# Public Economics (2450B)

# Topic 7: The EITC

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Spring, 2023

# EITC Papers

Lots of papers on the EITC. In class, we will discuss:

- Kleven (2021)
- Bastian and Jones (2021)
- Bastian (2020) (not assigned reading – slides follow)

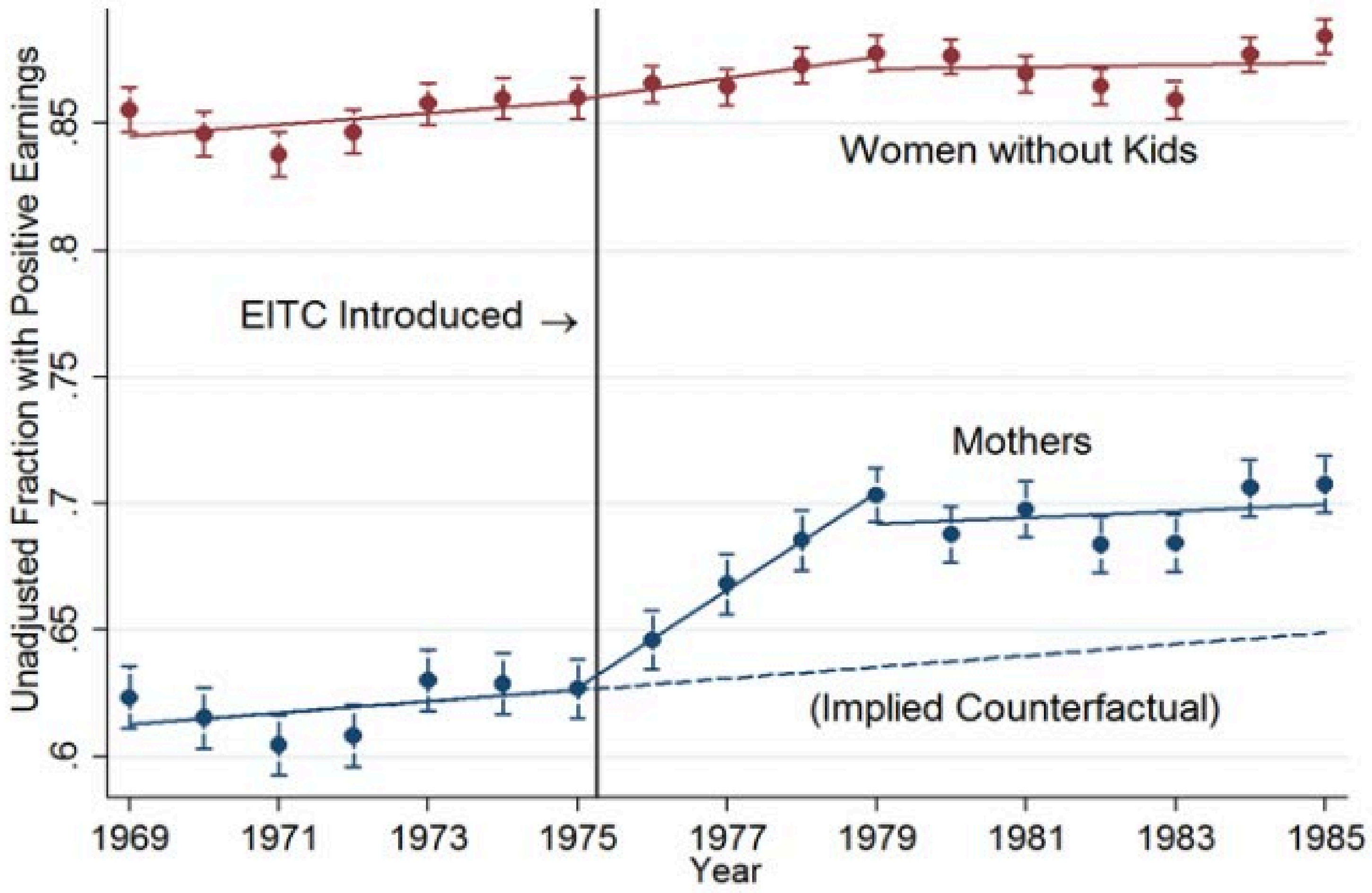



FIGURE 1.A. UNADJUSTED EMPLOYMENT TRENDS, WOMEN WITH AND WITHOUT KIDS

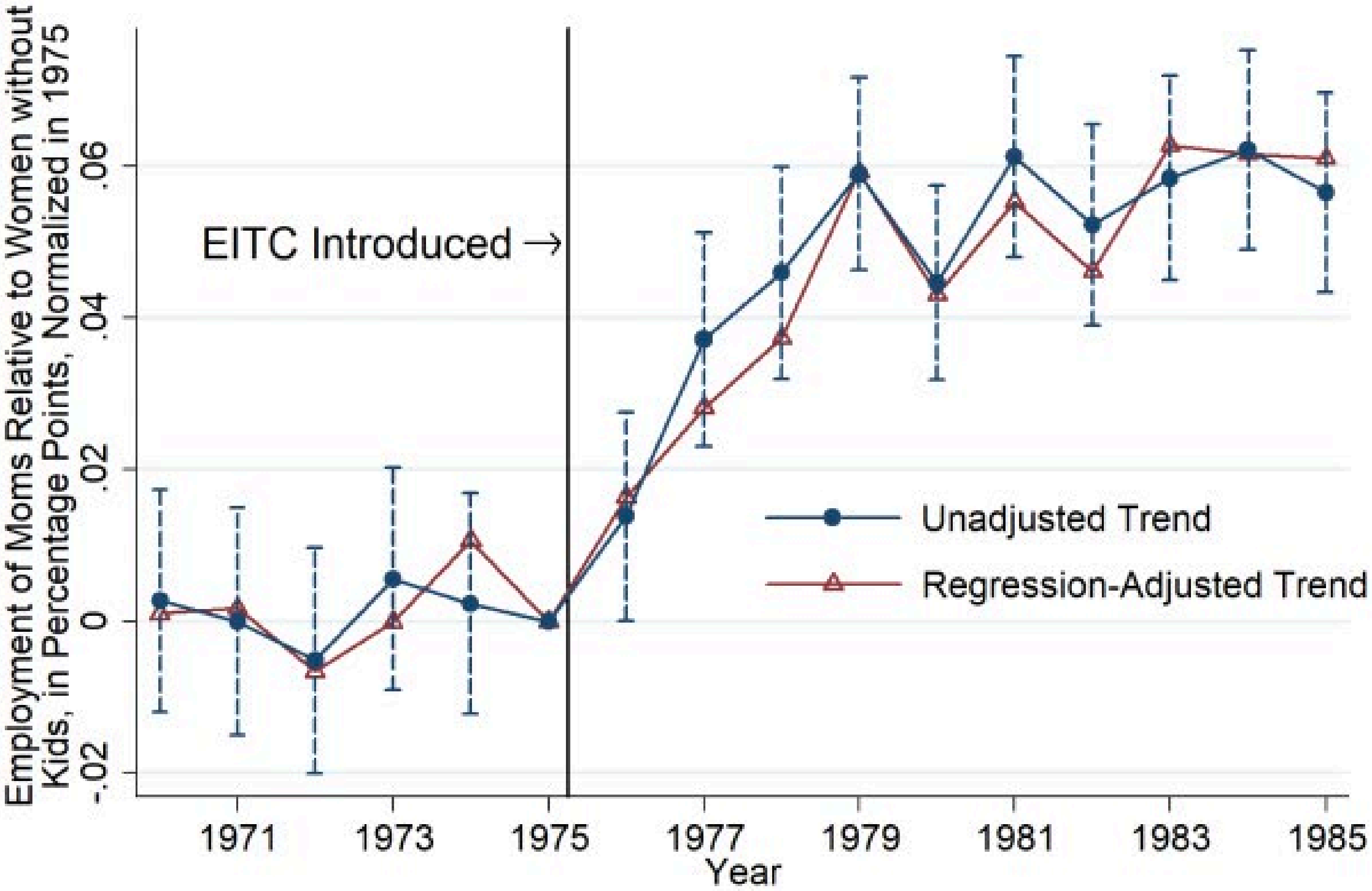



FIGURE 1.B. EMPLOYMENT GAP BETWEEN MOTHERS AND WOMEN WITHOUT KIDS

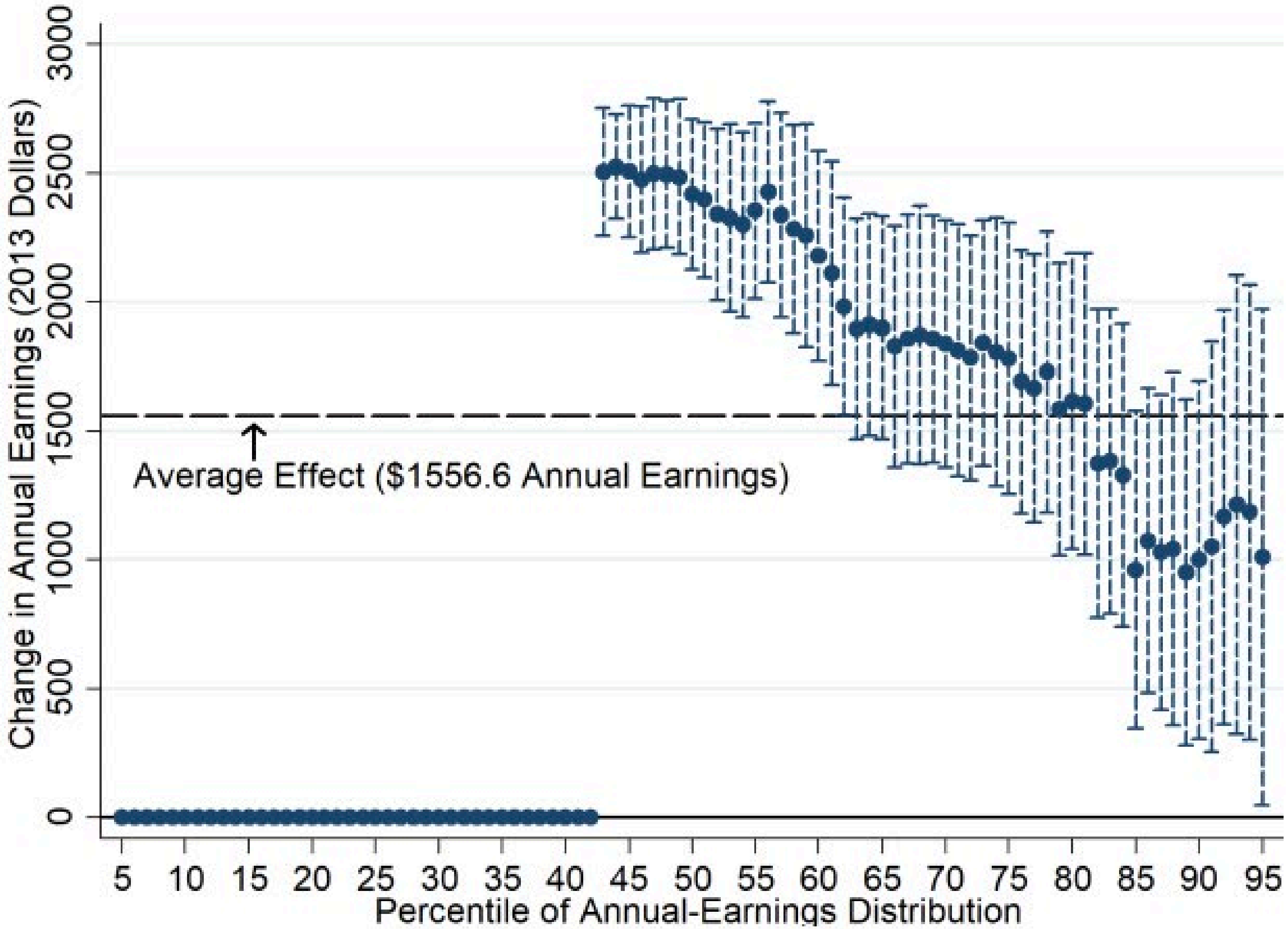
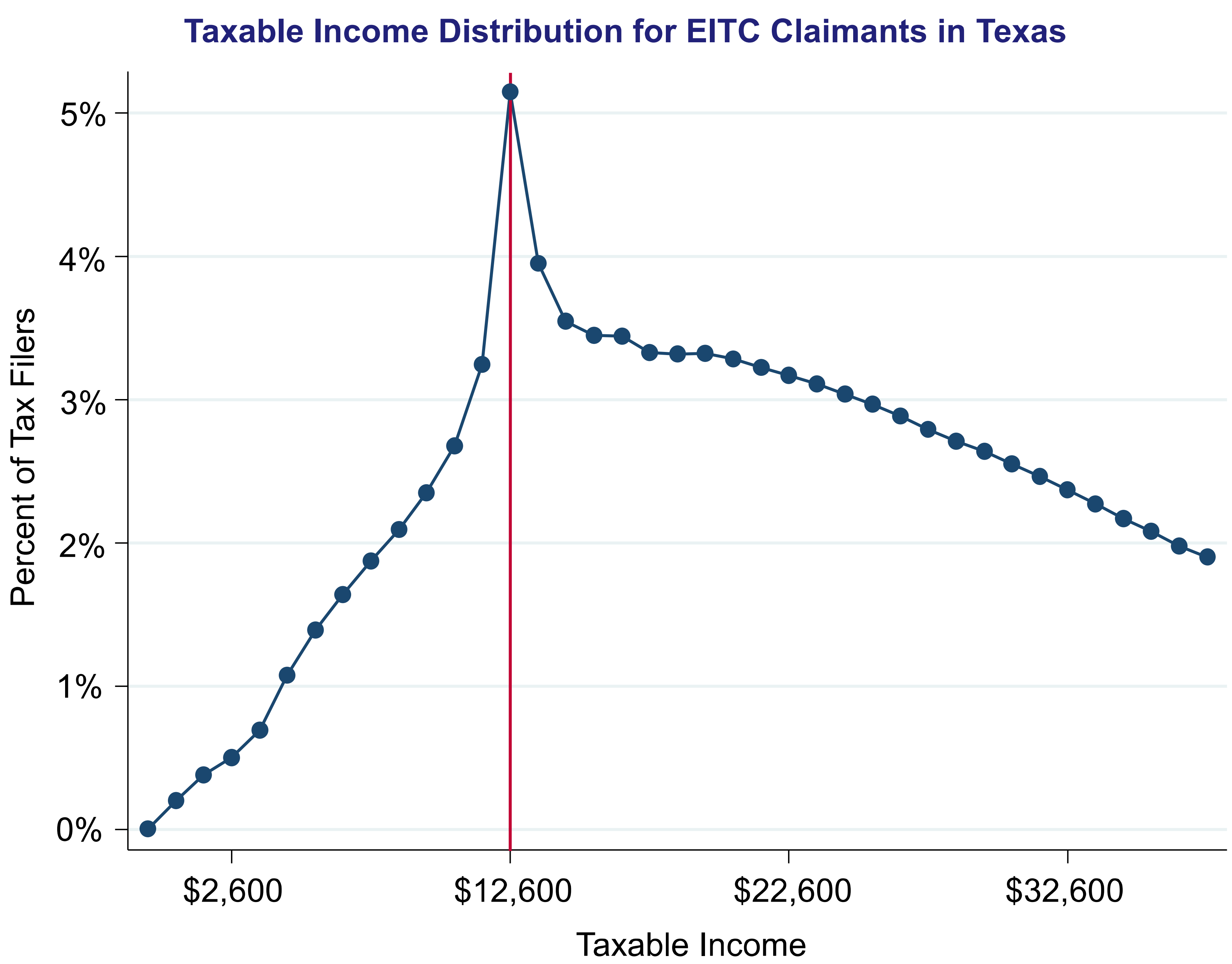
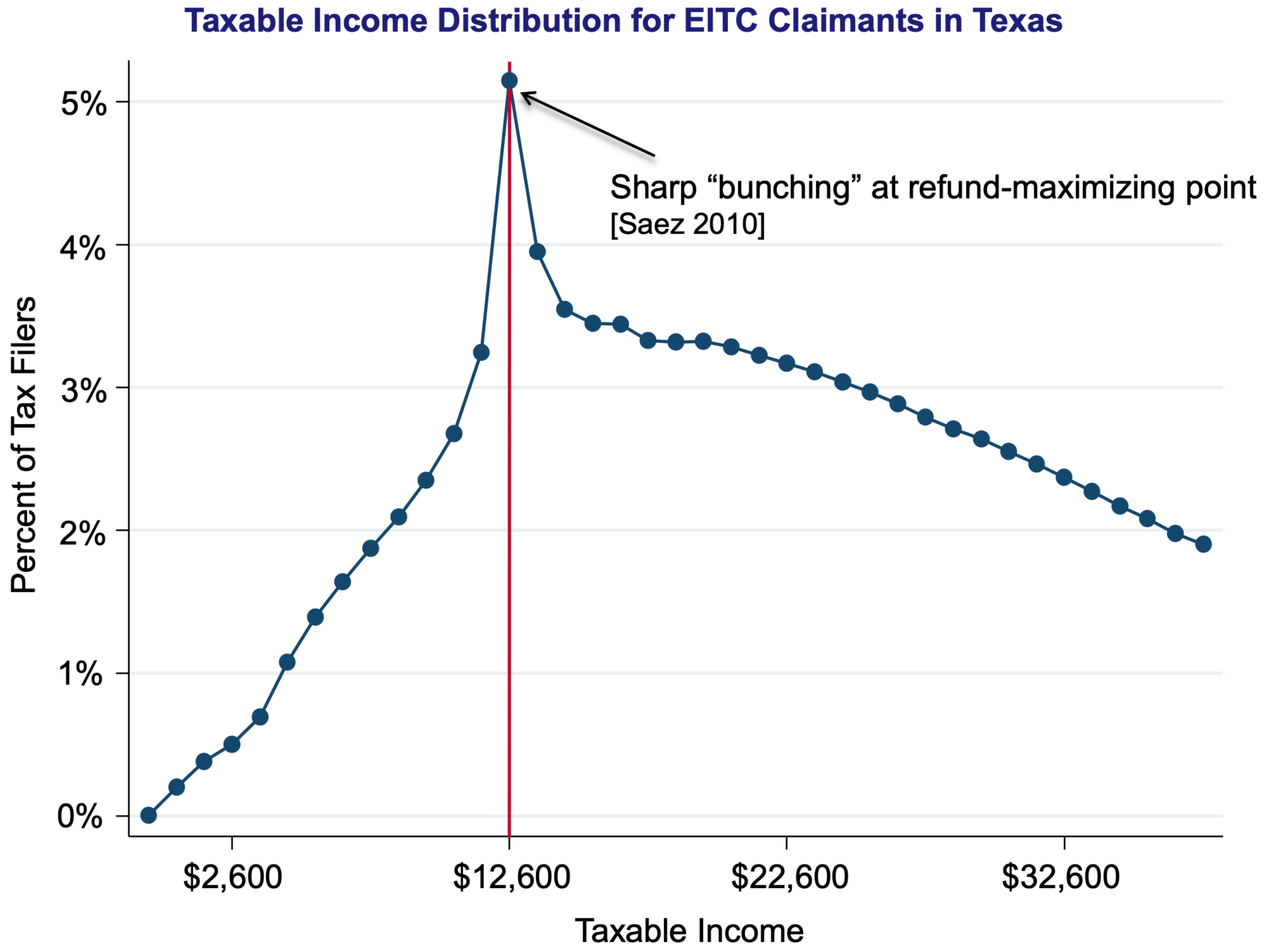



