High-frequency Spending Responses to the Earned Income Tax Credit

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Low-income working families and government financial support in the U.S.

Most low-income working families in the U.S. lack savings and struggle to pay their expenses

The U.S. government increasingly uses the income tax system to provide additional financial support to these families

The Earned Income Tax Credit (EITC) is the largest of these government programs

This study investigates how federal tax refunds to EITC recipients ("EITC refunds") affects spending

Overview of methodology

Estimate high-frequency retail spending responses to EITC refunds

◦ Weeks prior to, at time of, and immediately following EITC refund receipt

◦ Quantify response by retail category (e.g. grocery v. electronics store)

Use novel daily, state-level retail spending indexes in conjunction with daily EITC refund issuance magnitudes by state

Exploit plausibly exogenous variation in the timing and magnitude of EITC refund issuance

1. Shift in refund issuance timing to early EITC claimants starting in 2017

2. Cross-state differences in federal tax refund dollars to EITC recipients

Main findings and implications

25 cents of each EITC refund dollar is spent on retail goods and food services within two weeks of refund issuance

The spending response is *not* limited to durable goods

- ¼ of the spending response occurs at grocery stores and restaurants

Results suggest the following for EITC recipients:

1. Considerable excess sensitivity to a predictable change in income
2. Fiscal stimulus payments during downturn could provide quick boost to aggregate demand
3. Divvying up EITC refund into periodic payments may be preferable to one large annual refund

Contributions to literature

Extend understanding of spending out of refunds using high-frequency consumption data

- Prior work focused on longer time horizons or survey data: Barrow, McGranahan (2000), Goodman-Bacon, McGranahan (2008), Maag et al. (2016)

New estimate of marginal propensity to consume (MPC) out of a large, predictable payment

- Stephens (2003), Kueng (2018), Stephens and Unayama (2011)

Provide empirical evidence that could inform design of EITC disbursements and macroeconomic stabilizers

- Substantial evidence of financial insecurity among low-income families
  - Murdoch and Schneider (2017), Board of Governors (2019)
- Design of stimulus payments
  - Parker, Souleles, Johnson, McClelland (2013), Sahm, Shapiro, Slemrod (2012)

The EITC and its disbursement

The EITC is a refundable tax credit claimed by a large share of low-income working households in the U.S.

- 2017: 27 million households (18 percent of all tax returns processed)

Credit varies with earned income, marital status, and number of children

- Credit increases with each dollar earned until reaching a maximum level
- Credit phases out at higher income levels

Disbursed as part of an EITC household's federal tax refund

- In recent decades, U.S. government has shifted away from direct, periodic expenditures (e.g. welfare) to indirect annual expenditures through the tax system

EITC recipient characteristics

Concentrated among families whose incomes, after taxes and transfers, would be between 75 and 150 percent of poverty line (Hoynes and Patel, 2018)

Financial situation is somewhat tenuous in general (Maag et al., 2016)

- Median household reports liquid assets of only $400 and credit card debt of $2,000
- 4/5 of recipients report having faced financial hardship (e.g. skipping rent payment) in six months prior to being surveyed
- 40 percent report having used an alternative financial service (e.g. payday loan) in six months prior to filing their tax return

Areas with higher shares of EITC filers have higher subprime loan use and utilization of unsecured revolving credit

Subprime loan use and credit utilization rates by zip-code level EITC shares (Source: FRBNY/Equifax Consumer Credit Panel)
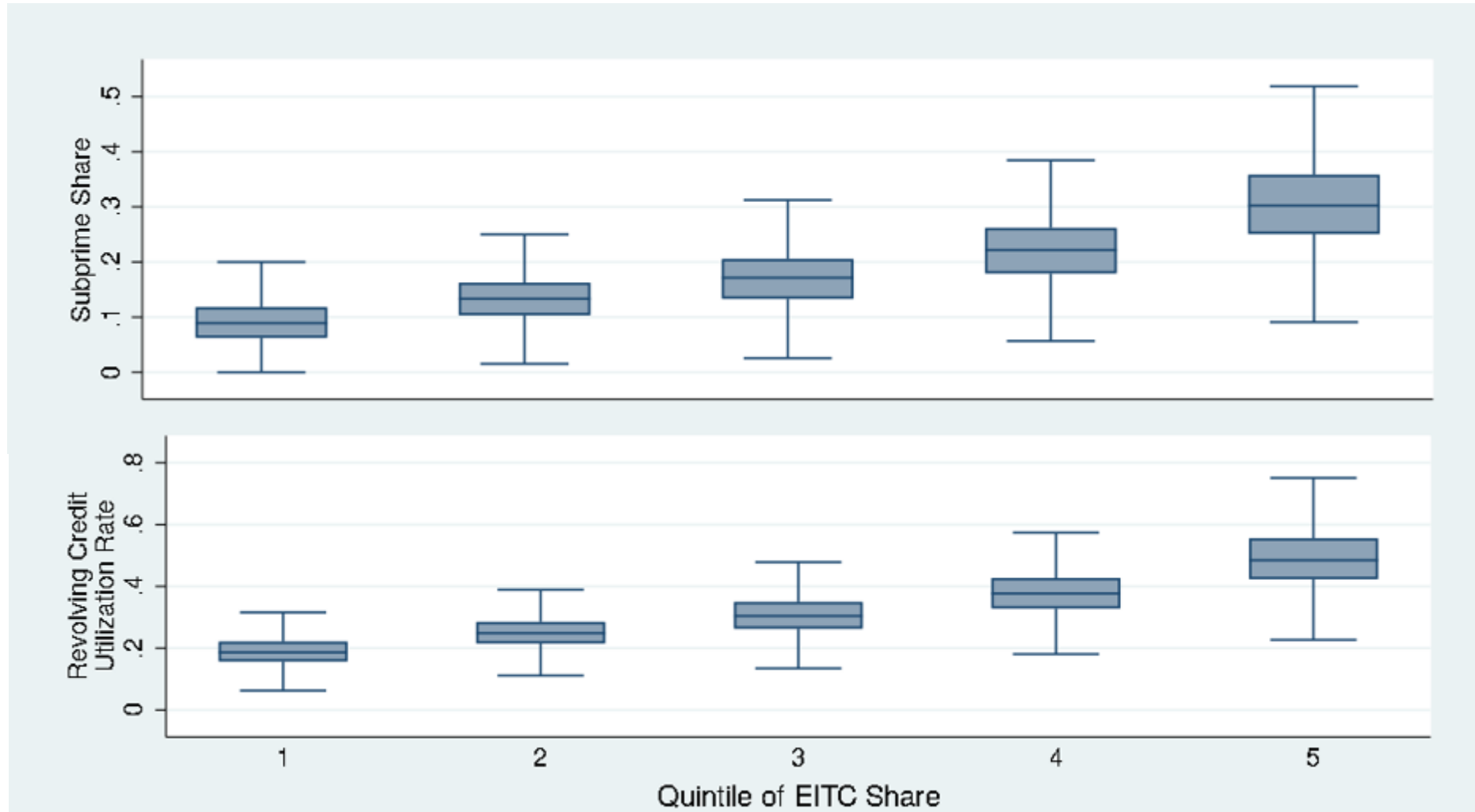
EITC refunds are large and predictable payments claimed early during tax season

Large payout as a share of income
- 2017: Average EITC refund was $4,250
- Roughly two months of take-home pay for median recipient (Maag et al., 2016)

Known prior to receipt
- EITC claimants learn expected amount of refund at time tax return is filed
- Prior to filing, low-income households have correct mean expectations about their refund, on average (Caldwell et al., 2018)
- EITC eligibility is highly persistent over time (Stevens et al., 2018)

Claimants tend to file early in the tax season
- 2015 and 2016: Nearly 60 percent of EITC claimants filed their taxes before February 15 (Maag et al., 2016)

