Labor Economics, Section 1

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Outline

- Logistics
- Economics Basics
- Causal Inference
- Labor Supply
- Empirical Papers

Logistics

- OH after section and by appointment
- Method of Contact: fengj@g.harvard.edu // Slack
- 2 take home Exams, Writing Assignment, 2 Empirical Data Project
- Submit everything online on canvas.

OLS and OVB

- In economics, we are about **causal** relationships.
- An Ordinary Least Squares (OLS) regression tells the relationship between independent variable and dependent variables.
- Consider a simple example of the effects of schooling on wages.

$$Y_i = \alpha + \beta S_i + \epsilon_i$$

  where Y_i is the income and S_i is schooling
- If ϵ_i is independent of S_i then we are done. But if not we have an issue. This is the Omitted Variable Bias (OVB).
- Examples? Ability!

Instruments

- Let Z_i be a variable (e.g. policy, subsidy etc.) that affects education.
- We need 3 criteria on Z_i:
- First Stage: That Z_i actually affects S_i, and hopefully strongly
- Exclusion restriction: Z_i should have no direct impacts on Y_i when holding S_i fixed.
- Independence Z_i is independent of ϵ_i.

Some Maths

- What we want: $Y_i = \alpha_1 + \beta_1 S_i + \ \beta_2 A_i + \epsilon_i$.
- What we have: $Y_i = \alpha_1 + \hat{\beta}_1 S_i + \epsilon_i$
- Set $S_i = \alpha_2 + \gamma_1 Z_i + u_i$.
- Then we can substitute for S_i, and due to independence between A_i and Z_i

$$Y_i = \alpha_3 + \gamma_1 \beta_1 Z_i + \tilde{\epsilon}_i$$

allowing us to back out the true effect β_1.

Quasi-Experiments

- Find Z_i in nature - typically through the channel of a policy.
  - Large Scale Merit Scholarships in the South (RD Implementation)
  - Vietnam Draft Lottery (Randomness)
- **Careful:** Local vs Average Treatment Effects!
- Can also randomly assign people to treatment - i.e. give out scholarship randomly to people. (RCT)

Diff in Diff

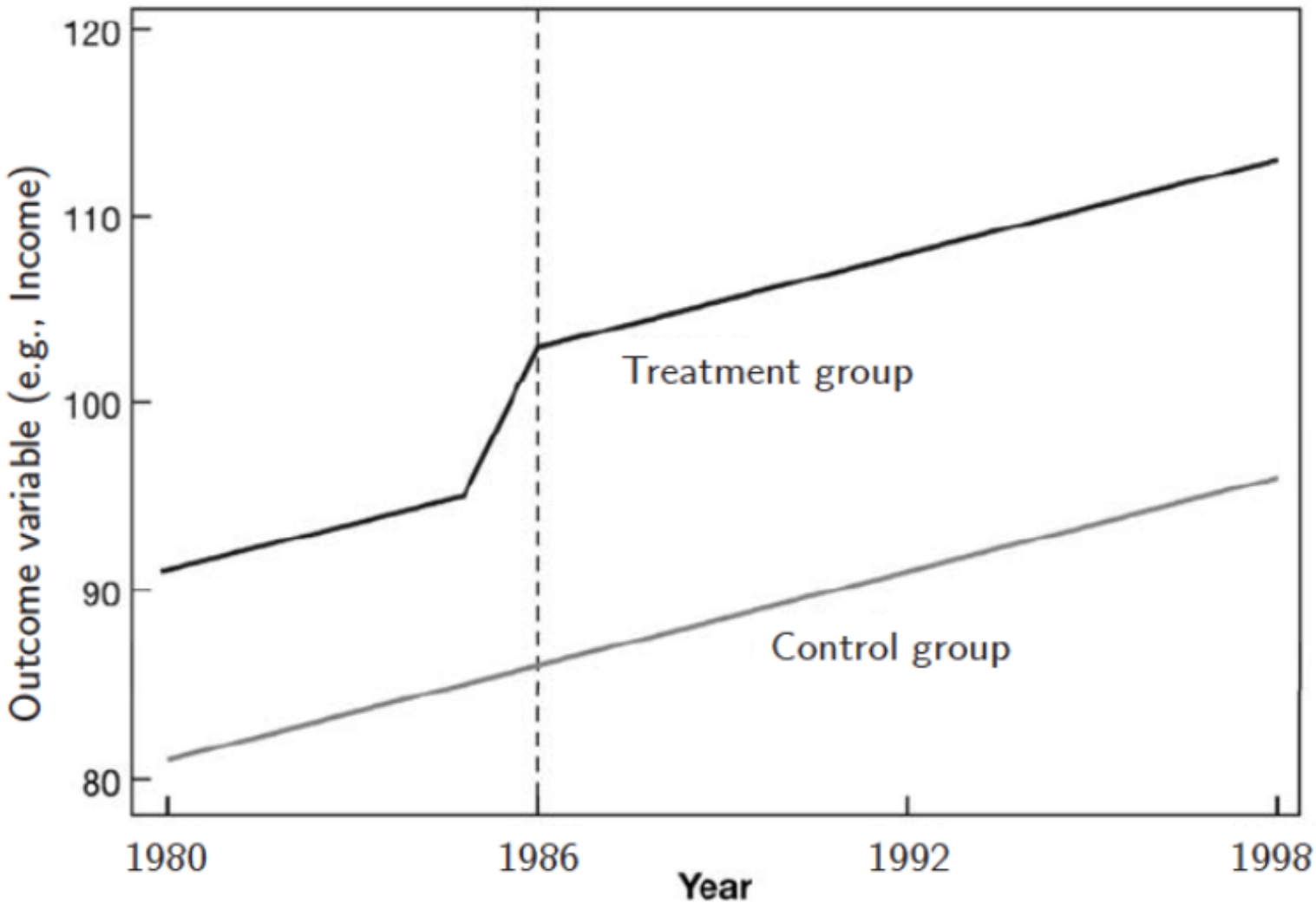
- Difference in Difference's idea is to get rid of the common covariates between pre and post changes. The effect of the treatment, β, can be computed then as

$$\beta = \text{Difference in Treatment} - \text{Difference in Controls}$$

- Main assumption is that other than the innate characteristics, the control and treatment 'grow' the same way. Essentially, **parallel trends**.
- What if parallel trends is violated? Regression Discontinuity.

