Responses to Taxes & Transfers Part 1 – Labor Supply

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GOALS OF THIS LECTURE

1) Cover empirical studies of labor supply responses to taxation going historically from earlier to more recent papers. Contributes to our highly important "internal paper repertoire" (IPR).

2) Understand key methodologies such as diff-in-diff; non-linear budget sets and "bunching at the kinks," which are useful for a wide range of empirical work.

3) Critically discuss papers' methodologies and results so as to practice our research skills.

MOTIVATION

1) Labor supply responses to taxation are of fundamental importance for income tax policy [efficiency costs and optimal tax formulas]

2) Labor supply responses along many dimensions:

(a) Intensive: hours of work on the job, intensity of work, how much skill to build

(b) Extensive: whether to work or not [e.g., retirement and migration decisions]; occupational choice [including level of education].

3) Reported earnings for tax purposes can also vary due to (a) tax avoidance [legal tax minimization], (b) tax evasion [illegal under-reporting]

4) Different responses in short-run and long-run: long-run response most important for policy but hardest to estimate

BASIC CROSS SECTION ESTIMATION

Data on hours or work, wage rates, non-labor income started becoming available in the 1960s when first micro surveys and computers appeared:

Simple OLS regression:

$$l_i = \alpha + \beta w_i + \gamma y_i + X_i \delta + \epsilon_i$$

w_i is the net-of-tax wage rate

y_i measures non-labor income [including spousal earnings for couples]

X_i are demographic controls [age, experience, education, etc.]

β measures uncompensated wage effects, and γ income effects [can be converted to ε^u, η]

BASIC CROSS SECTION RESULTS

1. Male workers [primary earners when married] (Pencavel, 1986 survey):

a) Small effects $\varepsilon^u = 0$, $\eta = -0.1$, $\varepsilon^c = 0.1$ with some variation across estimates (sometimes $\varepsilon^c < 0$).

2. Female workers [secondary earners when married] (Killingsworth and Heckman, 1986):

Much larger elasticities on average, with larger variations across studies. Elasticities go from zero to over one. Average around 0.5. Significant income effects as well

Female labor supply elasticities have declined overtime as women become more attached to labor market (Blau-Kahn JOLE'07)

KEY ISSUE: w CORRELATED WITH TASTES FOR WORK

$$l_i = \alpha + \beta w_i + \gamma y_i + \epsilon_i$$

Identification is based on cross-sectional variation in w_i: comparing hours of work of highly skilled individuals (high w_i) to hours of work of low skilled individuals (low w_i)

If highly skilled workers have more taste for work (independent of the wage effect), then ϵ_i is positively correlated with w_i leading to an upward bias in OLS

Plausible scenario: hard workers acquire better education and hence have higher wages

Controlling for X_i can help but can never be sure that we have controlled for all the factors correlated with w_i and tastes for work: **Omitted variable bias**

$\Rightarrow$ Tax changes provide more compelling identification

NEGATIVE INCOME TAX (NIT) EXPERIMENTS

1) Best way to resolve identification problems: exogenously change taxes/transfers with a **randomized experiment**

2) NIT experiment conducted in 1960s/70s in Denver, Seattle, and other cities

3) First major social experiment in U.S. designed to test proposed transfer policy reform

4) Provided lump-sum welfare grants G combined with a steep phaseout rate τ (50%-80%) [based on family earnings]

5) Analysis by Rees (1974), Munnell (1986) book, Ashenfelter and Plant JOLE'90, and others

6) Several groups, with randomization within each; approx. N = 75 households in each group

Starting from a Means-Tested Program

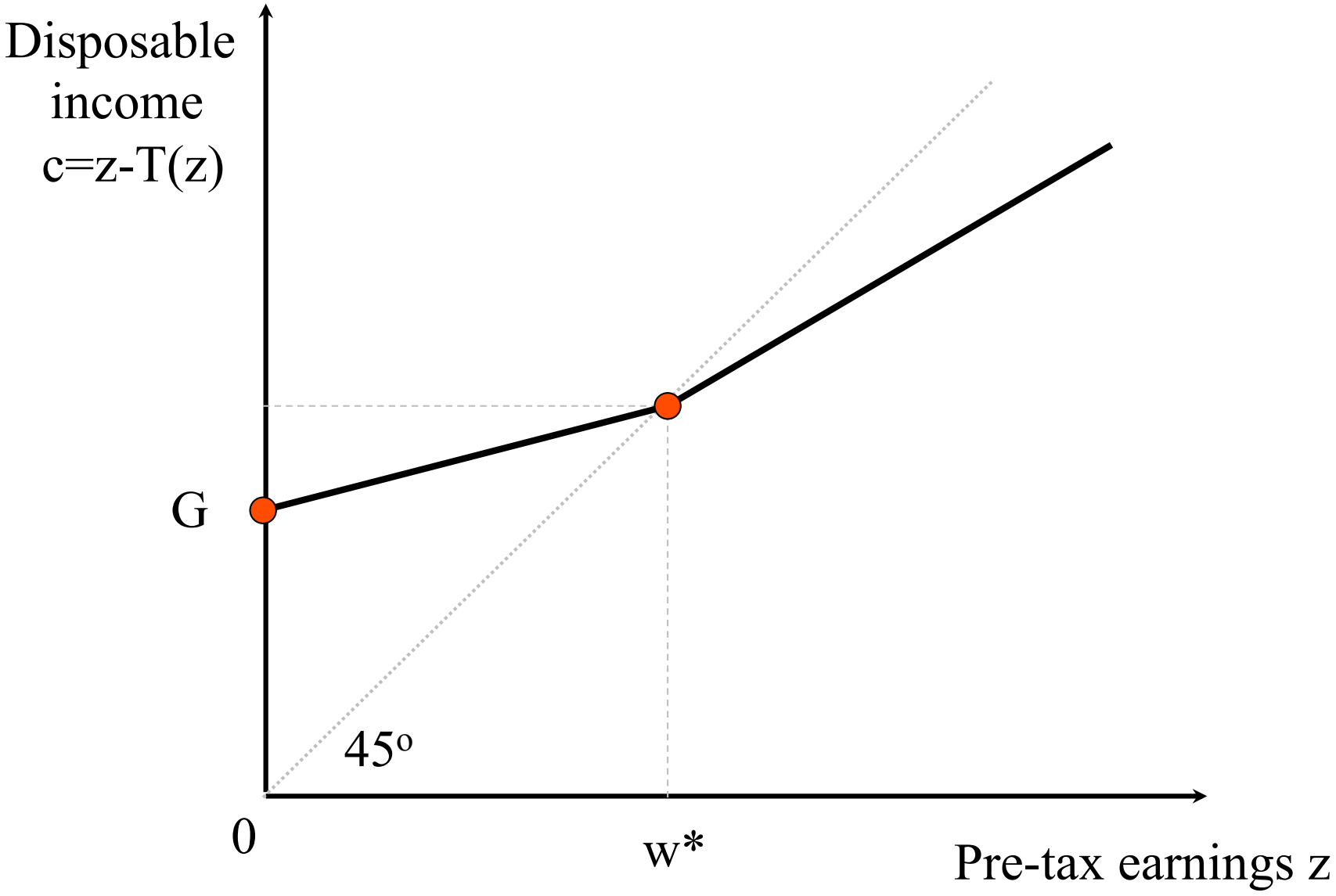


Table 1
Parameters of the 11 Negative Income Tax Programs

Program Number	G ($)	τ	Declining Tax Rate	Break-even Income ($)
1	3,800	.5	No	7,600
2	3,800	.7	No	5,429
3	3,800	.7	Yes	7,367
4	3,800	.8	Yes	5,802
5	4,800	.5	No	9,600
6	4,800	.7	No	6,857
7	4,800	.7	Yes	12,000
8	4,800	.8	Yes	8,000
9	5,600	.5	No	11,200
10	5,600	.7	No	8,000
11	5,600	.8	Yes	10,360

Source: Ashenfelter and Plant (1990), p. 403

NIT EXPERIMENTS: FINDINGS

See Ashenfelter and Plant JHR' 90 for non-parametric evidence. More parametric evidence in earlier work. Key results:

1) Significant labor supply response but small overall

2) Implied earnings elasticity for males around 0.1

3) Implied earnings elasticity for women around 0.5

4) Academic literature not careful to decompose response along intensive and extensive margin

5) Response of women is concentrated along the extensive margin (can only be seen in official govt. report)

6) Earnings of treated women who were working before the experiment did not change much

TAX ISSUE: NON-LINEAR BUDGET SETS

Actual tax system is not linear but piece-wise linear with varying marginal tax rate τ due to (a) means-tested transfer programs, (b) progressive individual income tax

Same theory applies when considering the linearized tax system $c = wl + y$ with $w = w^p(1 - T')$ and y defined as virtual income (intercept of budget with x-axis when setting $l = 0$)

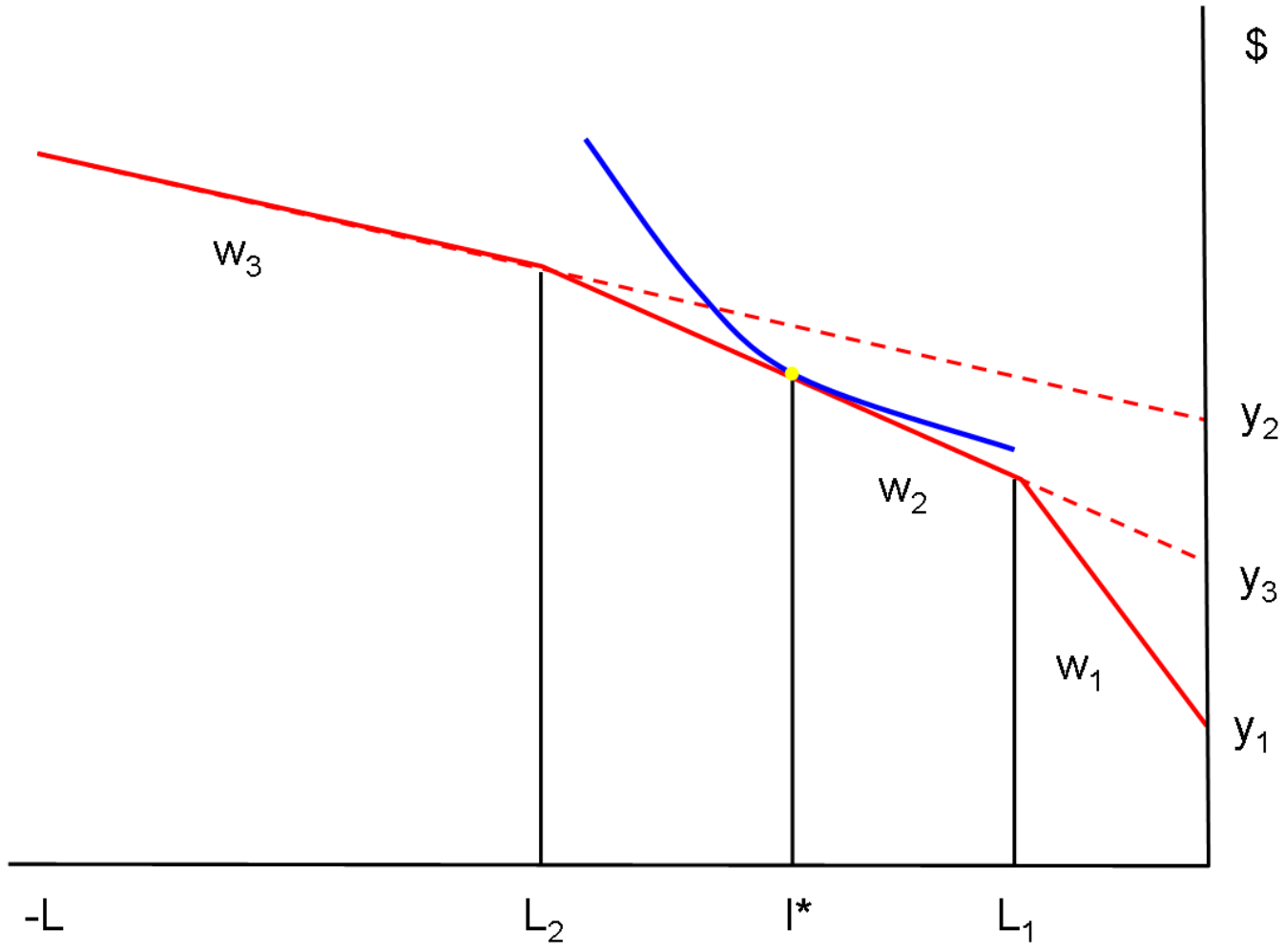
Main complications:

(a) w [and y] become endogenous to choice of l

(b) FOC may not hold if individual bunches at a kink

(c) FOC may not characterize the optimum choice

Non-Linear Budget Set Estimation: Virtual Incomes



Source: Hausman (Hbk 1985)

TAX ISSUE: NON-LINEAR BUDGET SETS

Non-linear budget set creates two econometric problems:

1) Model mis-specification: OLS regression no longer recovers structural elasticity parameter of interest

2) Econometric bias: $\tau_i = T'(w_i l_i)$ and y_i depends on income $w_i l_i$ and hence on l_i

Tastes for work are positively correlated with τ_i (due to progressive tax system) $\rightarrow$ downward bias in OLS regression of hours worked on net-of-tax rates

OLD NON-LINEAR BUDGET SET METHOD

Issue addressed by non linear budget set studies pioneered by Hausman in late 1970s (Hausman, 1985 PE handbook chapter)

Method uses a structural model of labor supply to derive and estimate labor supply function fully consistent with theory

Key point: the method still uses the standard cross-sectional variation in pre-tax wages w^p for identification. Taxes are seen as a problem to deal with rather than an opportunity for identification.

New literature identifying labor supply elasticities using tax changes has a totally different perspective: taxes are seen as an **opportunity** to identify labor supply

FROM TRUE EXPERIMENTS TO "NATURAL EXPERIMENTS"

True experiments are costly to implement and hence rare

However, real economic world (nature) provides variation that can be exploited to estimate behavioral responses $\Rightarrow$ **"Natural Experiments"**

Natural experiments sometimes come very close to true experiments: Imbens, Rubin, Sacerdote AER '01 did a survey of lottery winners and non-winners matched to Social Security administrative data (for those who agreed to release it) to estimate income effects

Lottery generates random assignment conditional on playing

Find significant but relatively small income effects: $\eta = w\partial l/\partial y$ between -0.05 and -0.10

Identification threat: differential response-rate among groups

Caveats: generalizability/representativeness? Are lottery wins similar to other income shocks?