Considerable high-frequency variation in EITC refund issuance timing in recent years
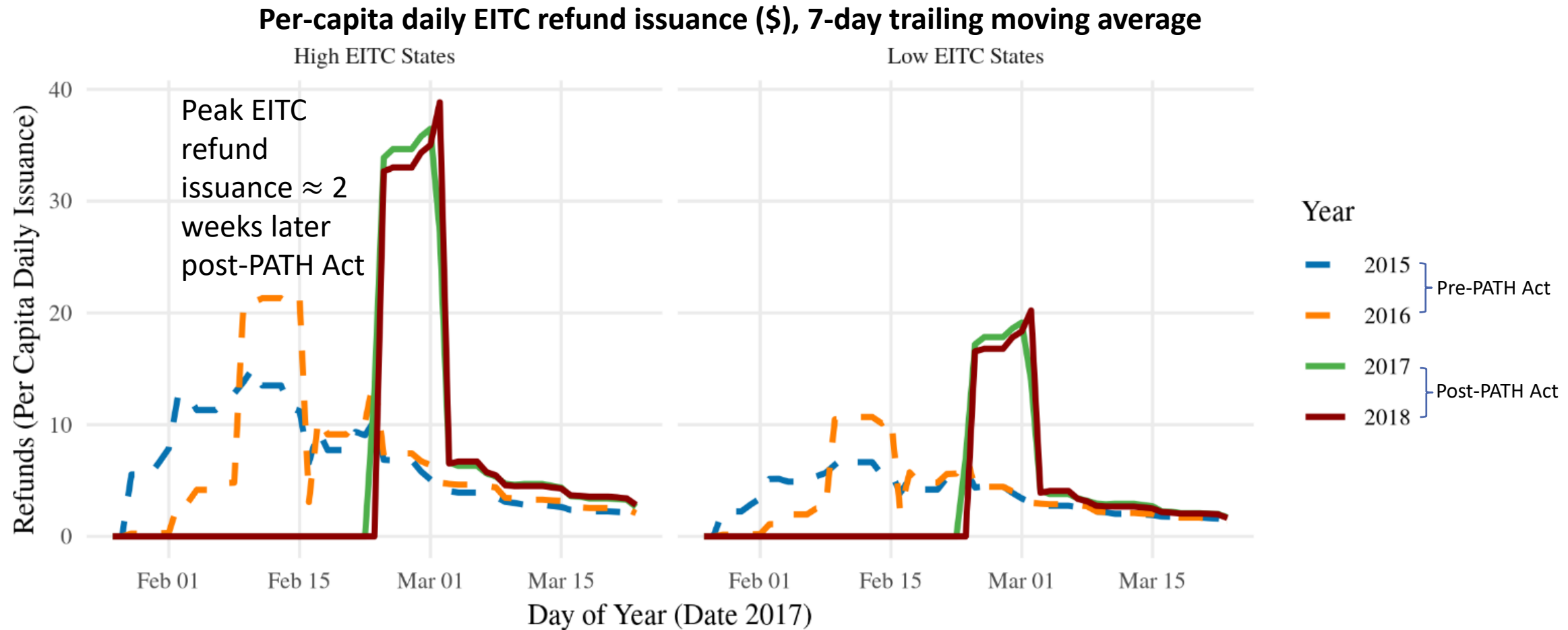
Beginning in 2017, EITC refund timing changed in response to federal tax legislation

The PATH Act prohibited the IRS from issuing any federal tax refunds claiming the EITC before February 15

- Legislation intended to provide IRS with additional time to detect tax fraud

- Induced plausibly exogenous variation in EITC refund timing and magnitude

Early EITC claimants had to wait an additional few weeks to receive their EITC refunds

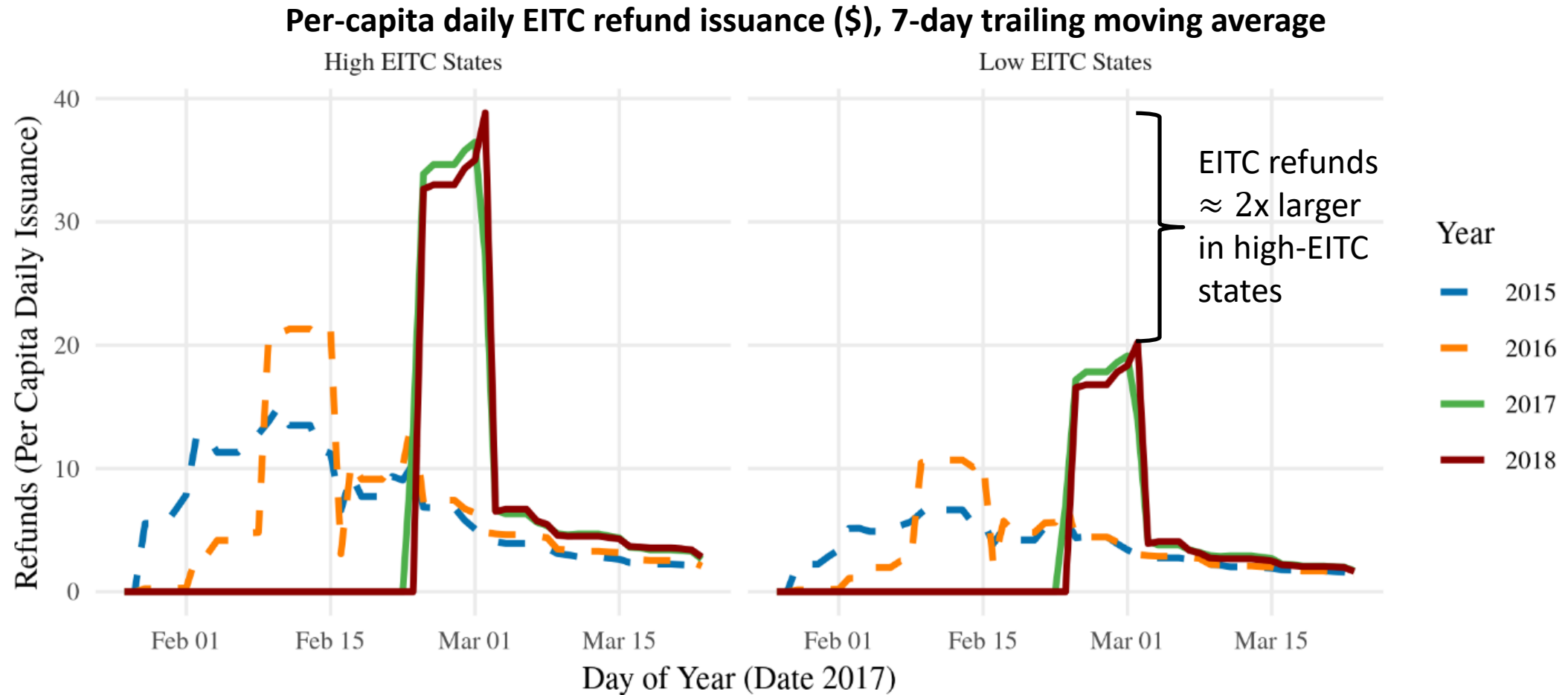# PATH Act Delays EITC Refunds to early EITC claimants

Per-capita daily EITC refund issuance ($), 7-day trailing moving average

Source: Internal Revenue Service: Research, Applied Analytics, & Statistics

Non-EITC refunds

IV robustness   Daily EITC refunds

In addition, notable cross-state variation in proportion of households receiving EITC...

Fraction of federal tax returns receiving EITC by state, 2016
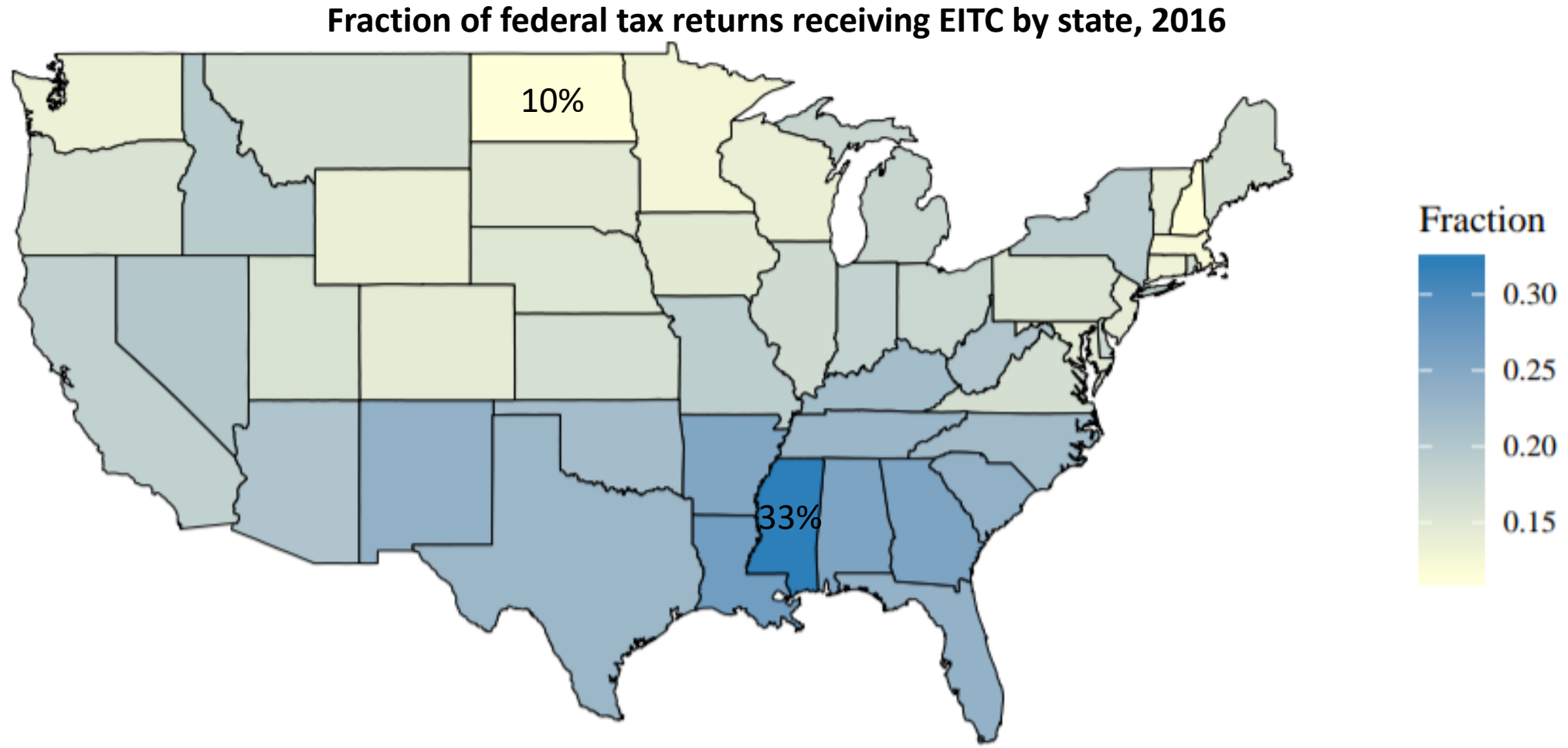
…is responsible for cross-state variation in per-capita EITC refund magnitudes.