FIGURE 5.4

Parallel Trends and Differences in Differences



Labor Supply I

- Key Equation: $w(1-\tau)\frac{\partial u}{\partial c} = -\frac{\partial u}{\partial l}$. Think as a consumption-leisure trade off:
- When wages go up, there are two effects.
  - **Substitution effect:** Consumption is effectively cheaper, so I want to consume more;
  - **Income effect:** I would like to have more leisure since I am already wealthy.
- Wages increase: substitution effect is always pushes for more consumption, while income effect pushes for less consumption.
- Leads to "backwards bending labor supply curves"

Labor Supply II

- **Exercise:** What happens when endowed income goes up?
- Labor supply is typically characterized by **elasticities**. (Total Income to 1 - Marginal Tax Rate).

$$\varepsilon_{TI,(1-MTR)} = \frac{dTI/TI}{d(1-MTR)/(1-MTR)}$$

  What does d mean? Why only M (Marginal) matter?

- Intuition: If I raise $1 - MTR$ by 1 percent, how much more percentage do I earn?
- Estimated ε to be in the range of 0 to 0.25 in the literature.

Angrist and Evans 1998

Study: Causal Effect of Children on women's labor supply

Difficulty: Many other things are changing at the same time, and childbirth is attributed to a myriad of other factors

Idea: Use "as good as random" variations of sexes of the first two kids (parents with the first two kids of the same sex are more likely to have a third), and whether the second AND third kid is a twin (guaranteed that the family has a third kid).

Weakness: Timing, Planning, Hand me downs etc.

Variable	Mean difference by *Twins-2*	Wald estimate using as covariate: *More than 2 children*	Wald estimate using as covariate: *Number of children*
More than 2 children	0.6031 (0.0084)	—	
Number of children	0.8094 (0.0139)	—	
Worked for pay	−0.0459 (0.0086)	−0.076 (0.014)	−0.057 (0.011)
Weeks worked	−1.982 (0.386)	−3.28 (0.63)	−2.45 (0.47)
Hours/week	−1.979 (0.327)	−3.28 (0.54)	−2.44 (0.40)
Labor income	−570.8 (186.9)	−946.4 (308.6)	−705.2 (229.8)
ln(*Family income*)	−0.0341 (0.0223)	−0.057 (0.037)	−0.042 (0.027)

Effect of kids on labor supply = Effect of twins on labor supply / Effect of twins on # of kids

$$-0.076 = \frac{-0.0459}{0.6031}$$

$$-0.057 = \frac{-0.0459}{0.8094}$$

Variable	Mean difference by *Same sex*	Wald estimate using as covariate: *More than 2 children*	Wald estimate using as covariate: *Number of children*
More than 2 children	0.0600 (0.0016)	—	
Number of children	0.0765 (0.0026)	—	
Worked for pay	−0.0080 (0.0016)	−0.133 (0.026)	−0.104 (0.021)
Weeks worked	−0.3826 (0.0709)	−6.38 (1.17)	−5.00 (0.92)
Hours/week	−0.3110 (0.0602)	−5.18 (1.00)	−4.07 (0.78)
Labor income	−132.5 (34.4)	−2208.8 (569.2)	−1732.4 (446.3)
ln(*Family income*)	−0.0018 (0.0041)	−0.029 (0.068)	−0.023 (0.054)

Effect of kids on labor supply = Effect of same sex sibs on labor supply / Effect of same sex sibs on # of kids

$$-0.133 = \frac{-0.008}{0.060}$$

$$-0.104 = \frac{-0.008}{0.0765}$$

Imbens et Al

Study: What are actual income effects?

Difficulty: Non labor income is correlated with labor participation.

Idea: Use lottery winners to see how much their labor participation changes in response to income changes.

Weakness: Local effects; how to isolate internal margins vs external. Also looks like winners are different from non-winners/big winners?