FIGURE 6. EFFECT OF THE EITC ON ANNUAL EARNINGS (QUANTILE DIF IN DIF)

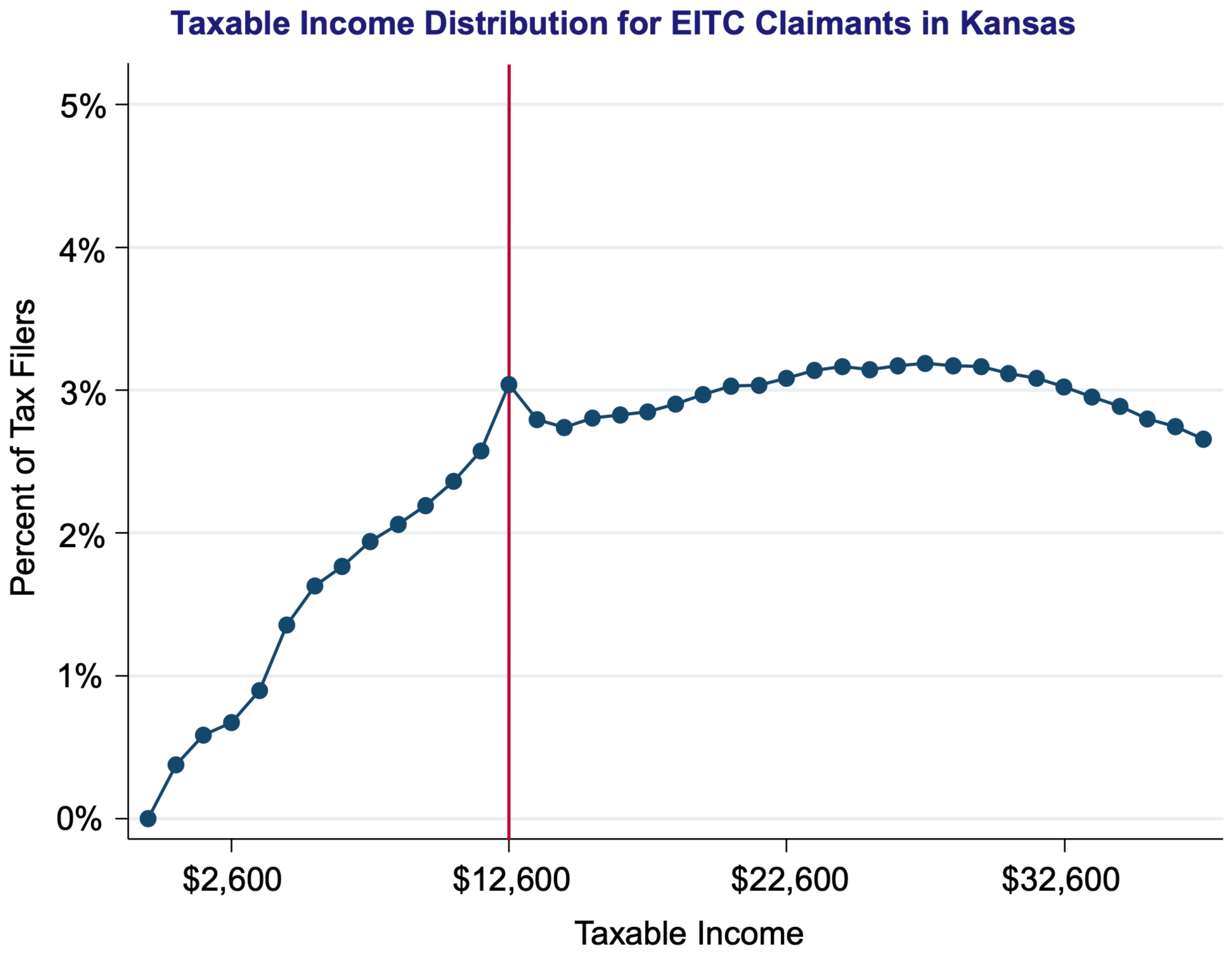
# Chetty et al 2013

Chetty et al (2013) study variation in knowledge about the EITC to estimate its impact on labor supply


Taxable Income Distribution for EITC Claimants in Texas
Percent of Tax Filers
5%
4%
3%
2%
1%
0%
$2,600
$12,600
$22,600
$32,600
Taxable Income

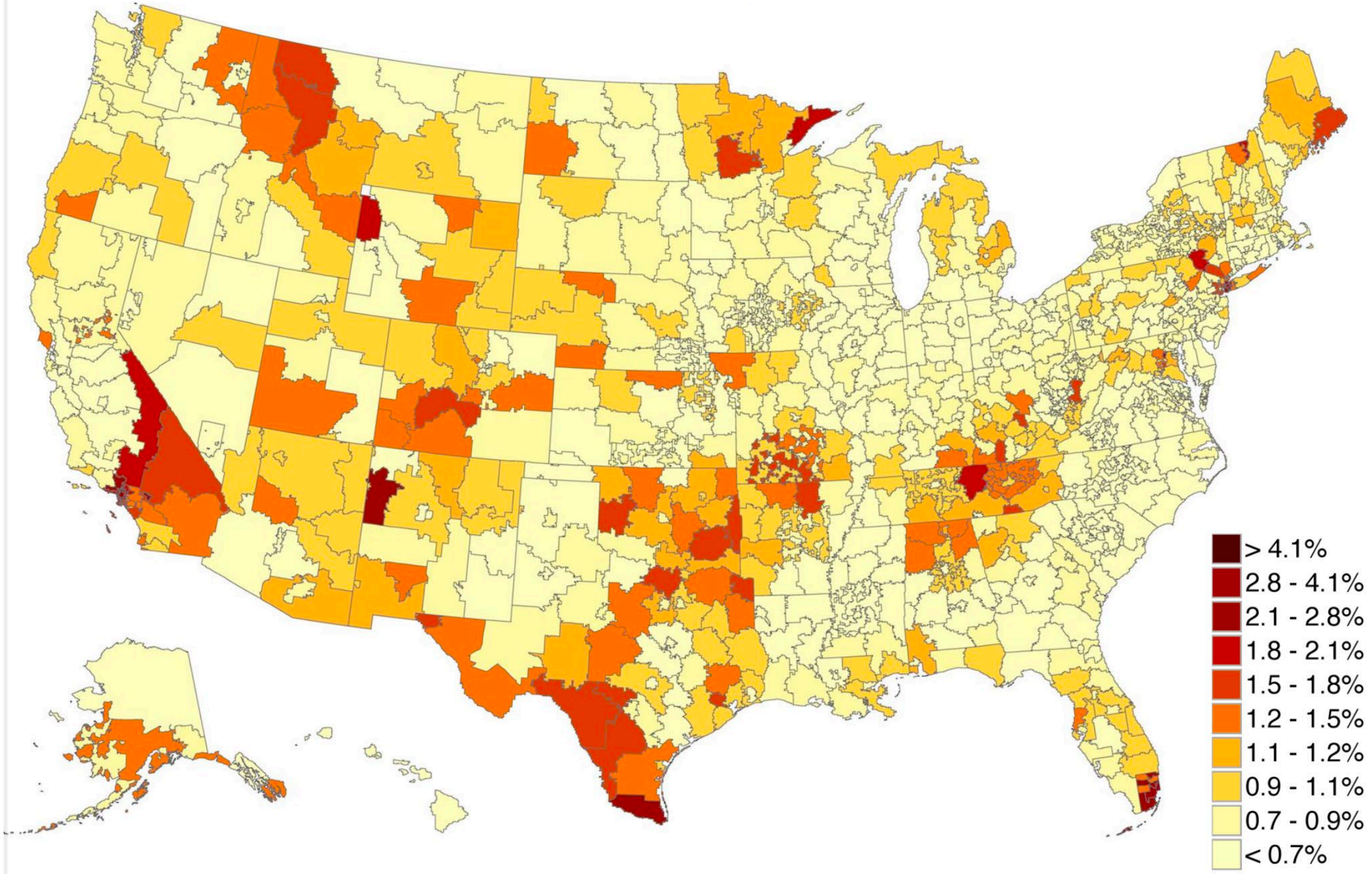


Taxable Income Distribution for EITC Claimants in Texas
Sharp "bunching" at refund-maximizing point
[Saez 2010]
Percent of Tax Filers
5%
4%
3%
2%
1%
0%
$2,600
$12,600
$22,600
$32,600
Taxable Income



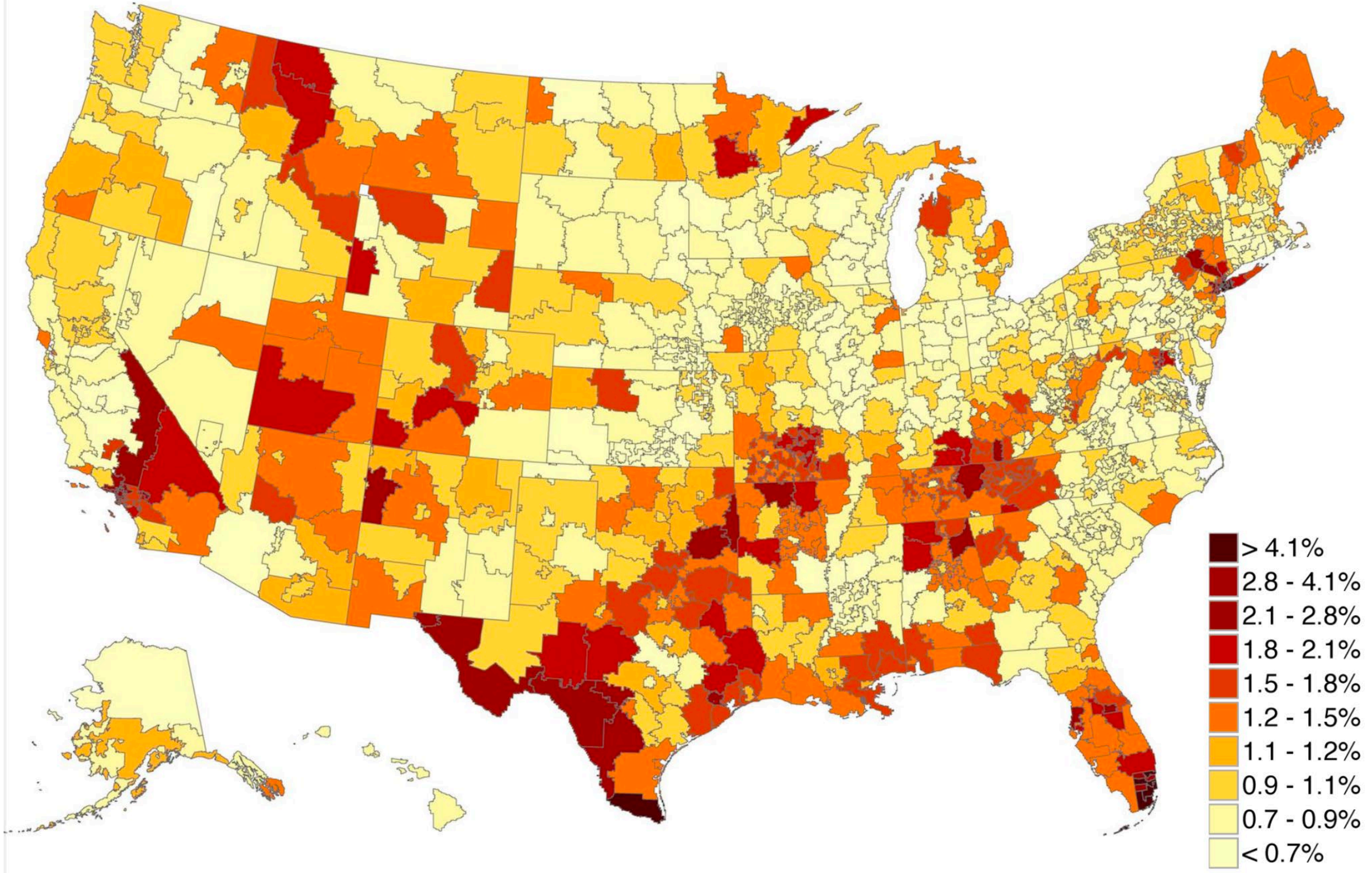
Taxable Income Distribution for EITC Claimants in Kansas
5%
4%
3%
2%
1%
0%
Percent of Tax Filers
$2,600
$12,600
$22,600
$32,600
Taxable Income

# Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 1996



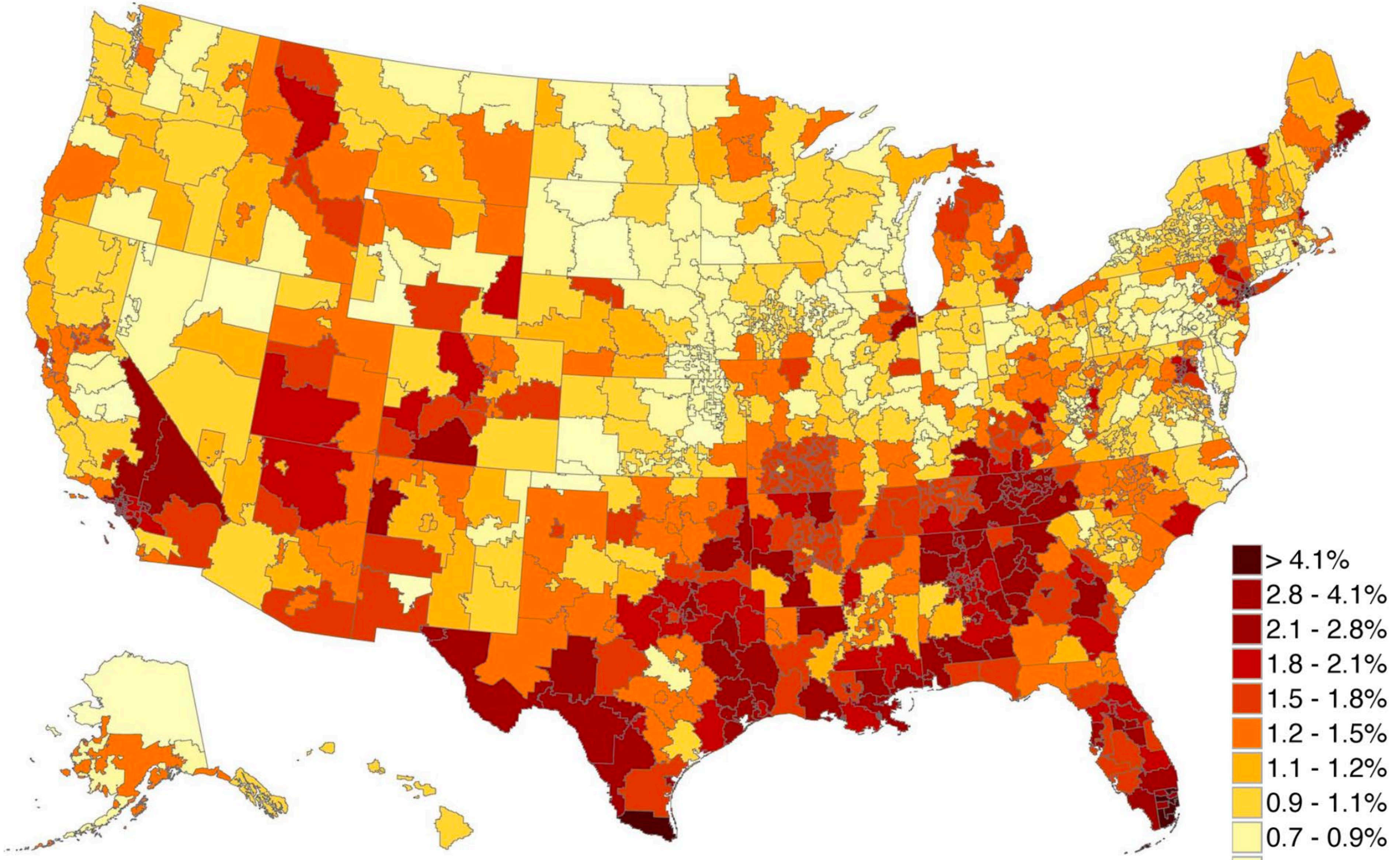

*Note: Darker Color = More EITC Sharp Bunching*

## Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 1999



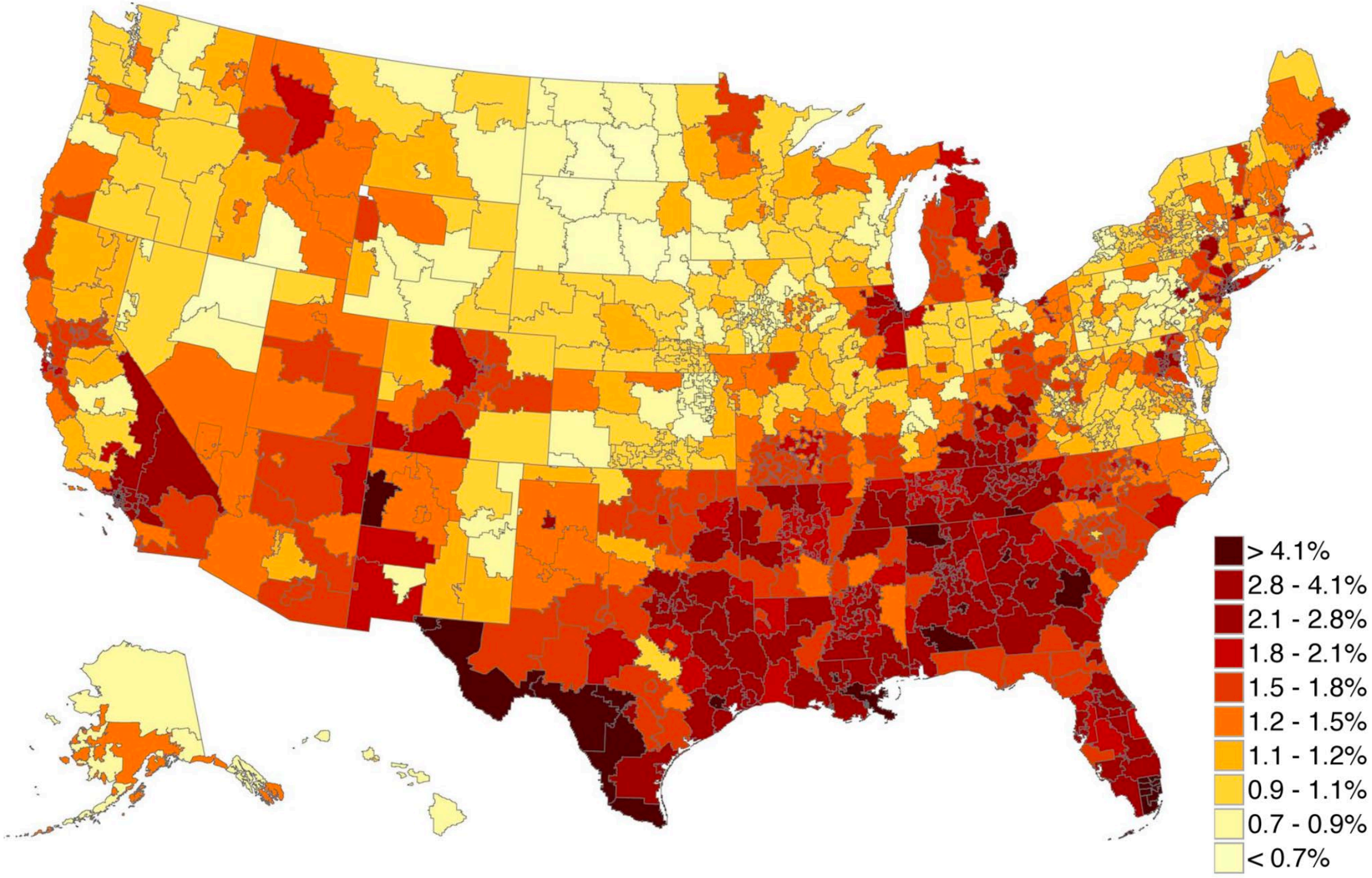

*Note: Darker Color = More EITC Sharp Bunching*

## Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 2002



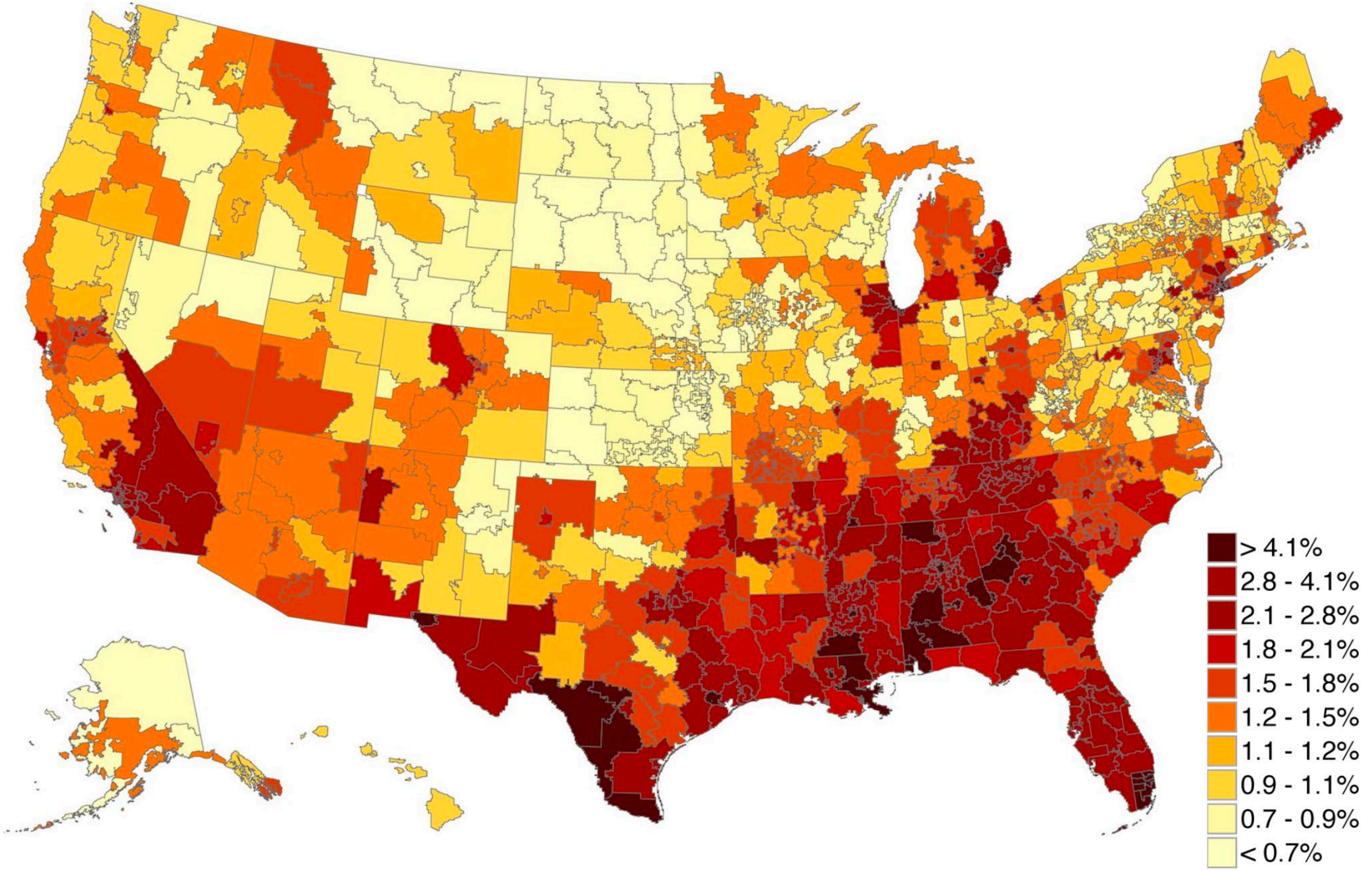

*Note: Darker Color = More EITC Sharp Bunching*

## Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 2005




*Note: Darker Color = More EITC Sharp Bunching*

## Fraction of Tax Filers Who Report Income that Maximizes EITC Refund in 2008




*Note: Darker Color = More EITC Sharp Bunching*

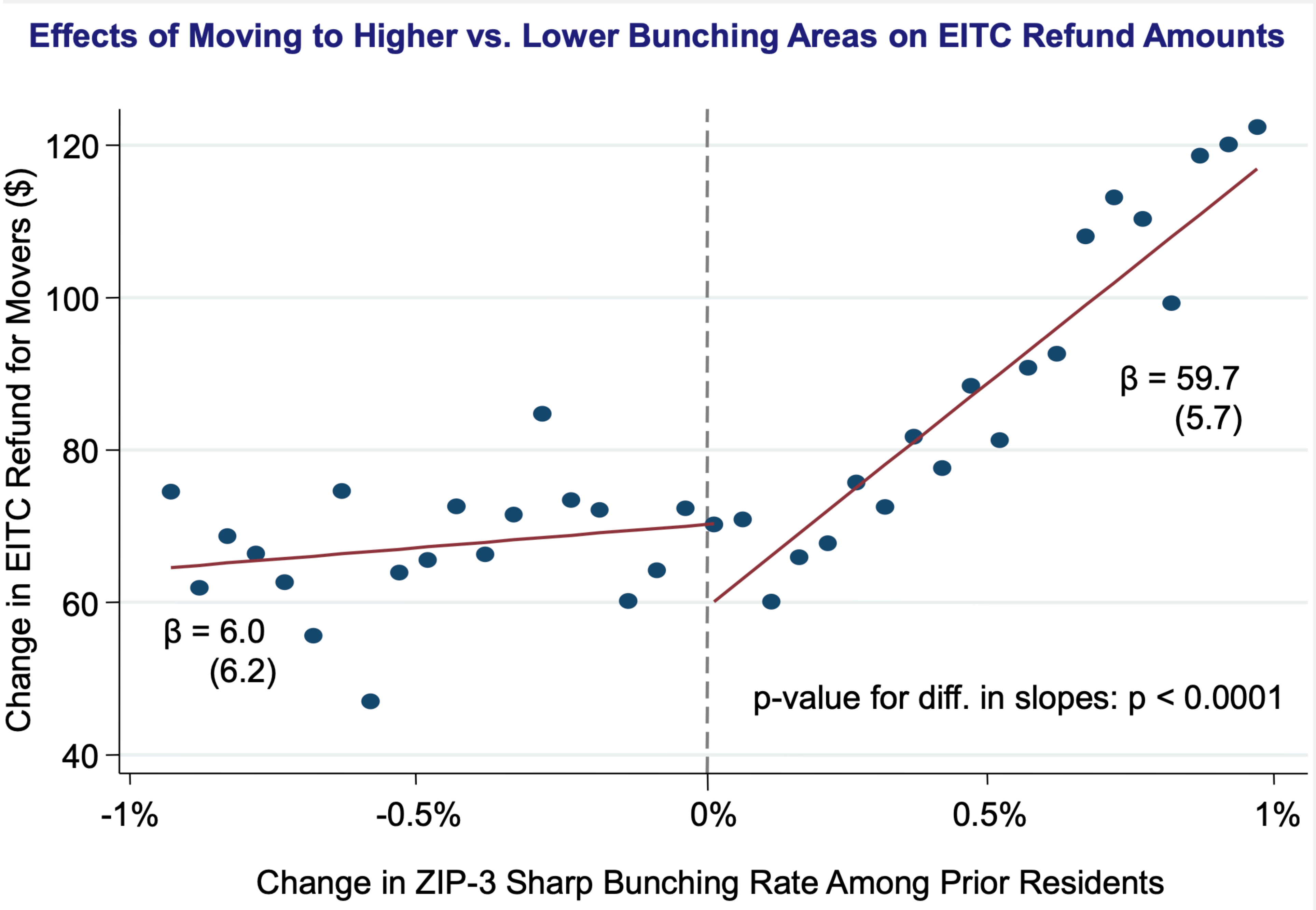
## Differences in Knowledge about the EITC?

- Why does impact of EITC on income vary so much across areas?

- Plausible behavioral model: differences in knowledge about EITC To test this explanation, consider individuals who move

- Knowledge model predicts asymmetric impact of moving:

  – Moving to a higher-bunching area should raise EITC refund
  – Moving to a lower-bunching area should not affect EITC refund


Effects of Moving to Higher vs. Lower Bunching Areas on EITC Refund Amounts
Change in EITC Refund for Movers ($)
120
100
80
60
40
β = 6.0
(6.2)
β = 59.7
(5.7)
p-value for diff. in slopes: p < 0.0001
-1%
-0.5%
0%
0.5%
1%
Change in ZIP-3 Sharp Bunching Rate Among Prior Residents

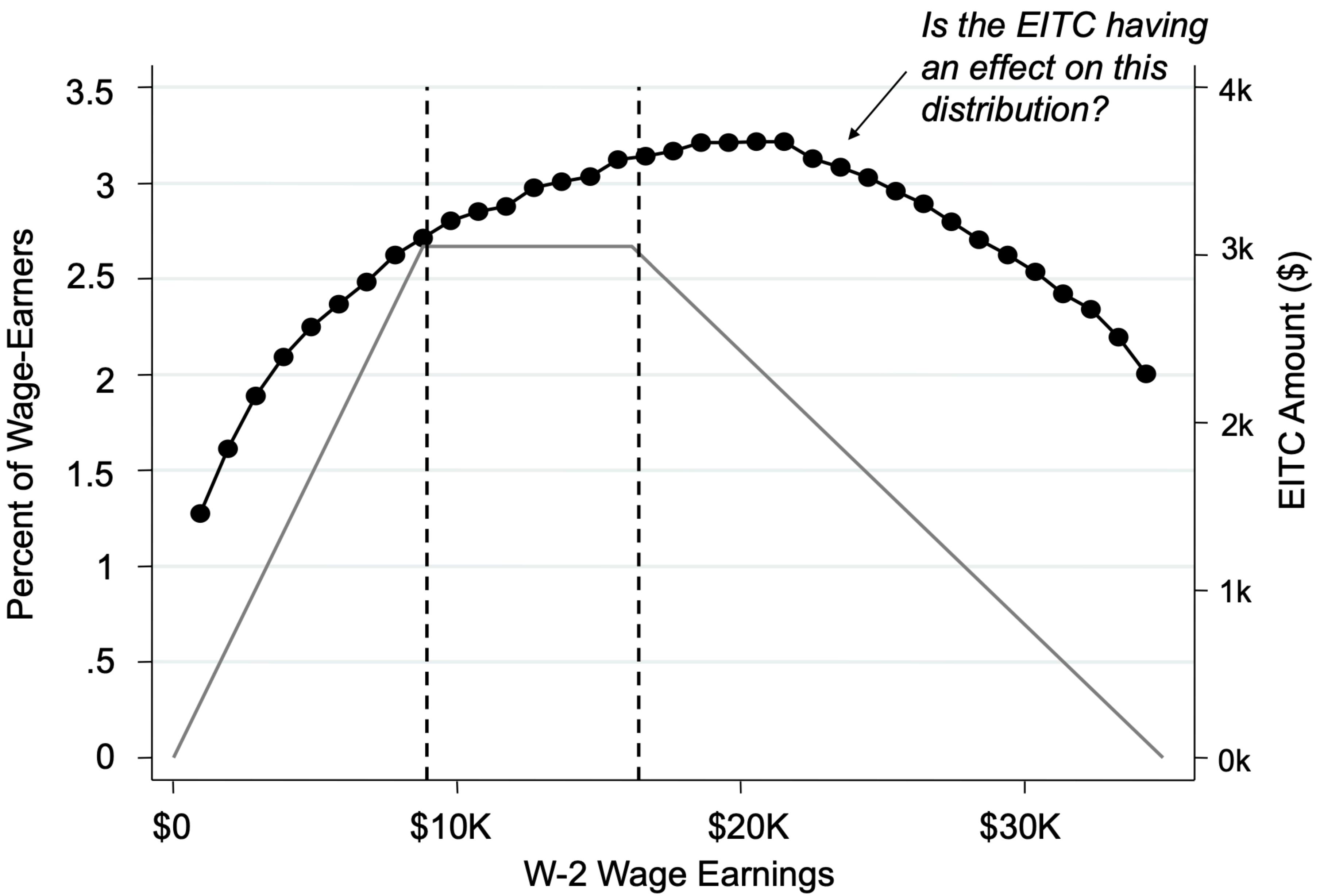
## Differences in Knowledge about the EITC?