Per-capita daily EITC refund issuance ($), 7-day trailing moving average

Source: Internal Revenue Service: Research, Applied Analytics, & Statistics

Research question

What is the marginal propensity to spend out of a large, predictable payment for low-income U.S. households?

We can use the considerable high-frequency time-series and cross-state variation in EITC refund magnitudes in recent years to obtain an estimate

Of course, we also need sufficiently high-frequency spending data disaggregated by geographic locale (i.e. state)

New daily, state-level spending indexes

Indexes constructed using anonymized, filtered, and aggregated credit, debit, and other card transactions (Aladangady et al., 2019)

Raw data: Merchant-level card transactions from First Data, a global payment processor ($2 trillion annual transactions)
- Authorization and settlement dates
- Transaction amount
- Merchant name, address, and category code

Raw data is very noisy and unsuitable on its own for empirical analyses
- Much of this noise comes from client churn and M&A activity
- Clients may utilize multiple payment systems due to fee schedules

Constructing the spending indexes

To address these issues…

- Filter data to merchants with a stable relationship with First Data platform over a specified time period
- Collapse overlapping samples of merchants by State and 3-digit NAICS code (e.g. grocery stores)
- Benchmark index levels in 2012 to that year's Economic Census

Focus on spending at retail stores and restaurants as defined by Census

- Well measured by card transactions
- Comprise about 30 percent of total household spending
- Notable exclusions: Motor vehicle dealers, gas stations, building materials stores, and most non-store retailers
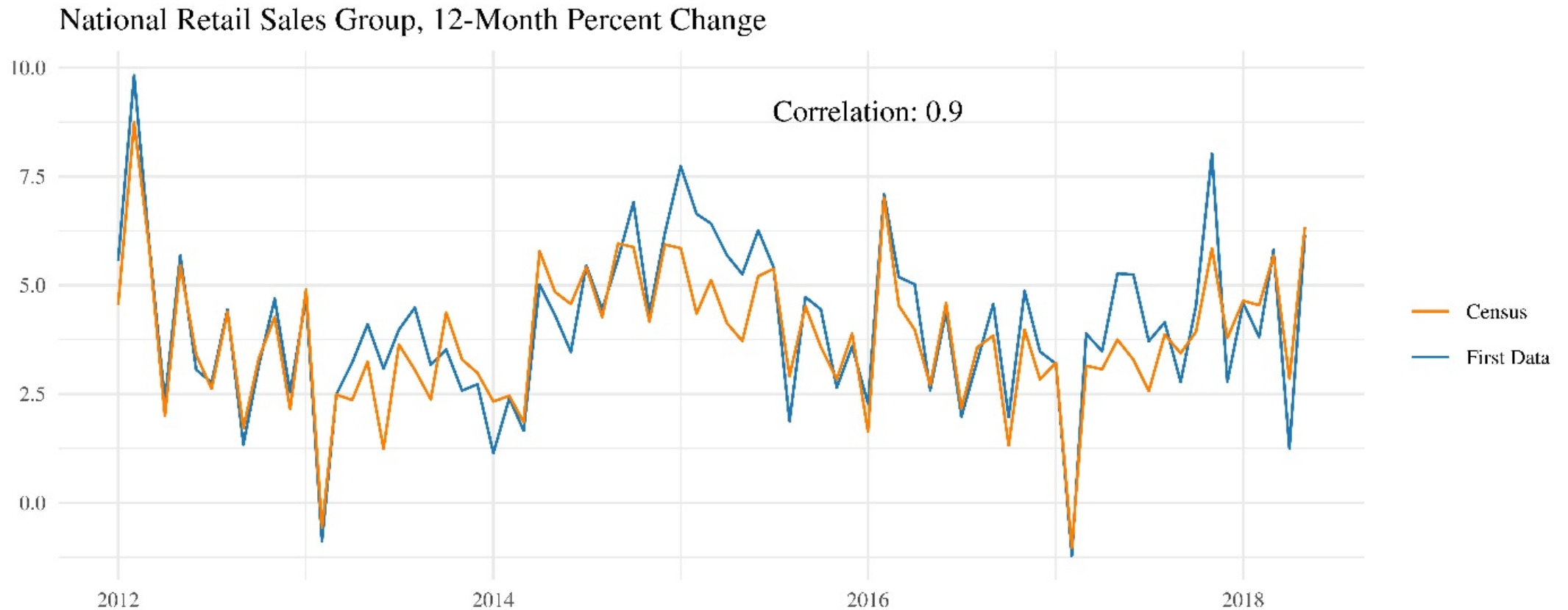
Constant merchant sample

Data used to construct spending indexes cover 7½ percent of total national retail sales

**First Data coverage of Economic Census Retail Sales Group by state, 2018**
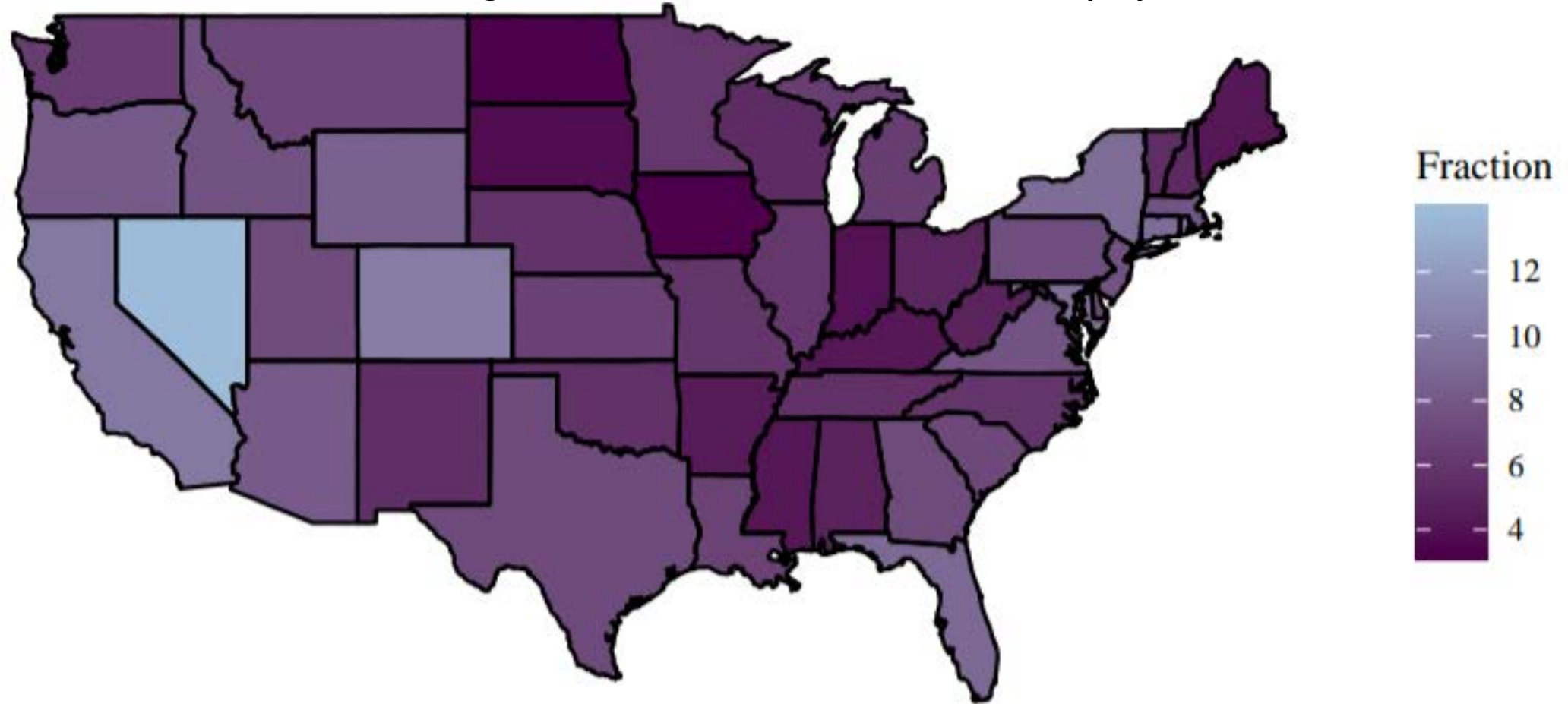
Spending growth in the First Data index compares favorably to official statistics

National Retail Sales Group, 12-Month Percent Change

Correlation: 0.9

Census
First Data

Source: Census and First Data, not seasonally adjusted.