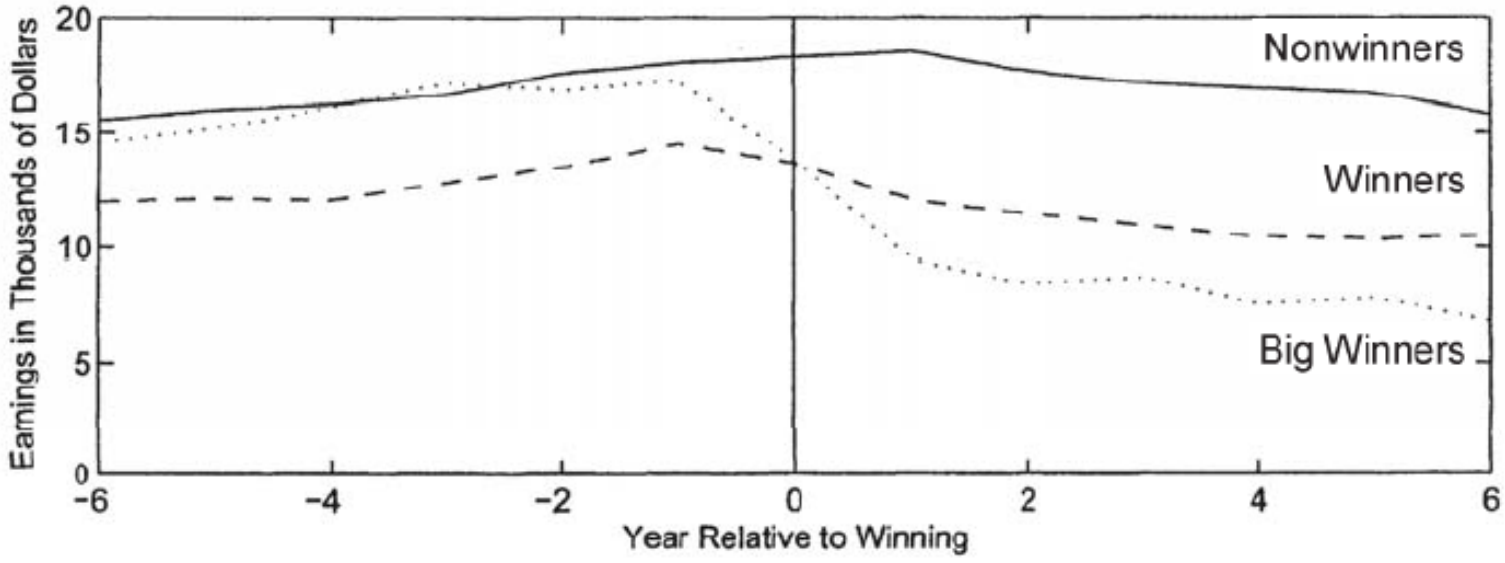


FIGURE 1. AVERAGE EARNINGS FOR NONWINNERS, WINNERS, AND BIG WINNERS

Source: Imbens, Rubin, and Sacerdote 2001

Feldstein

Study: Uses the Tax Reform Act of 1986 that significantly dropped the top marginal income tax rate.

Method: Applies the Diff-in-Diff method to see how labor supply changed. Control group is High/Medium Income. Treatment group is Highest/High Income, with a 25 and 44 percent change in Marginal Tax Rates.

Finding: Elasticies of Taxable incomes of 1.04 to 1.48.

Weaknesses: Very LATE, Differential trends violation.

TABLE 2

ESTIMATED ELASTICITIES OF TAXABLE INCOME WITH RESPECT TO NET-OF-TAX RATES

Taxpayer Groups Classified by 1985 Marginal Rate	Net of Tax Rate (1)	Adjusted Taxable Income (2)	Adjusted Taxable Income Plus Gross Loss (3)
	Percentage Changes, 1985–88		
1. Medium (22–38)	12.2	6.2	6.4
2. High (42–45)	25.6	21.0	20.3
3. Highest (49–50)	42.2	71.6	44.8
	Differences of Differences		
4. High minus medium	13.4	14.8	13.9
5. Highest minus high	16.6	50.6	24.5
6. Highest minus medium	30.0	65.4	38.4
	Implied Elasticity Estimates		
7. High minus medium		1.10	1.04
8. Highest minus high		3.05	1.48
9. Highest minus medium		2.14	1.25

Source: Feldstein (1995)

- Feldstein's difference-in-difference estimator is

$$\widehat{\varepsilon}_{TI,1-MTR} = \frac{DD_{\%\Delta TI}}{DD_{\%\Delta(1-MTR)}} = \frac{\%\Delta TI_T - \%\Delta TI_C}{\%\Delta(1-MTR_T) - \%\Delta(1-MTR_C)}$$

- For high minus medium, row 7 in Feldstein table:

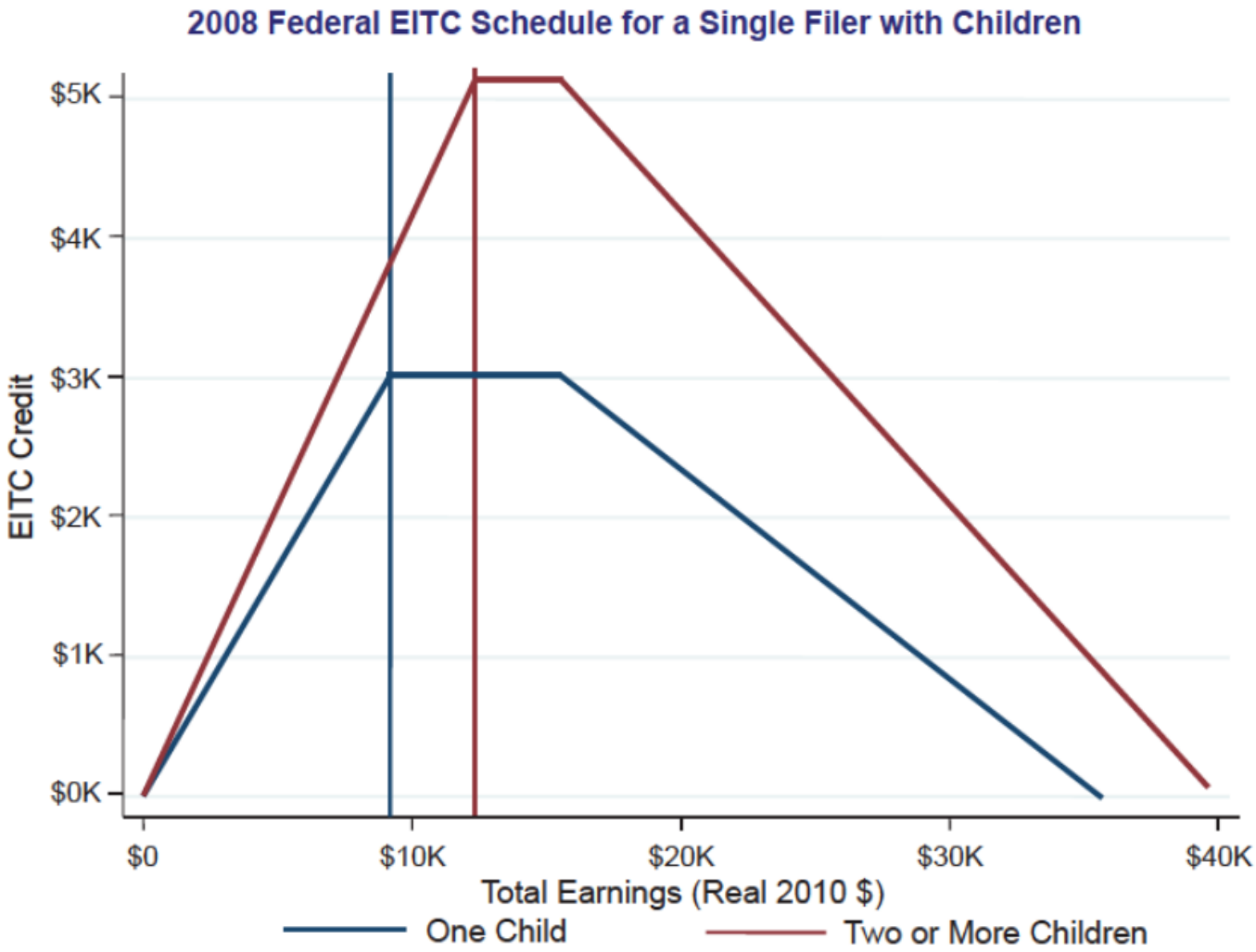
$$\frac{0.203 - 0.064}{0.256 - 0.122} = 1.0373$$