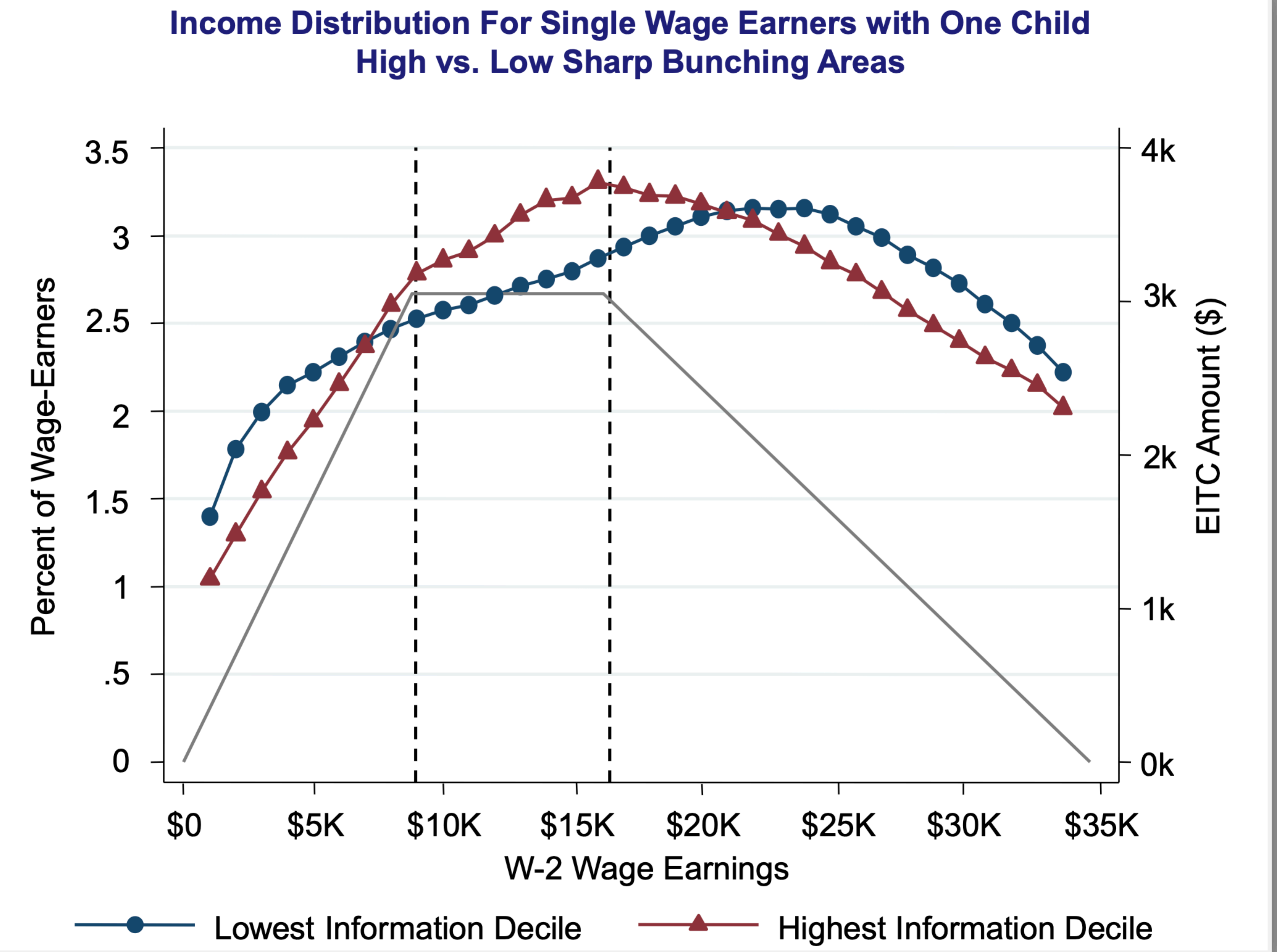
- Paper documents clear evidence of heterogeneous bunching across areas
  - Driven mainly by self-employed (Saez 2010)
  - Easy to manipulate income

- Paper goes on to exploit bunching variation to ask a much deeper (more difficult) question:

- How does EITC affect real labor supply?

## Income Distribution For Single Wage Earners with One Child




Income Distribution For Single Wage Earners with One Child
High vs. Low Sharp Bunching Areas
Percent of Wage-Earners
3.5
3
2.5
2
1.5
1
.5
0
EITC Amount ($)
4k
3k
2k
1k
0k
$0
$5K
$10K
$15K
$20K
$25K
$30K
$35K
W-2 Wage Earnings
Lowest Information Decile
Highest Information Decile

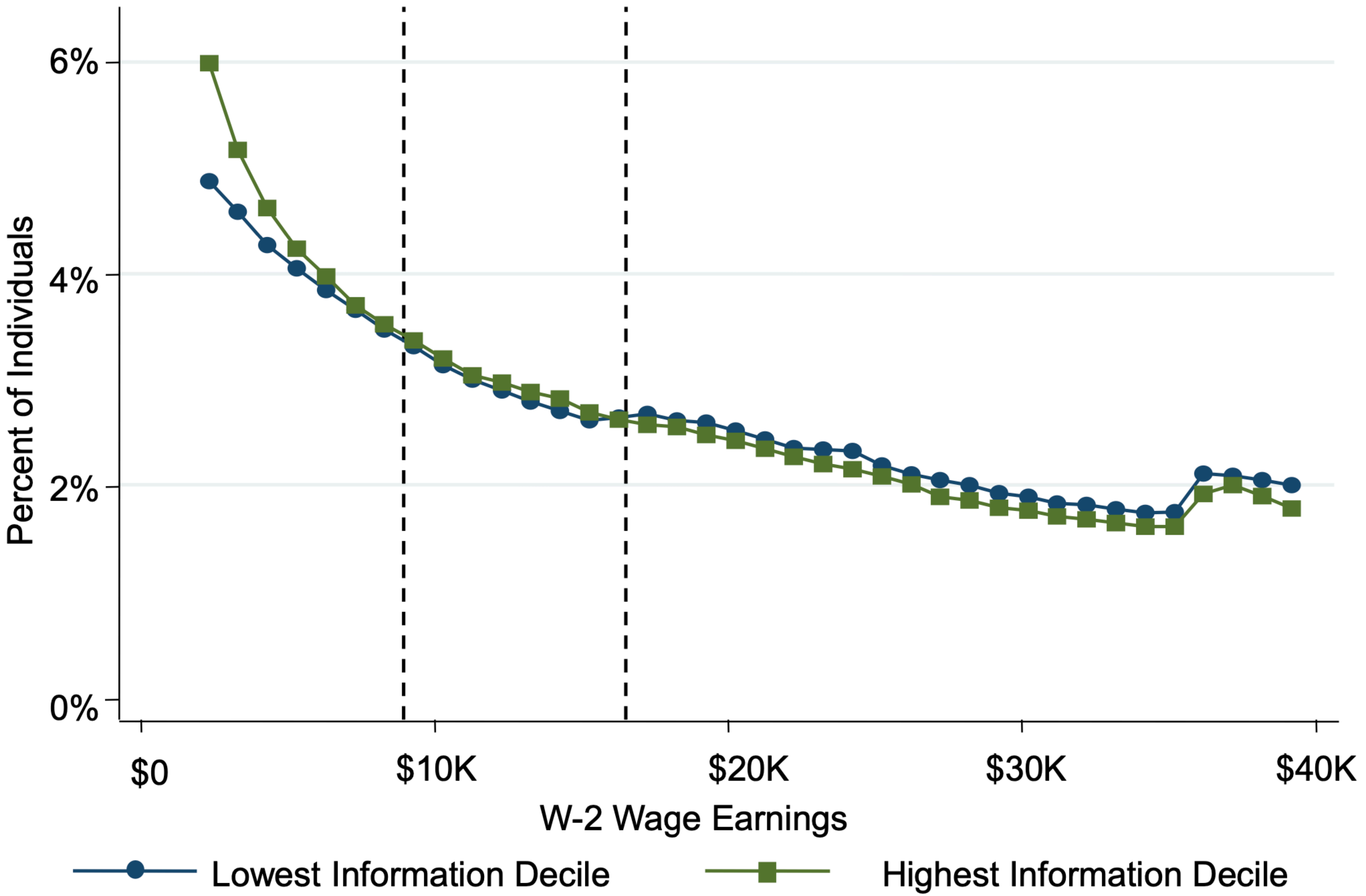
# Child Birth Research Design

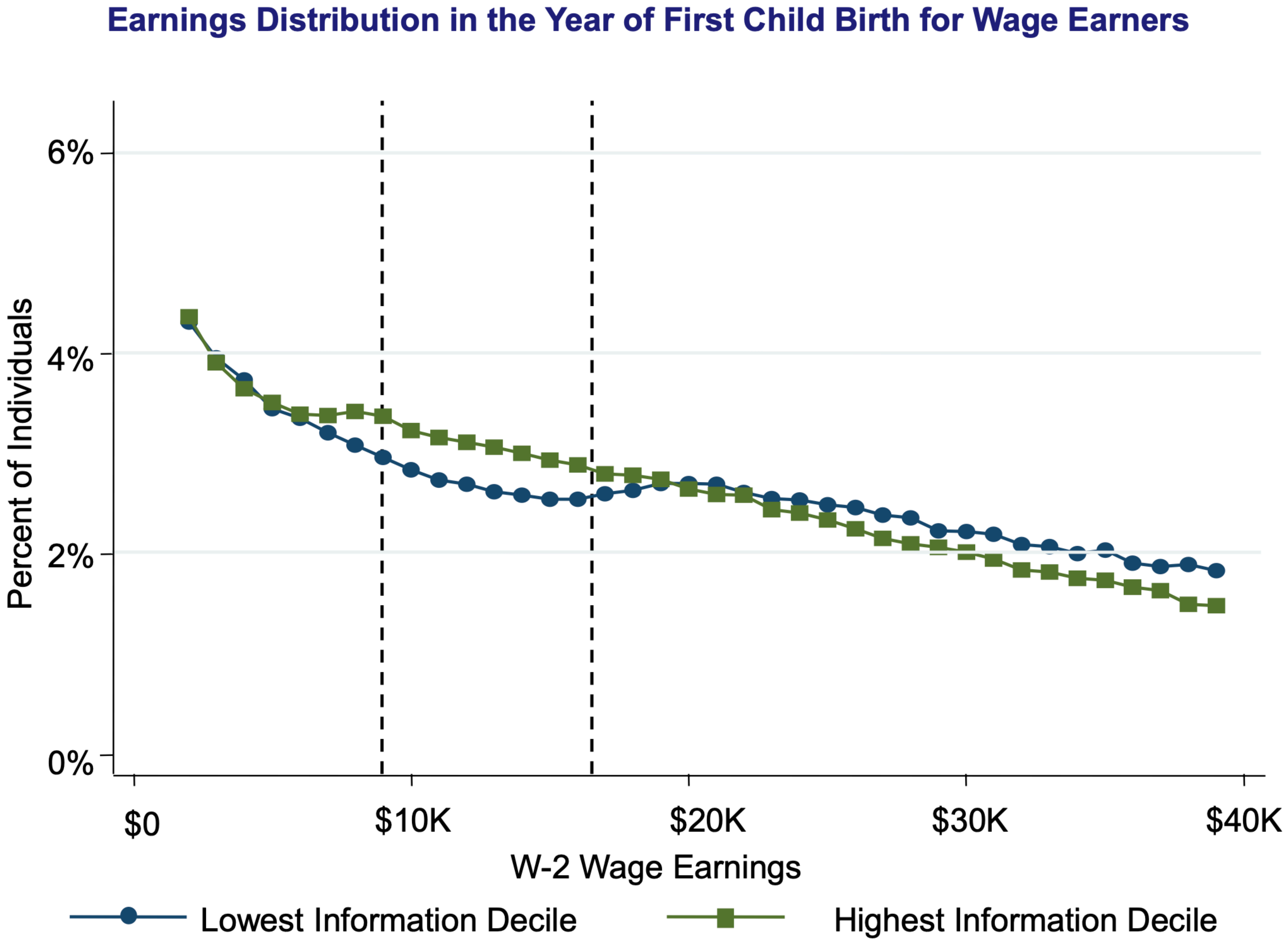
- Comparisons across areas could be biased by omitted variables

- Study changes in earnings around childbirth to address this concern

  – Individuals without children are essentially ineligible for the EITC
  – Birth of a child generates sharp variation in marginal incentives

## Earnings Distribution in the Year Before First Child Birth for Wage Earners





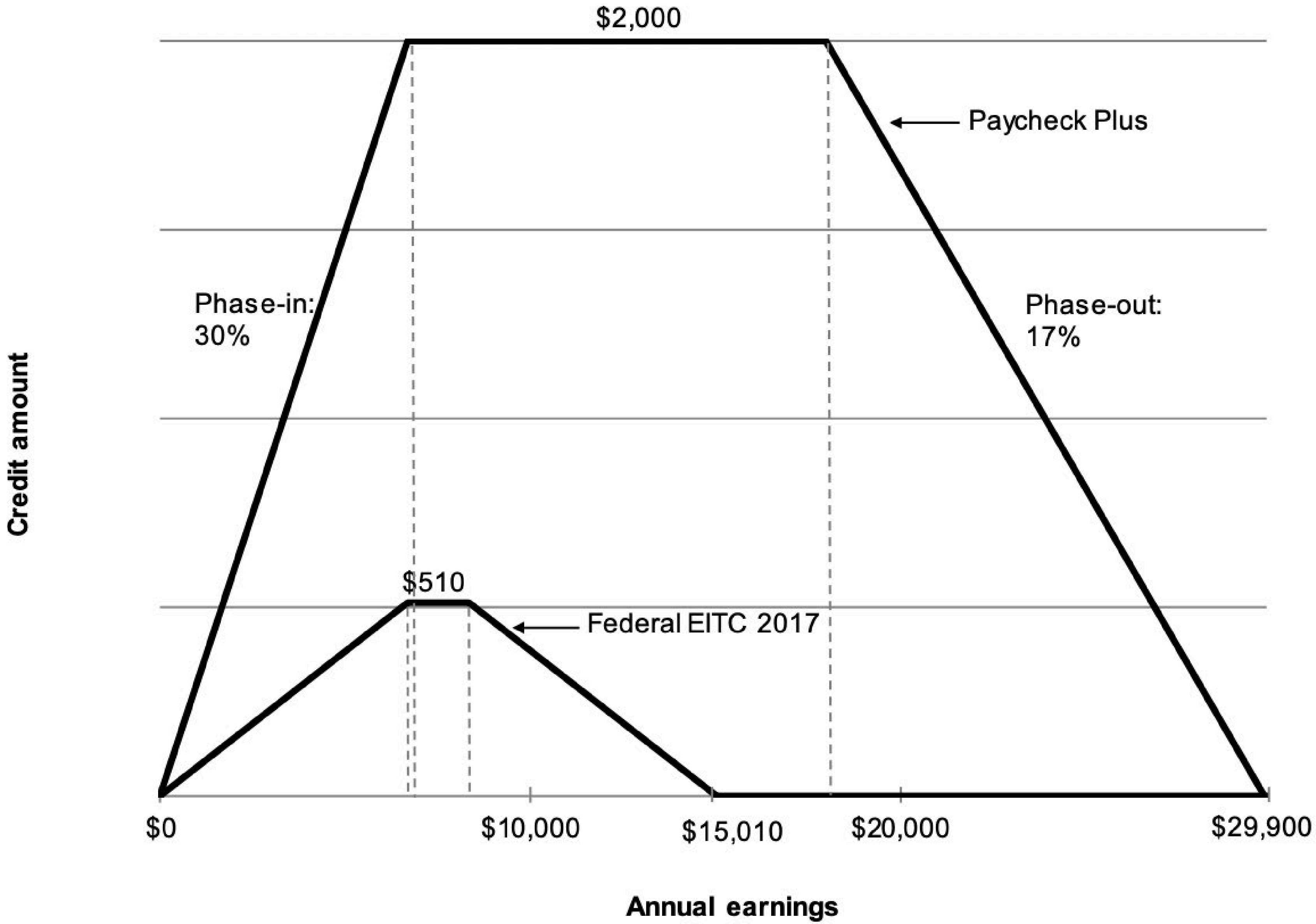
Earnings Distribution in the Year of First Child Birth for Wage Earners
6%
4%
2%
0%
Percent of Individuals
$0
$10K
$20K
$30K
$40K
W-2 Wage Earnings
Lowest Information Decile
Highest Information Decile

## Paycheck Plus

- Paycheck Plus provides RCT-like incentives to singles without children

**Figure ES.1**

**Paycheck Plus Versus the Federal Earned Income Tax Credit (EITC)**



## Table ES.1

## Paycheck Plus Effects on Income and Poverty

| Outcome | Program Group | Control Group | Difference (Effect) |
|---|---|---|---|
| After-bonus earnings, Years 1-3 ($) | 12,054 | 11,419 | 635 *** |
| Household income at survey ($) | 16,210 | 16,259 | -49 |
| Income below 50% of poverty line (%) | 29.2 | 32.6 | -3.4 ** |
| Income 50-100% of poverty line (%) | 20.2 | 17.4 | 2.8 ** |
| Income below poverty line (%) | 49.4 | 50.0 | -0.6 |

## Table ES.2

## Paycheck Plus Effects on Employment Rates

| Outcome | Program Group | Control Group | Difference (Effect) | Program Group | Control Group | Difference (Effect) | Difference Between Groups |
|---|---|---|---|---|---|---|---|
| | **Full study sample** | | | | | | |
| Year 1 | 79.7 | 78.8 | 0.9 | | | | |
| Year 2 | 76.4 | 73.8 | 2.6 *** | | | | |
| Year 3 | 75.7 | 73.6 | 2.1 ** | | | | |
| Years 1-3 | 77.3 | 75.4 | 1.9 ** | | | | |
| | **More disadvantaged men** | | | **Other men** | | | |
| Year 1 | 73.1 | 72.6 | 0.6 | 79.5 | 80.0 | -0.5 | |
| Year 2 | 60.6 | 58.4 | 2.1 | 79.0 | 78.8 | 0.2 | |
| Year 3 | 62.4 | 56.6 | 5.8 ** | 76.6 | 78.0 | -1.3 | †† |
| Years 1-3 | 65.4 | 62.5 | 2.8 | 78.4 | 78.9 | -0.6 | |
| | **All women** | | | **All men** | | | |
| Year 1 | 84.0 | 81.8 | 2.3 * | 76.7 | 77.0 | -0.3 | |
| Year 2 | 83.0 | 78.4 | 4.6 *** | 71.7 | 71.0 | 0.7 | † |
| Year 3 | 82.5 | 79.9 | 2.6 * | 70.8 | 69.6 | 1.2 | |
| Years 1-3 | 83.2 | 80.0 | 3.2 *** | 73.1 | 72.5 | 0.5 | † |
| Sample size (total = 5,968) | | | | | | | |

SOURCES: IRS tax forms, W-2s, and 1099-MISCs.