Simple plots of national index suggest spending affected by timing of EITC refund issuance

Index of national daily spending at retail stores and restaurants, 7-day trailing moving average
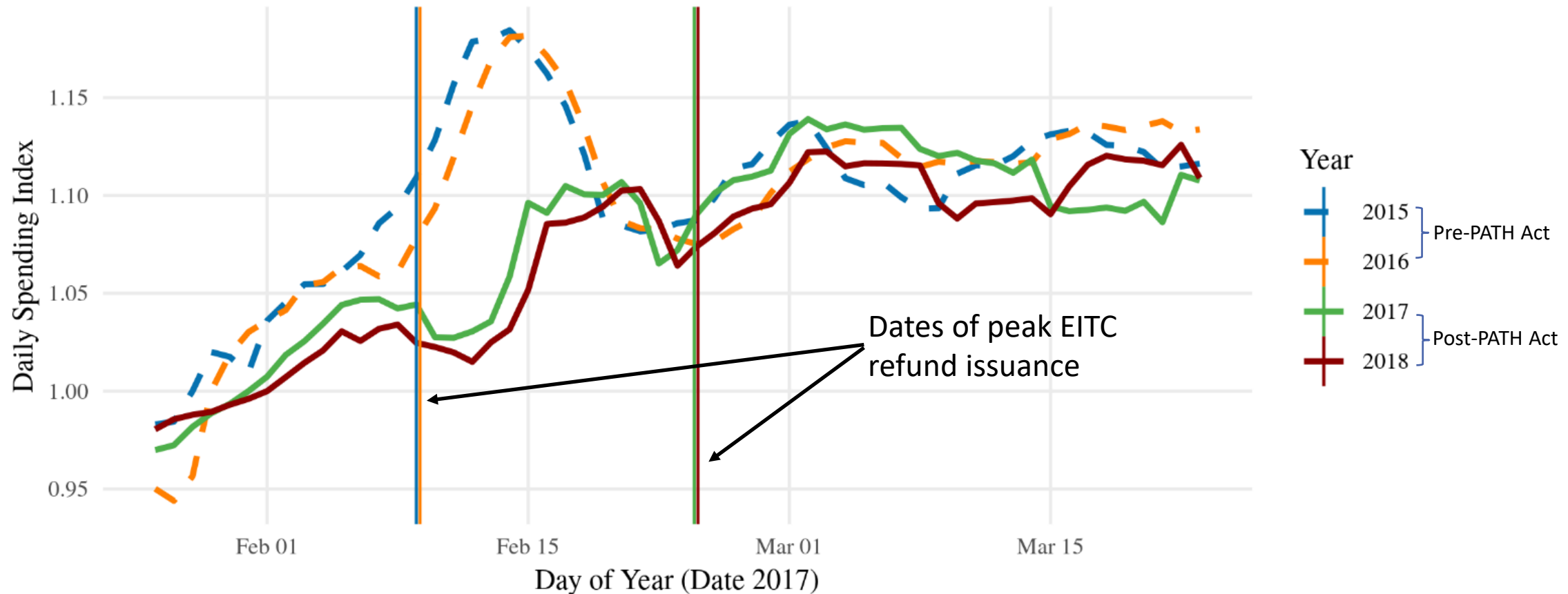
Note: Spending is a trailing, seven-day moving average, indexed to the third week of January in each year. Vertical lines correspond to date of peak refund issuance. The peak is the same in 2015 and 2016, and roughly two weeks later in 2017 and 2018.

But other factors correlated with EITC refund issuance may have affected spending

e.g. Unlike 2015 & 2016, we *do not* observe a prominent hump-shaped pattern in spending around peak EITC refund issuance in 2017 & 2018

Potential confounding factors

1. National trends or shocks
2. Regional or state-specific trends or shocks

Can address (1) by exploiting cross-state variation in EITC refund issuance

But even then, (2) may cause spurious correlations → Rich set of state-specific controls needed

Empirical strategy

Goal is to recover causal effect of EITC refund receipt on spending

$$C_{st} = \theta \cdot EITCrefunds_{st} + v_{st}$$

- C_{st}: Per-capita spending at retail stores and restaurants in state s on date t
- $EITCrefunds_{st}$: Per-capita federal tax refunds to EITC claimants

Given large, predictable payment like EITC refund, optimizing behavior in absence of constraints suggests $\theta = 0$

But many reasons to expect that $\theta > 0$
- Insufficient liquidity to adjust spending if timing of refund payout unanticipated
- Borrowing constraints
- Mental accounting of refunds (e.g. tagging refund for big-ticket items)

Multiple threats to identifying θ...

Spending and EITC refunds may be spuriously correlated over time and space

1. The timing of EITC refund issuance is similar from year to year, and there are myriad other factors affecting spending around this time of year (e.g. holidays)
   - Separating the effect of these confounding factors is not straightforward in most (monthly or quarterly) data sets, even with the EITC refund timing shift induced by PATH Act

2. EITC refund magnitudes may co-vary with location-specific spending trends or shocks
   - Warmer spring weather in high-EITC Southern may spur spending
   - Winter storms in low-EITC northern states may depress spending

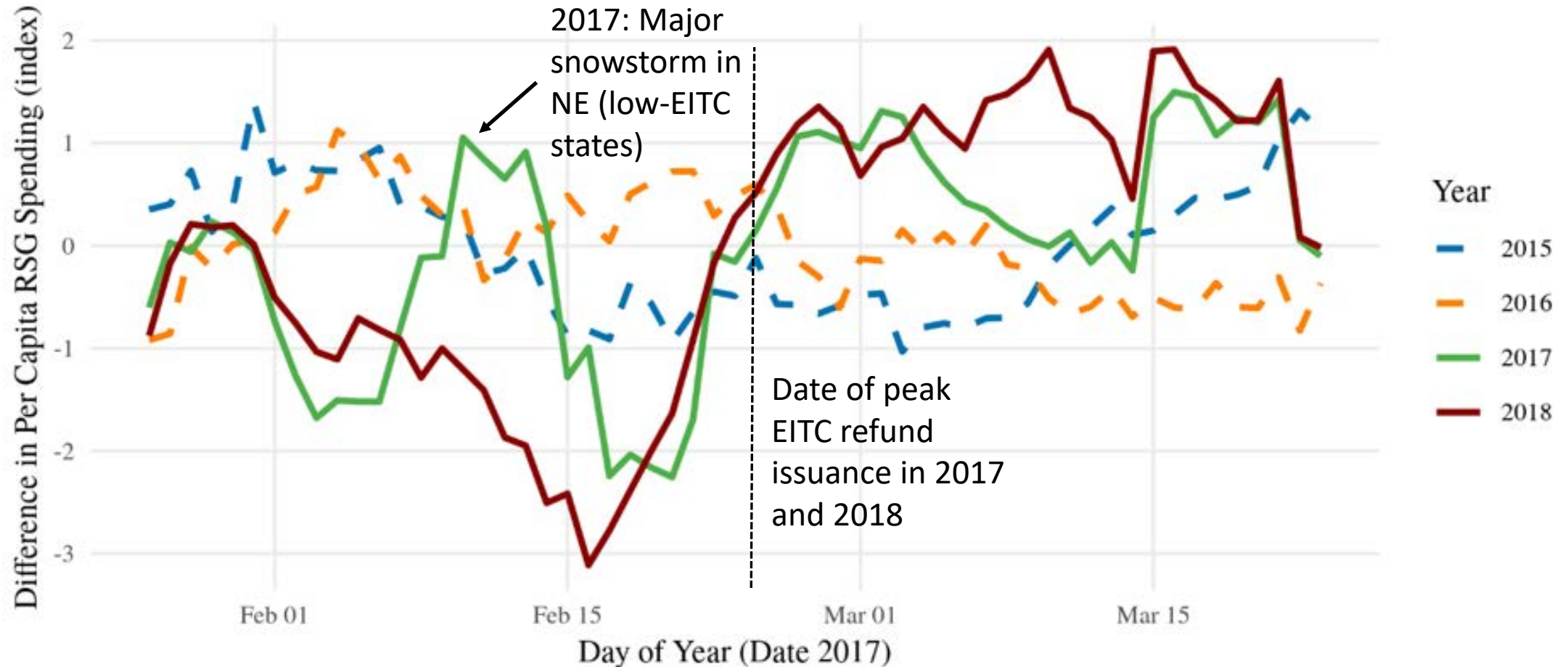# But our daily, state-level spending indexes are a *BIG* help in addressing threats to identification

1. Daily spending data narrow the time periods over which we are looking for a correlation between spending and EITC refunds
   - Many factors influence spending over, say, Q1, but far fewer factors consistently impact spending during specific week of peak refund issuance
   - Allow us to make use of sharp, but short-lived time-series variation in EITC refund issuance from PATH Act legislation

2. Disaggregating spending by state
   - Comparing high- to low-EITC refund states controls for national spending trends or shocks correlated with EITC refund timing

Still, state-specific spending trends or shocks are an identification concern…

Spending differences between high- and low-EITC states highlight need for state controls

**Daily deviation in per-capita spending between high- and low-EITC states**

2017: Major snowstorm in NE (low-EITC states)

Date of peak EITC refund issuance in 2017 and 2018

Year
- 2015
- 2016
- 2017
- 2018

Difference in Per Capita RSG Spending (index)

Day of Year (Date 2017)

State Fixed-Effects Model

$$C_{st} = \sum_{\ell=-2}^{4} \theta_\ell EITCrefunds_{s,t-7\ell} +$$

$$\sum_{state} \left[\sum_{y \in [2014,2018]} \delta^{state,y} + \sum_{w \in wk.of.yr} \delta^{state,w} + \beta^{state} snow_{st} \right] +$$

$$\sum_{d \in days.of.wk} \delta^d + \sum_{h \in holidays} \delta^h + \sum_{\ell=-2}^{4} \gamma_\ell \, ave.refunds_{t-7\ell} + u_{st}$$

- Distributed lag allows spending in a given week to respond to EITC refunds received 2 weeks in the future to 4 weeks in the past
- Controls vary flexibly across states to allow for differential economic trends, seasonality, and winter storms
- Distributed lag of national average refunds controls for unobserved national spending shocks whose timing is correlated with EITC refund disbursement