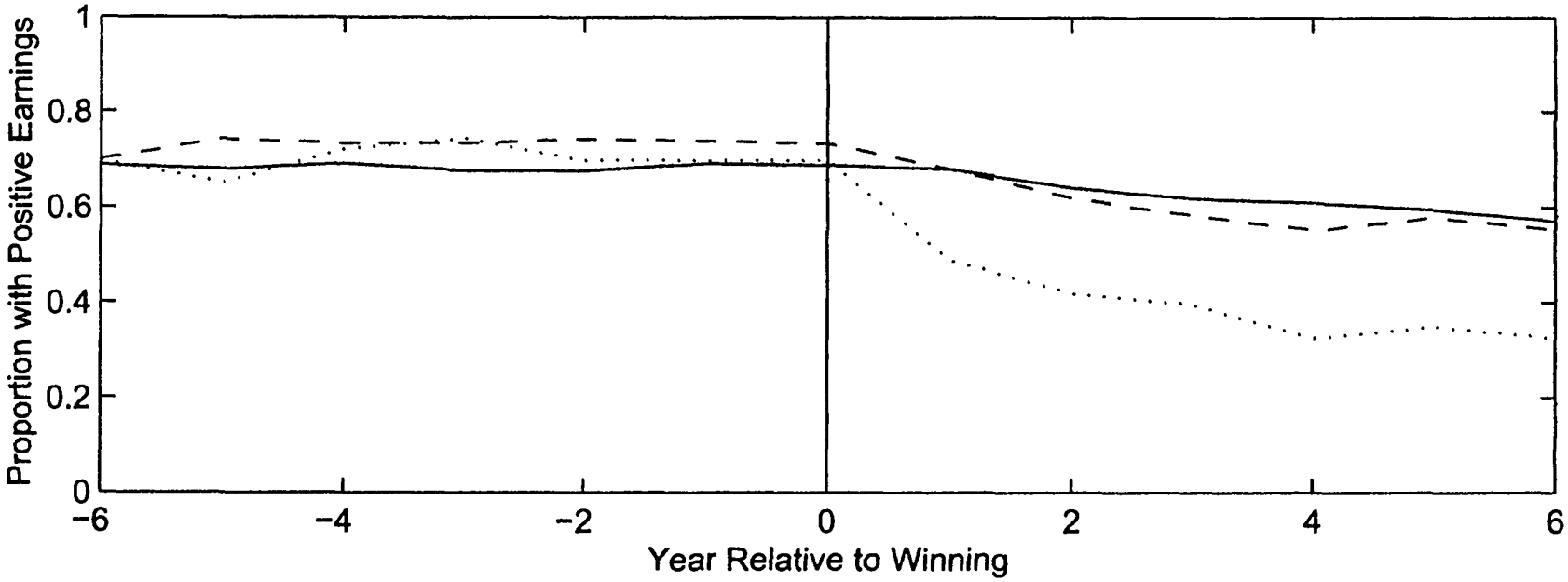


FIGURE 2. PROPORTION WITH POSITIVE EARNINGS FOR NONWINNERS, WINNERS, AND BIG WINNERS

Note: Solid line = nonwinners; dashed line = winners; dotted line = big winners.

Source: Imbens et al (2001), p. 784

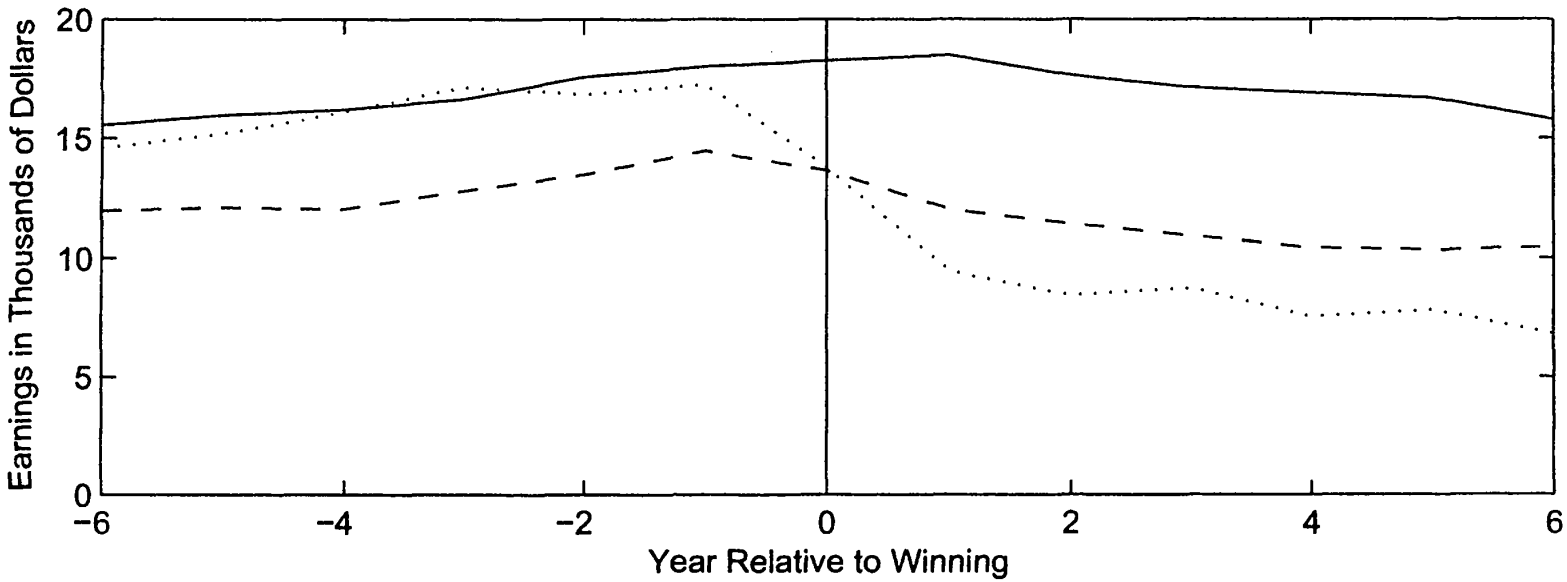


FIGURE 1. AVERAGE EARNINGS FOR NONWINNERS, WINNERS, AND BIG WINNERS

Note: Solid line = nonwinners; dashed line = winners; dotted line = big winners.

Source: Imbens et al. (2001), p. 783

DIFFERENCE-IN-DIFFERENCE (DD) METHODOLOGY

Two groups: Treatment group (T) which faces a change [lottery winners] and control group (C) which does not [non winners]

Compare the evolution of T group (before and after change) to the evolution of the C group (before and after change)

DD identifies the **treatment effect** if the **parallel trend assumption** holds:

Absent the change, T and C would have evolved in parallel

DD most convincing when groups are very similar to start with

Should always test DD using data from more periods and plot the two time series to check parallel trend assumption

LABOR SUPPLY AND LOTTERIES IN SWEDEN

Cesarini et al. (2017) use Swedish population wide administrative data with more compelling setting: (1) bank accounts with random prizes (PLS), (2) monthly lottery subscription (Kombi), and (3) TV show participants (Triss)

Estimation:

$$y_{it} = \beta_t L_{i,0} + \mathbb{X}_{i,0}\delta_t + \mathbb{Z}_{i,s}\gamma_t + \varepsilon_{i,t}$$

where $\mathbb{X}_{i,0}$ are "cell" fixed effects; $\mathbb{Z}_{i,s}$ are pre-lottery characteristics (for precision); and $L_{i,0}$ is lottery prize won.

Key results:

1) Effects on both extensive and intensive labor supply margin, immediate, small & quite stable

2) Significant but relatively small income effects: $\eta = w\partial l/\partial y$ around -0.10

3) Effects on spouse but not as large as on winner
$\Rightarrow$ Rejects the **unitary** model of household labor supply:
$\max u(c_1, c_2, l_1, l_2)$ st $c_1 + c_2 \leq w_1 l_1 + w_2 l_2 + R$ (where only household R matters).

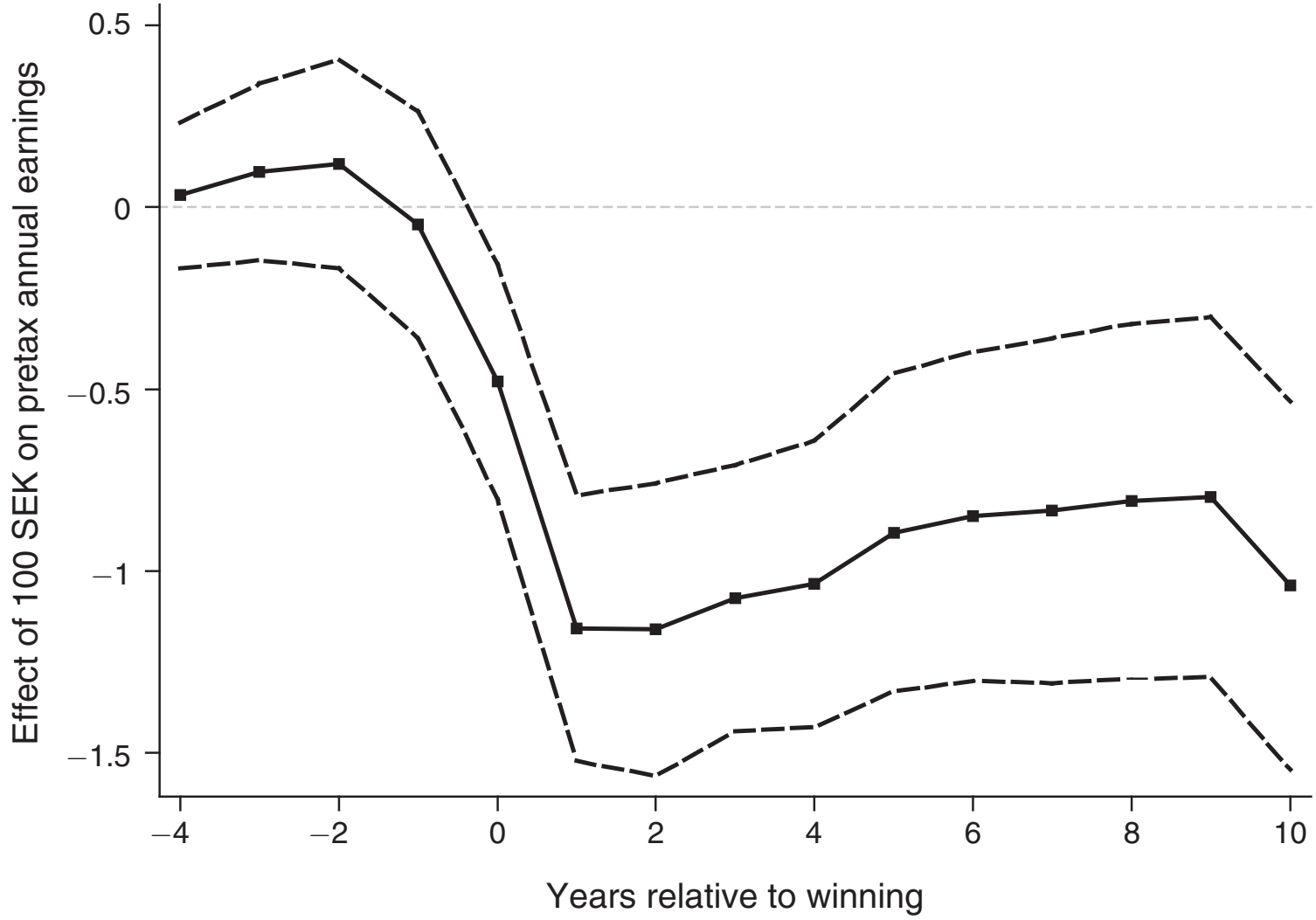


FIGURE 1. EFFECT OF WEALTH ON INDIVIDUAL EARNINGS

Notes: This figure reports estimates obtained from equation (2) estimated in the pooled lottery sample with pretax labor earnings as the dependent variable. A coefficient of 1.00 corresponds to an increase in annual earnings of 1 SEK for each 100 SEK won. Each year corresponds to a separate regression and the dashed lines show 95 percent confidence intervals.

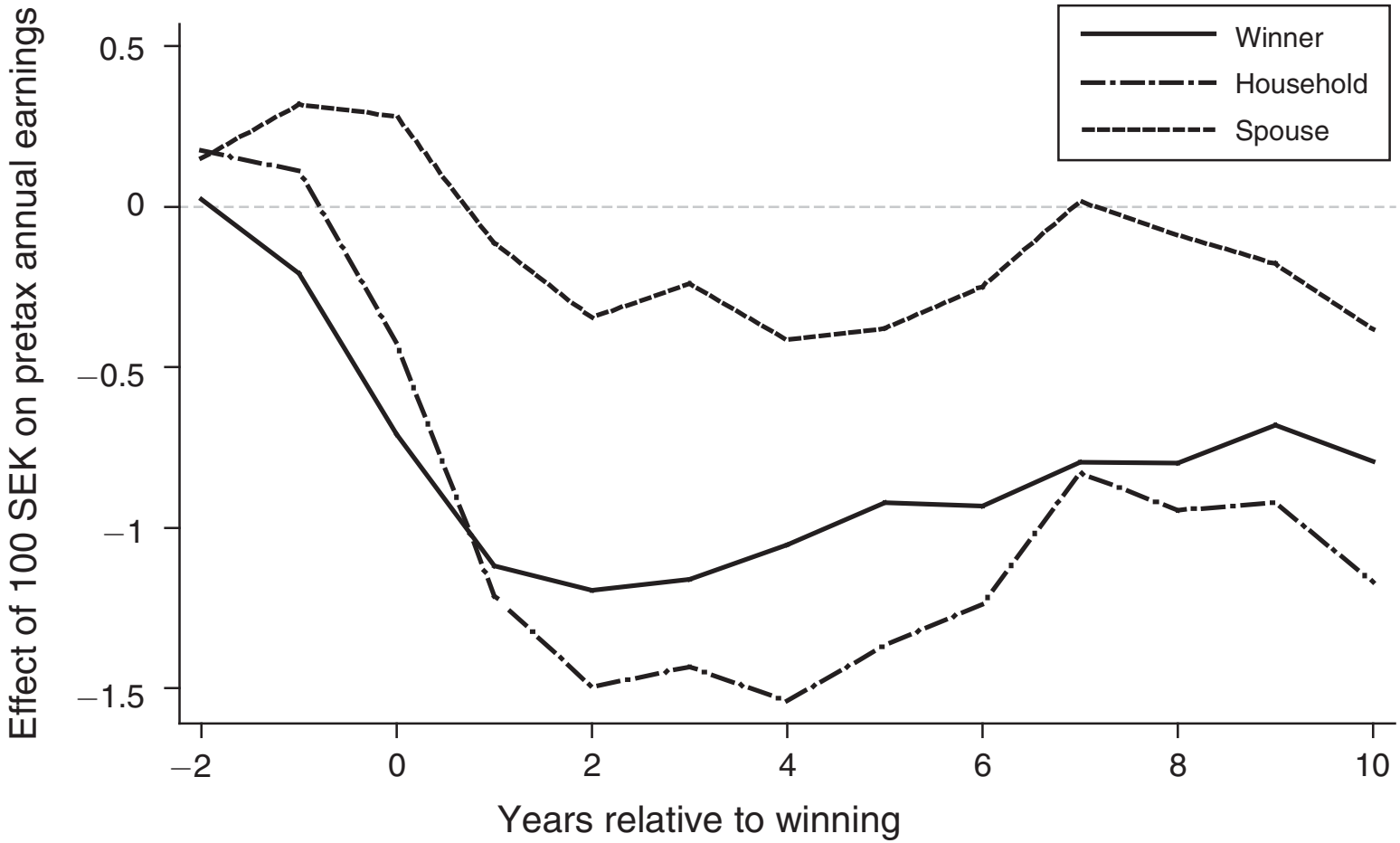


FIGURE 5. EFFECT OF WEALTH ON EARNINGS OF MARRIED WINNERS AND SPOUSES

Notes: This figure reports estimates obtained from estimating equation (2) separately for married winners, their spouses, and married households. The dependent variable is pretax labor earnings. Each year corresponds to a separate regression.

