not find a statistically significant unconditional effect.

In figure 7, we present results for the nondurables portion of transportation. This includes gasoline, local public transportation, and car expenses outside of vehicle purchases. We find that EITC eligible households spend about 4 percent more in February than September, while noneligible households spend about 3 percent less (panel A). Most of this difference arises from higher spending conditional on positive expenditure (panel C). If we look at the first column of table 4, we find that transportation spending increases in February are the largest single contributor to the overall nondurables increase. From table 4, we also observe that EITC households spend relatively more on food and on trips than noneligible households in February.

Durable goods

Figure 8 presents results for all durable goods. The difference in expenditure patterns between EITC and non-EITC families in February is much more pronounced than for nondurable goods. While non-EITC families spend about 8 percent less on durables in February than in September, EITC families spend about 18 percent more (panel A). The EITC families are significantly more likely both to make a durable goods purchase in February and to spend more conditional on making a purchase (panels B and C, respectively).

We now examine the subcategories of durable goods that drive the patterns depicted in figure 8. Figure 9 presents results for new and used vehicle purchases.¹⁵ While non-EITC families spend about 17 percent less on vehicles in February than in September, EITC families spend 18 percent more (panel A), for a statistically significant difference of 35 percent (p value = 0.0332). This difference is entirely attributable to the fact that

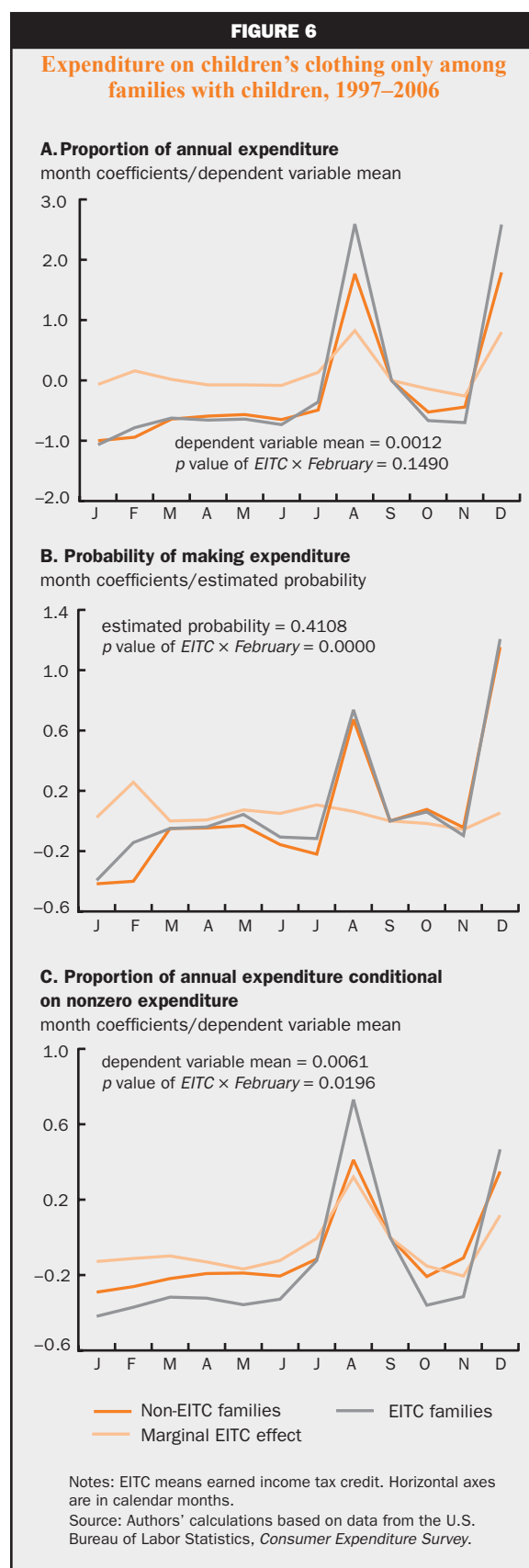
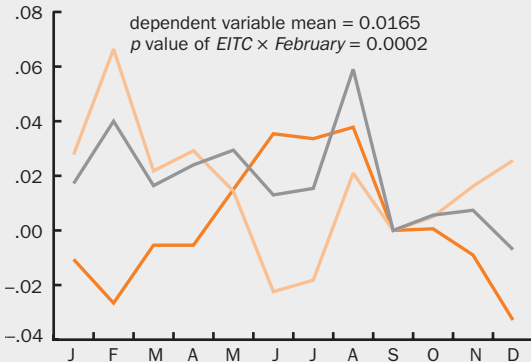