25 cents of each EITC refund dollar spent within ± 2 weeks of refund issuance

Fraction of each EITC refund dollar spent at retail stores and restaurants
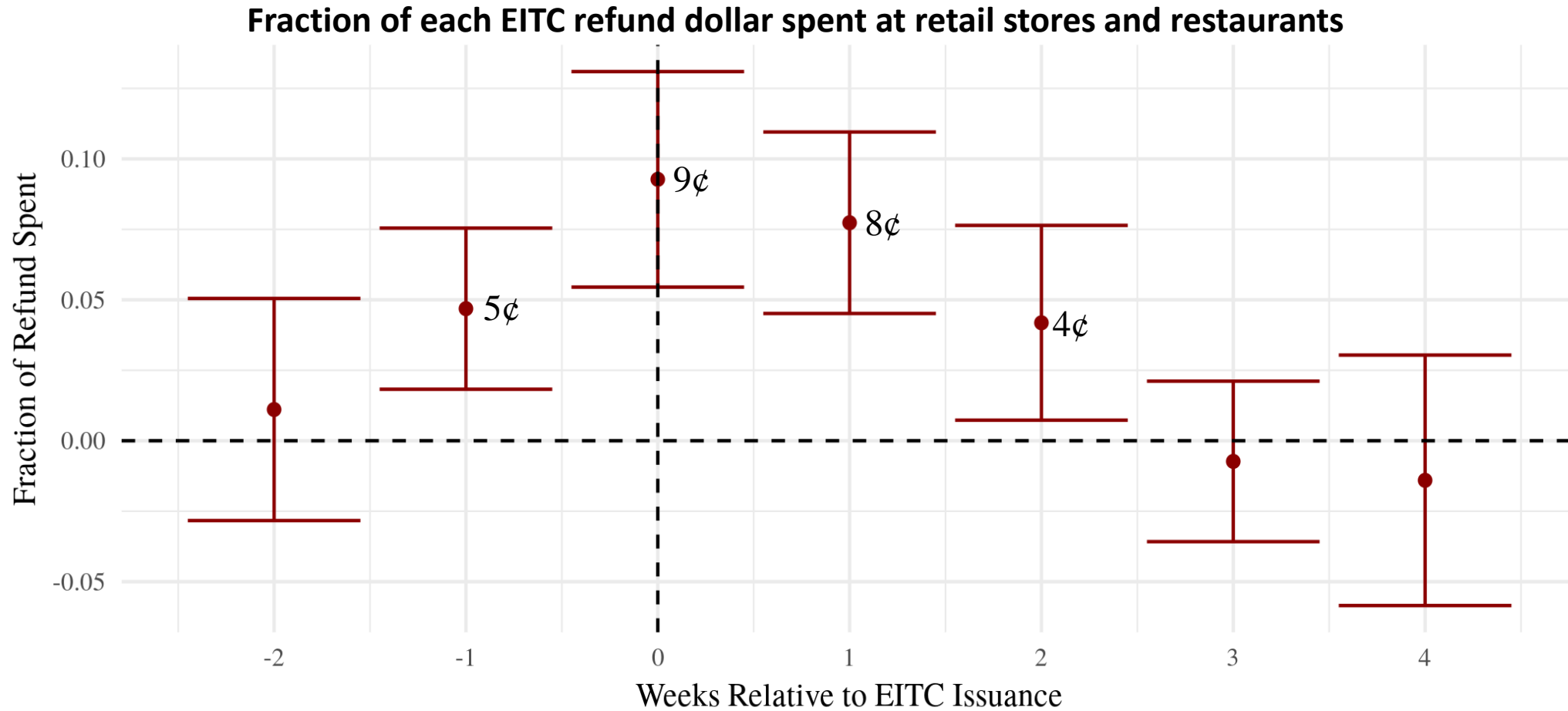
*Results robust to longer leads/lags, excluding snow states, and state-invariant week-of-year fixed effects
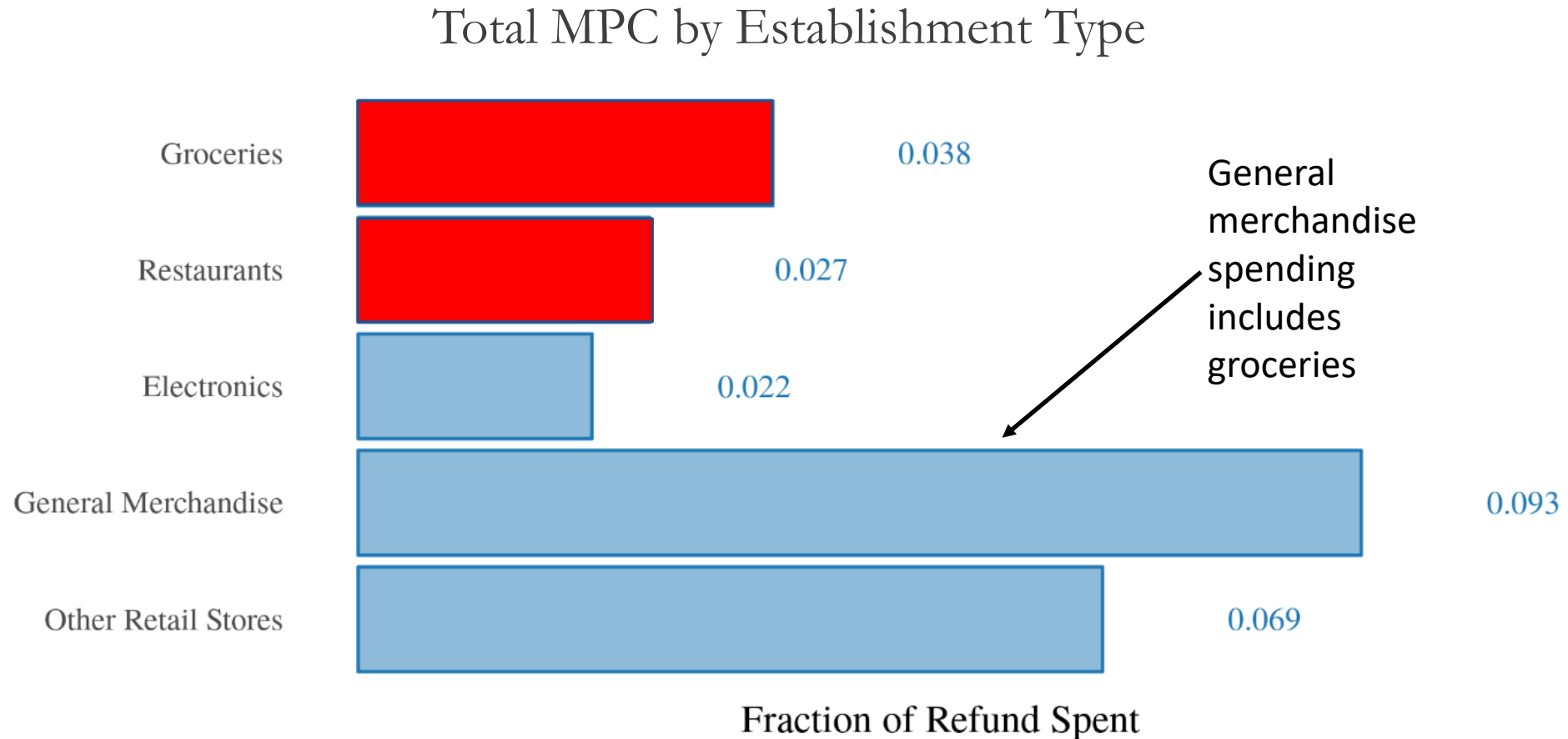
Interpretation of baseline results

Spend out is sizeable, and likely a lower bound on overall response
- ◦ Categories of spending we observe comprise only 1/3 of household spending
- ◦ Only capture card transactions
- ◦ Some of the refund being used to pay down debt (Jones and Michelmore, 2018 & 2019)
- ◦ Aggregate spending response is large given that annual EITC refunds > $110 bn.

Anticipatory spending response to a large, predictable payment not previously documented
- ◦ Households may be willing to run down account balances or use short-term credit once projected refund magnitude and issuance date are known
- ◦ Possible use of refund anticipation loans (RAL) offered by tax preparers

Non-durable consumption increases upon EITC refund receipt

Total MPC by Establishment Type

Groceries — 0.038
Restaurants — 0.027
Electronics — 0.022
General Merchandise — 0.093
Other Retail Stores — 0.069

General merchandise spending includes groceries

Fraction of Refund Spent

Typical EITC recipient spends roughly an additional $280 at grocery stores and restaurants within two weeks of refund issuance.

Interpretation of establishment-type results

Previous research on spend out of the EITC highlights increases in durable goods expenditures, like automobiles (e.g. Barrow and McGranahan, 2000)

- Durables expenditures may be a sign that EITC recipients use their annual refunds as a form of forced savings

Beyond durables expenditures, we find immediate spending of EITC refunds on groceries and restaurant meals

- Suggests that spending of EITC claimants constrained → Excess sensitivity*
- If so, divvying up EITC refund into periodic payments might benefit EITC recipients more than one, large annual refund

*Caveat: Merchant-level, not item-level, transactions mean we cannot observe mix of storable versus non-storable goods at grocery stores → Cannot observe consumption flow

# Results due to PATH Act surprise in 2017?

Our results are highly dependent on the time-series variation in EITC refunds induced by the PATH Act legislation

- Interpretation of results depends crucially on whether or not households expected the delay in refund issuance caused by the legislation
- Possible that households have the ability to smooth through a short delay in income receipt, but were simply caught off guard with insufficient liquidity

To test whether results driven by transitory liquidity shock, we re-estimate our baseline equation...

