SUPPLEMENT

Parallel Trends Evaluation

Difference-in-differences analysis relies on the assumption that trends (not the levels) in outcomes during the non-exposed period are similar among treatment and control groups. In this case, we conducted a graphical analysis to evaluate whether trends in expenditures were similar among EITC-eligible and non-eligible individuals in the months in which the EITC refund is not received (Supplemental Figure 1). For the majority of outcomes, trends appeared to be parallel among the two groups. For emergency department and inpatient hospital services, trends were not fully parallel during the non-exposed period, although expenditures in these categories were also somewhat rare (Table 1). For these, results should be interpreted with caution.

Power Analysis

We carried out a power analysis. Based on a two-tailed α of 0.05 and power $(1 - \beta)$ of 0.8, and given the sample size of over 1.2 million individuals, we determined that we are well powered to detect a Cohen's effect size (d) of less than 0.02, which is considered small.[1]

Alternative Specifications

We conducted an additional analysis in which the outcome for each category was binary rather than continuous, i.e., any expenditure rather than the amount of expenditure. In this analysis, we were unable to rule out the null hypothesis that there was a short-term effect of the EITC refund on any expenditure category; the primary coefficient for every estimate in this model was less than 1% per $1000 of EITC (Supplemental Table 1).

We also tested for heterogeneity in effect estimates by year, in case of differences over time in how the EITC may impact healthcare expenditures. To do so, we first separately examined trends during 1997-2003 versus 2004-2011. Similarly, we conducted a separate analysis solely

using 2008-2009 data, to determine whether effects were different during the Great Recession. We were unable to reject the null hypothesis that estimates for 1997-2003 were different from those for 2004-2011. Similarly, analysis of data from only 2008-2009 demonstrated null results for all outcomes of interest (Supplemental Table 2).

We also carried out an alternative specification in which we restricted the sample to individuals with less than $50,000 of household income annually (instead of $100,000, as in our main specification). This was intended to make the control group more comparable to the treatment group. For this analysis (N=865,880), we again found no statistically significant short-term effects of the EITC on any outcome (Supplemental Table 1).

Next, we carried out a subgroup analysis in which we stratified the analyses by gender, since prior work suggests that the effects of the EITC may be stronger for single mothers.[2-4] In this analysis, results were null for every outcome (Supplemental Table 2), except for emergency department expenditures among men (-0.50 per $1000 in EITC, 95%CI: -0.88, -0.11). This effect estimate was statistically significantly different from the estimate for women's expenditures on emergency department services (0.04 per $1000 in EITC, 95%CI: -0.24, 0.32), although it was not robust to adjustment of the p-value for multiple hypothesis testing. Moreover, emergency department services did not convincingly demonstrate parallel trends during the non-exposure months (see above).

Finally, we conducted an additional analysis in which we modeled number of adults and children as indicator variables rather than continuous variables. For this specification, we were again unable to reject the null hypothesis that there was no short-term effect of the EITC on any category of healthcare expenditures (Supplemental Table 1).

SUPPLEMENTAL REFERENCES

1. Cohen J. *Statistical power analysis for the behavioral sciences.* Hillsdale, NJ: Lawrence Earlbaum Associates; 1988.
2. Meyer BD. Labor supply at the extensive and intensive margins: The EITC, welfare, and hours worked. *American Economic Review.* 2002;92(2):373-379.
3. Meyer BD, Rosenbaum DT. Welfare, the earned income tax credit, and the labor supply of single mothers. *The quarterly journal of economics.* 2001;116(3):1063-1114.
4. Eissa N, Hoynes HW. Behavioral responses to taxes: Lessons from the EITC and labor supply. *Tax policy and the economy.* 2006;20:73-110.

Supplemental Table 1. Effects of the Earned Income Tax Credit on Short-term Out-of-Pocket Healthcare Expenditures, Alternative Specifications