MARRIED WOMEN ELASTICITIES: BLAU AND KAHN '07

1) Identify elasticities from 1980-2000 using grouping instrument

a) Define cells (year$\times$age$\times$education) and compute mean wages

b) Instrument for actual wage with mean wage in cell

2) Identify purely from group-level variation, which is less contaminated by individual endogenous choice

3) Results: (a) total hours elasticity for **married women** (including intensive + extensive margin) shrank from 0.4 in 1980 to 0.2 in early 2000s, (b) effect of husband earnings $\downarrow$ overtime

4) Interpretation: elasticities shrink as women become more attached to the labor force

SUMMARY OF STATIC LABOR SUPPLY LITERATURE

1) Small elasticities for prime-age males

Probably institutional restrictions, need for at least one income, etc. prevent a short-run response

2) Larger responses for workers who are less attached to labor force: Married women, low income earners, retirees

3) Responses driven primarily by extensive margin

a) Extensive margin (participation) elasticity around 0.2-0.5

b) Intensive margin (hours) elasticity smaller

RESPONSES TO LOW-INCOME TRANSFER PROGRAMS

1) Particular interest in treatment of low incomes in a progressive tax system: are they responsive to incentives?

2) Complicated set of transfer programs in US

a) In-kind: food stamps, Medicaid, public housing, job training, education subsidies

b) Cash: TANF, EITC, SSI

3) See Gruber undergrad textbook for details on institutions

1996 US WELFARE REFORM

1) Reform modified AFDC cash welfare program to provide more incentives to work (renamed TANF)

a) Requiring recipients to go to job training or work

b) Limiting the duration for which families able to receive welfare

c) Reducing phase-out rate of benefits

2) Fed govt provided incentives for states to experiment with reforms in 1992-1995 (state waivers). Some did randomized experiments.

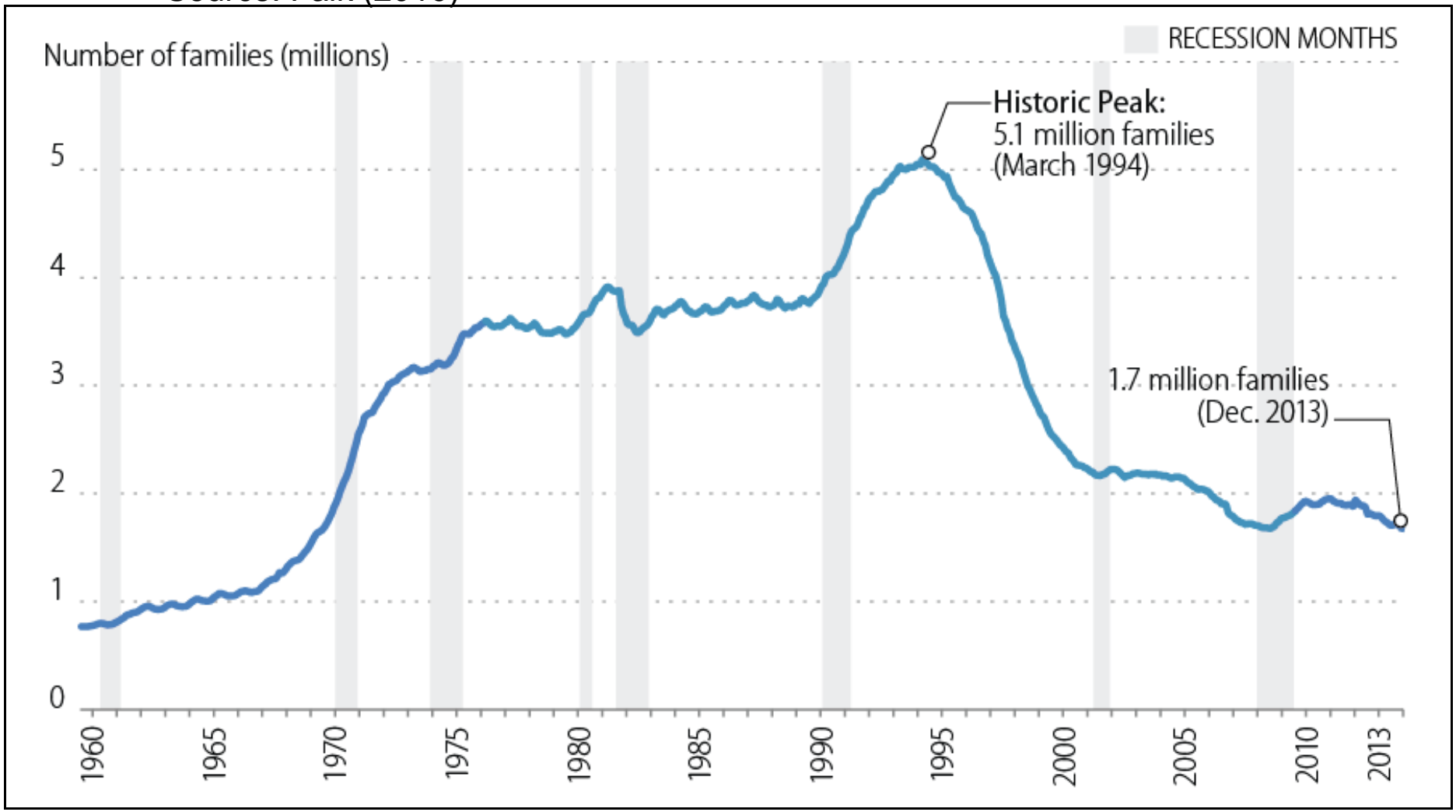
4) EITC also expanded during this period: general shift from welfare to "workfare"

Did welfare reform and EITC increase labor supply?

Figure 1. Number of Families Receiving AFDC/TANF Cash Assistance, 1959-2013

(Families in millions)

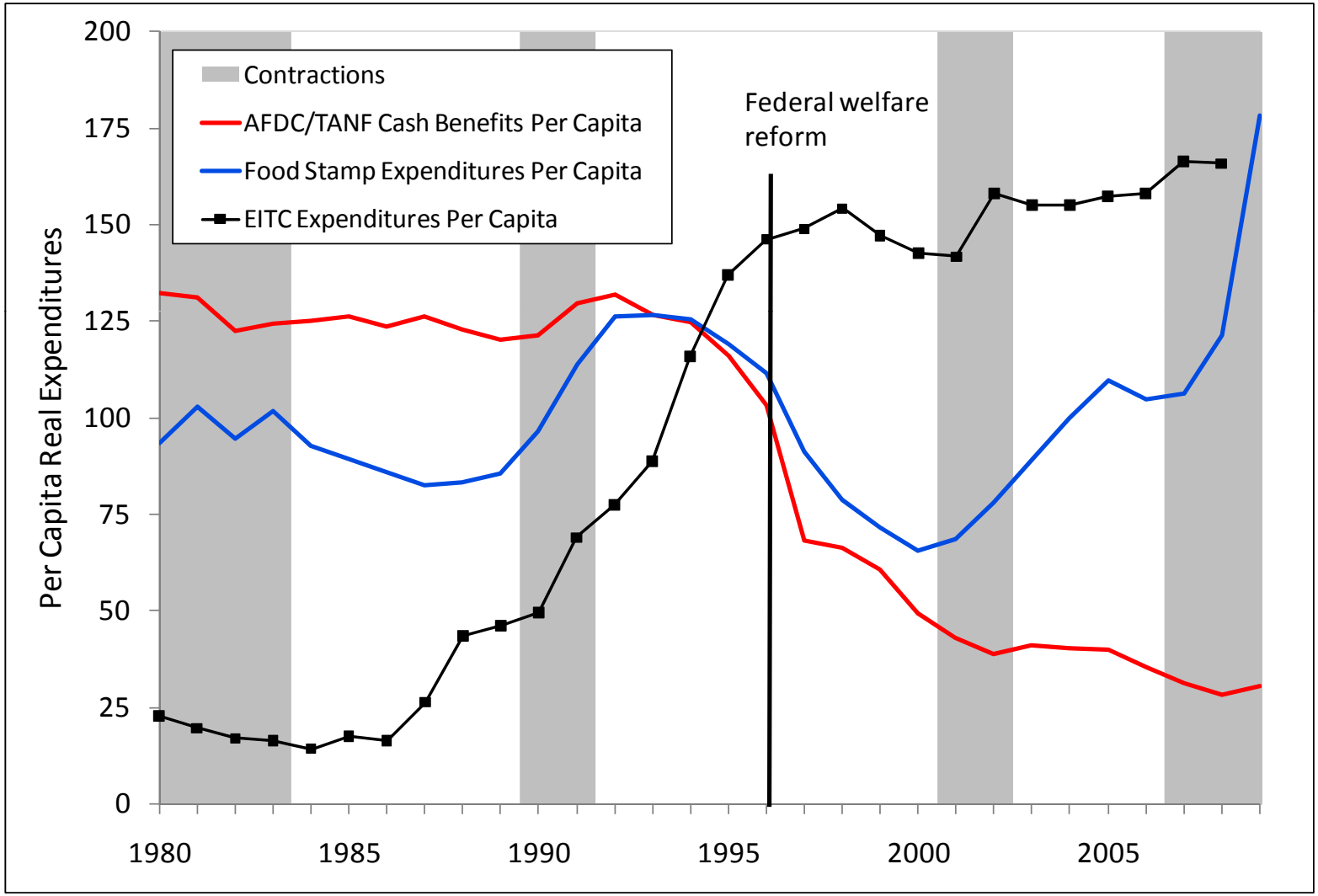
Source: Falk (2016)



Source: Congressional Research Service (CRS), based on data from the U.S. Department of Health and Human Services (HHS).

Notes: Shaded areas represent recessionary periods. Families receiving TANF cash assistance since October 1, 1999, include families receiving cash assistance from separate state programs (SSPs) with expenditures countable toward the TANF maintenance of effort requirement (MOE).

The landscape providing assistance to poor families with children has changed substantially



THEORETICAL BEHAVIORAL RESPONSES TO AN EITC

Extensive margin: positive effect on Labor Force Participation as EITC makes work more attractive

Intensive margin: earnings conditional on working, mixed effects

1) Phase in: (a) Substitution effect: work more due to wage subsidy, (b) Income effect: work less $\Rightarrow$ Net effect: ambiguous; probably work more

2) Plateau: Pure income effect (no change in net wage) $\Rightarrow$ Net effect: work less

3) Phase out: (a) Substitution effect: work less, (b) Income effect: also work less $\Rightarrow$ Net effect: work less

Should expect bunching at the EITC kink points

RANDOMIZED WELFARE EXPERIMENT: SSP WELFARE DEMONSTRATION IN CANADA

Canadian Self Sufficiency Project (SSP): randomized experiment that gave welfare recipients an earnings subsidy for 36 months in 1990s (but need to start working by month 12 to get it)

3 year temporary participation tax rate cut from average rate of 74.3% to 16.7% [get to keep 83 cents for each $ earned instead of 26 cents]

Card and Hyslop (EMA 2005) provide classic analysis. Two results:

1) Strong effect on employment rate during experiment (peaks at 14 points)

2) Effect quickly vanishes when the subsidy stops after 36 months (entirely gone by month 52)

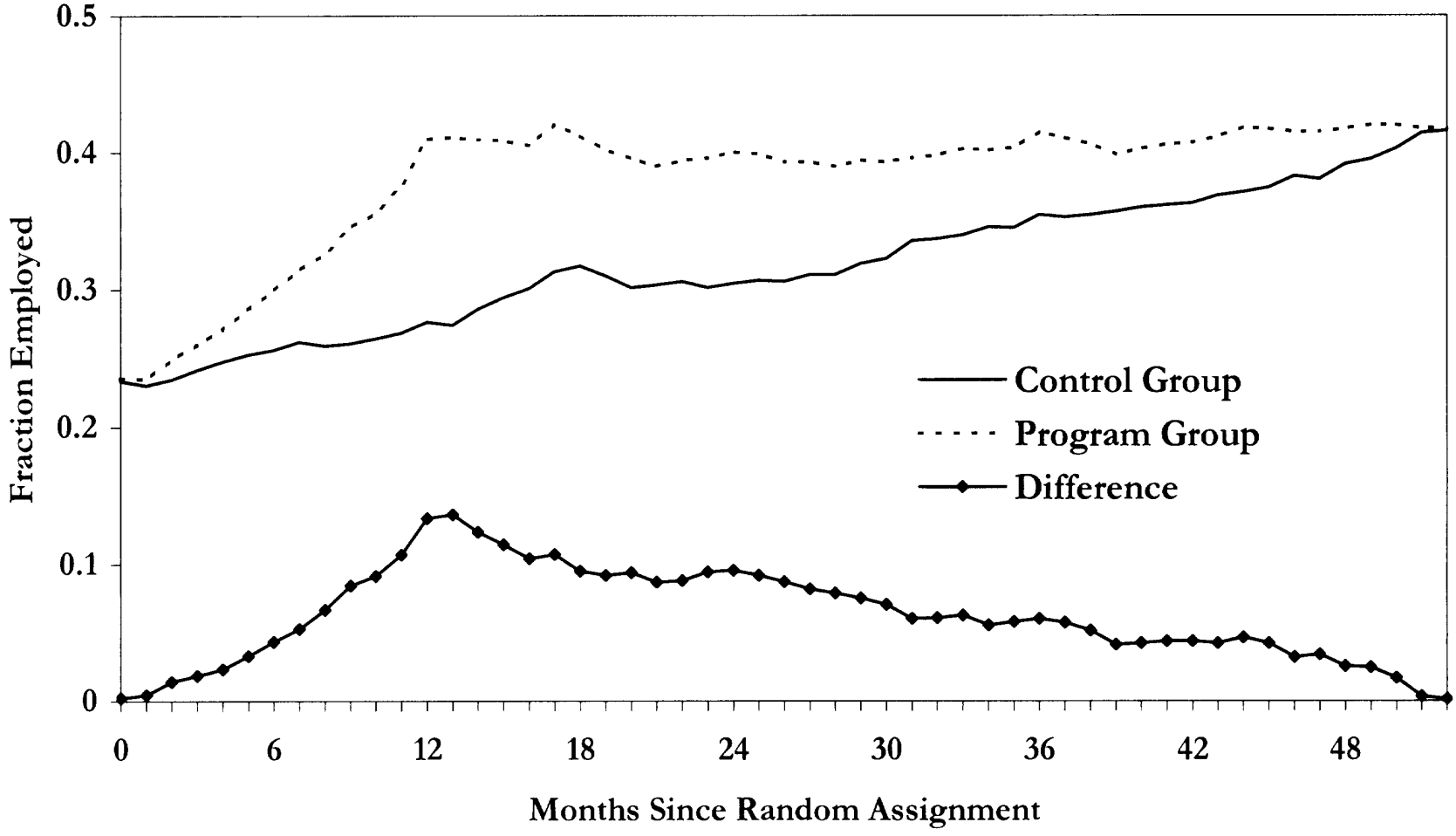


FIGURE 3.—Monthly employment rates.