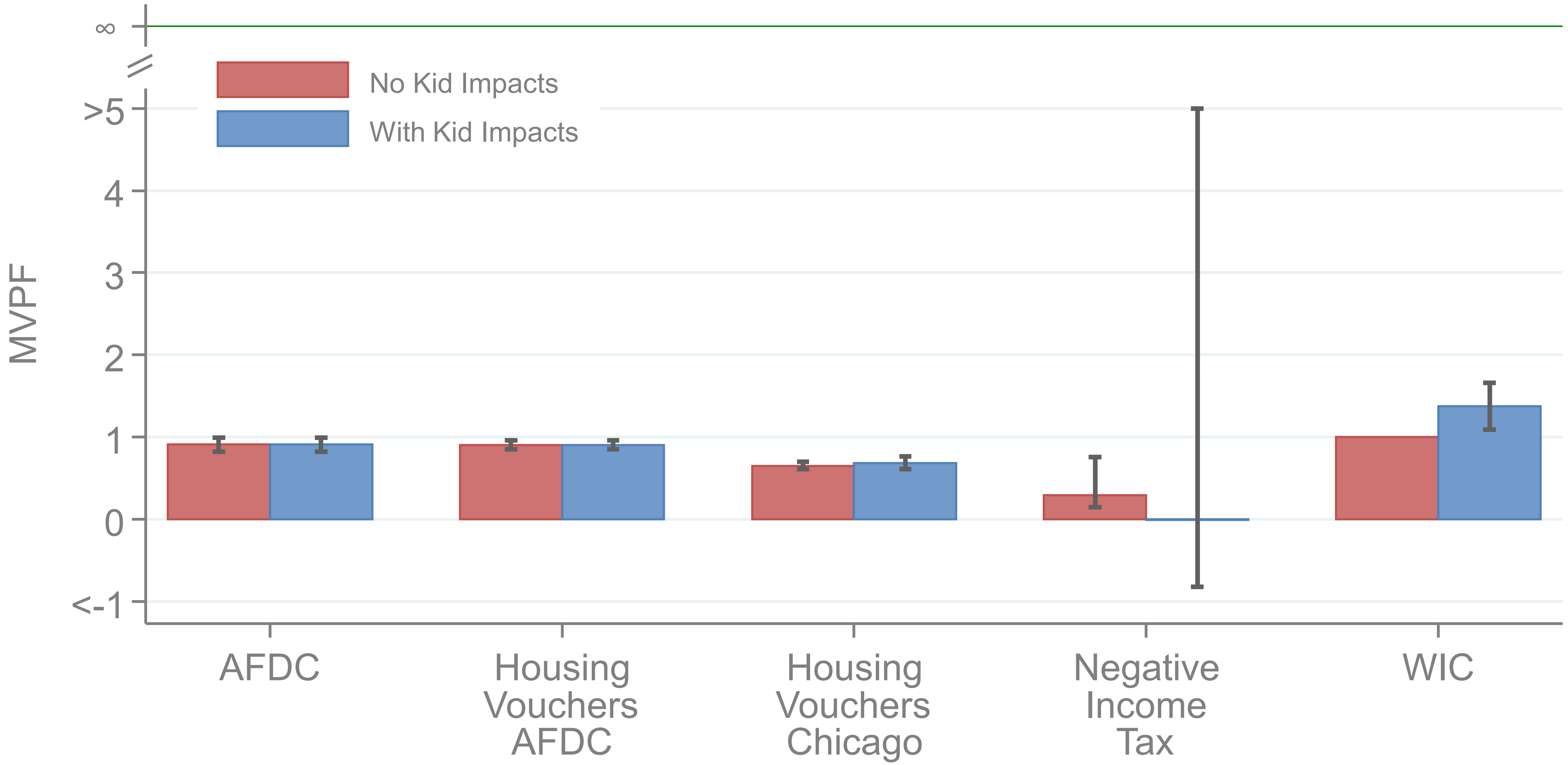
## Impact on Kids

- What is the impact of EITC on kids?

- Crucial for thinking about the MVPF of the EITC

# MVPF Estimates

## With and Without Spillovers on Children

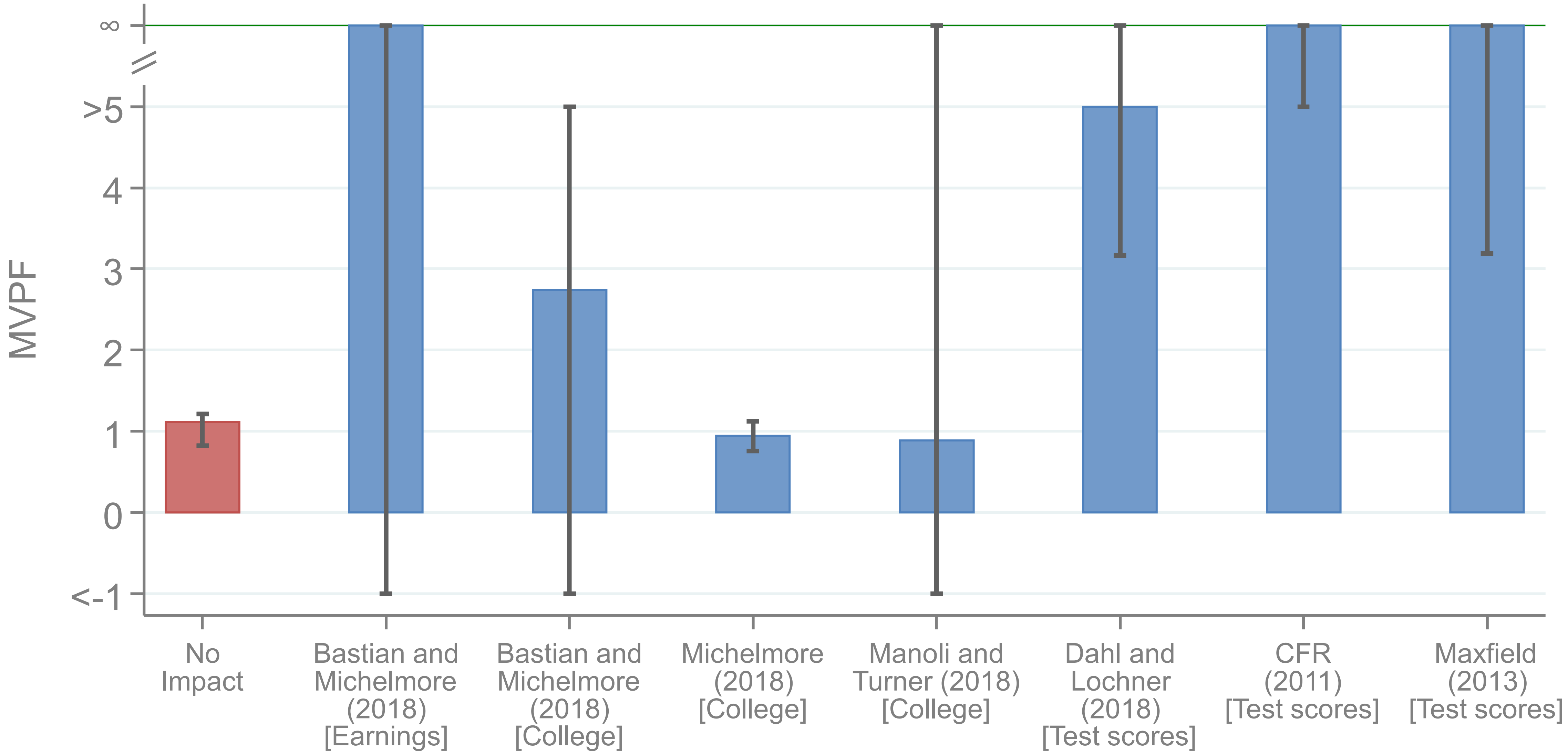



Theory Back

Back

# EITC OBRA 1993 MVPF Estimates

Incorporating Different Estimates of Spillovers on Children



# The impact of a poverty reduction intervention on infant brain activity

Sonya V. Troller-Renfree[a], Molly A. Costanzo[b], Greg J. Duncan[c,1], Katherine Magnuson[b,d], Lisa A. Gennetian[e], Hirokazu Yoshikawa[f], Sarah Halpern-Meekin[g], Nathan A. Fox[h], and Kimberly G. Noble[a,i,1]

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Contributed by Greg J. Duncan; received August 25, 2021; accepted December 29, 2021; reviewed by Martha Farah and Joan Luby

**Early childhood poverty is a risk factor for lower school achievement, reduced earnings, and poorer health, and has been associated with differences in brain structure and function. Whether poverty causes differences in neurodevelopment, or is merely associated with factors that cause such differences, remains unclear. Here, we report estimates of the causal impact of a poverty reduction intervention on brain activity in the first year of life. We draw data from a subsample of the Baby's First Years study, which recruited 1,000 diverse low-income mother–infant dyads. Shortly after giving birth, mothers were randomized to receive either a large or nominal monthly unconditional cash gift. Infant brain activity was assessed at approximately 1 y of age in the child's home, using resting electroencephalography (EEG; $n = 435$). We hypothesized that infants in the high-cash gift group would have greater EEG power in the mid- to high-frequency bands and reduced power in a low-frequency band compared with infants in the low-cash gift group. Indeed, infants in the high-cash gift group showed more power in high-frequency bands. Effect sizes were similar in magnitude to many scalable education interventions, although the significance of estimates varied with the analytic specification. In sum, using a rigorous randomized design, we provide evidence that giving monthly unconditional cash transfers to mothers experiencing poverty in the first year of their children's lives may change infant brain activity. Such changes reflect neuroplasticity and environmental adaptation and display a pattern that has been associated with the development of subsequent cognitive skills.**

the theta-band), and some represent higher-frequency (faster) brain activity in the mid to high portions of the frequency spectrum (e.g., the alpha-, beta-, and gamma-bands). All individuals have brain activity across the frequency spectrum throughout the brain. "Power" refers to the amount of brain activity in a certain band measured across the scalp, broadly reflecting the electrical activity of the underlying brain. Power varies across frequency bands and between people. "Absolute power" refers to the amount of brain activity measured at a certain frequency (or within a certain frequency band). "Relative power" expresses absolute power as a fraction of power summed across all frequency bands.

Childhood EEG-based brain activity demonstrates a specific developmental pattern. As children mature from the neonatal period through middle childhood, they tend to show a decrease in brain power in the low-frequency portion of the frequency spectrum, as well an increase in brain power in the mid- to high-frequency portions of the frequency spectrum (17–20). Individual differences in this pattern, particularly in absolute power, have been associated with children's cognitive and behavioral outcomes. For example, more absolute power in mid- to high- (i.e., alpha, beta, and gamma) frequency bands has been associated with higher language (21–24), cognitive (21, 25), and social-emotional (26) scores, whereas more absolute or relative low-frequency (i.e., theta) power has been associated with the development of behavioral, attention, or learning problems (27–29).

**Table 1. Characteristics of EEG sample**

| | Low-cash gift EEG sample | | High-cash gift EEG sample | | *P* value of group difference |
|---|---|---|---|---|---|
| | | *n* | | *n* | |
| Child is female | 49.8 | 251 | 44.0 | 184 | 0.23 |
| Child age at visit (mo) | 12.93 (1.66) | 251 | 12.60 (1.13) | 184 | 0.02 |
| Mother education (y) | 11.9 (3.1) | 248 | 12.1 (3.1) | 183 | 0.60 |
| Mother race/ethnicity | | | | | |
| White, non-Hispanic | 11.6 | 251 | 6.0 | 184 | 0.05 |
| Black, non-Hispanic | 38.6 | 251 | 47.3 | 184 | 0.07 |
| Multiple, non-Hispanic | 5.6 | 251 | 2.7 | 184 | 0.15 |
| Other or unknown | 4.4 | 251 | 2.7 | 184 | 0.36 |
| Hispanic | 39.8 | 251 | 41.3 | 184 | 0.76 |
| Household combined income at baseline (dollars) | $22,739 (20,875) | 238 | $20,213 (14,402) | 168 | 0.18 |
| Number of artifact-free EEG epochs | 288.2 (183.7) | 251 | 284.3 (189.2) | 184 | 0.83 |

Data are presented as mean (SD) or %. Child age and number of epochs were measured at the time of the age 1 visit. All other characteristics were measured at baseline prior to random assignment. Household income measures are as reported by mother at time of baseline. This includes two outlier values in the low-cash gift group (>3 SD above the mean), which results in the large SD for the low-cash gift group for the household income measure. Reported *P* values of mean differences are unadjusted. For site-adjusted *P* values and a joint test of orthogonality for baseline measures, see *SI Appendix*, Table SI1.1.

By design, all infants were healthy at birth (*SI Appendix*, SI1), and mothers reported average household incomes of just over \$20,000 in the calendar year prior to the birth. On average, the cash gifts amounted to an approximate 20% boost in annual income for the mothers in the high-cash gift group.

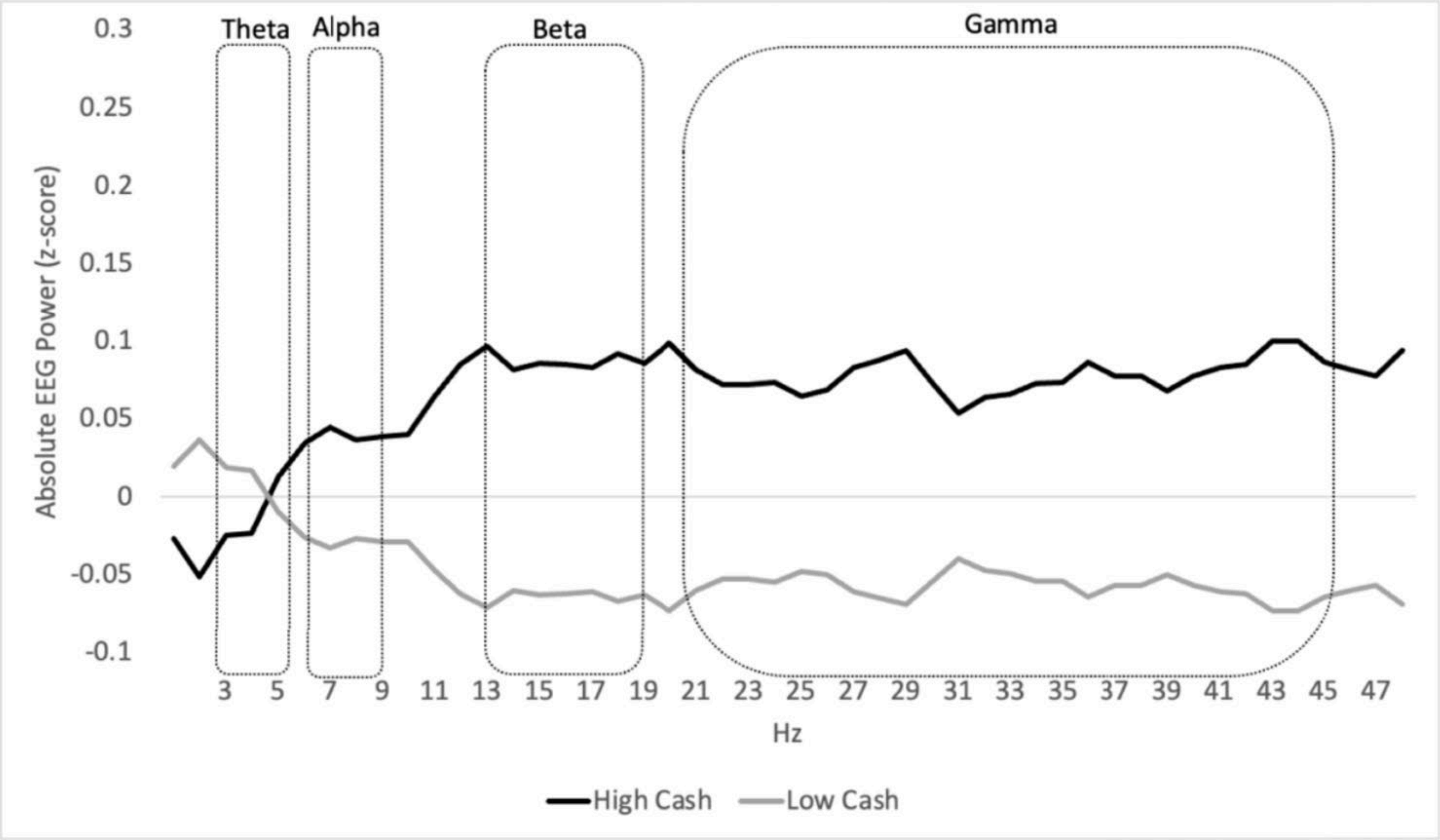
Childhood EEG-based brain activity demonstrates a specific developmental pattern. As children mature from the neonatal period through middle childhood, they tend to show a decrease in brain power in the low-frequency portion of the frequency spectrum, as well an increase in brain power in the mid- to high-frequency portions of the frequency spectrum (17–20). Individual differences in this pattern, particularly in absolute power, have been associated with children's cognitive and behavioral outcomes. For example, more absolute power in mid- to high- (i.e., alpha, beta, and gamma) frequency bands has been associated with higher language (21–24), cognitive (21, 25), and social-emotional (26) scores, whereas more absolute or relative low-frequency (i.e., theta) power has been associated with the development of behavioral, attention, or learning problems (27–29).