Outcomes	Exposure: Feb-Apr		Outcome: any expenditure		Income < $50,000		Number adults/children as indicators	
	β	95% CI	β	95% CI	β	95% CI	β	95% CI
Total Monthly Spending	-0.11	[-1.07,0.85]	0.00	[-0.00,0.00]	0.29	[-1.88,2.46]	0.67	[-1.43,2.78]
Office Visits								
Total	-0.21	[-0.52,0.10]	0.00	[-0.00,0.00]	-0.33	[-0.92,0.26]	-0.11	[-0.63,0.41]
Check-Ups	-0.06	[-0.13,0.00]	0.00	[-0.00,0.00]	0.01	[-0.07,0.08]	-0.02	[-0.09,0.05]
Mental Health	-0.01	[-0.05,0.03]	0.00	[-0.00,0.00]	-0.03	[-0.09,0.03]	-0.03	[-0.07,0.02]
Follow-Up	0.04	[-0.04,0.13]	0.00	[-0.00,0.00]	0.02	[-0.19,0.23]	0.04	[-0.15,0.24]
Diagnosis/Treatment	-0.09	[-0.30,0.12]	0.00	[-0.00,0.00]	-0.12	[-0.52,0.28]	-0.08	[-0.41,0.26]
Dental	-0.15	[-0.60,0.29]	0.00	[-0.00,0.00]	-0.19	[-0.86,0.48]	0.22	[-0.44,0.89]
Emergency	-0.07	[-0.28,0.14]	0.00	[-0.00,0.00]	-0.18	[-0.47,0.11]	-0.19	[-0.43,0.04]
Hospital Inpatient	0.21	[-0.48,0.90]	0.00	[-0.00,0.00]	0.97	[-0.97,2.91]	0.73	[-1.18,2.63]
Hospital Outpatient	0.11	[-0.09,0.30]	0.00	[-0.00,0.00]	0.03	[-0.20,0.26]	0.03	[-0.20,0.25]

Note: N = 1,282,080 adults surveyed in the 1997-2012 waves of the Medical Expenditure Panel Survey, and N=865,880 for <$50,000 income-restricted sample. EITC: earned income tax credit. Estimates derived from multivariable linear regressions using difference-in-differences analyses, adjusting for gender, race, marital status, a third-degree polynomial for age (i.e., age, age-squared, age-cubed), a fifth-degree polynomial for family income, number of children in the household, number of adults in the household, insurance status, and year. Observations during the months of February were considered to fall in the "treatment" window, except as noted otherwise. Expenditures on provider visits were reported on a monthly basis for each individual in the family. Robust standard errors clustered at the family level.
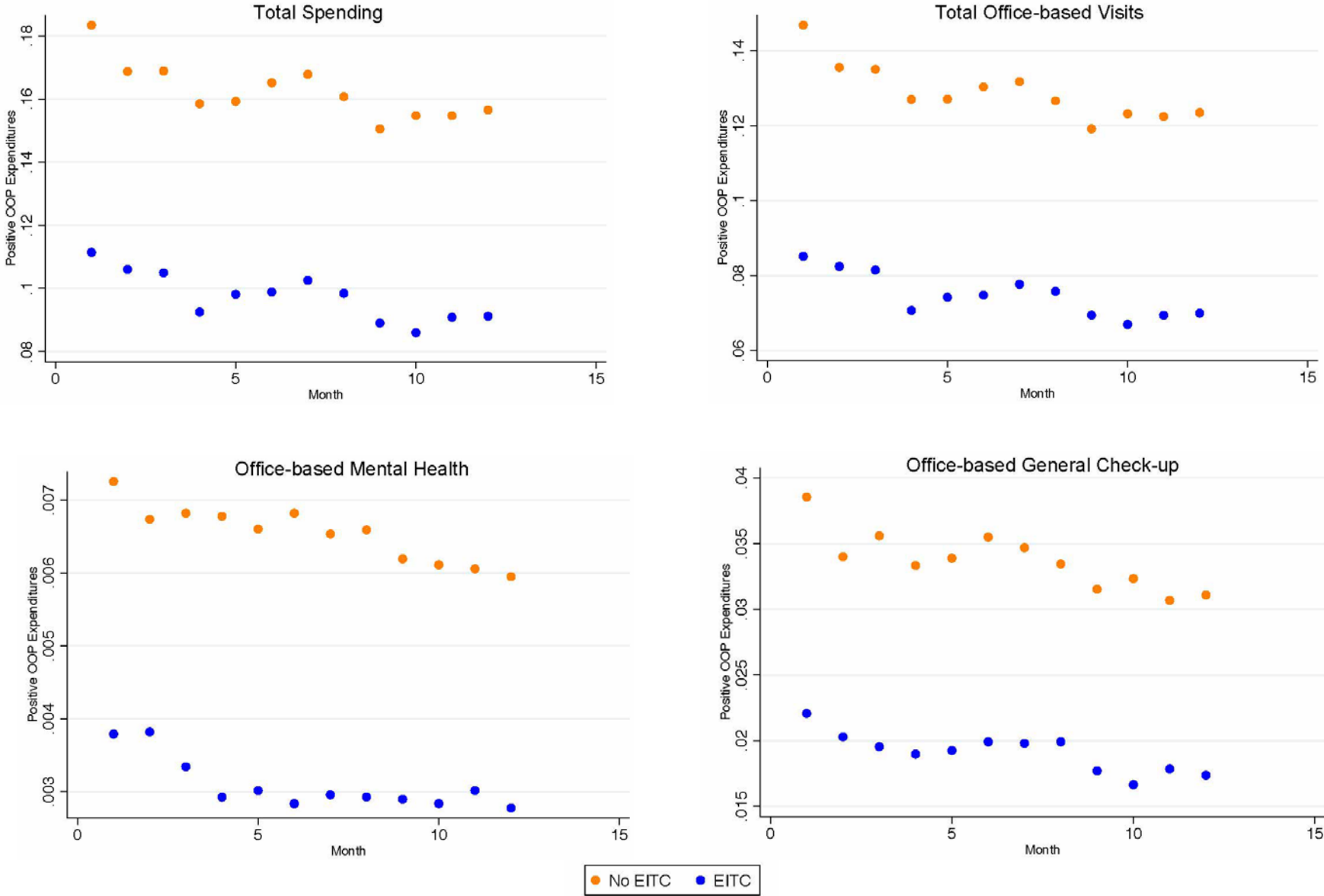* $p < 0.05$