1. Excluding 2018 (i.e. 2017 only post-PATH Act year included): In 2017, refund delay may have been a surprise
2. Excluding 2017: By 2018, EITC households likely knew about delay

Results due to a surprise in 2017? No.
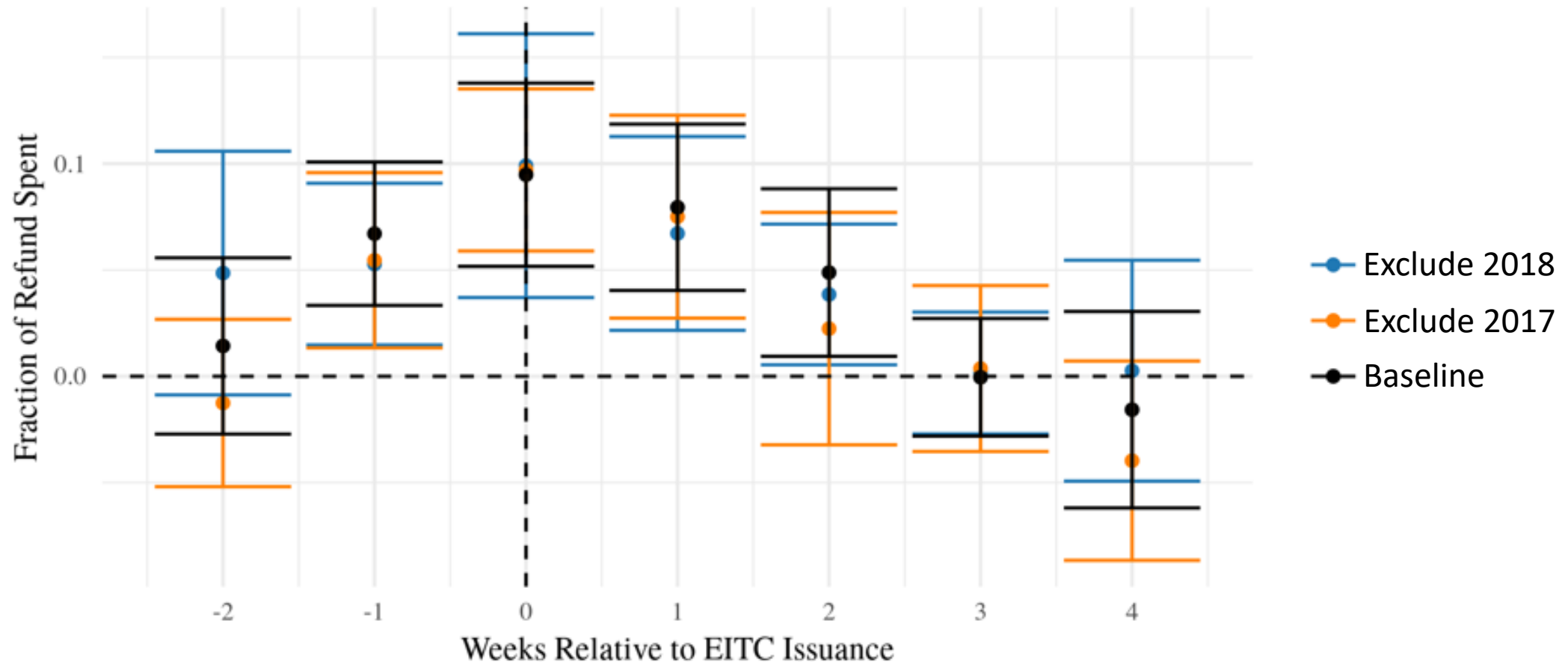
Very similar MPC estimates for each specification. If liquidity shock was driving the results, we would have expected smaller estimate when excluding 2017.

IV robustness check isolating only the PATH Act-induced variation in EITC refund timing

OLS estimates rely on variation in EITC refunds beyond plausibly exogenous variation induced by PATH Act legislation

Isolate variation in EITC refund timing from PATH Act with instrument

$$Z_{st} = EITC.Fraction_s * \mathbf{1}(t \in Post.Path.Act) * \mathbf{1}(week.of.year = w)$$

1. Clearly a strong instrument (first-stage regressions confirm)
2. Exclusion restriction: Spending in states with higher EITC shares does not respond to passage of PATH Act except through impact on refund timing
   ◦ State-year fixed effects address other aspects of PATH Act that may be correlated with EITC share and refund magnitude (e.g. easing of Child Tax Credit threshold)

Reassuringly, we obtain similar IV MPC estimates of 0.25-0.30

EITC refund chart

Remaining work to be completed

Add 2019 spending and EITC refund issuance data
- Further exogenous variation in EITC refund issuance timing (PATH Act + government shutdown)

Additional analysis at MSA rather than state level
- Substantial increase in cross-sectional EITC refund issuance variation
- Potentially allows us to distinguish whether spending response differed pre- and post-PATH Act
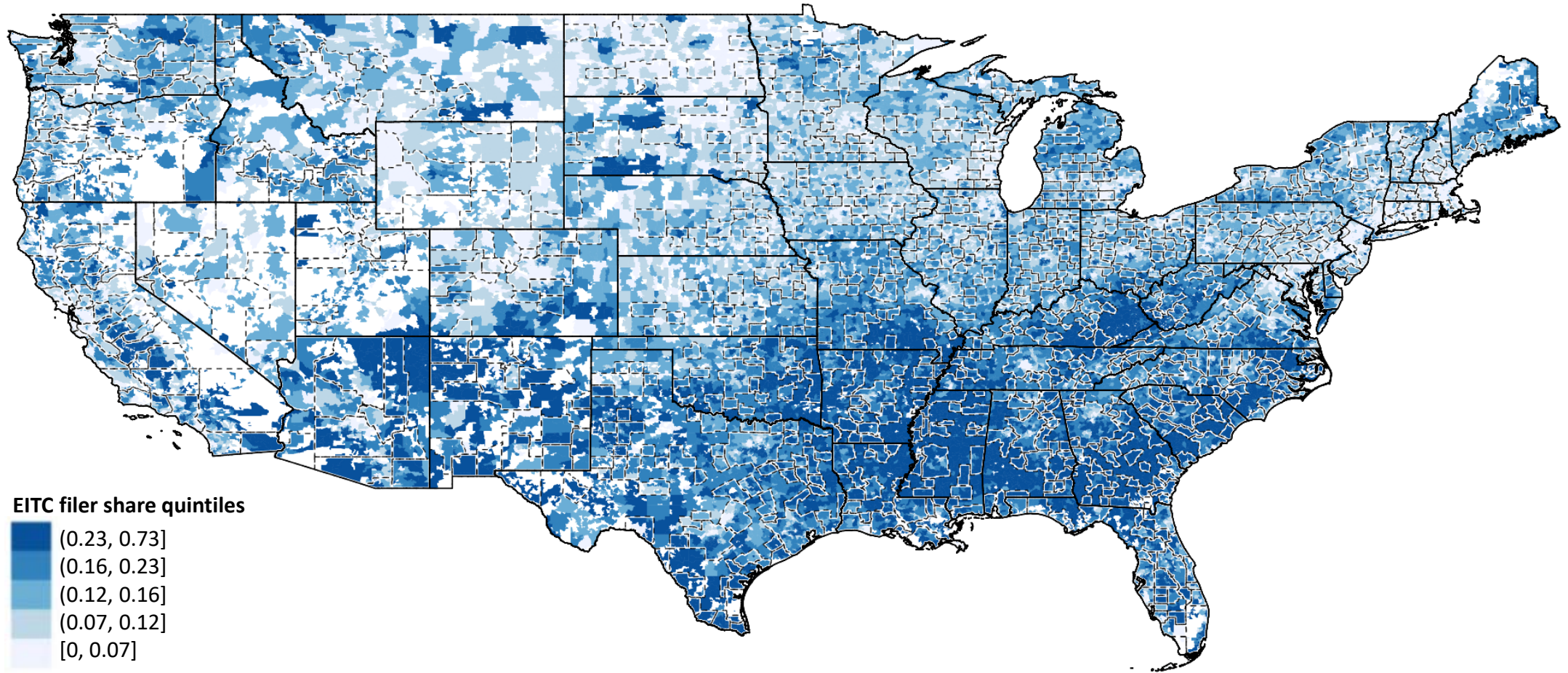
Possibly incorporate refund anticipation loan (RAL) usage
- RALs responsible for anticipation effect?