- Each of the numbers in rows 1-3 refer to the percentage change:

$$0.203 = \frac{TI_T^{88} - TI_T^{85}}{TI_T^{85}}$$

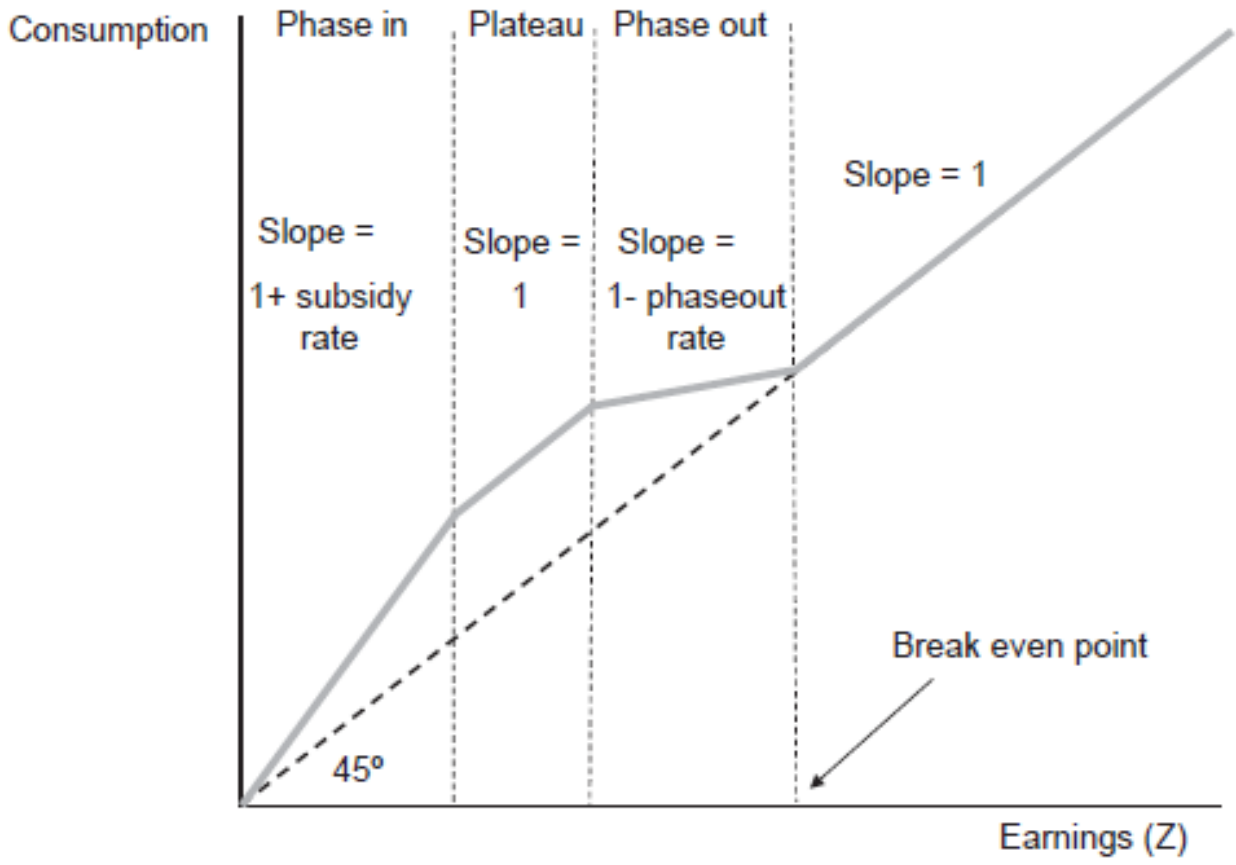
$$0.256 = \frac{(1 - MTR_T^{88}) - (1 - MTR_T^{85})}{(1 - MTR_T^{85})}$$

EITC I



The subsidy you get is dependent on your income.

EITC II



Fixing income, everyone consumes more under EITC!

Extensive Margin

- Extensive margin is the decision of whether to enter the labor force or not due to the policy
- In theory, EITC definitely has a positive effect on the extensive margin.
- Those who don't work are at the 0 point. Therefore, if they do in fact work, EITC raises a dollar wage to more than a dollar.

Intensive Margin

- Intensive margin describes changes in work hours of the working population due to the policy.
- For relatively high earners after the phase out, a dollar earned is worth less than a dollar. For relatively low earners with the subsidy, a dollar is worth more!
- Furthermore, there is an income effect such that even for those middle earners who's dollar is a dollar, they work less.

Aggregate effect is ambiguous.