**Table 2. Cash-gift treatment effects on EEG power**

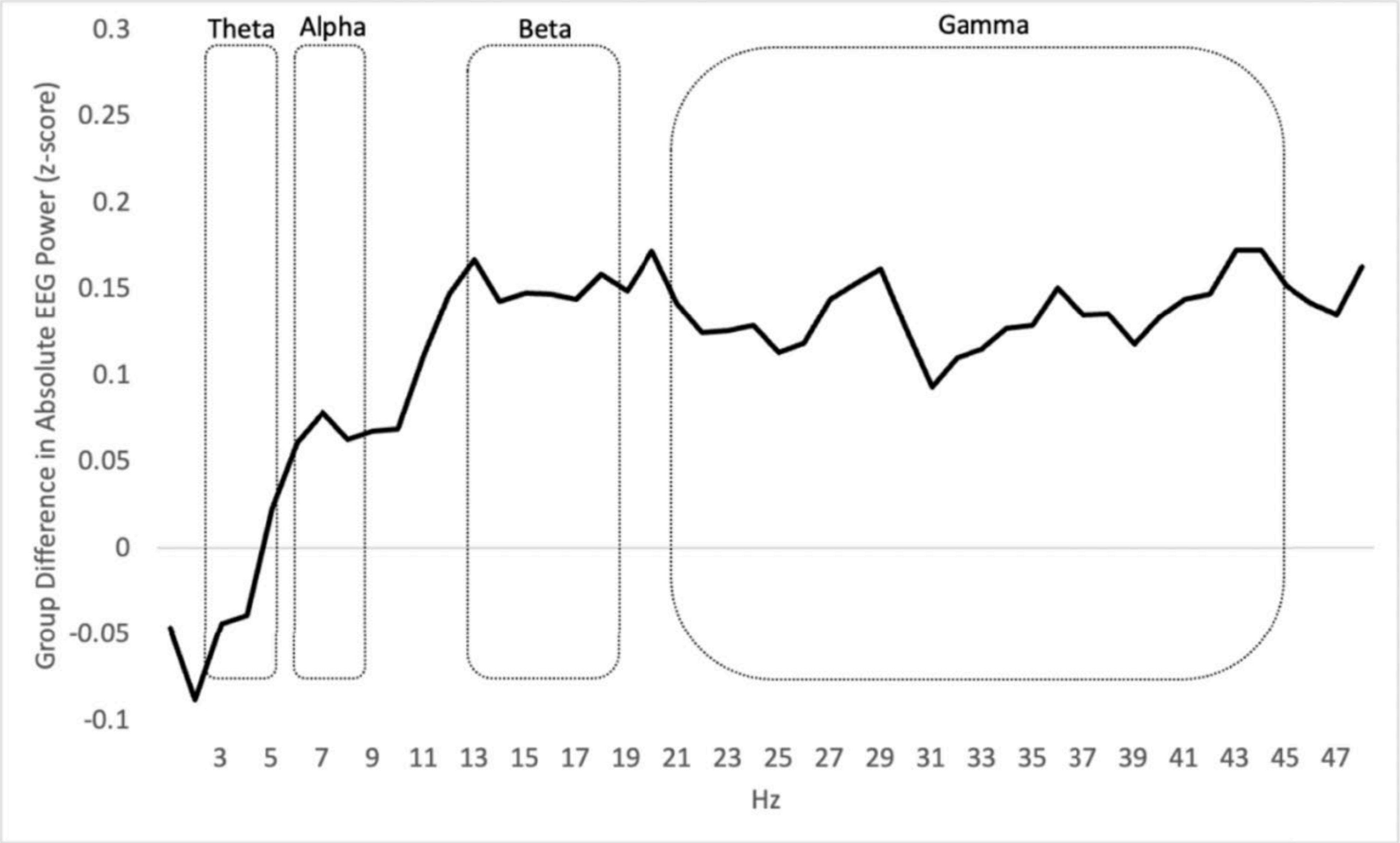
| | Low-cash gift group mean (SD) | High-cash gift group mean (SD) | OLS with site fixed effects (SE) | OLS with site fixed effects and covariates (SE) | Effect size (including covariates) | *P* value (no adjustments) | Westfall–Young adjusted *P* value | *n* |
|---|---|---|---|---|---|---|---|---|
| Absolute alpha | 7.441 (4.213) | 7.667 (3.896) | 0.294 (0.381) | 0.720 (0.396) | 0.17 | 0.07 | 0.12 | 435 |
| Absolute beta | 1.874 (1.592) | 2.167 (2.281) | 0.307 (0.187) | 0.414 (0.176) | 0.26 | 0.02 | 0.07 | 435 |
| Absolute gamma | 0.986 (0.947) | 1.137 (1.202) | 0.155 (0.103) | 0.221 (0.109) | 0.23 | 0.04 | 0.12 | 435 |
| Absolute theta | 40.268 (23.317) | 38.887 (16.578) | −0.961 (1.860) | 0.396 (1.869) | 0.02 | 0.83 | 0.84 | 435 |
| Relative alpha | 0.148 (0.040) | 0.152 (0.045) | 0.004 (0.004) | 0.006 (0.005) | 0.16 | 0.17 | 0.31 | 435 |
| Relative beta | 0.038 (0.027) | 0.042 (0.036) | 0.004 (0.003) | 0.005 (0.003) | 0.19 | 0.09 | 0.19 | 435 |
| Relative gamma | 0.020 (0.018) | 0.022 (0.021) | 0.002 (0.002) | 0.003 (0.002) | 0.16 | 0.18 | 0.31 | 435 |
| Relative theta | 0.794 (0.070) | 0.784 (0.083) | −0.010 (0.007) | −0.014 (0.008) | −0.21 | 0.07 | 0.17 | 435 |

OLS, ordinary least squares. Effect size (column 5) was computed by dividing the covariate-adjusted treatment effect (column 4) by the SD of the EEG sample low-cash group. Unadjusted *P* values (column 6) and preregistered Westfall–Young adjusted *P* values (column 7), which adjust for multiple hypothesis testing, are both reported. For the Westfall–Young adjustment, the four frequency bands (theta, alpha, beta, gamma) for absolute power are placed into one family and the four frequency bands (theta, alpha, beta, gamma) for relative power were placed into a second family. These *P* values are associated with the treatment coefficient and effect size in a regression with site-level fixed effects and covariates. Covariate-adjusted models include the following maternal self-report covariates from the BFY baseline survey conducted at the time of enrollment: mother's age, completed maternal schooling, household income, net worth, general maternal health, maternal mental health, maternal race and ethnicity, marital status, number of adults in the household, number of other children born to the mother, maternal smoking during pregnancy, maternal alcohol consumption during pregnancy, father living with the mother, child's sex, child's birth weight, child's gestational age at birth. Models also control for child's age at interview (in months), and the total number of usable epochs. Missing data for covariates impute the mean value from the EEG analytic sample. Relative power calculated at the child-level. Robust SEs are given in parentheses for OLS models (columns 5 and 6). SDs provide in parentheses in columns 1 and 2.

A


Theta
Alpha
Beta
Gamma
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
Absolute EEG Power (z-score)
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
47
Hz
High Cash
Low Cash

B


Theta
Alpha
Beta
Gamma
Group Difference in Absolute EEG Power (z-score)
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Hz

# Tax Compliance

- This deserves a much longer lecture

- Here, focus on the most puzzling angle: people not taking up EITC benefits.

# Bhargava and Manoli (2015, AER)

- Study imperfect take up of EITC benefits
  - Roughly 25% of benefits are unclaimed
  - Average of $1K per person (roughly 1 month of earnings...)
- Two models of low take up:
  1. Confusion and lack of understanding
  2. Stigma
- In model 1, increasing take up improves welfare,
  - "$u_a < v_a$" as choosing to take up benefits increases utility
- In model 2, increasing take up is pure social waste because of envelope theorem
  - $u_a = v_a$ as individuals were indifferent to taking up benefits because of the social stigma cost

# Bhargava and Manoli (2015, AER)

- To distinguish these theories, paper conducts randomized experiment with the IRS to increase knowledge of benefits
- Send mailers to all CA taxpayers who failed to claim 2009 EITC credit despite presumed eligibility given information on their return
  - Provided information about EITC and offered opportunity to re-file
- Informed people of roughly $26M in unclaimed benefits
  - Roughly $4M was paid as a result of the experiment
- Experimental conditions included:
  - Simple and Complex Notices
  - Variation in potential benefit advertising
  - Stigma: include wording saying that money is from the result of hard work

# Simple and Complex Notices

## Panel A1. Simple notice (control)

IRS Department of the Treasury
Internal Revenue Service
Submission Processing Center
Fresno, CA 93888-0405

| | |
|---|---|
| Notice | EIC0927 |
| Tax Year | 2009 |
| Notice Date | November 2010 |
| Social Security Number | 999-99-9999 |
| To Contact Us | 1-800-829-1040 |

**Page 1 of 4**

JAMES Q HINDS
22 BOULDER STREET
HANSON, CT 00000-7253

Important information about the Earned Income Credit

**You may be eligible for a refund**

Do not discard or overlook this notice because you may be entitled to some additional money.

**Summary**

Our records show that you may be eligible for a refund called the Earned Income Credit (EIC), which you did not claim on your 2009 tax form. The credit is for certain people who have worked and have earned income. You should complete the worksheet on Page 3 to determine if you are eligible for the credit.

**What you need to do**

Complete the Earned Income Credit Worksheet on Page 3.

**If the worksheet confirms that you are eligible for the credit**
Sign and date the attached worksheet, and mail it to us in the enclosed envelope.

**If the worksheet indicates that you are not eligible for the credit**
Please do not return the worksheet to us.

**Next steps**

If you are eligible for the credit, we will send you a refund check in 6 to 8 weeks. If you owe back taxes or other debts, such as child support which we are required to collect, we will use your credit to reduce or pay off those debts.

Next year, to receive your refund more quickly, write "EIC" on the EIC line of your form 1040. If you qualify for the credit, the IRS will calculate it for you and send you a check.

**Additional information**

If you need additional assistance, please call 1-800-829-1040, or visit online at www.irs.gov/eitc. For tax forms, call 1-800-TAX-FORM (1-800-829-3676).

You can also find tax forms and other helpful documents which explain the EIC program in greater detail (e.g., Publication 596) at www.irs.gov.

## Panel A2. Complex notice (page 1of 2)

IRS Department of the Treasury
Internal Revenue Service
Submission Processing Center
Fresno, CA 93888-0405

| | |
|---|---|
| Notice | EIC0927 |
| Tax Year | 2009 |
| Notice Date | November 2010 |
| Social Security Number | 999-99-9999 |
| To contact us | 1-800-829-1040 |

**Page 1 of 4**

JAMES Q HINDS
22 BOULDER STREET
HANSON, CT 00000-7253

**You May Be Eligible for a Refund**
**If You Qualify for the Earned Income Credit**

**Why We Are Sending You this Notice**

You may qualify for the earned income credit (EIC). The EIC is for certain people who work and have earned income. This tax credit usually means more money in your pocket. It reduces the amount of tax you owe, and may give you a refund. Our records show:

- Your income falls in the eligible range to receive the EIC,
- You have a dependent who may be an EIC qualifying child, and
- You did not claim the EIC on your 2009 Individual Income Tax Return.

**What You Need to Do**

Income is not the only condition that determines if you qualify for EIC. We need you to complete the enclosed *EIC Eligibility Check-Sheet* to see if you may qualify for the EIC. Take the following steps to complete the check-sheet:

- Check that you are eligible for the EIC in Step 1.
  - If your Social Security Number is not valid or if you are a qualifying dependent of another person, you do not qualify.
  - If your Social Security Number is valid and you are not a qualifying dependent of another person, you may qualify. Continue to Step 2 only if you did not place a check next to any of the eligibility criteria in Step 1.
- In Steps 2 and 3, fill in the name and Social Security number for each child who *may* qualify you for the EIC and check that each child meets the stated requirements.
  - Any NO answer for a child means that child is not your qualifying child for the EIC. Do not respond to this notice unless you have a qualifying child.
  - All YES answers mean a child is your qualifying child for the EIC. Sign and date the declaration on the last page of this notice. Mail the completed *EIC Eligibility Worksheet* to us in the enclosed envelope.

*Note: Return the EIC Worksheet to us **only** if you determine you may qualify for the EIC.*

# High and Low Benefit Treatments

## Panel C1. Benefit display (high)

IRS Department of the Treasury
Internal Revenue Service
Submission Processing Center
Fresno, CA 93888-0405

| | |
|---|---|
| **Notice** | EIC0927 |
| **Tax Year** | 2009 |
| **Notice Date** | November 2010 |
| **Social Security Number** | 999-99-9999 |
| **To Contact Us** | 1-800-829-1040 |
| **Page 1 of 4** | |

JAMES Q HINDS
22 BOULDER STREET
HANSON, CT 00000-7253

Important information about the Earned Income Credit

**You may be eligible for a refund of up to $5,657**

Do not discard or overlook this notice because you may be entitled to some additional money.

Depending on your earnings and eligibility, your benefit can be up to $5,657.

**Summary**

Our records show that you may be eligible for a refund called the Earned Income Credit (EIC), which you did not claim on your 2009 tax form. The credit, which can be up to $5,657, is for certain people who have worked and have earned income. You should complete the worksheet on Page 3 to determine if you are eligible for the credit.

**What you need to do**

Complete the Earned Income Credit Worksheet on Page 3.

**If the worksheet confirms that you are eligible for the credit**
Sign and date the attached worksheet, and mail it to us in the enclosed envelope.

**If the worksheet indicates that you are not eligible for the credit**
Please do not return the worksheet to us.

**Next steps**

If you are eligible for the credit, we will send you a refund check in 6 to 8 weeks. If you owe back taxes or other debts, such as child support which we are required to collect, we will use your credit to reduce or pay off those debts.

Next year, to receive your refund more quickly, write "EIC" on the EIC line of your form 1040. If you qualify for the credit, the IRS will calculate it for you and send you a check.

**Additional information**

If you need additional assistance, please call 1-800-829-1040, or visit online at www.irs.gov/eitc. For tax forms, call 1-800-TAX-FORM (1-800-829-3676).

You can also find tax forms and other helpful documents which explain the EIC program in greater detail (e.g., Publication 596) at www.irs.gov.

## Panel C2. Benefit display (low)

IRS Department of the Treasury
Internal Revenue Service
Submission Processing Center
Fresno, CA 93888-0405

| | |
|---|---|
| **Notice** | EIC0927 |
| **Tax Year** | 2009 |
| **Notice Date** | November 2010 |
| **Social Security Number** | 999-99-9999 |
| **To Contact Us** | 1-800-829-1040 |
| **Page 1 of 4** | |

JAMES Q HINDS
22 BOULDER STREET
HANSON, CT 00000-7253

Important information about the Earned Income Credit

**You may be eligible for a refund of up to $457**

Do not discard or overlook this notice because you may be entitled to some additional money.

Depending on your earnings and eligibility, your benefit can be up to $457.

**Summary**

Our records show that you may be eligible for a refund called the Earned Income Credit (EIC), which you did not claim on your 2009 tax form. The credit, which can be up to $457, is for certain people who have worked and have earned income. You should complete the worksheet on Page 3 to determine if you are eligible for the credit.

**What you need to do**

Complete the Earned Income Credit Worksheet on Page 3.

**If the worksheet confirms that you are eligible for the credit**
Sign and date the attached worksheet, and mail it to us in the enclosed envelope.

**If the worksheet indicates that you are not eligible for the credit**
Please do not return the worksheet to us.

**Next steps**

If you are eligible for the credit, we will send you a refund check in 6 to 8 weeks. If you owe back taxes or other debts, such as child support which we are required to collect, we will use your credit to reduce or pay off those debts.