Source: Card and Hyslop, 2005, p. 1734

EARNED INCOME TAX CREDIT (EITC) PROGRAM

See Kleven (2020) provides comprehensive ex-post re-analysis using women aged 20-50 and CPS data

1) EITC started small in the 1970s but was expanded in 1986-88, 1994-96, 2008-09: today, largest means-tested cash transfer program [$70bn in 2016, 30m families recipients]

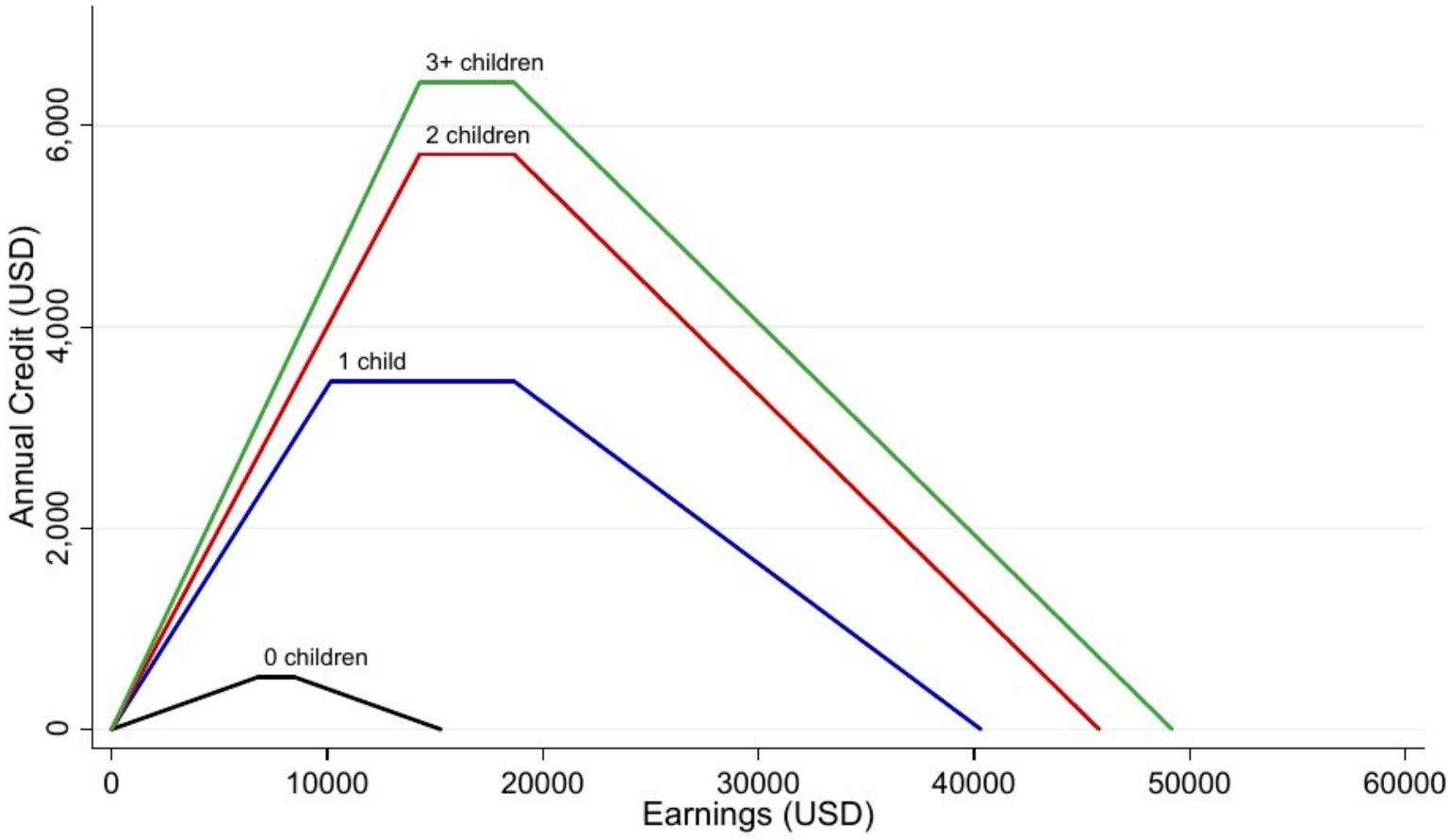
2) Eligibility: families with kids and low earnings.

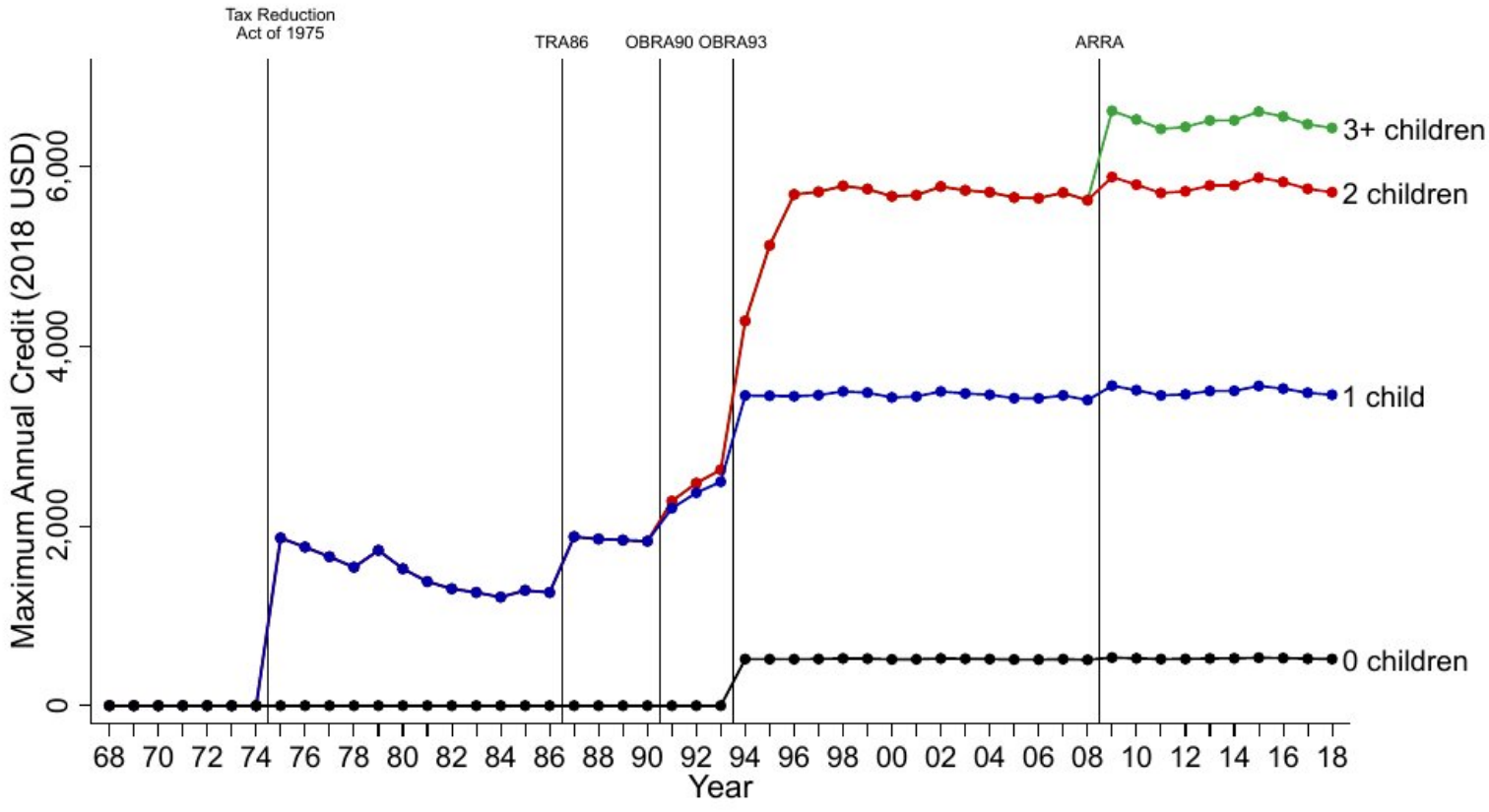
3) Refundable Tax credit: administered as annual tax refund received in Feb-April, year $t+1$ (for earnings in year t)

4) EITC has flat pyramid structure with phase-in (negative MTR), plateau, (0 MTR), and phase-out (positive MTR)

5) States have added EITC components to their income taxes [in general a percentage of the Fed EITC, great source of natural experiments, understudied bc CPS too small]

A: EITC Schedule in 2018

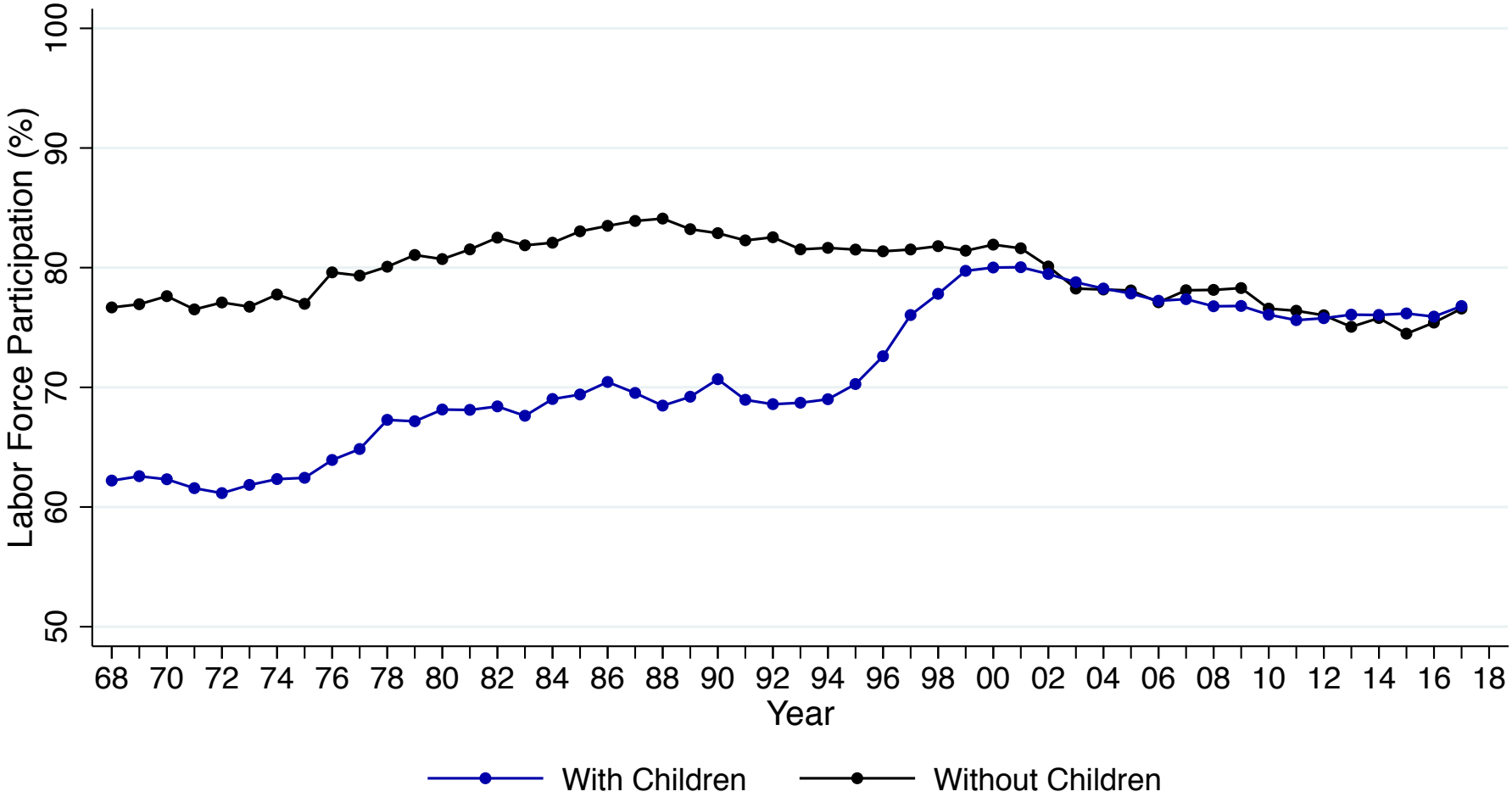




Notes: This figure shows federal EITC parameters for different family sizes. Panel A shows the 2018 EITC schedule as a function of total family earnings for families with 0, 1, 2, and 3+ EITC-eligible children. Panel B shows the maximum annual credit for families with 0, 1, 2, and 3+ EITC-eligible children between 1968 and 2018, in 2018 USD.

Labor Force Participation of Single Women

With and Without Children

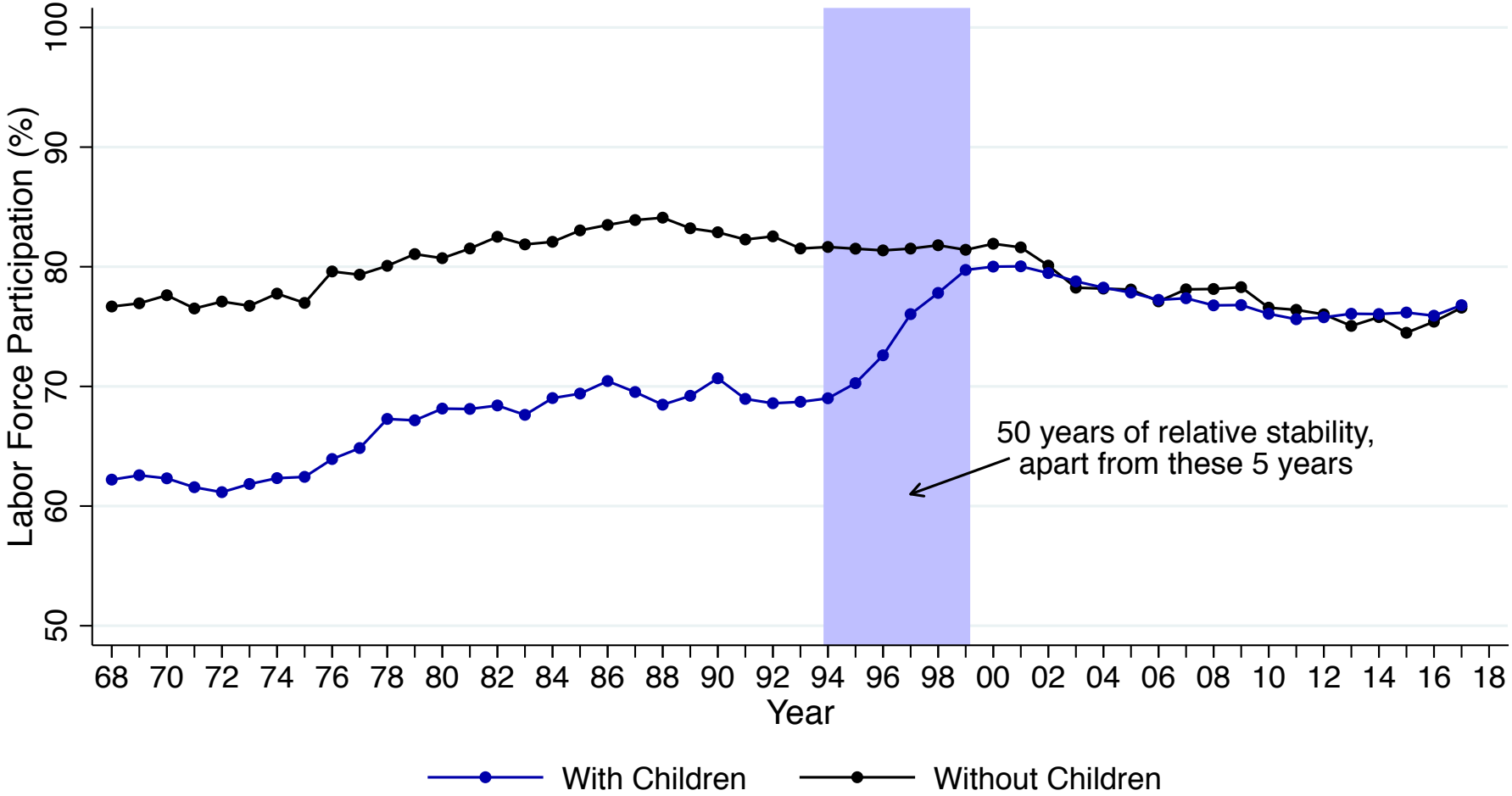


Source: Kleven (2018)