Chetty Friedman Saez Part I

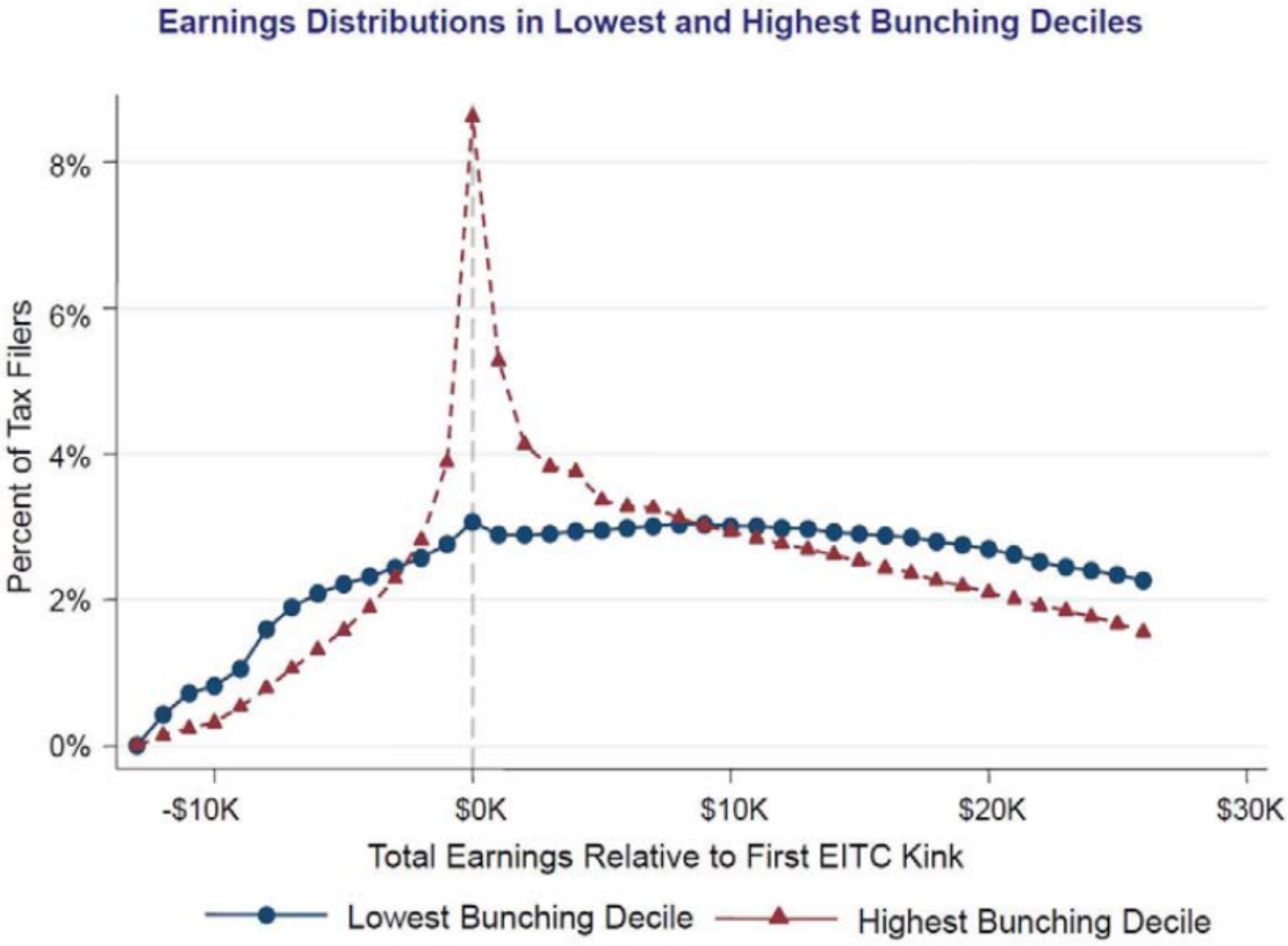
Study: The effect of EITC Policy on labor supply

1. Identify that there is clumping at the self-employed level at EITC maximization point
2. Show that different zip codes have different clumping
3. Argue it is due to knowledge of EITC by looking at how clumping spreads across zipcodes, and migrations instruments