Supplemental Table 2. Effects of the Earned Income Tax Credit on Short-term Out-of-Pocket Healthcare Expenditures, Stratified
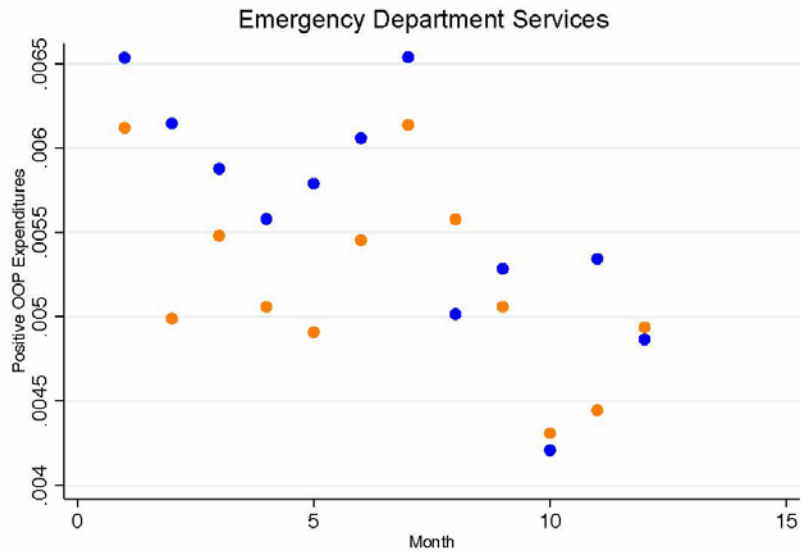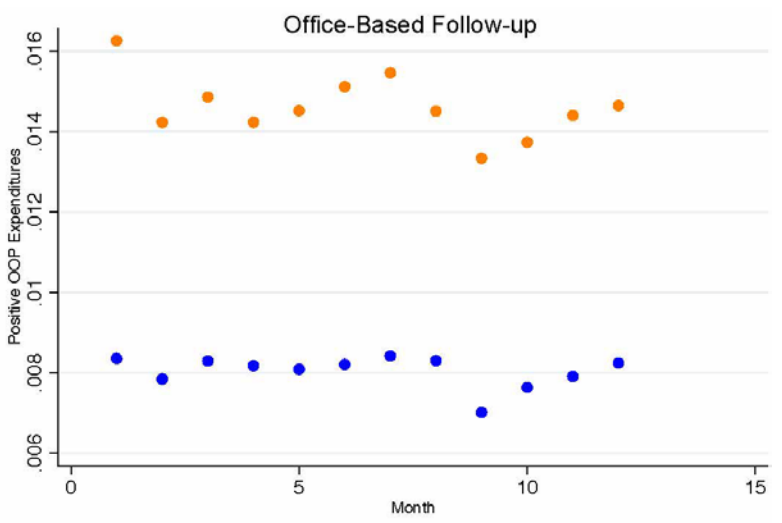
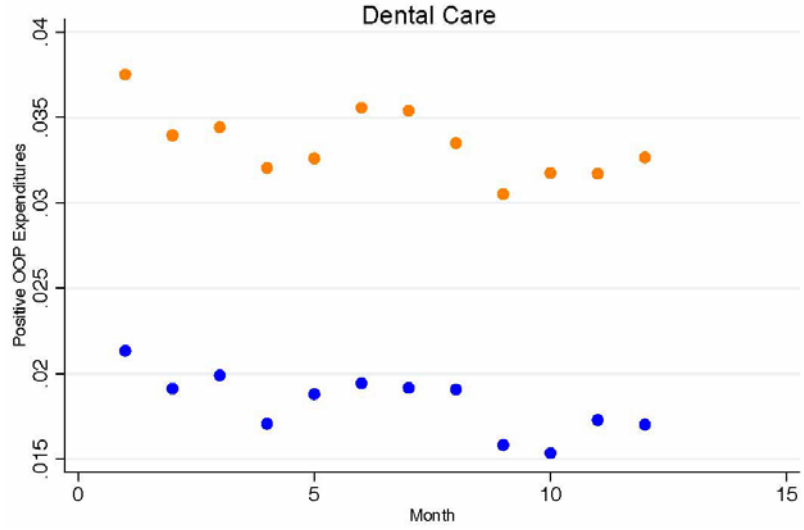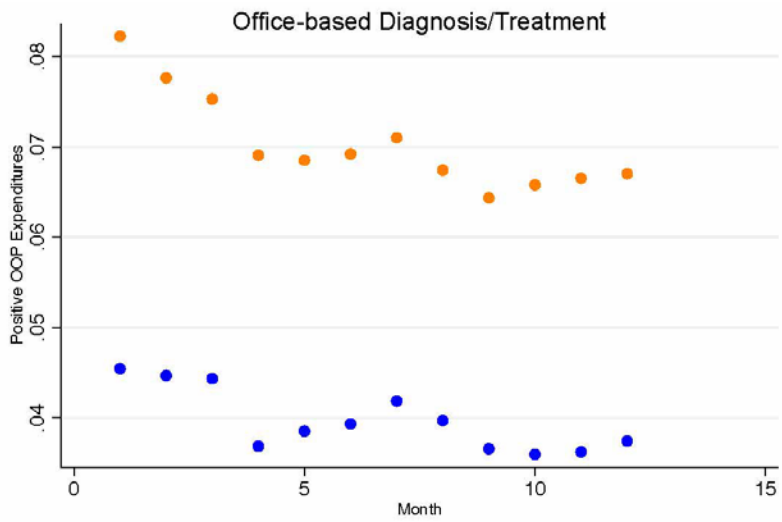| Outcomes | By Year | | | | | | By Gender | | | |
| | 1997-2003 | | 2004-2011 | | 2008-2009 | | Women | | Men | |
	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI
Total Monthly Spending	2.08	[-2.67,6.83]	-0.34	[-1.72,1.04]	0.71	[-3.13,4.56]	1.35	[-1.91,4.62]	-0.57	[-2.09,0.95]
Office Visits										
Total	-0.35	[-0.91,0.20]	0.03	[-0.78,0.83]	0.46	[-1.96,2.88]	-0.44	[-1.08,0.20]	0.31	[-0.63,1.26]
Check-Ups	-0.03	[-0.13,0.07]	-0.01	[-0.12,0.09]	0.02	[-0.21,0.25]	-0.05	[-0.16,0.05]	0.02	[-0.09,0.13]