Annual Employment Low Education

Labor Force Participation of Single Women

With and Without Children



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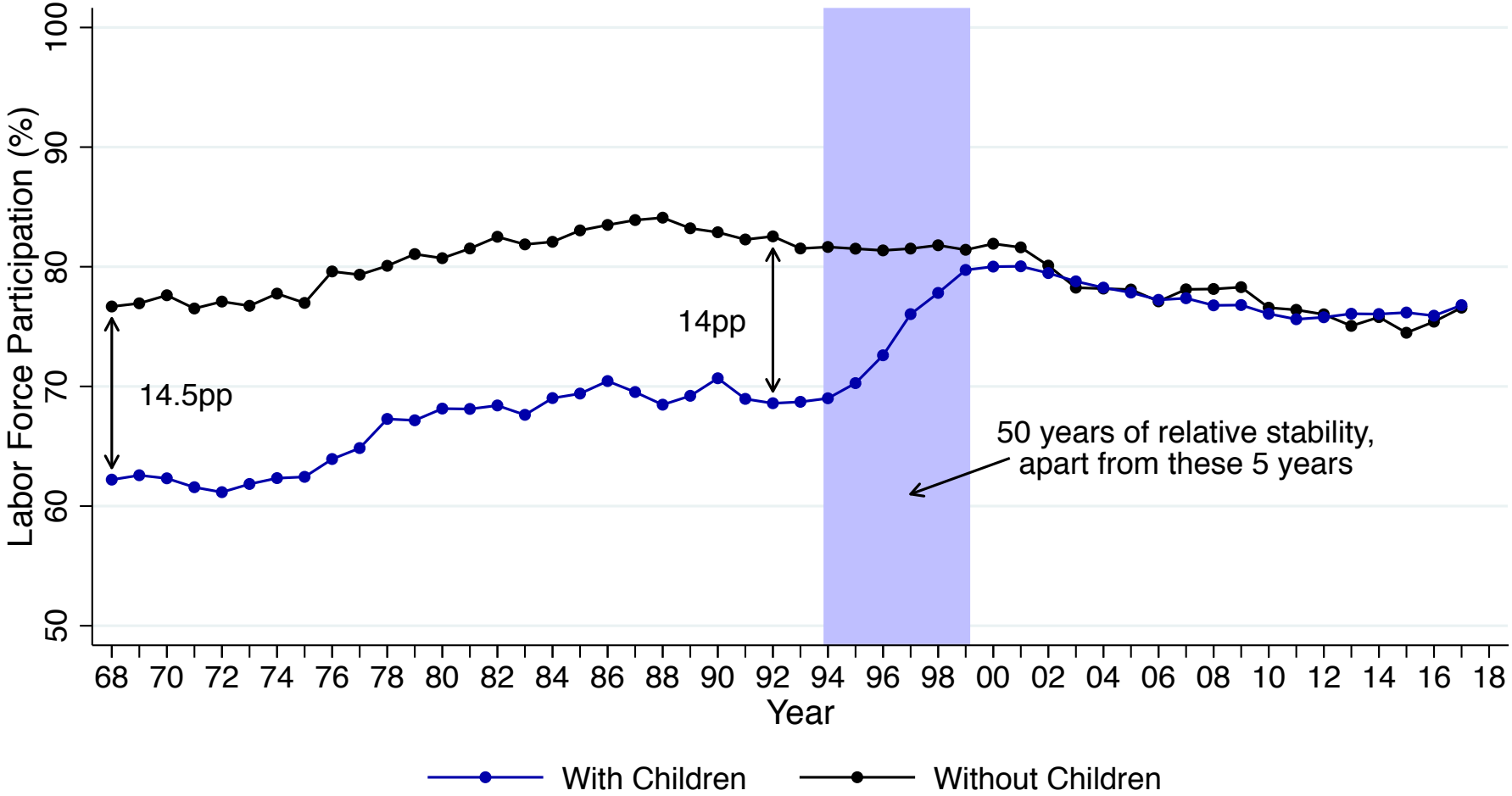

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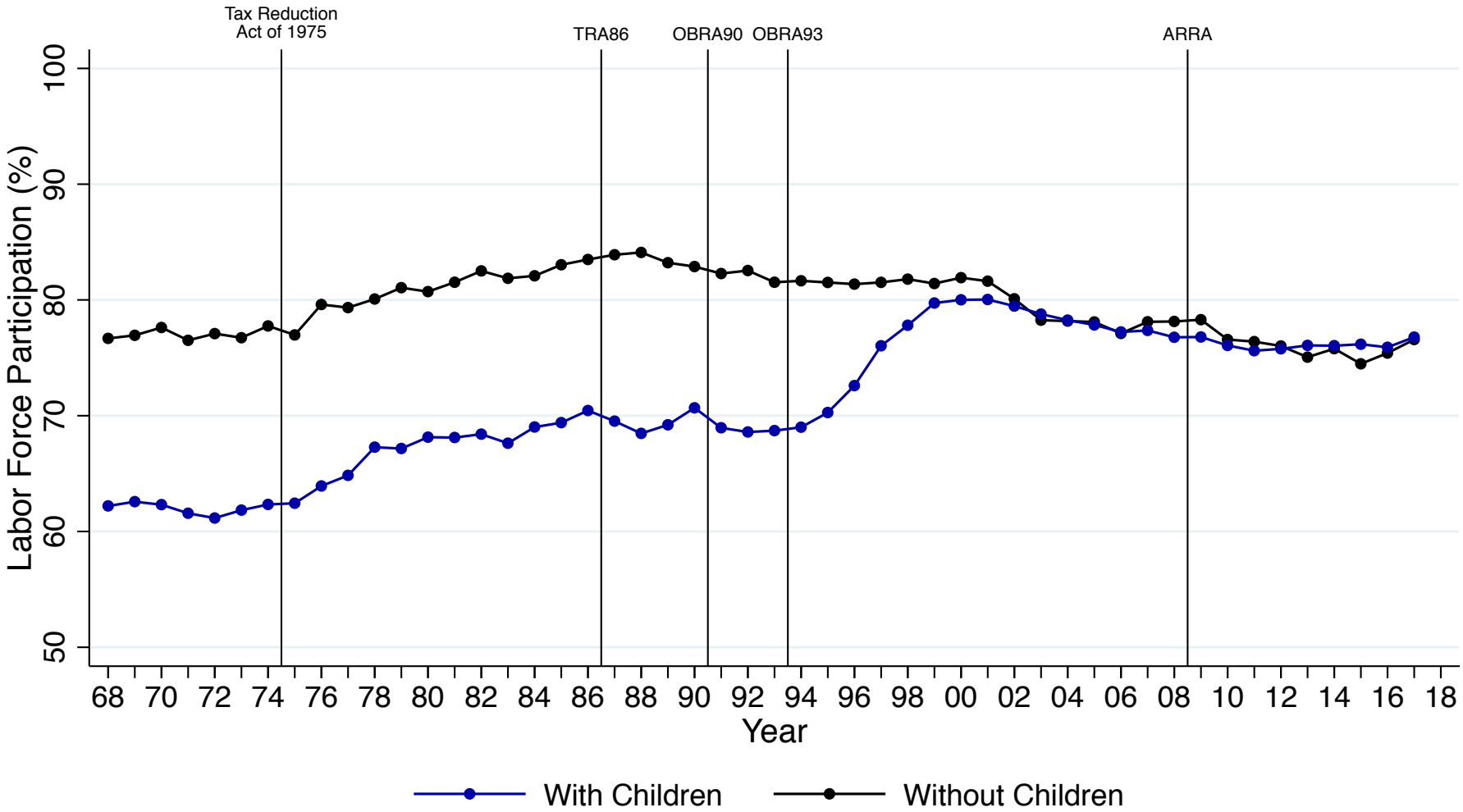

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Labor Force Participation of Single Women

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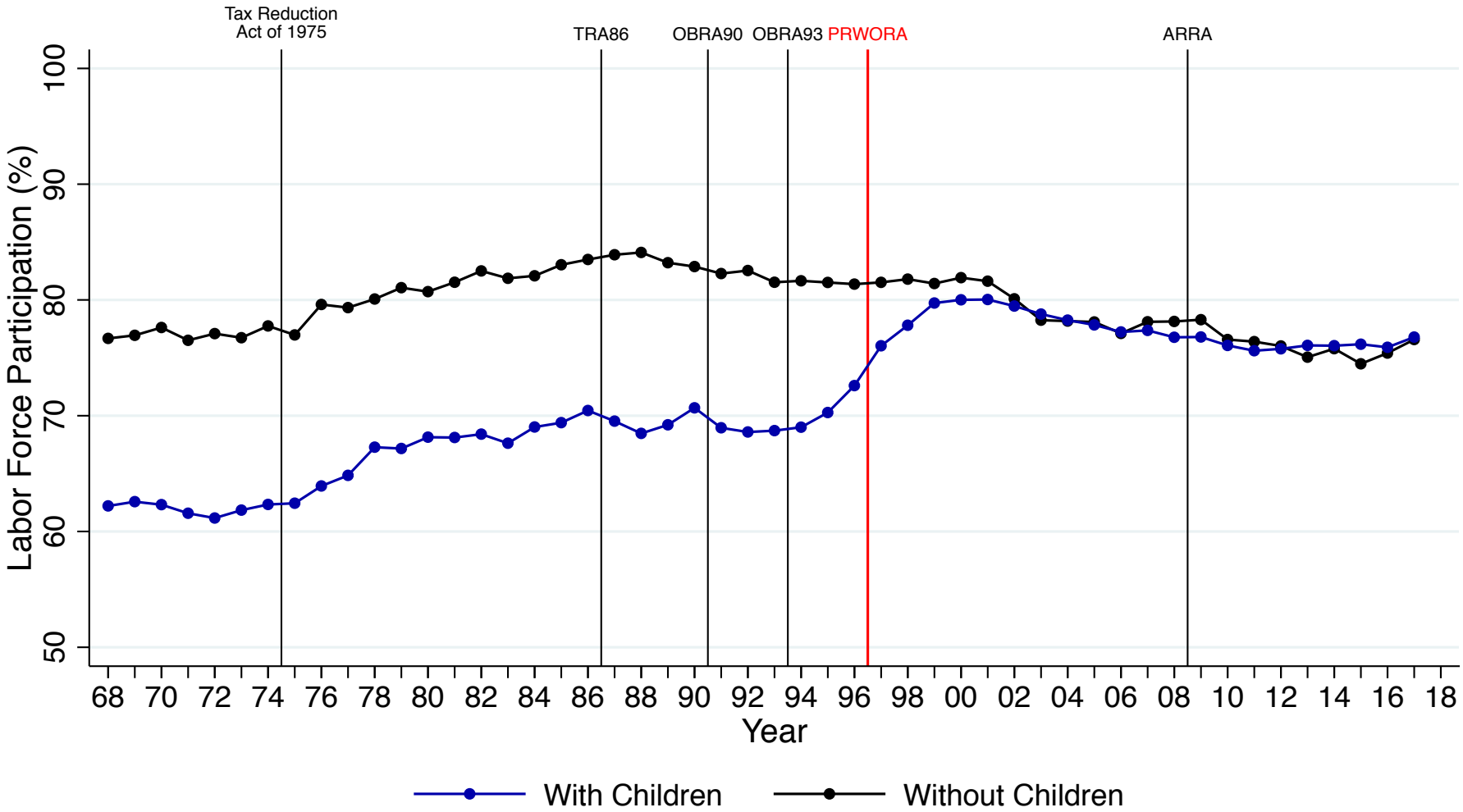

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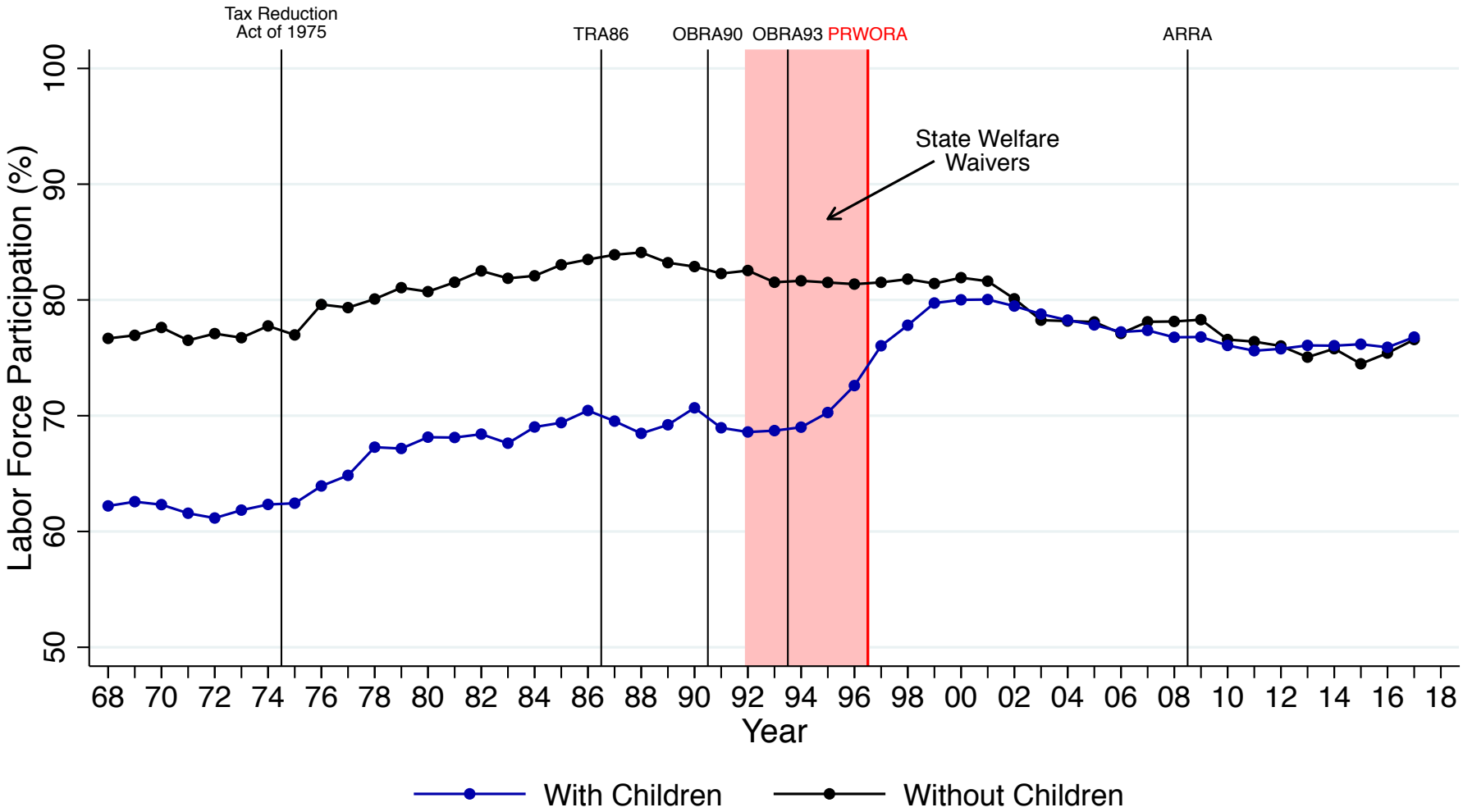