U.S. government shutdown in early 2019 delayed EITC refund issuance another week

Weekly Individual Tax Refund Issuance
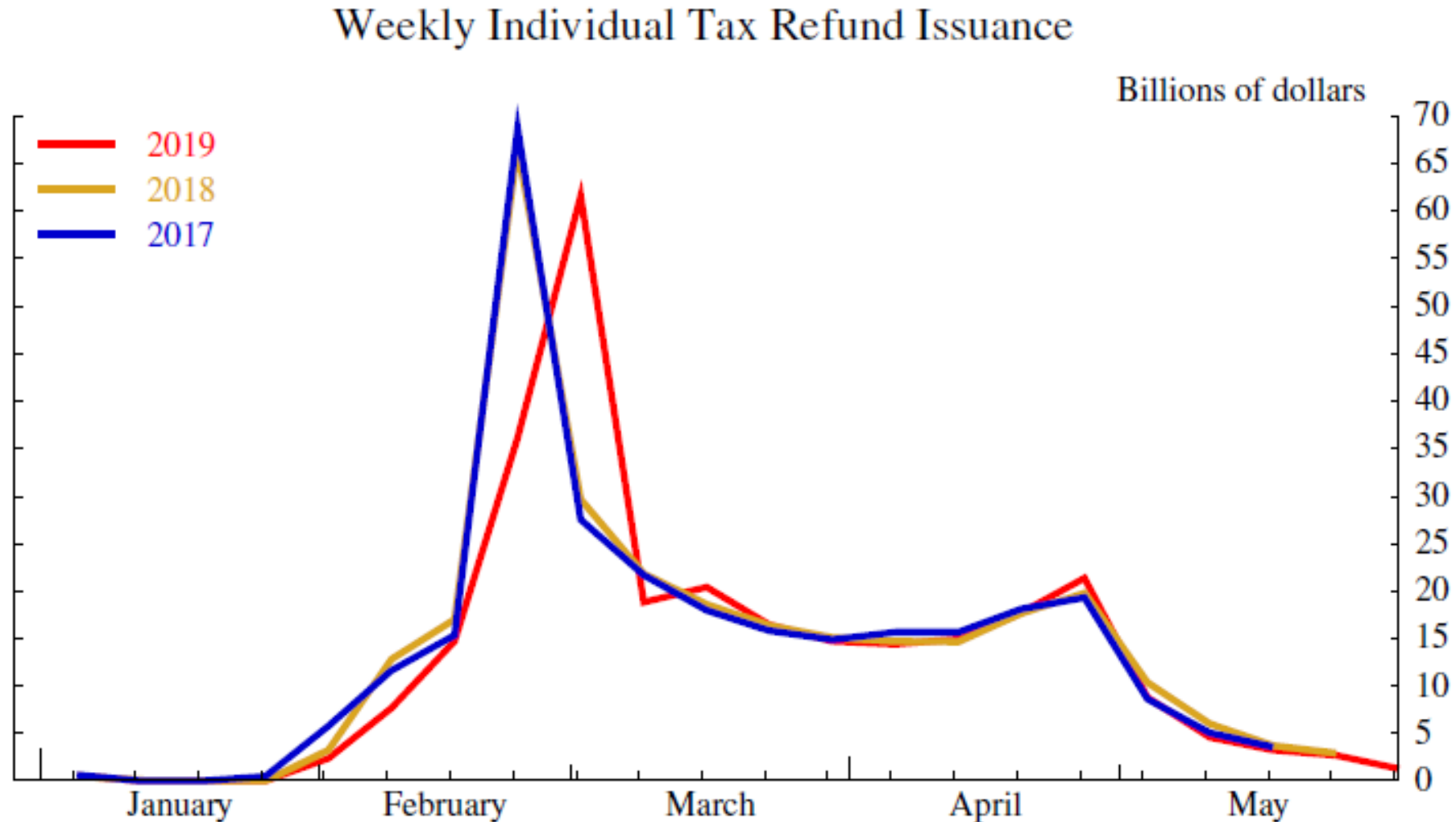
Zip code level shares of refundable EITC filers overlaid with MSA borders

EITC filer share quintiles

- (0.23, 0.73]
- (0.16, 0.23]
- (0.12, 0.16]
- (0.07, 0.12]
- [0, 0.07]

MSA-level variation in EITC refunds greatly exceeds state-level variation

Summary and policy implications

Estimate high-frequency retail spending out of EITC refund receipt

Total MPC of 25 cents per dollar of EITC refund received within two weeks
- Estimate is likely a lower bound on MPC

Significant spending response for nondurables

- Suggests excess sensitivity to predictable change in income among low-income U.S. households

Policy implications
- Alternatives to lump-sum EITC refund payments might better support consumption throughout the year
- Targeted fiscal stimulus payments to this group during a downturn would be effective

Appendix slides

EITC parameters

FIGURE 1
**Earned Income Tax Credit**
2018
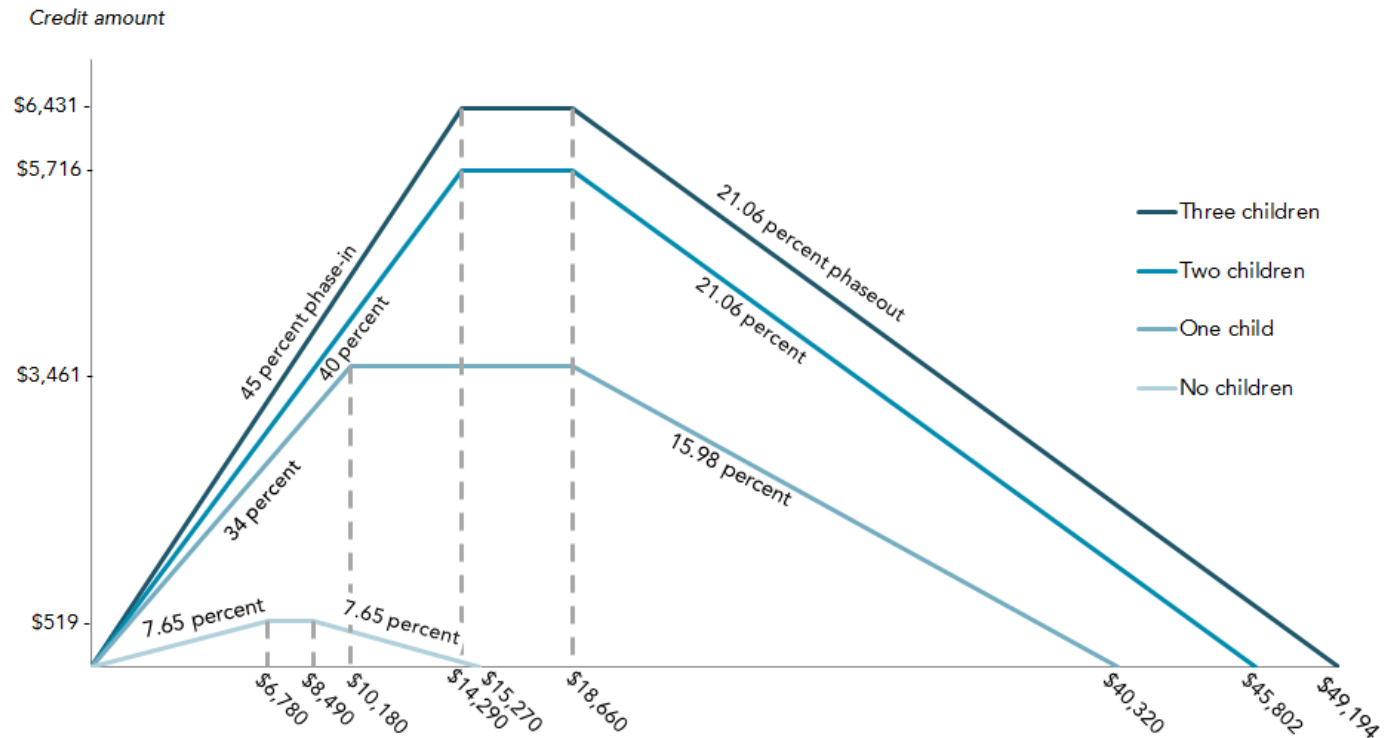
Source: Urban-Brookings Tax Policy Center (2018). Internal Revenue Procedure 2018-18, Internal Revenue Service.
Notes: Assumes all income comes from earnings. Amounts are for taxpayers filing a single or head-of-household tax return. For married couples filing a joint tax return, the credit begins to phase out at income $5,690 higher than shown.