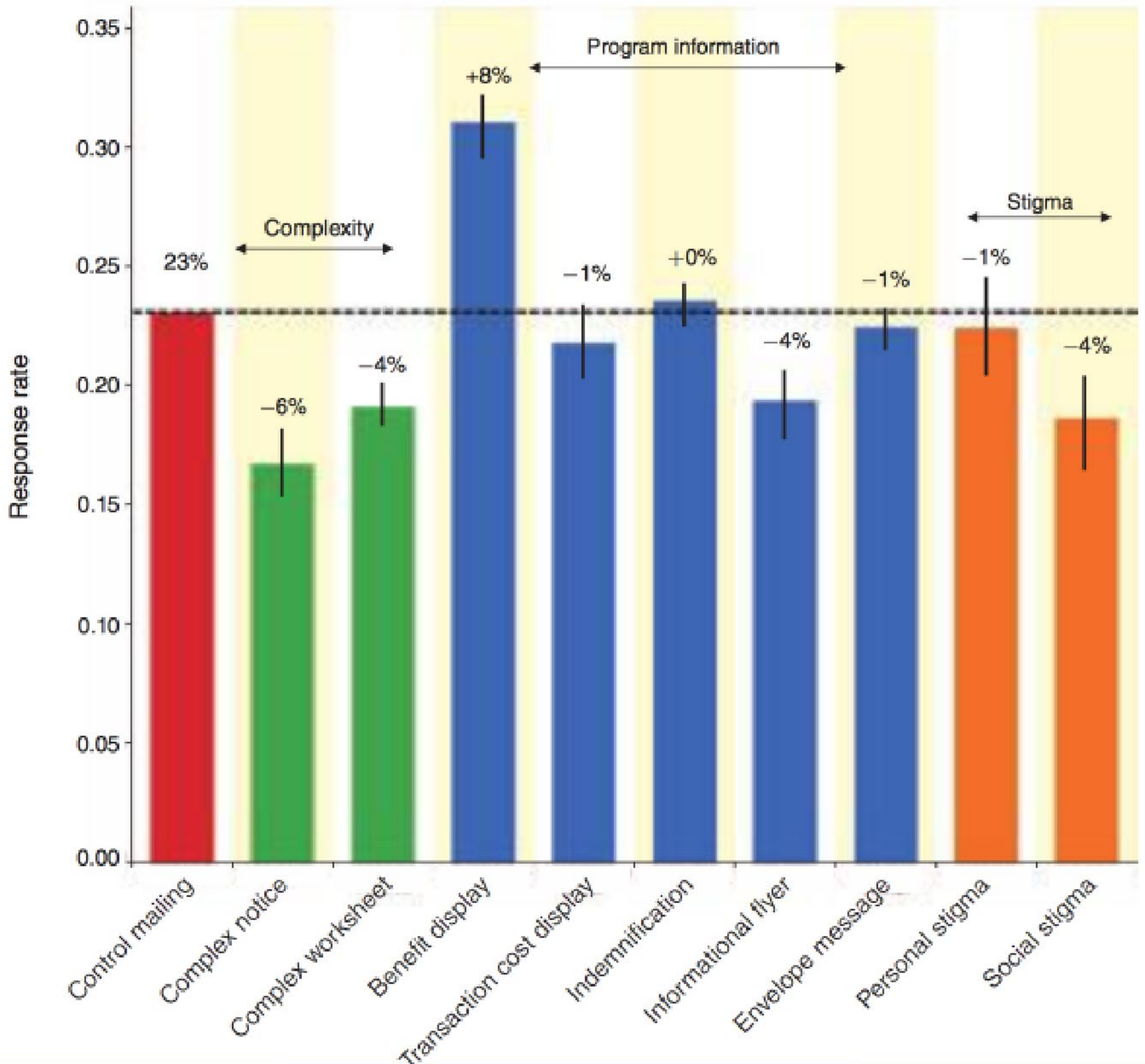
Next year, to receive your refund more quickly, write "EIC" on the EIC line of your form 1040. If you qualify for the credit, the IRS will calculate it for you and send you a check.

**Additional information**

If you need additional assistance, please call 1-800-829-1040, or visit online at www.irs.gov/eitc. For tax forms, call 1-800-TAX-FORM (1-800-829-3676).

You can also find tax forms and other helpful documents which explain the EIC program in greater detail (e.g., Publication 596) at www.irs.gov.

# RCT Results


Response rate
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Complexity
Program information
Stigma
23%
−6%
−4%
+8%
−1%
+0%
−4%
−1%
−1%
−4%
Control mailing
Complex notice
Complex worksheet
Benefit display
Transaction cost display
Indemnification
Informational flyer
Envelope message
Personal stigma
Social stigma

# RCT Results

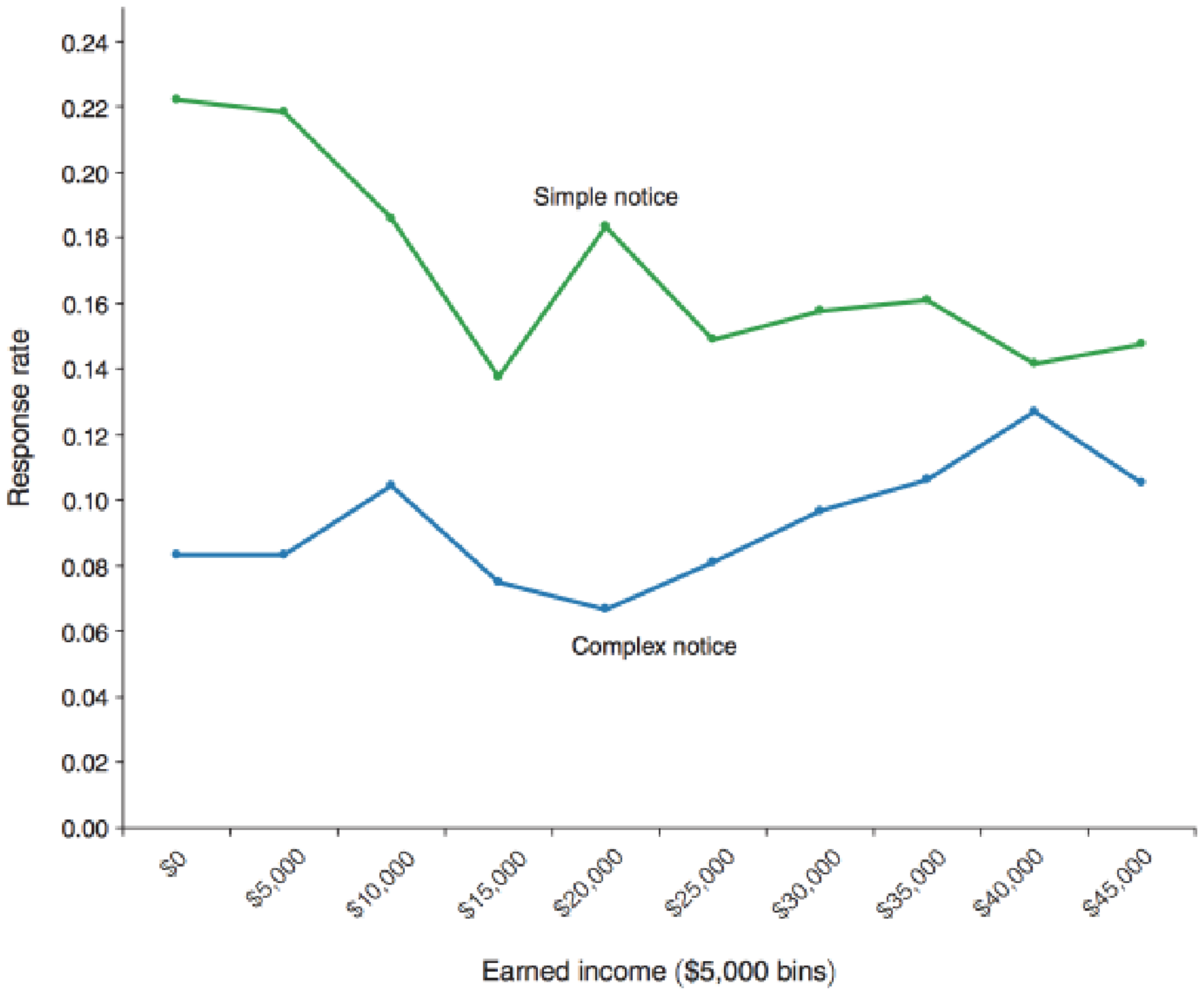
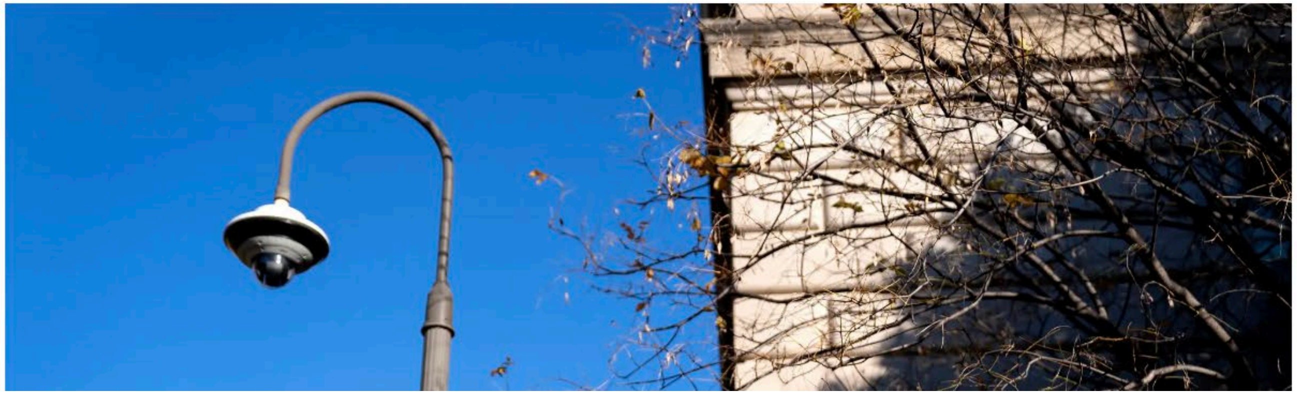



FIGURE 6. HETEROGENEITY IN RESPONSE TO SIMPLIFICATION BY EARNED INCOME
(For recipients with dependents)

# *Black Americans Are Much More Likely to Face Tax Audits, Study Finds*

A new report documents systemic discrimination in how the I.R.S. selects taxpayers to be audited, with implications for a debate on the agency's funding.

Give this article



Stanford | Institute for Economic Policy Research (SIEPR)

## MEASURING AND MITIGATING RACIAL DISPARITIES IN TAX AUDITS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# Measuring and Mitigating Racial Disparities in Tax Audits *

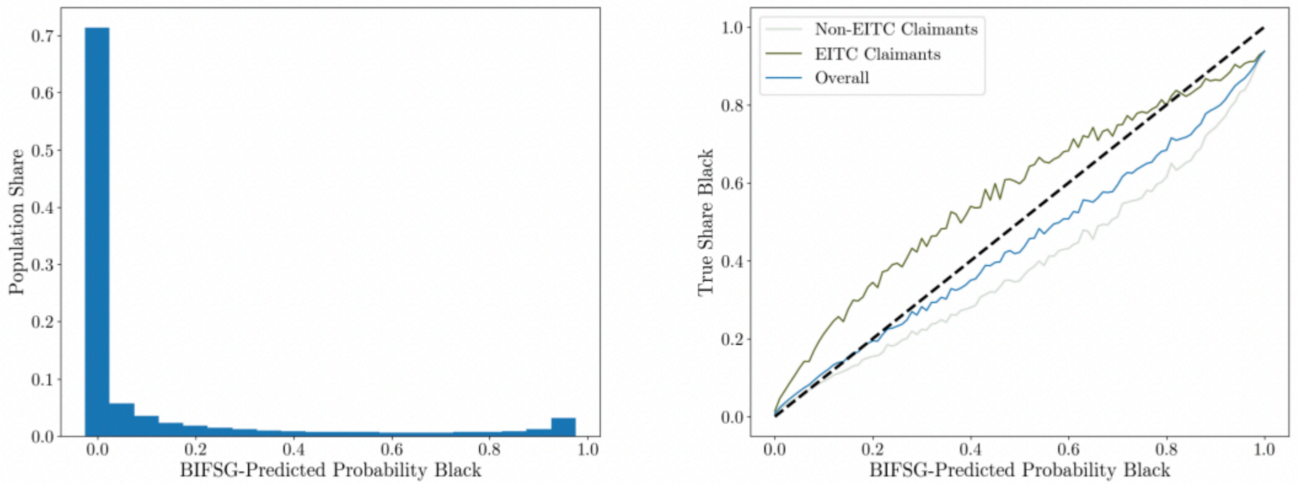
Hadi Elzayn[†] Evelyn Smith[‡] Thomas Hertz[§] Arun Ramesh[¶]
Robin Fisher[§] Daniel E. Ho[‖] Jacob Goldin[**]

January 30, 2023

**Abstract**

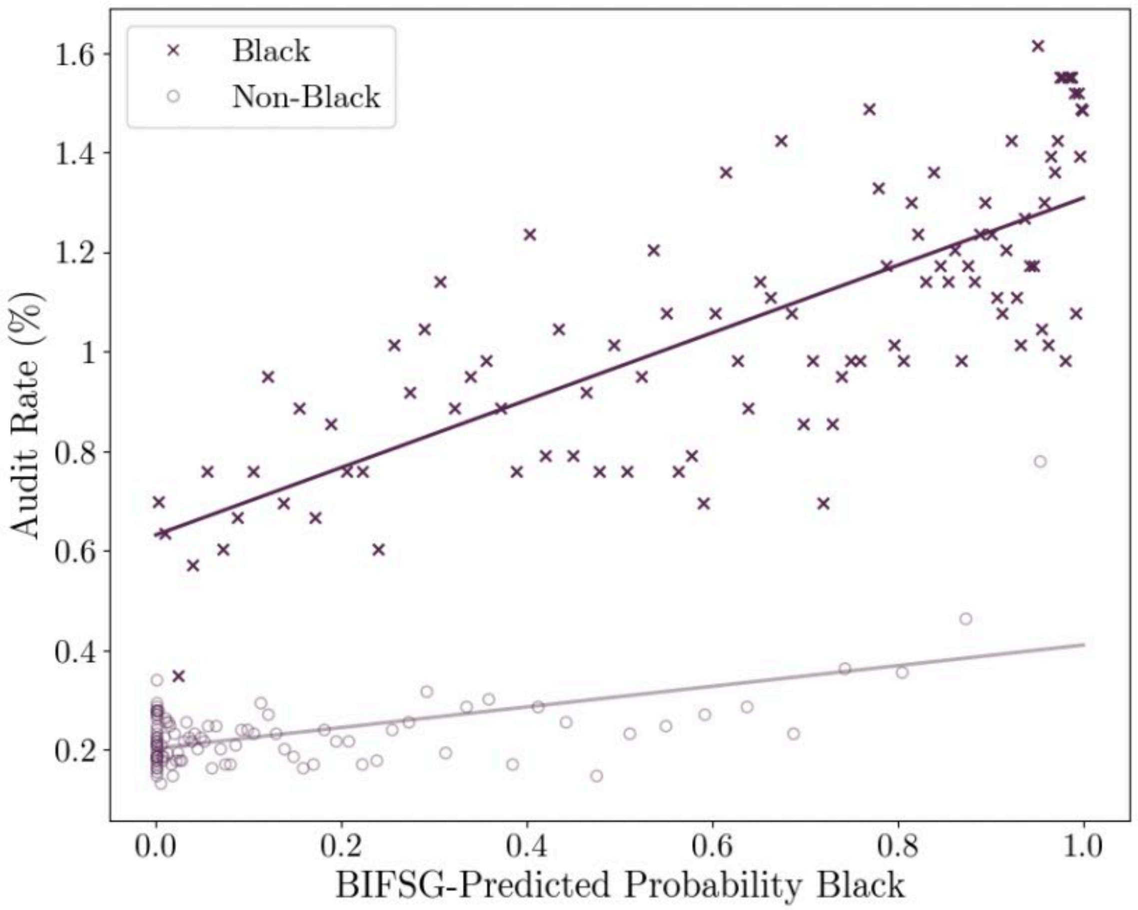
Government agencies around the world use data-driven algorithms to allocate enforcement resources. Even when such algorithms are formally neutral with respect to protected characteristics like race, there is widespread concern that they can disproportionately burden vulnerable groups. We study differences in Internal Revenue Service (IRS) audit rates between Black and non-Black taxpayers. Because neither we nor the IRS observe taxpayer race, we propose and employ a novel partial identification strategy to estimate these differences. Despite race-blind audit selection, we find that Black taxpayers are audited at 2.9 to 4.7 times the rate of non-Black taxpayers. The main source of the disparity is differing audit rates by race among taxpayers claiming the Earned Income Tax Credit (EITC). Using counterfactual audit selection models for EITC claimants, we find that maximizing the detection of underreported taxes would not lead to Black taxpayers being audited at higher rates. In contrast, in these models, certain policies tend to increase the audit rate of Black taxpayers: (1) designing audit selection algorithms to minimize the "no-change rate"; (2) targeting erroneously claimed refundable credits rather than total under-reporting; and (3) limiting the share of more complex EITC returns that can be selected for audit. Our results highlight how seemingly technocratic choices about algorithmic design can embed important policy values and trade-offs.