FIGURE 7

Expenditure on transportation excluding vehicle purchases, 1997–2006

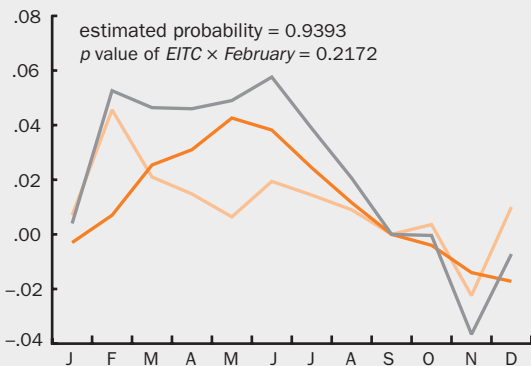
A. Proportion of annual expenditure

month coefficients/dependent variable mean



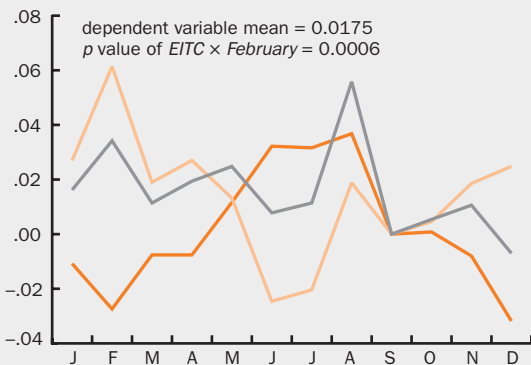
B. Probability of making expenditure

month coefficients/estimated probability



C. Proportion of annual expenditure conditional on nonzero expenditure

month coefficients/dependent variable mean



— Non-EITC families — EITC families
— Marginal EITC effect

Notes: EITC means earned income tax credit. Horizontal axes are in calendar months.

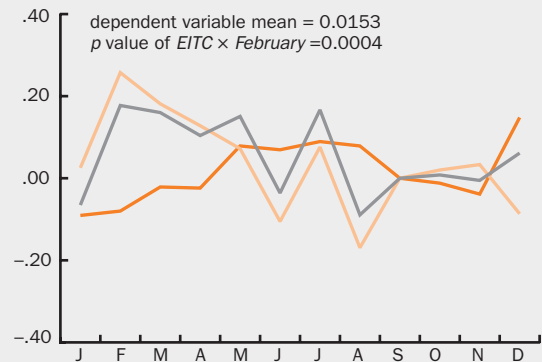
Source: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey*.