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Labor Force Participation of Single Women

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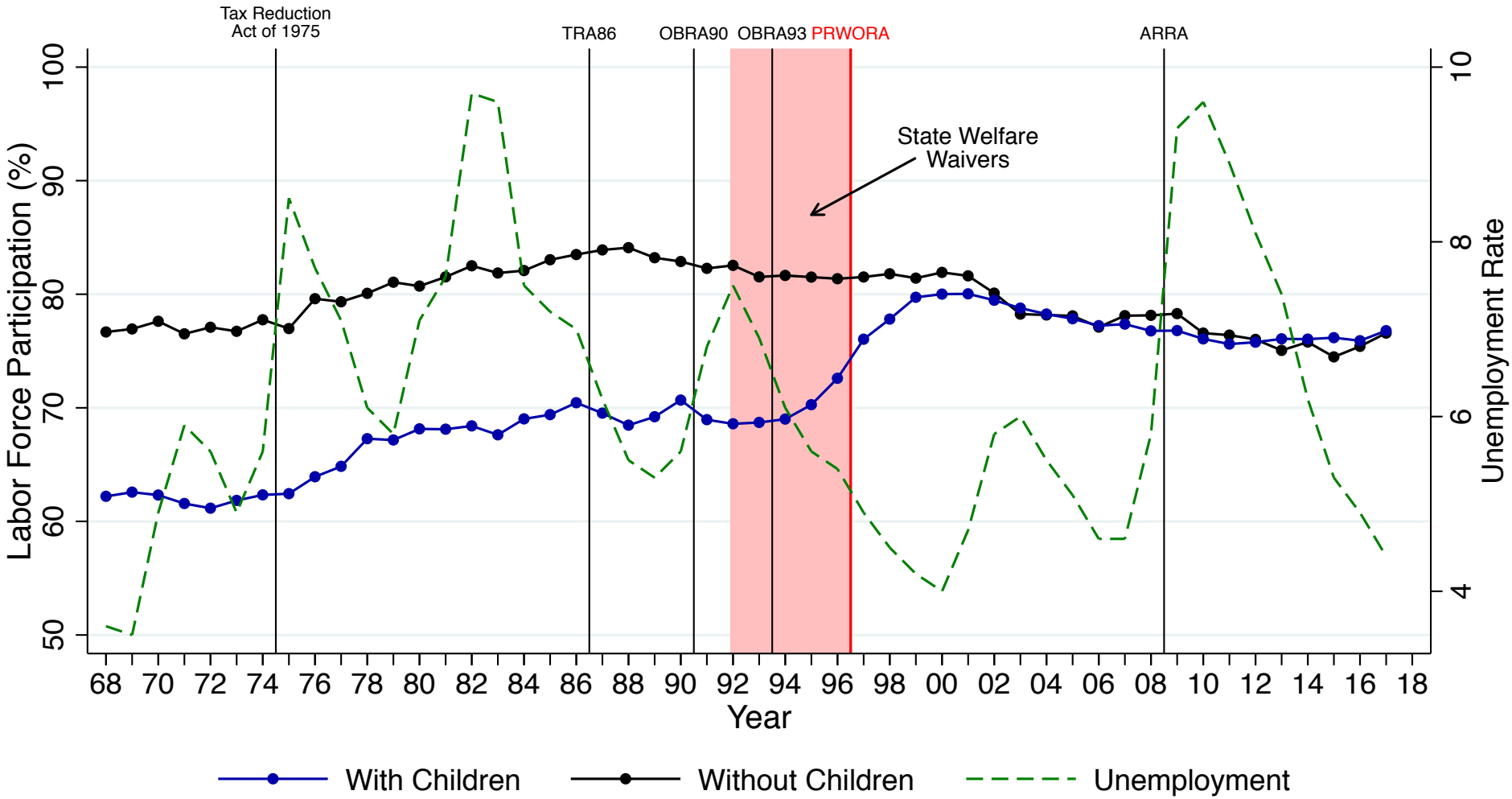

Source: Kleven (2018)

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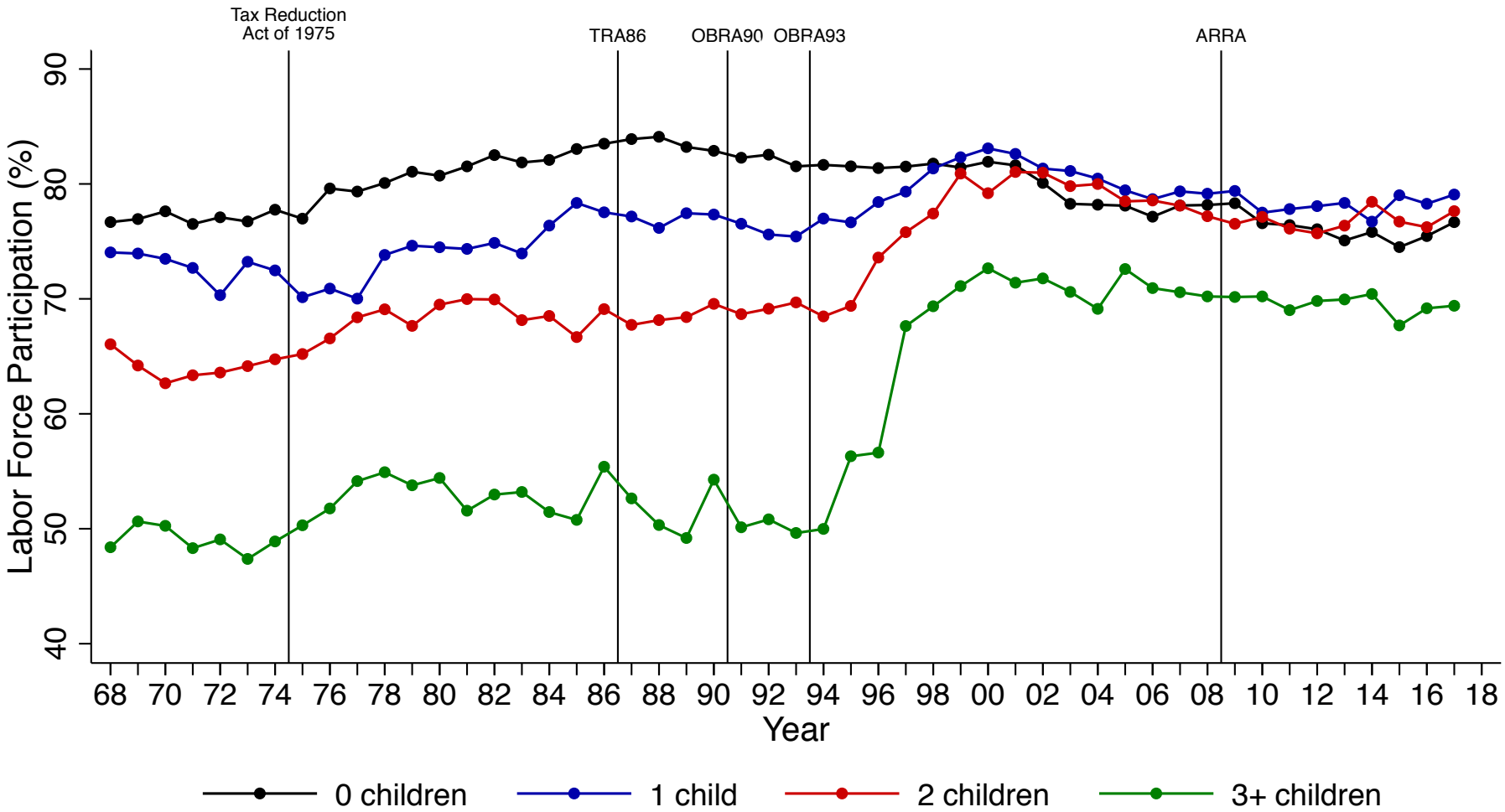
Labor Force Participation of Single Women

By Number of Children



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Labor Force Participation of Single Women

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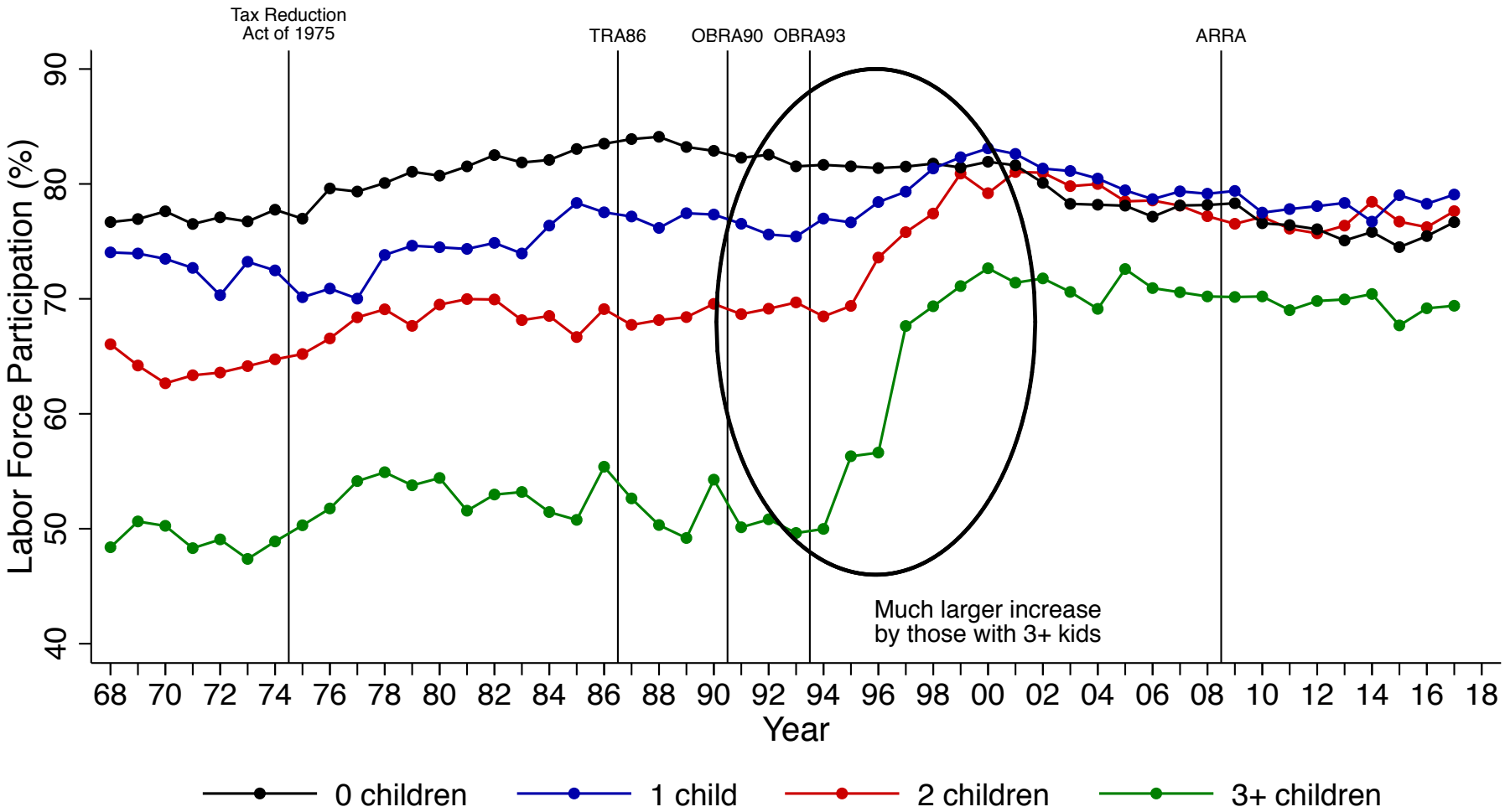

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Labor Force Participation of Single Women