Mental Health	-0.01	[-0.08,0.06]	-0.04	[-0.09,0.02]	-0.04	[-0.11,0.03]	-0.05	[-0.11,0.02]	-0.01	[-0.05,0.03]
Follow-Up	-0.05	[-0.18,0.07]	0.12	[-0.20,0.44]	0.64	[-0.64,1.92]	0.00	[-0.10,0.09]	0.14	[-0.33,0.62]
Diagnosis/Treatment	-0.34*	[-0.66,-0.02]	0.10	[-0.44,0.64]	0.23	[-0.83,1.28]	-0.23	[-0.73,0.26]	0.11	[-0.33,0.56]
Dental	0.46	[-0.59,1.51]	0.06	[-0.80,0.92]	0.73	[-1.95,3.41]	0.68	[-0.21,1.56]	-0.44	[-1.42,0.55]
Emergency	-0.06	[-0.47,0.34]	-0.30*	[-0.60,-0.01]	-0.30	[-1.00,0.39]	0.04	[-0.24,0.32]	-0.50*	[-0.88,-0.11]
Hospital Inpatient	1.95	[-2.65,6.55]	-0.09	[-0.59,0.40]	0.30	[-0.35,0.94]	1.00	[-2.06,4.06]	0.08	[-0.23,0.38]
Hospital Outpatient	0.09	[-0.18,0.36]	-0.03	[-0.37,0.31]	-0.47	[-1.16,0.21]	0.07	[-0.24,0.39]	-0.02	[-0.33,0.29]