FIGURE 8

Durable goods expenditures, 1997–2006

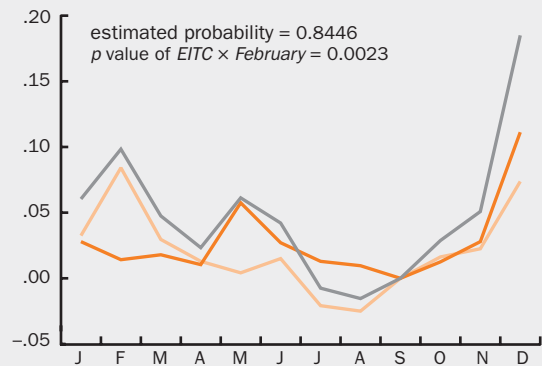
A. Proportion of annual expenditure

month coefficients/dependent variable mean



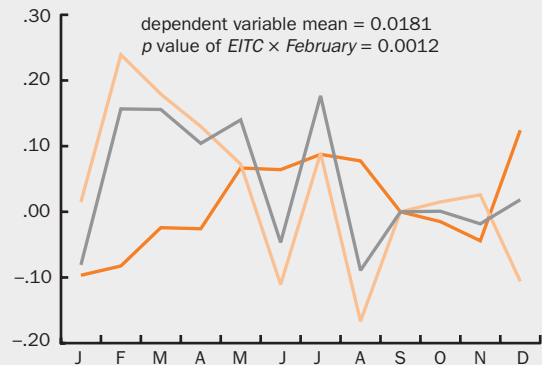
B. Probability of making expenditure

month coefficients/estimated probability



C. Proportion of annual expenditure conditional on nonzero expenditure

month coefficients/dependent variable mean



— Non-EITC families — EITC families
— Marginal EITC effect

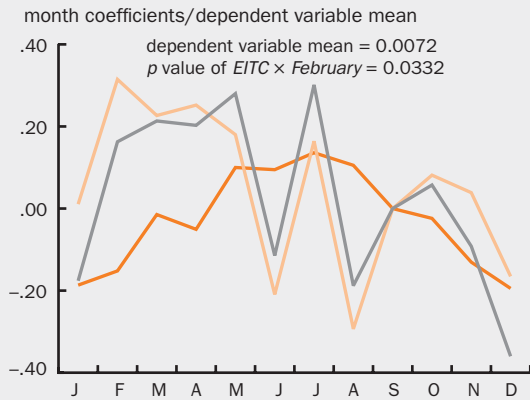
Notes: EITC means earned income tax credit. Horizontal axes are in calendar months.

Source: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey*.

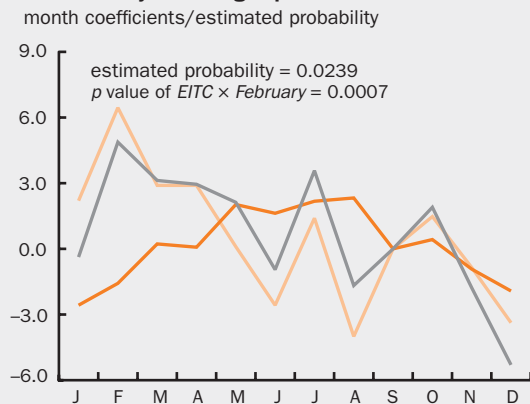
FIGURE 9

**Vehicle purchases expenditures,
1997–2006**

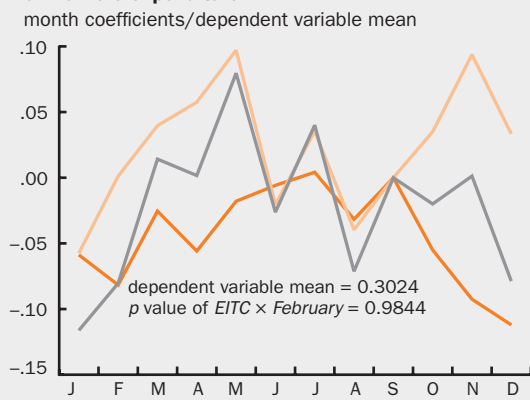
A. Proportion of annual expenditure



B. Probability of making expenditure



**C. Proportion of annual expenditure conditional
on nonzero expenditure**



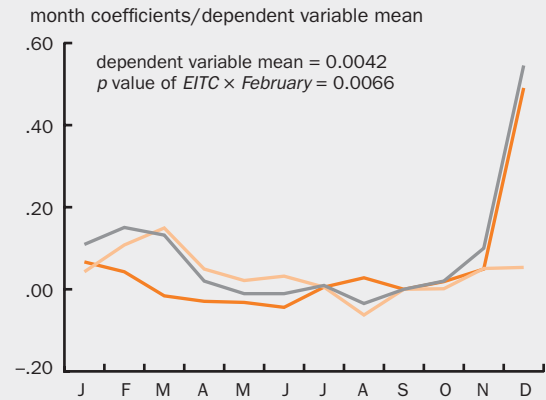
— Non-EITC families — EITC families
— Marginal EITC effect

Notes: EITC means earned income tax credit. Horizontal axes are in calendar months.
Source: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey*.