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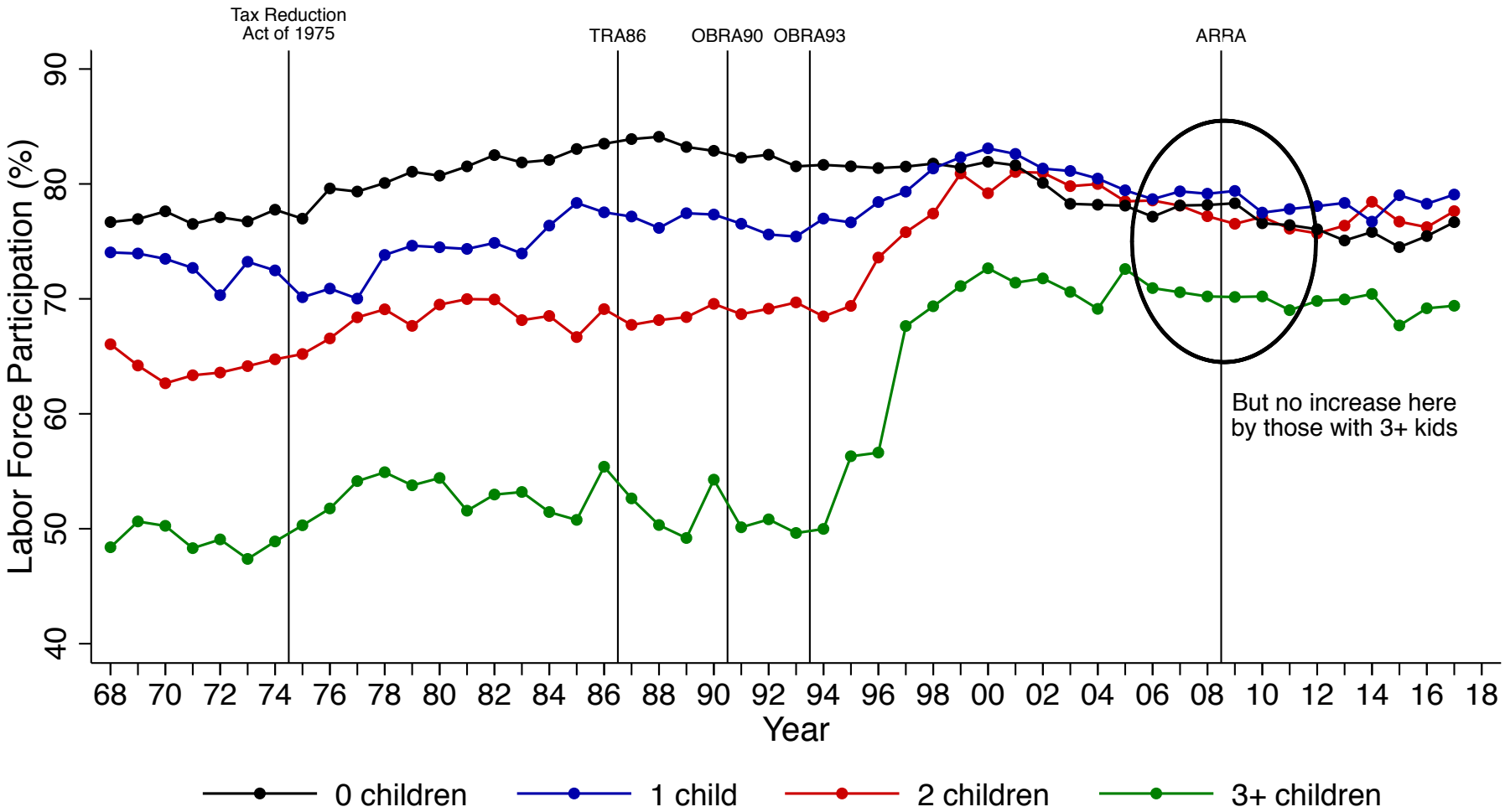
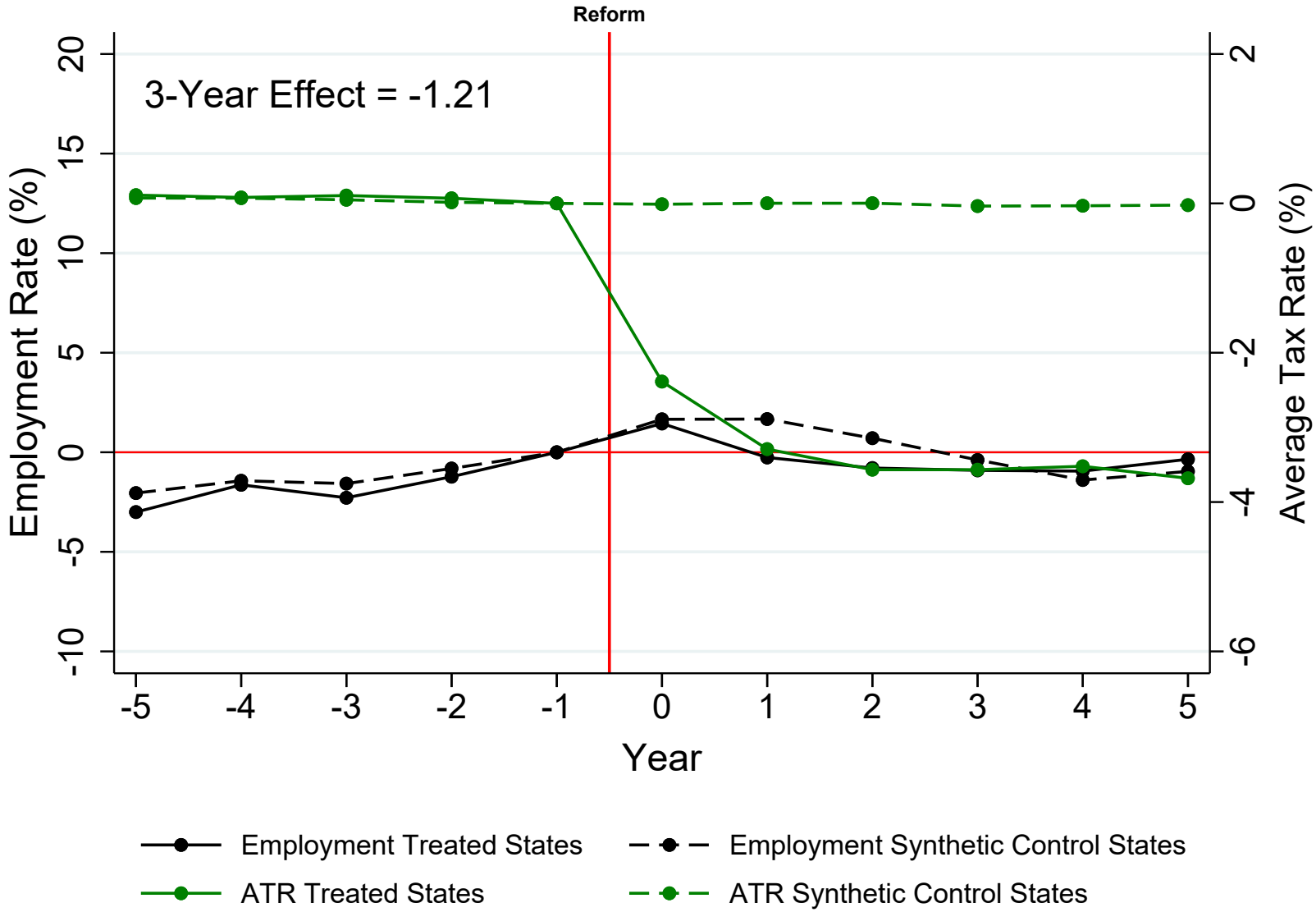


Source: Kleven (2018)

Annual Employment Low Education

Difference-in-Differences:

Treated vs Control States (With Kids)



WELFARE REFORM AND EITC EXPANSION: LABOR SUPPLY

Incredible increase in labor force participation of single mothers during the 1990s when welfare reform and EITC expansion happened

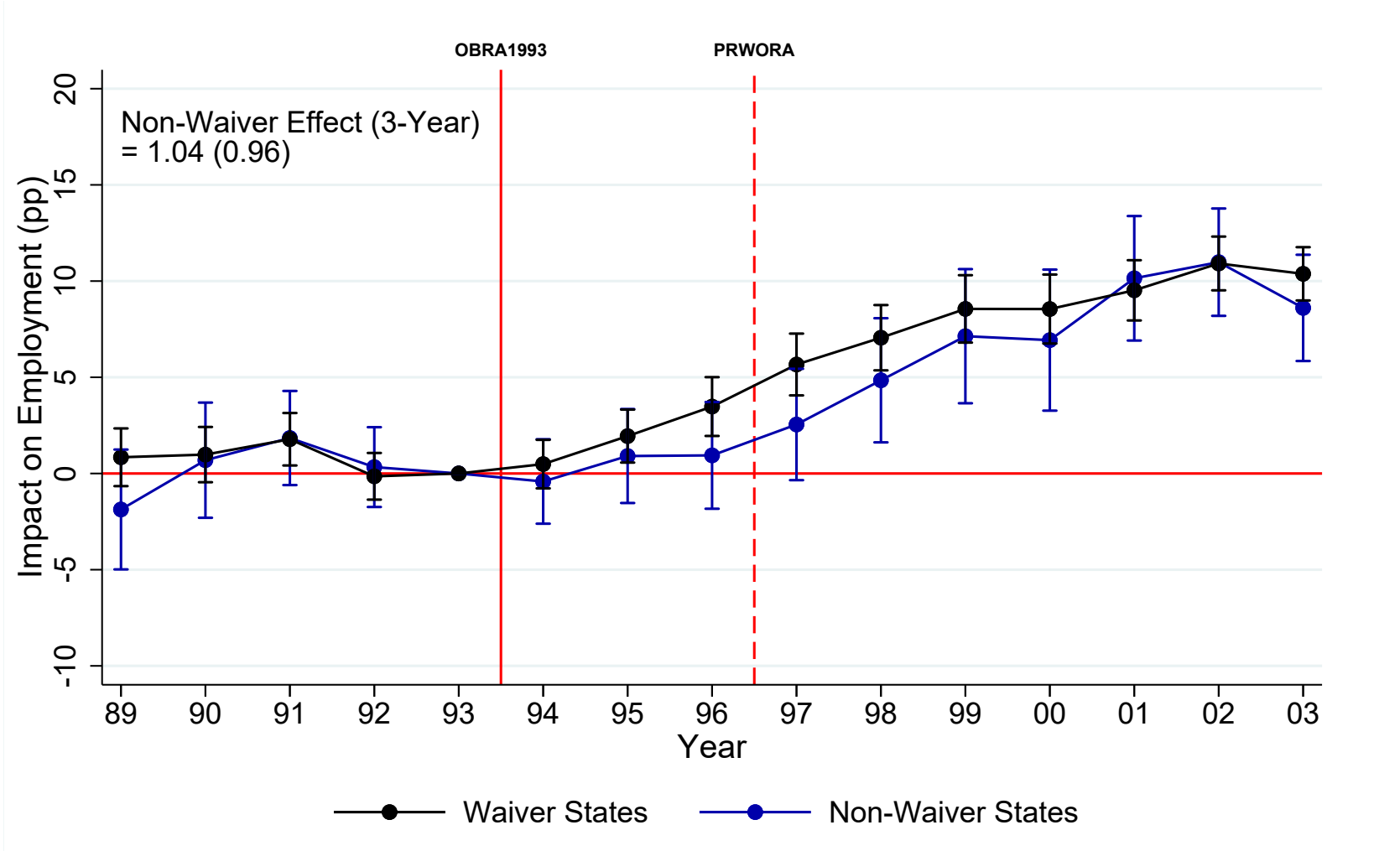
Unlikely that the EITC can explain it because other EITC changes haven't generated such large effects

Sociological evidence shows that welfare reform "scared" single mothers into working

Single moms in the US were suddenly expected to work

Kleven (2019): Maybe a unique combination of EITC reform, welfare reform, economic upturn, and changing social norms lead to this shift

FIGURE 16: HOW MUCH CAN BE EXPLAINED BY WELFARE WAIVERS?
ALL SINGLE WOMEN, WEEKLY EMPLOYMENT



Notes: This figure shows DiD event studies of the 1993 reform for waiver states (black series) and non-waiver states (blue series). Specifically, the series show estimates of the DiD coefficient γ_t from specification (2), implemented separately on states that ever approved statewide waiver legislation and those that did not. Both series include controls for demographics and unemployment. From Table A.3 in the appendix, there were 13 states without any statewide waiver legislation: Alabama, Alaska, District of Columbia, Kansas, Kentucky, Louisiana, Nevada, New Mexico, New York, Oklahoma, Pennsylvania, Rhode Island, and Wyoming. The extensive margin outcome is weekly employment. The sample includes single women aged 20-50 using the March and monthly CPS files combined. The 95% confidence intervals are based on robust standard errors clustered at the individual level.

BUNCHING AT KINKS (SAEZ AEJ-EP'10)

Key prediction of standard labor supply model: individuals should bunch at (convex) kink points of the budget set

1) The only non-parametric source of identification for intensive elasticity in a single cross-section of earnings is amount of bunching at kinks creating by tax/transfer system

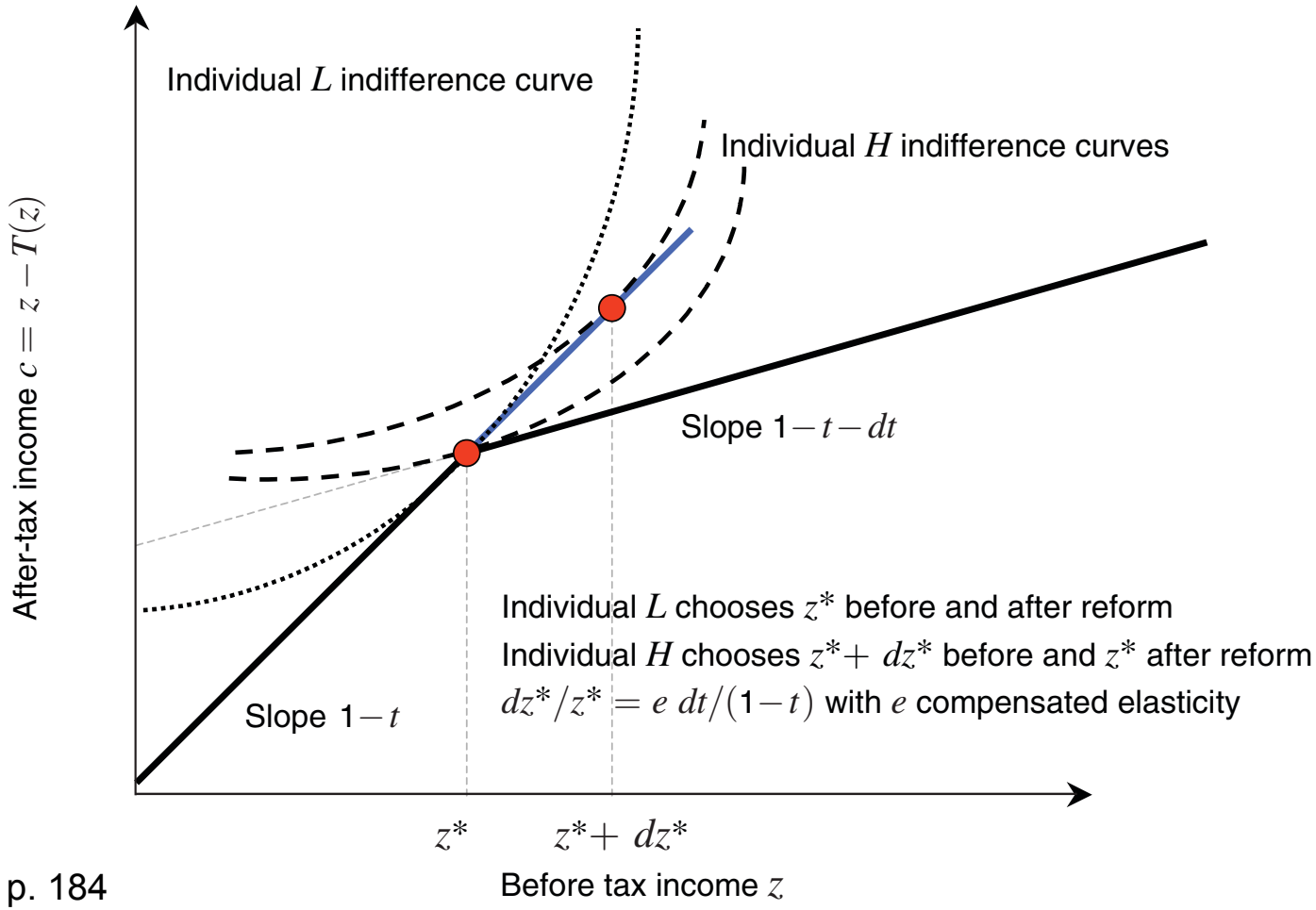
2) Saez '10 develops method of using bunching at kinks to estimate the compensated income elasticity

Formula for elasticity: $\varepsilon^c = \frac{dz/z^*}{dt/(1-t)}$ = excess mass at kink / change in NTR