Figure 1: Distribution and Calibration of Race Imputations



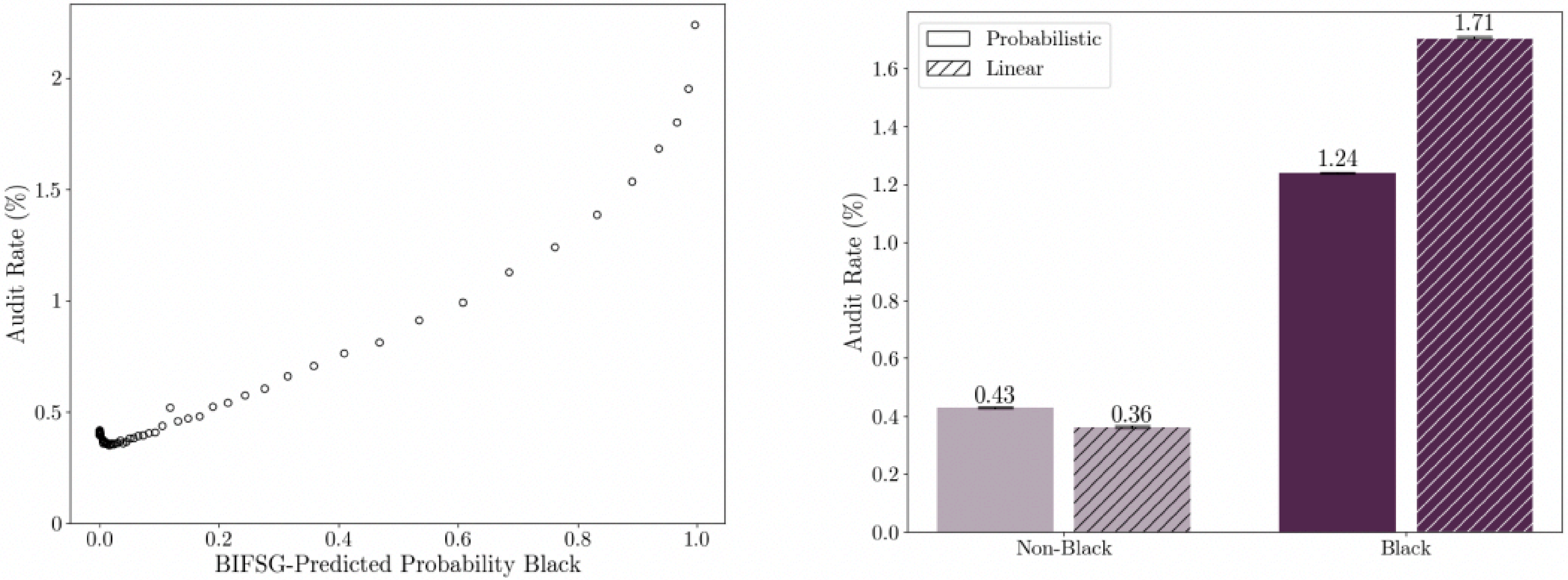

*Notes:* Left: Nationwide histogram of BIFSG-predicted probability that a taxpayer is Black (non-Hispanic). The mean prediction is 12.4%. Right: The figure shows the calibration of the BIFSG imputations for the taxpayers in the matched North Carolina data set. Taxpayers are split into groups based on their predicted probability of being Black (discretized into 100 bins 1 percentage point wide). The predicted probability of being Black is on the $x$-axis; the $y$-axis represents the true proportion of each group that is Black according to ground-truth race observed in the North Carolina matched sample, re-weighted to be representative of the overall United States (see Appendix C.2 for details). A perfectly calibrated predictor would fall exactly on the 45-degree line, shown as the black dotted line. The figure shows overall calibration in blue as well as calibration among EITC claimants (dark green) and non-EITC claimants (light green).

Figure 2: Audit Rate by Predicted Race Conditional on Self-Reported Race



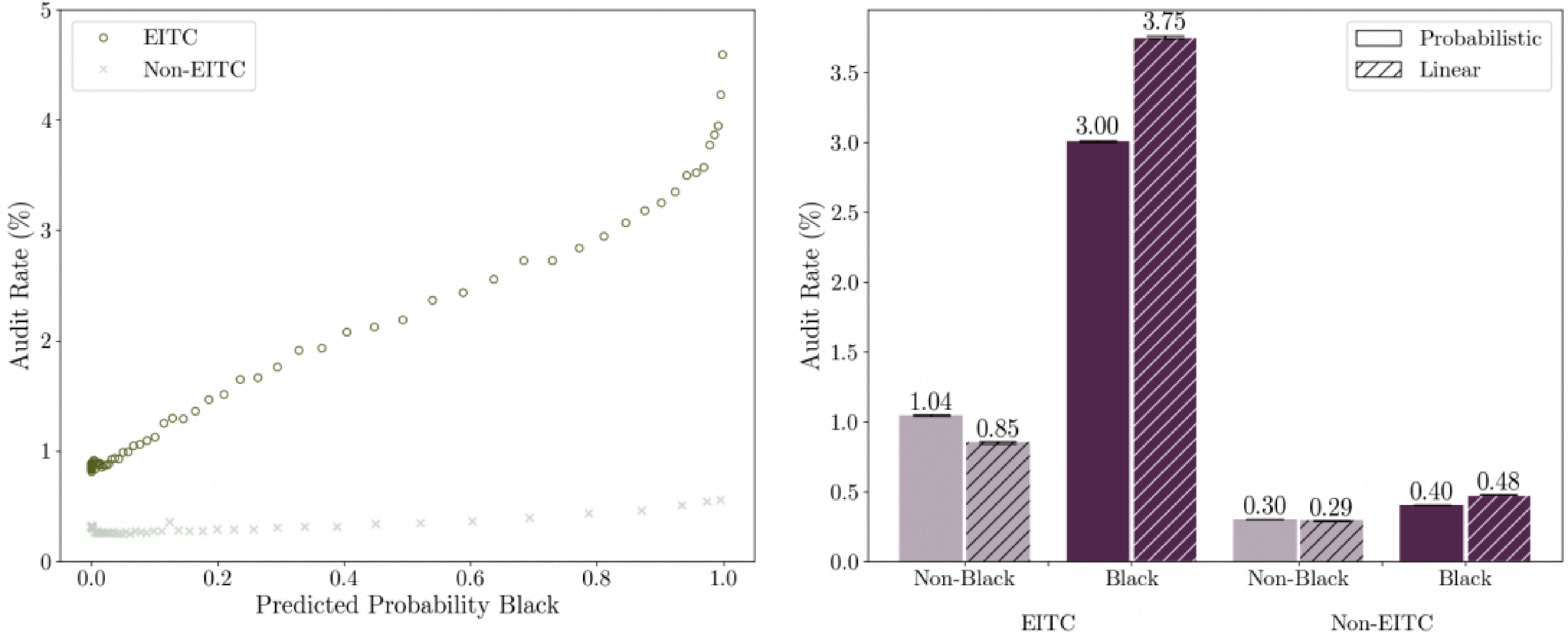

*Notes:* The figures show the relationship between audit incidence and BIFSG-predicted probability that a taxpayer is Black for taxpayers filing returns for tax year 2014. Audit incidence is plotted separately for Black and non-Black taxpayers in the North Carolina matched sample. Black and non-Black taxpayers are each grouped into 100 equal-sized bins, with Black taxpayers indicated by dark purple x's and non-Black taxpayers indicated by light purple circles.

Figure 3: Estimated Audit Rates by Race



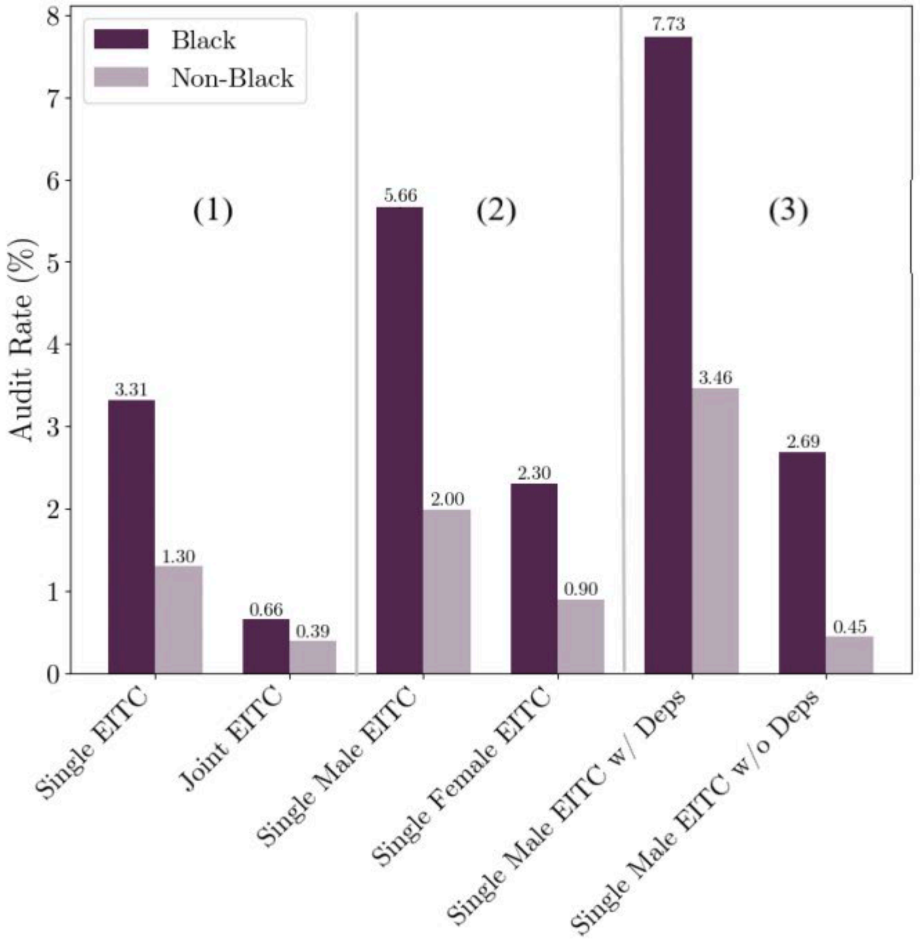

*Notes:* The figure shows the relationship between audits and race among taxpayers filing returns for tax year 2014. Left: Binned scatterplot of audit rate by BIFSG-predicted probability that a taxpayer is Black. Taxpayers have been grouped into 100 equal-sized bins. Right: Estimated audit rates among Black and non-Black taxpayers, calculated using the probabilistic audit rate estimator and the linear disparity estimator with BIFSG-predicted probabilities. Error bars show the 95% confidence interval, derived from the asymptotic distributions described in Appendix B.3.

Figure 5: Estimated Audit Rates by Race and EITC Claim Status



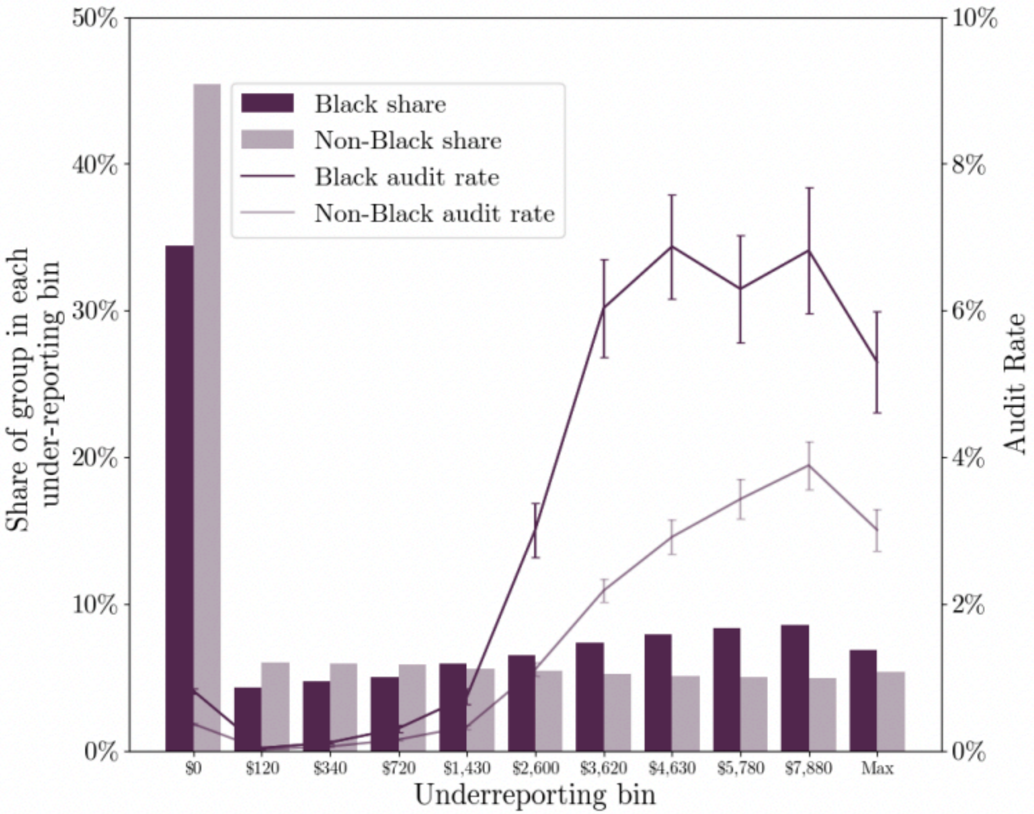

*Notes:* The figure shows the relationship between audits and race among taxpayers filing returns for tax year 2014, broken out by whether a taxpayer claims the EITC in that year. Left: Binned scatterplot of audit rate by BIFSG-predicted probability Black by EITC claim status, with EITC claimants and non-claimants each grouped into 100 equal-sized bins based on their estimated probability of being Black. EITC claimants are represented by dark green dots and non-claimants by light gray x's. Right: Estimated audit rate by race and EITC claim status, calculated using the probabilistic audit rate estimator and the linear audit rate estimator with BIFSG-predicted probabilities. Error bars show the 95% confidence interval, derived from the asymptotic distributions described in Appendix B.3.

Figure 6: Audit Rate Disparities by EITC Subgroup



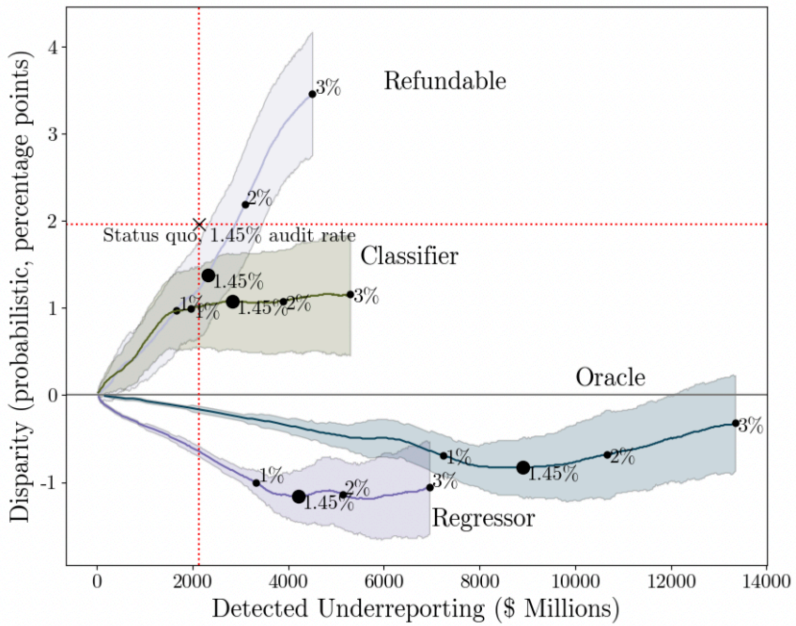

*Notes:* The figure shows the estimated audit rate among the specified subgroups of Black and non-Black taxpayers. Conditional audit rates by race are calculated using the probabilistic audit rate estimator applied to BIFSG-predicted probabilities that a taxpayer is Black. Panel (1) splits EITC claimants by single vs joint filers; (2) splits single EITC claimants by taxpayer gender; and (3) splits single men claiming the EITC by whether they claim dependents. A similar analysis, corresponding to the linear disparity estimator, is presented in Appendix Figure A.6

Figure 7: Racial Audit Disparity Among EITC Claimants by Underreported Taxes




*Notes:* The figure shows the estimated audit rates for Black and non-Black EITC claimants, respectively, by under-reported taxes. Taxpayers are binned into 11 categories: those with less than $1 of under-reporting, and 10 equal deciles of taxpayers with positive under-reporting. Under-reporting deciles are defined based on the NRP. Bin labels on the x-axis reflect the upper dollar limit of each underreporting bin (rounded for confidentiality). Estimated audit rates by race are calculated using the probabilistic disparity estimator and the method described in Section 6 of the main text. All analyses account for NRP sampling weights. Brackets reflect the estimated 95% confidence interval, derived from bootstrapped standard errors (N=100). The bars show the estimated share of Black and non-Black taxpayers, respectively, that fall into each under-reporting bin. A similar analysis, corresponding to the linear disparity estimator, is presented in Appendix Figure A.7.

Figure 8: Detected Underreporting and Disparity by Algorithm




*Notes:* The figure shows the estimated difference in audit rates between Black and non-Black taxpayers ($y$-axis) and annualized detected underreporting ($x$-axis) under alternative models for selecting EITC audits and under alternative audit rates. Models are trained and evaluated on the set of NRP EITC claimants from 2010-14; see Appendix F for details. The displayed trajectories correspond to the oracle (blue), random forest regressor (purple), random forest classifier (green), and refundable credit models (light purple). The labeled points along each trajectory represent estimated detected underreporting and disparity for the specified model at the audit rate specified in the label. The audit rates considered range from 0.1% to 3%. The audit rate corresponding to the status quo (1.45%) is denoted by a larger dot. The regression model is trained to predict underreporting. The classification model is trained to predict whether or not underreporting exceeds $100. The oracle selects returns in descending order of true underreporting. The refundable credit model is trained to predict total adjustments to EITC, CTC, and AOTC amounts. Disparity is calculated using the probabilistic disparity estimator; Appendix Figure A.8 replicates this analysis using the linear disparity estimator. Annualized detected underreporting is calculated as the total detected underreporting (positive or negative) imposed on returns selected for audit under the specified audit selection model, scaled to reflect our use of five years of NRP data. The point labeled "Status quo" shows estimated disparity and total underreporting from the 1.45% of EITC returns selected for audit from the population of tax year 2014 returns. All analyses incorporate NRP sampling weights. Bars around each trajectory represent 95% confidence intervals around disparity estimates; they are calculated using the standard deviation of estimated disparity across 100 bootstrapped samples from the full set of NRP EITC claimants; see Appendix F for details.