Back

7-day trailing moving average of federal tax refund issuance magnitudes ($ billions)
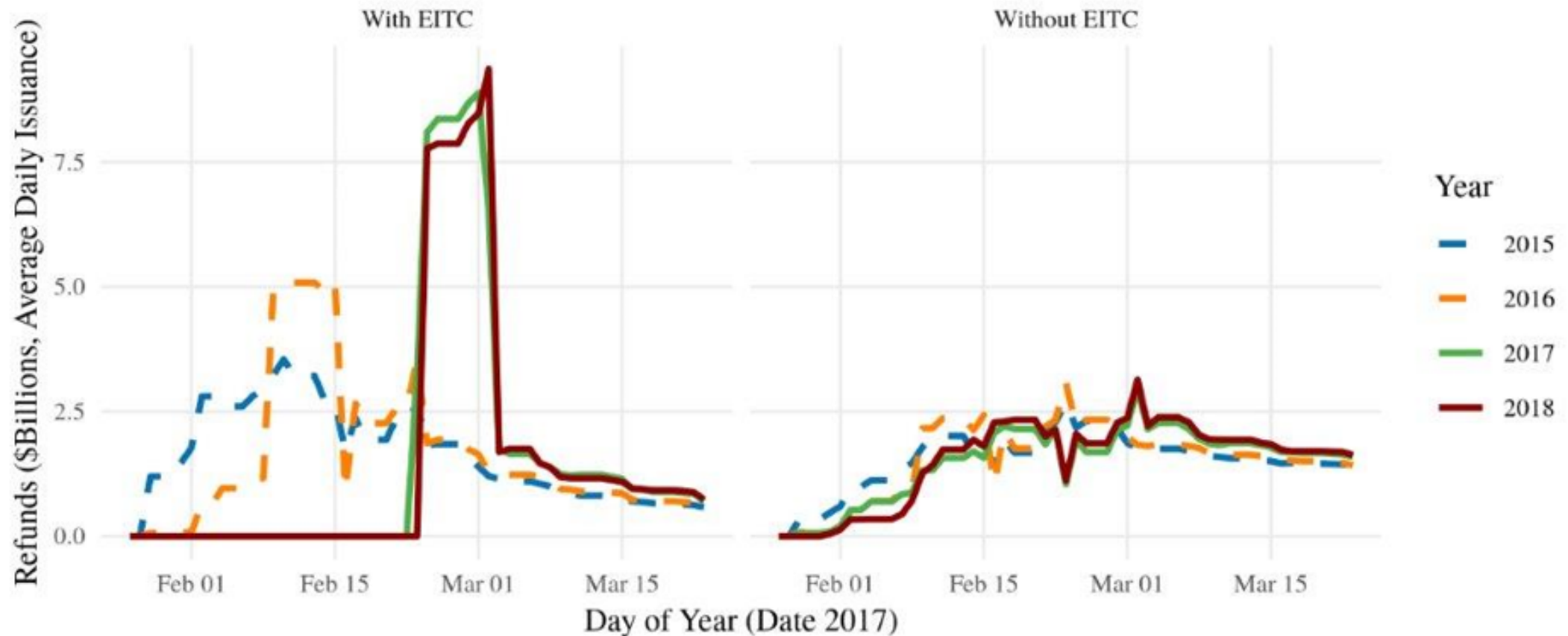
Source: Internal Revenue Service: Research, Applied Analytics, & Statistics. Note: We define the first week of the year as the one which has both a Monday and Friday within January. We align the Fridays in 2015, 2016, and 2018 to the corresponding Friday in 2017. We calculate the 7-day trailing moving average of federal tax refund refund issuance over dates t to $t-6$.

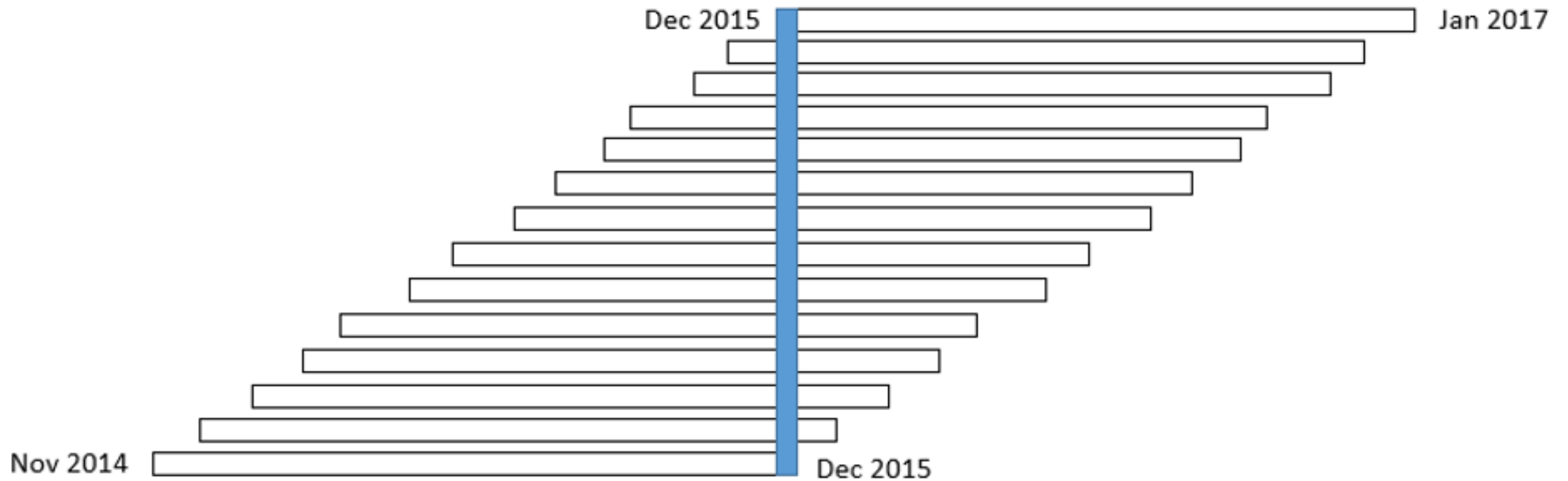# Daily issuance of federal tax refunds with and without EITC ($ billions)
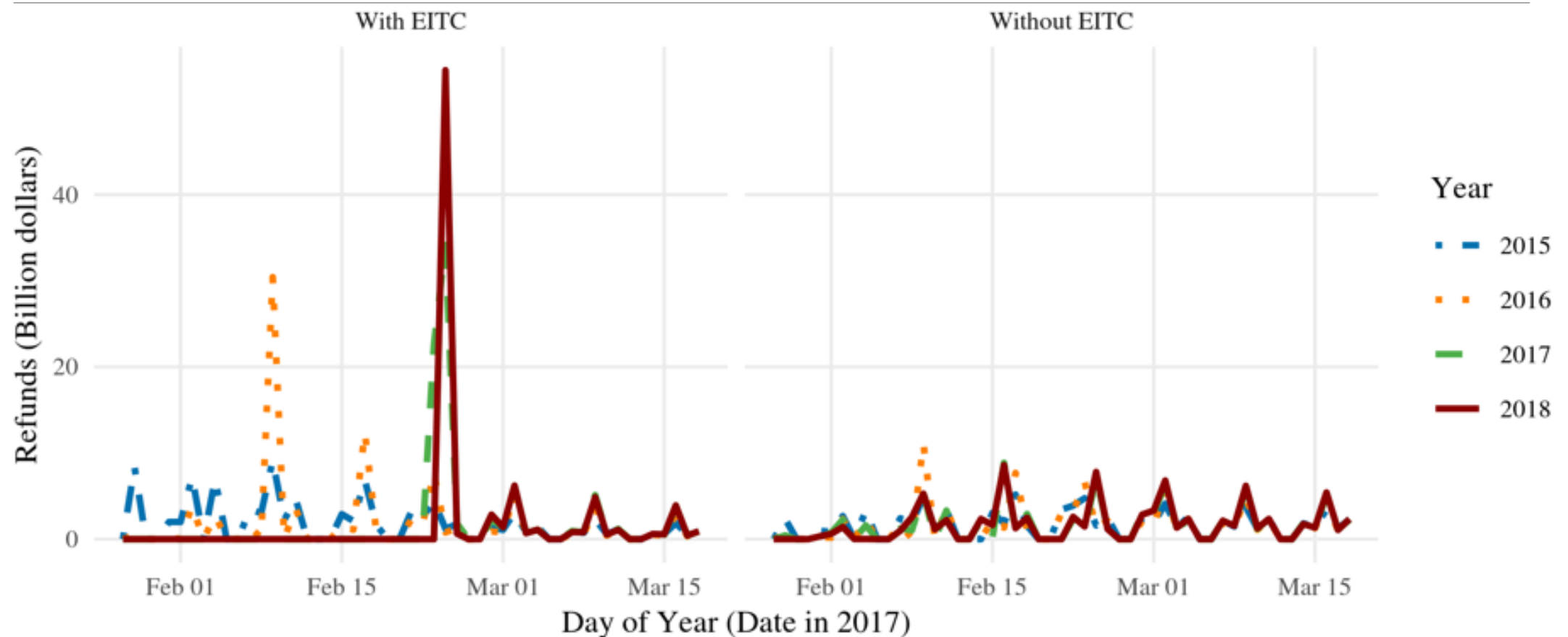
Source: Internal Revenue Service: Research, Applied Analytics, & Statistics. Note: The first week of the year is the one which has both a Monday and Friday within January. We align the Fridays in 2015, 2016, and 2018 to the corresponding Friday in 2017.

Overlapping 14-month constant merchant samples

Spending response by merchant type and week relative to EITC refund issuance

Table 1: Spending Categories MPC estimates

| | Sales / Population | | | |
| | Grocery | Restaurants | Electronics | General Merchandise |
	(1)	(2)	(3)	(4)
EITC Shock Lead 2 Weeks	−0.002	0.004*	0.001	0.003
	(0.004)	(0.003)	(0.001)	(0.008)
EITC Shock Lead 1 Week	0.002	−0.002	−0.00002	0.023***
	(0.006)	(0.003)	(0.002)	(0.008)
EITC Shock	0.005	0.010***	0.012***	0.041***
	(0.005)	(0.002)	(0.003)	(0.009)
EITC Shock Lag 1 Week	0.006*	0.009***	0.005***	0.021**
	(0.003)	(0.003)	(0.002)	(0.010)
EITC Shock Lag 2 Weeks	0.012**	0.006***	0.003**	0.009
	(0.005)	(0.002)	(0.001)	(0.011)
EITC Shock Lag 3 Weeks	0.010**	0.005**	0.002*	−0.002
	(0.004)	(0.002)	(0.001)	(0.011)
EITC Shock Lag 4 Weeks	0.006	−0.006***	−0.001	−0.002
	(0.005)	(0.001)	(0.001)	(0.011)
Total MPC	0.038***	0.027***	0.022***	0.093***
	(0.013)	(0.006)	(0.005)	(0.026)

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$