Note: N = 1,282,080 adults surveyed in the 1997-2012 waves of the Medical Expenditure Panel Survey. EITC: earned income tax credit. Estimates derived from multivariable linear regressions using difference-in-differences analyses, adjusting for gender, race, marital status, a third-degree polynomial for age (i.e., age, age-squared, age-cubed), a fifth-degree polynomial for family income, number of children in the household, number of adults in the household, insurance status, and year. Observations during the months of February were considered to fall in the "treatment" window. Expenditures on provider visits were reported on a monthly basis for each individual in the family. Robust standard errors clustered at the family level.
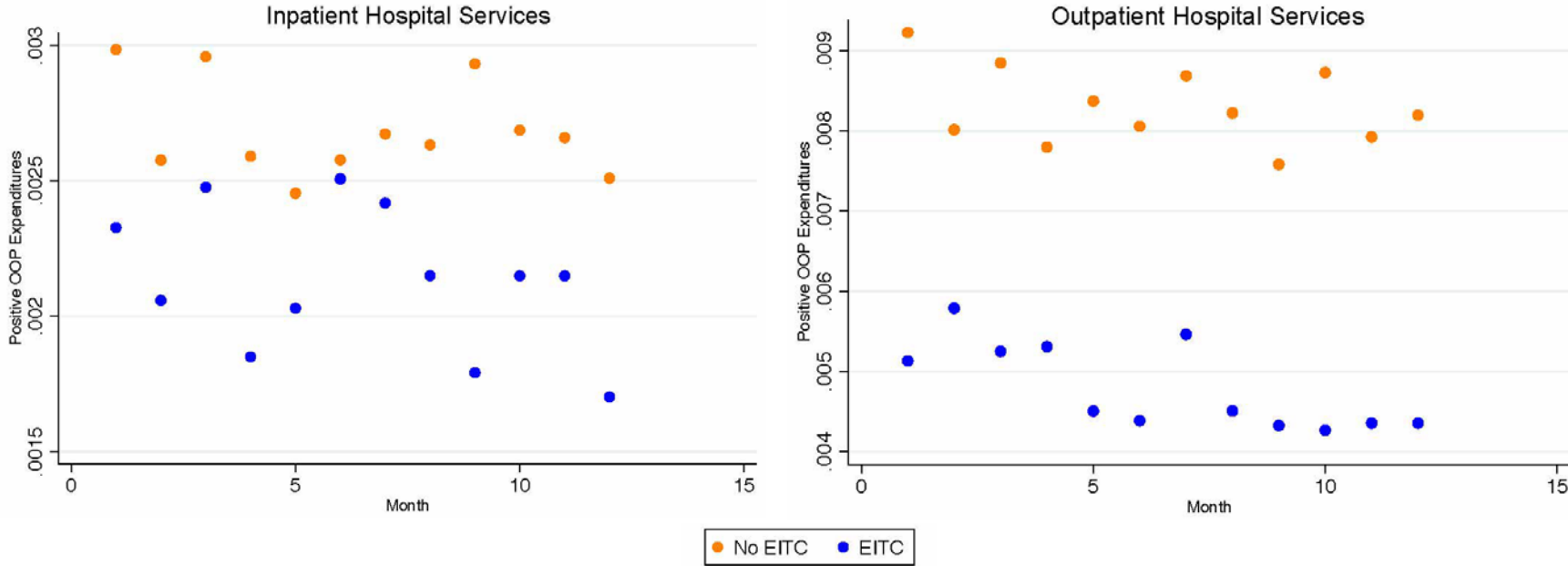
* $p < 0.05$

Supplemental Figure 1. Monthly OOP Healthcare Expenditures, by Outcome and EITC Eligibility

Office-based Diagnosis/Treatment

Dental Care

Office-Based Follow-up

Emergency Department Services

● No EITC   ● EITC

Note: N = 1,282,080 adults surveyed in the 1997-2012 waves of the Medical Expenditure Panel Survey. EITC: earned income tax credit; OOP: out-of-pocket.