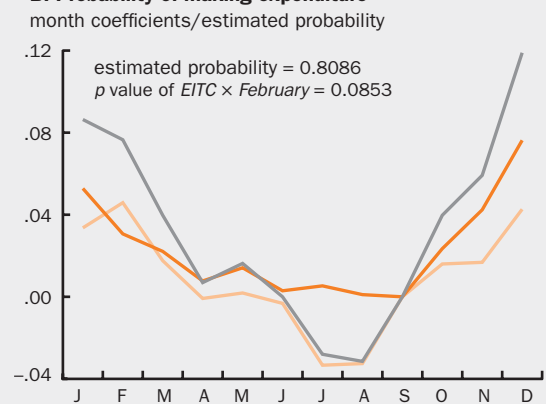
FIGURE 10

**Consumer electronics expenditures,
1997–2006**

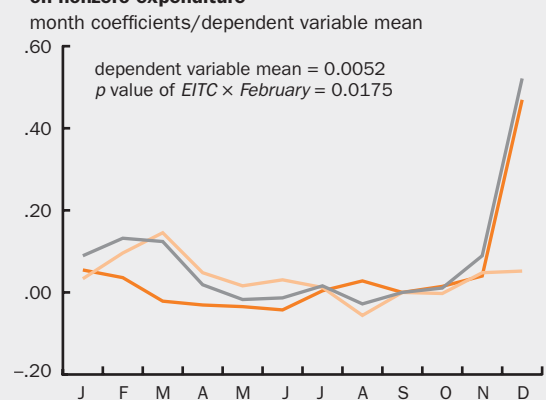
A. Proportion of annual expenditure



B. Probability of making expenditure



**C. Proportion of annual expenditure conditional
on nonzero expenditure**



— Non-EITC families — EITC families
— Marginal EITC effect

Notes: EITC means earned income tax credit. Horizontal axes are in calendar months.
Source: Authors' calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey*.

relative to September, EITC families are more than 600 percent more likely than non-EITC families to buy a car in February (panel B). This difference is about twice as large in February as in either January or March. These findings are also consistent with the research of Adams, Einav, and Levin (2007), which shows high demand for subprime auto loans in tax rebate season among households likely to be receiving an EITC refund. Interestingly, though, among families making a vehicle purchase in February (panel C), all families spend the same proportion of their annual expenditure on these goods (p value = 0.9844). Recall that in dollars, this amount is considerably smaller for EITC families.

Figure 10 graphs the coefficients from models of spending on consumer electronics, which include television sets, computers, and video and music players. Considering all observations, non-EITC households spend about 5 percent more on consumer electronics in February than in September, and EITC households spend about 15 percent more (panel A). However, the February effect is relatively small compared with the overall February effect for durable goods and substantially smaller than the effect for vehicles.

Results for other subcategories of durable goods are similar to the findings for electronics. In February, EITC eligible households spend more than noneligible

households on both household goods and appliances, but the magnitude of these effects is smaller than the magnitude of the effect for vehicles.

Conclusion

The results presented here indicate that EITC families spend at least a portion of their refund immediately upon receipt. Consistent with Barrow and McGranahan (2000), we find that recipients spend more on durables than on nondurables in response to the EITC. In particular, recipients are far more likely to purchase vehicles after receiving EITC refunds. The EITC increases relative average monthly spending on vehicles in February by about 35 percent for EITC families compared with their non-EITC counterparts. Within nondurables, expenditure increases are concentrated in transportation. Given the crucial role of access to transportation in promoting work, this leads to the conclusion that recipient spending patterns support the program's prowork goals. The EITC recipients are also more likely to spend money within the other durable goods categories, as well as on trips and food.

In future work, we hope to further analyze the consumption effects of the EITC by taking advantage of differences in state EITCs and by exploiting expansions in the EITC since its inception, as well as the changes in the timing of EITC payments.

NOTES

¹The 2005 CES contains data for the first quarter of 2006.