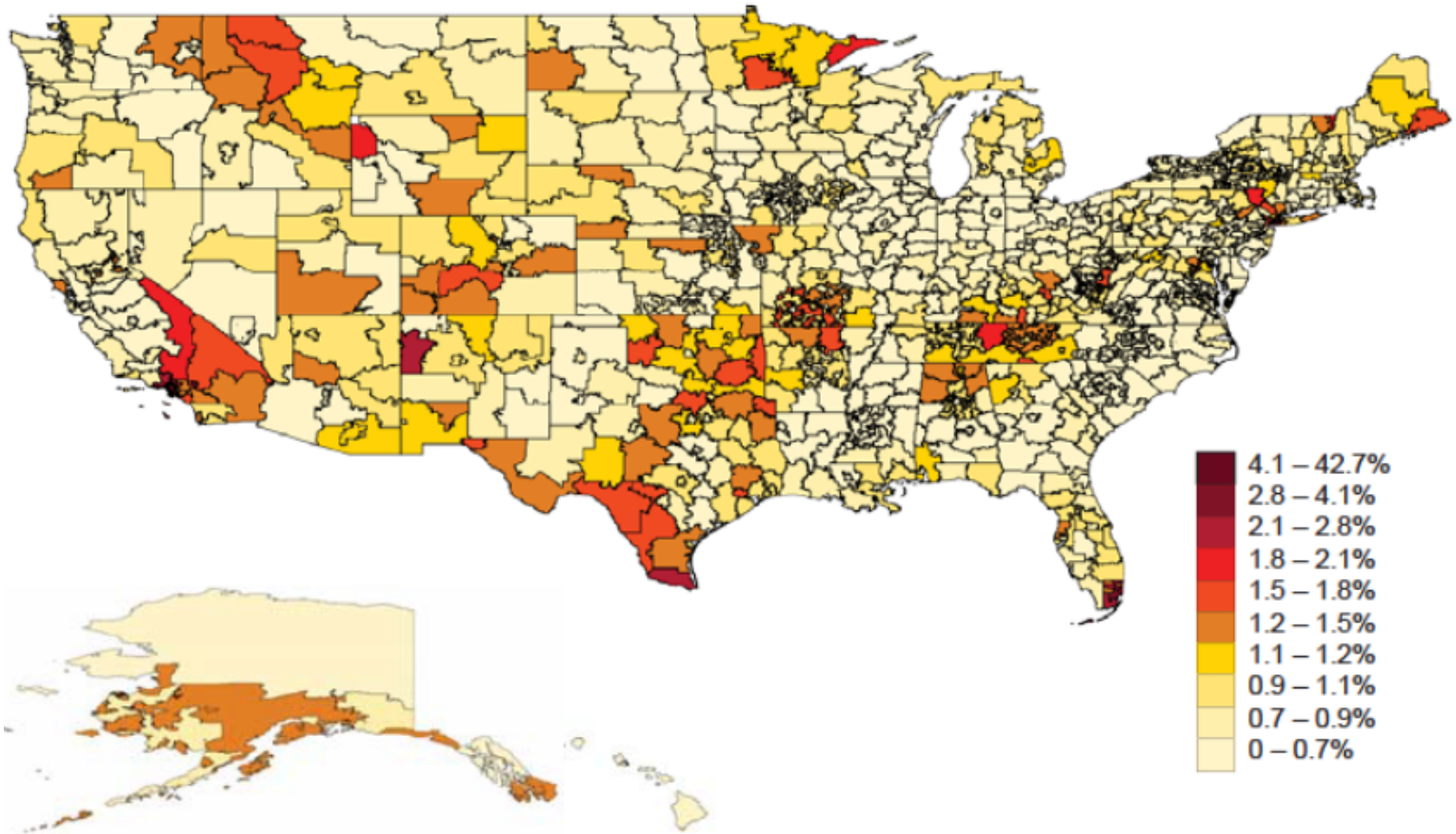
Chetty Friedman Saez Part II

Study: The effect of EITC Policy on labor supply

4. Use clumping as instrument for knowledge,and therefore effect of EITC, and look at differences of waged-employees behavior. (Weakness: Can't answer what happens if EITC is tweaked.)
5. Use birth of first child as instrument for eligibility to look at changes in the earning distribution of waged earners. (Weakness: having a child may be endogenous decision)

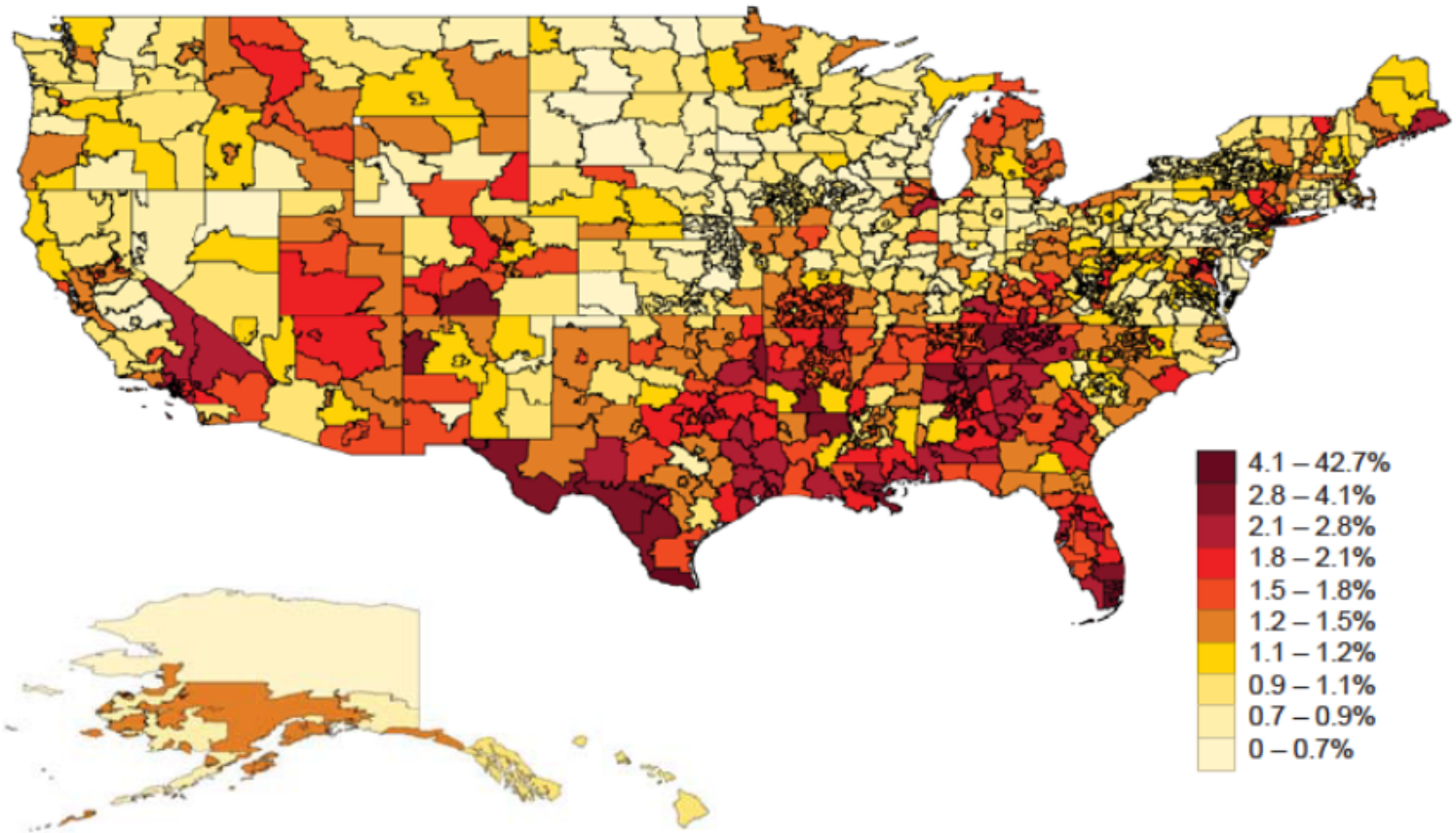

Earnings Distributions in Lowest and Highest Bunching Deciles
Percent of Tax Filers
8%
6%
4%
2%
0%
-$10K
$0K
$10K
$20K
$30K
Total Earnings Relative to First EITC Kink
Lowest Bunching Decile
Highest Bunching Decile