²A qualifying child must meet three requirements. First, this individual must be a child, stepchild, foster child, sibling, half sibling, stepsibling, or a descendent of a sibling of the tax filer. Second, the qualifying child must be younger than 19 at the end of the year, younger than 24 and a full-time student, or permanently disabled. Third, the qualifying child must live with the tax filer in the U.S. for at least six months out of the year. If two tax filers can claim one qualifying child, they can choose which one claims the child, but they both cannot claim the same child (U.S. Internal Revenue Service, 2006a). Starting in 2002, some married taxpayers filing jointly had higher benefits than singles with the same income and number of children.

³For e-filing, the e-file window needs to be open. This occurs in early January and happened on January 12, 2007.

⁴This was determined from authors' calculations based on data from the U.S. Internal Revenue Service (2006b).

⁵These figures for tax year 2004 are based on calculations using U.S. Internal Revenue Service (2006b) data. We assume that all overpayment refunds not due to the EITC are given to non-EITC recipients. The 26 percent of non-EITC taxpayers who did not receive a refund are included as zeros in this calculation.

⁶U.S. Social Security Administration (2006); and U.S. Department of Agriculture, Food and Nutrition Service (2008).

⁷The nondurables portion of transportation consists of gasoline and motor oil (42 percent), other vehicle expenses (49 percent), and public transportation (9 percent), according to the U.S. Bureau of Labor Statistics (2007).

⁸A consumer unit is defined to be an individual or a group of individuals who are either related or use their income to make joint expenditures on two of three categories—housing, food, or other living expenses.

⁹In future work, we plan to take advantage of changes in the timing of EITC payments and of expansions in the EITC to further investigate consumption responses to the program.

¹⁰In 2004, the credit for childless families accounted for only 3 percent of EITC payments despite representing 21 percent of returns receiving the EITC (U.S. Internal Revenue Service, 2006b).

¹¹Our method of dealing with qualifying children could falsely impute EITC eligibility or inflate refund amounts for CUs with children and multiple, unrelated TUs. This is only a potential problem for the 4 percent of CUs that contain multiple TUs, have any qualifying children, and were assigned the EITC. Furthermore, if EITC eligibility “truly” has an impact on expenditure, then misallocating households into the EITC group should bias our results away from finding a difference in expenditure seasonality between eligible and noneligible CUs.

¹²Throughout the analysis, we rely on the monthly data in the CES. In some cases the monthly information is unreliable because of the random attribution of some expenditure to months in the survey. This attribution would likely operate in the same manner for EITC recipient and nonrecipient households.

¹³For households with 12 observations, $X_{i,Annual} = \sum_{t=1}^{12} X_{i,t}^{Total}$. In order to adjust monthly expenditure proportions for households with fewer than 12 observations, we regress X_{it}^{Total} on household characteristics for 12-month households only and then generate predicted expenditure proportions for all households. The sum of these predicted monthly proportions gives the expected proportion of annual expenditures that we actually observe for households with fewer than 12 observations. Thus, we estimate true annual expenditures by dividing the sum of m ($m < 12$) observed expenditures by the

sum of m expected monthly proportions: $\frac{\sum_{t=1}^m X_{it}^{Total}}{\sum_{t=1}^m E\left(\frac{X_{it}^{Total}}{X_{i,Annual}}\right)}$. We use this

expression as the denominator of monthly expenditure proportions for households with fewer than 12 observations. It is because of this adjustment that average monthly expenditures are not equal to 1/12, or 8.33 percent, in table 2. We do not adjust the estimated standard errors in our regressions for this imputation.

¹⁴In their study of retail markdowns in Ann Arbor, Michigan, Warner and Barsky (1995) note that “prices are indeed lowest in January, but tend to return in February to December’s level.” We do not correct for the fact that February has fewer days than other months, which should, all else being equal, reduce February expenditures for both EITC recipient and nonrecipient households.

¹⁵According to the CES documentation, vehicle expenditures are defined as the purchase price minus the trade-in value on new and used domestic and imported cars and trucks and other vehicles, including motorcycles and private planes.

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