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



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

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



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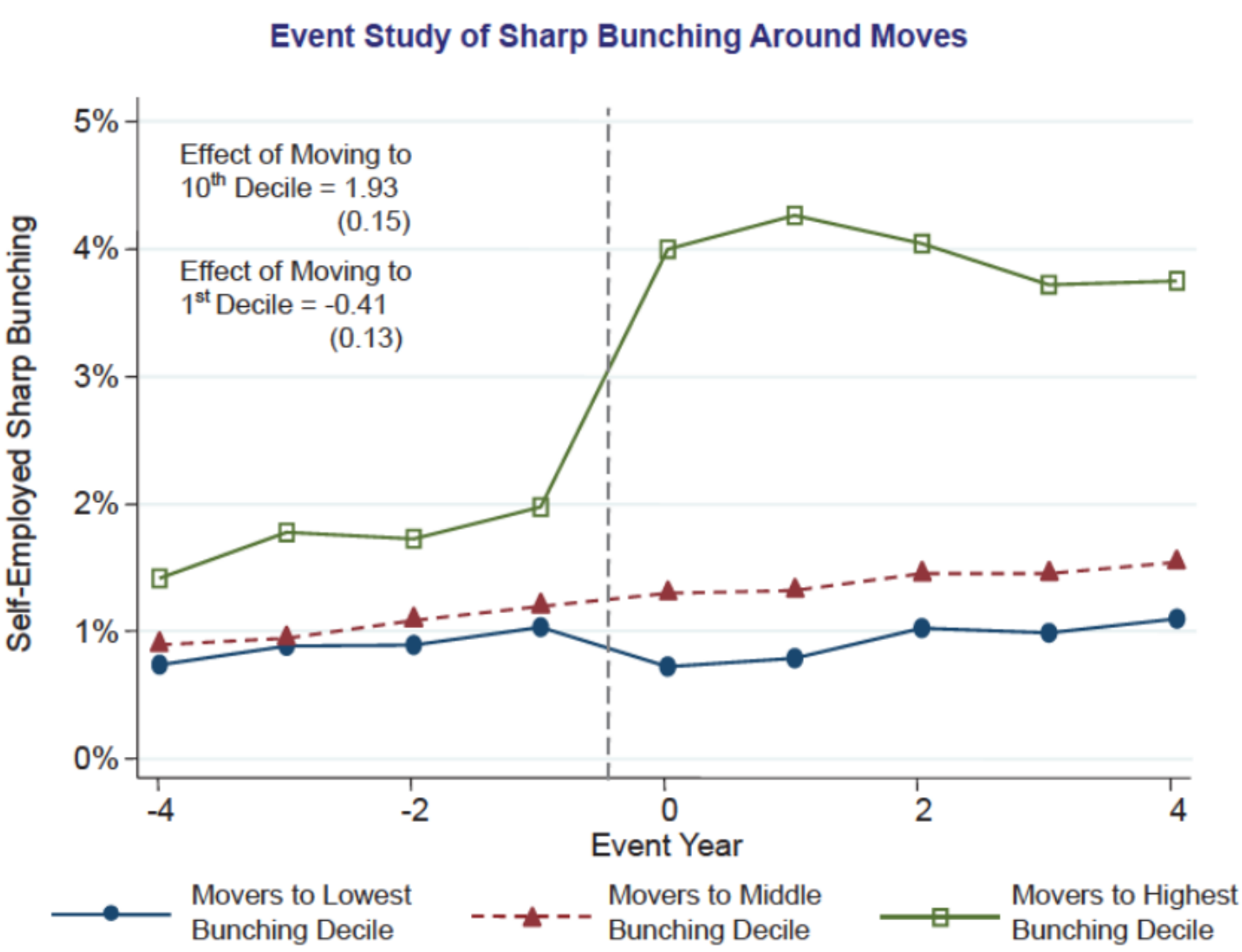
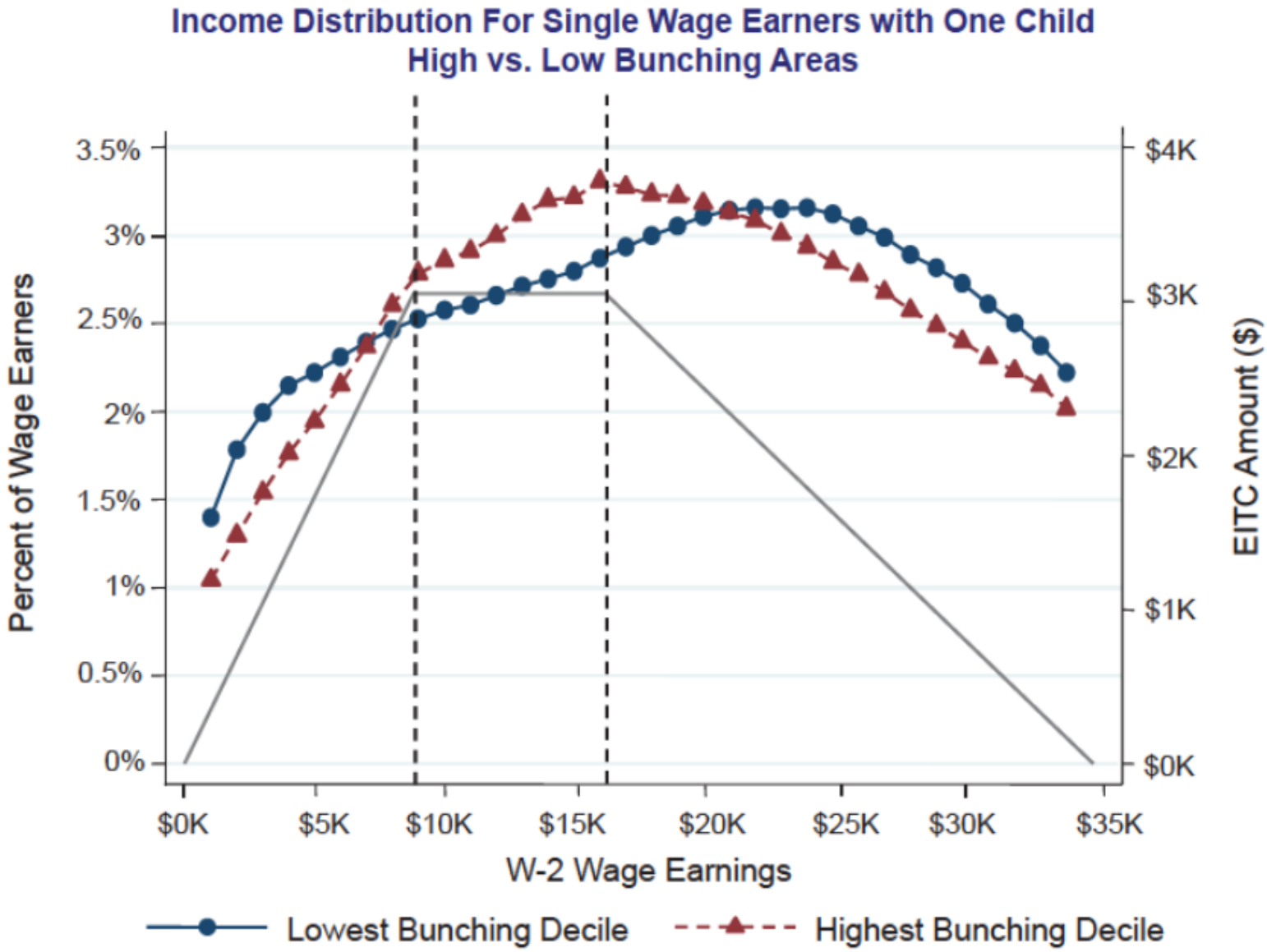
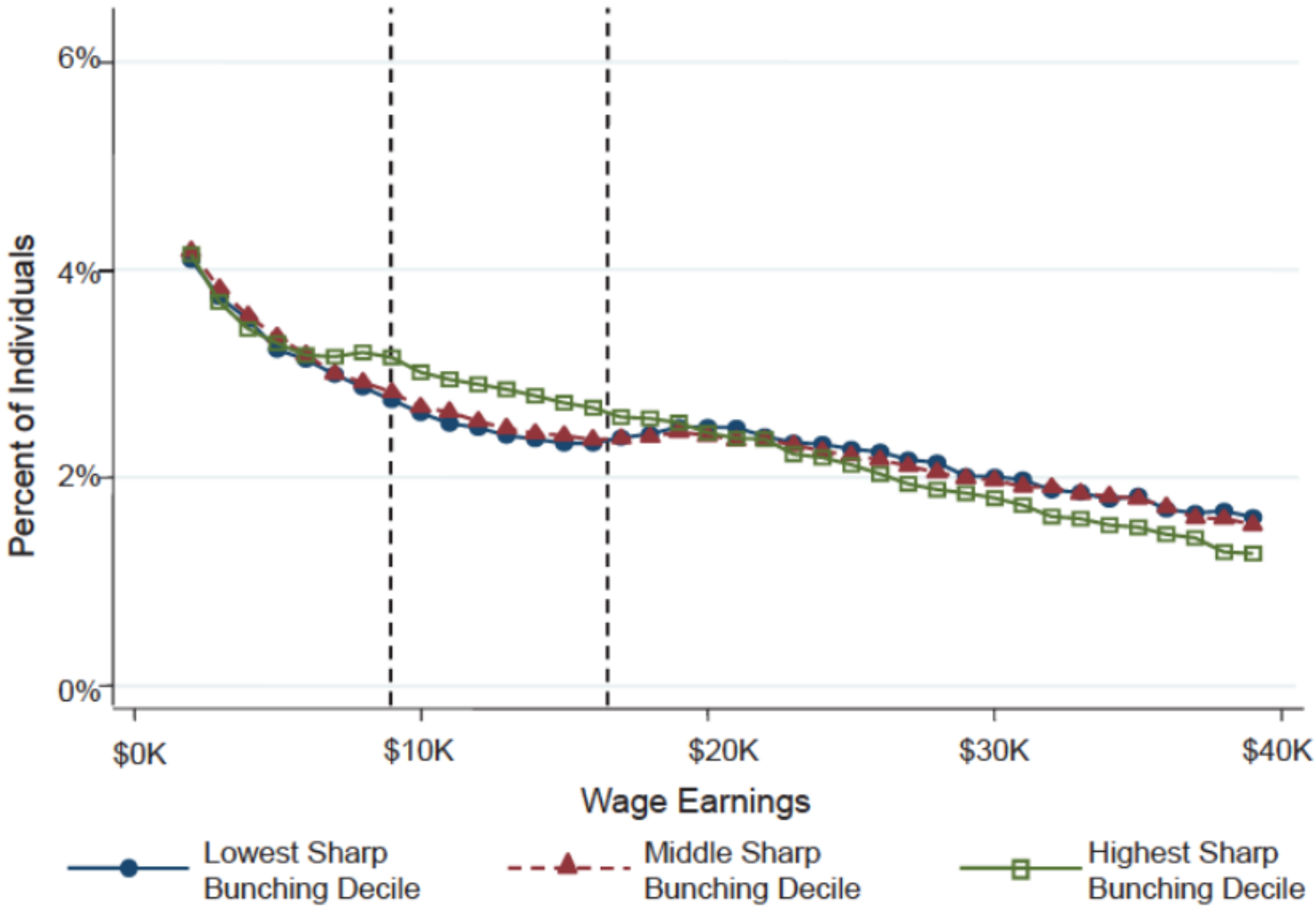

Event Study of Sharp Bunching Around Moves
Effect of Moving to
10th Decile = 1.93
(0.15)
Effect of Moving to
1st Decile = -0.41
(0.13)
Self-Employed Sharp Bunching
5%
4%
3%
2%
1%
0%
-4
-2
0
2
4
Event Year
Movers to Lowest Bunching Decile
Movers to Middle Bunching Decile
Movers to Highest Bunching Decile


Income Distribution For Single Wage Earners with One Child
High vs. Low Bunching Areas
Percent of Wage Earners
3.5%
3%
2.5%
2%
1.5%
1%
0.5%
0%
EITC Amount ($)
$4K
$3K
$2K
$1K
$0K
$0K
$5K
$10K
$15K
$20K
$25K
$30K
$35K
W-2 Wage Earnings
Lowest Bunching Decile
Highest Bunching Decile

Earnings Distribution in the Year of First Child Birth for Wage Earners



Open Floor Discussion

Ask me questions.