$\Rightarrow$ Amount of bunching proportional to compensated elasticity

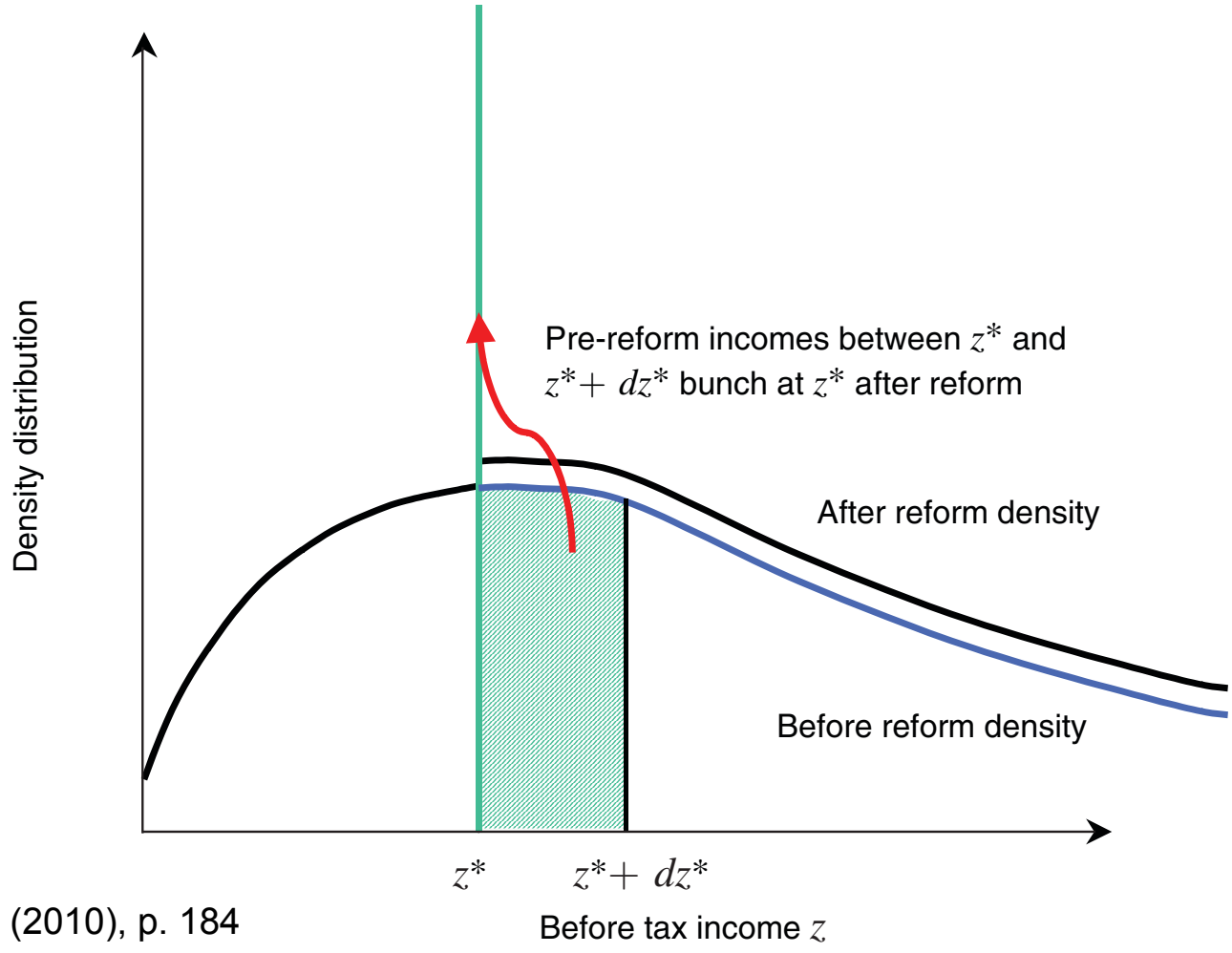
Blomquist-Newey 2017: Bunching method requires making assumptions on counterfactual density (but testable using tax changes see Londono-Avila '20 below)

Panel A. Indifference curves and bunching



Source: Saez (2010), p. 184

Panel B. Density distributions and bunching



Source: Saez (2010), p. 184

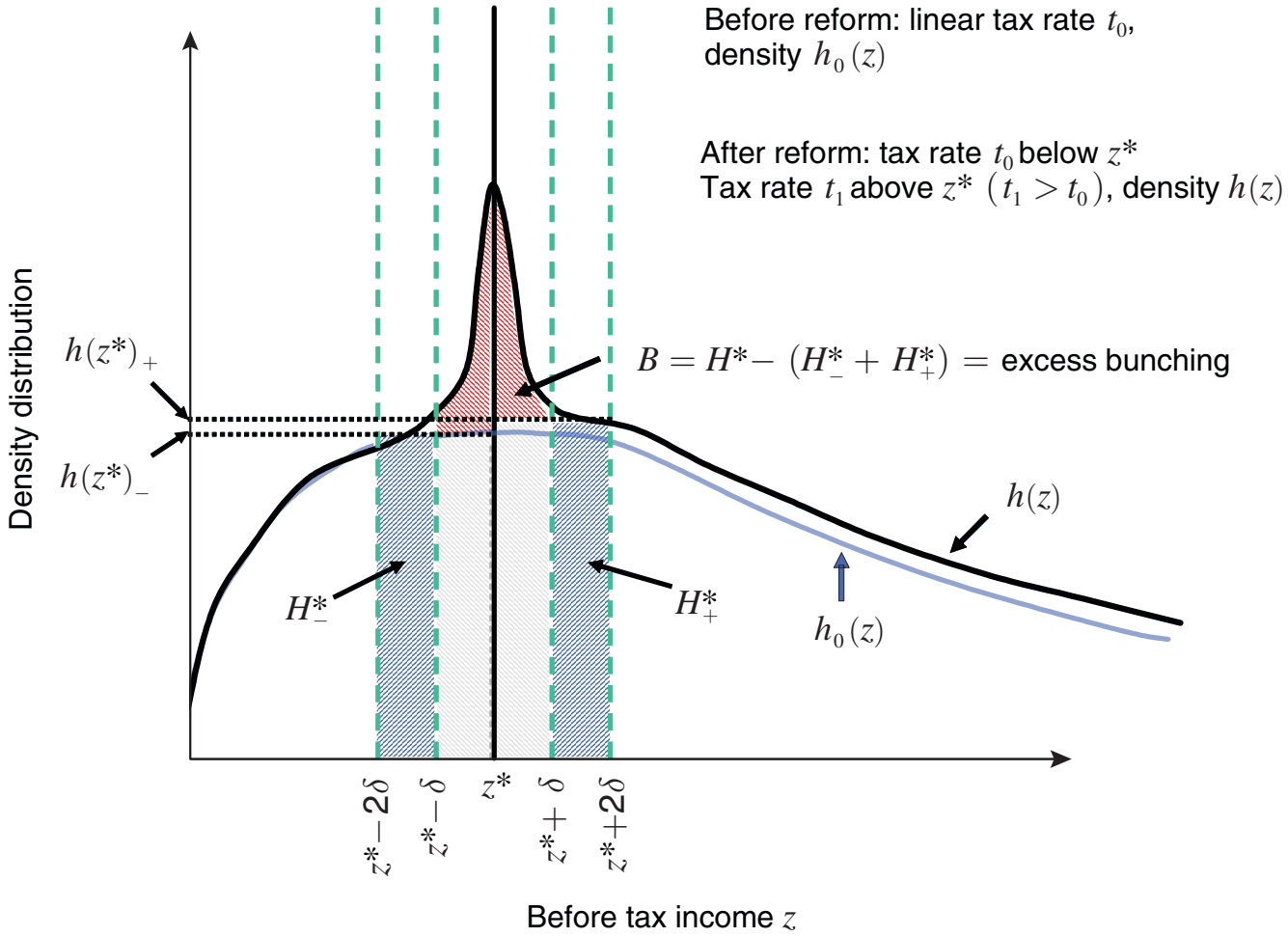


FIGURE 2. ESTIMATING EXCESS BUNCHING USING EMPIRICAL DENSITIES

BUNCHING AT KINKS (SAEZ AEJ-EP'10)

1) Uses individual tax return micro data (IRS public use files) from 1960 to 2004

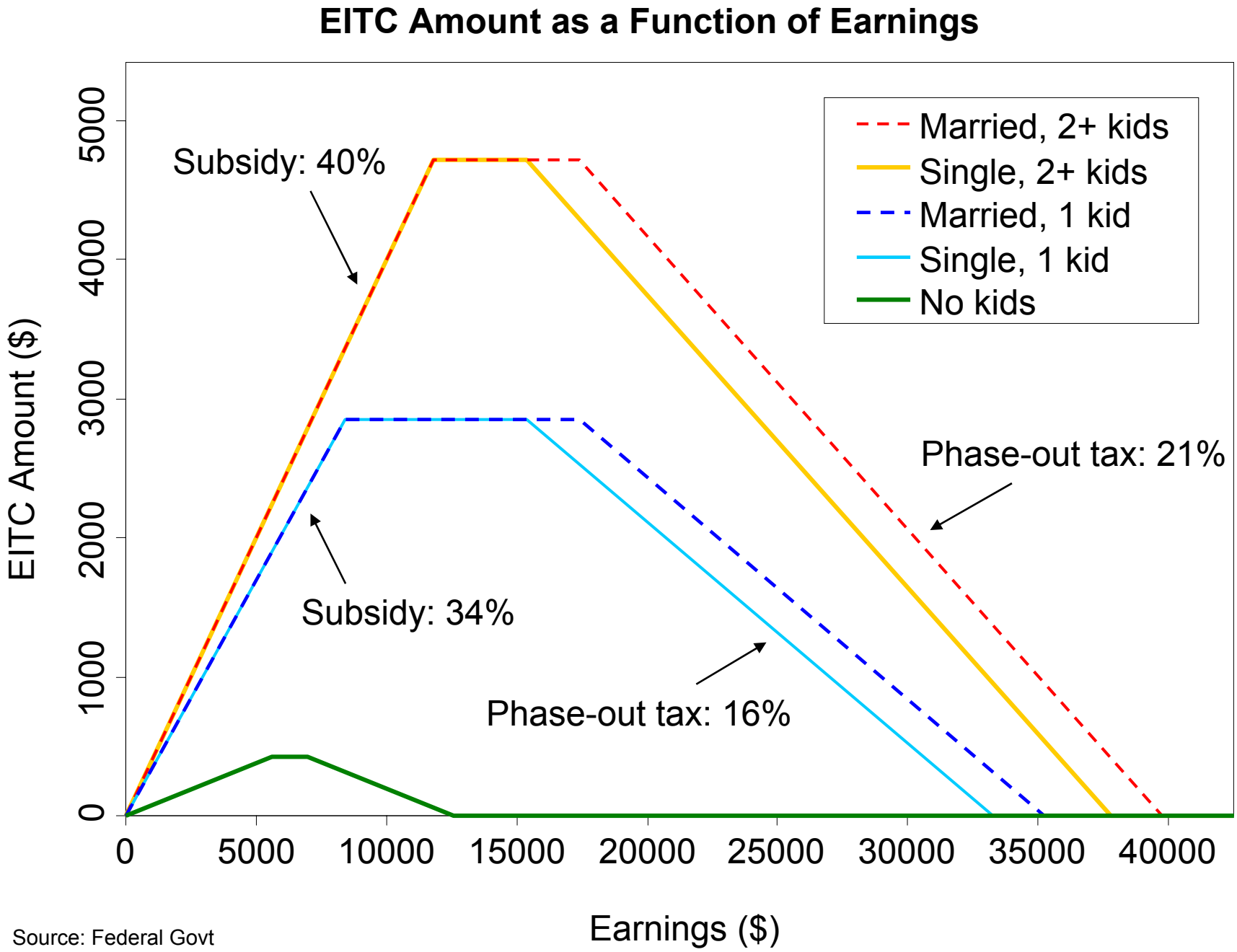
2) Advantage of dataset over survey data: very little measurement error

3) Finds bunching around:

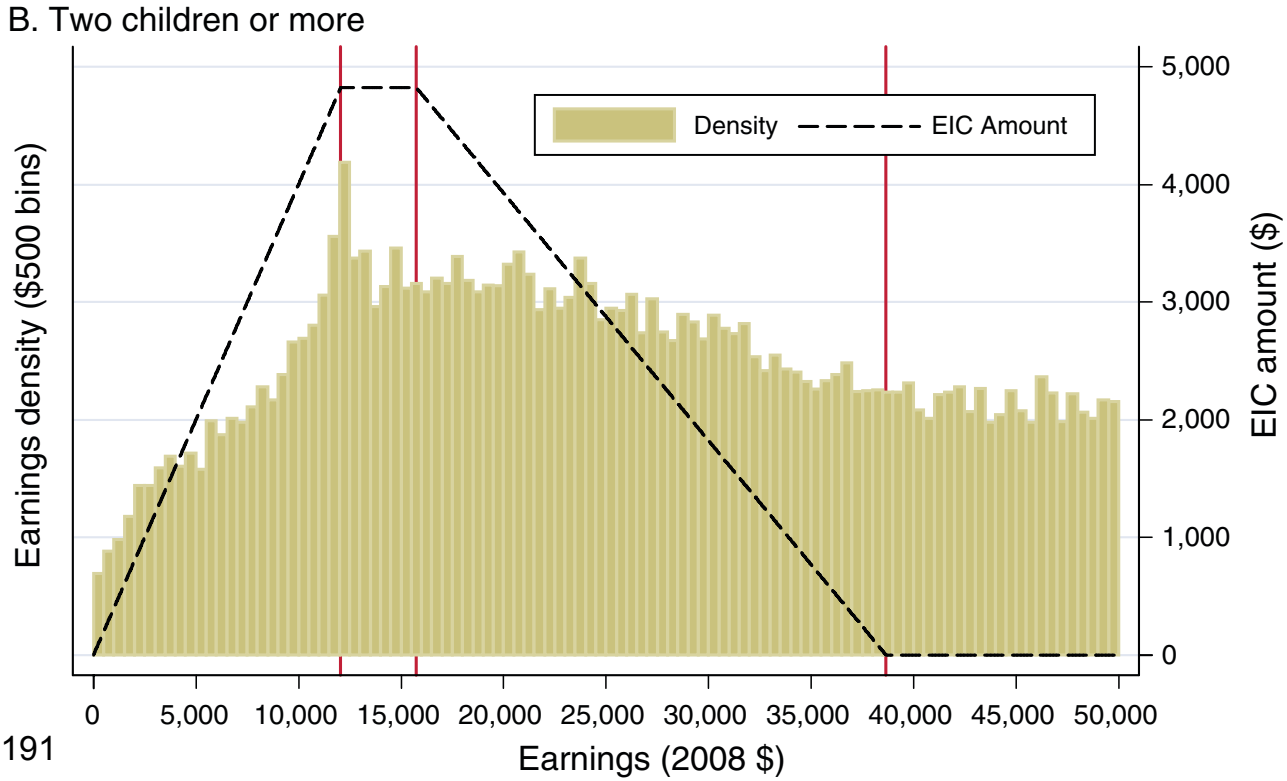
a) First kink point of the Earned Income Tax Credit (EITC), especially for self-employed

b) At threshold of the first tax bracket where tax liability starts, especially in the 1960s when this point was very stable

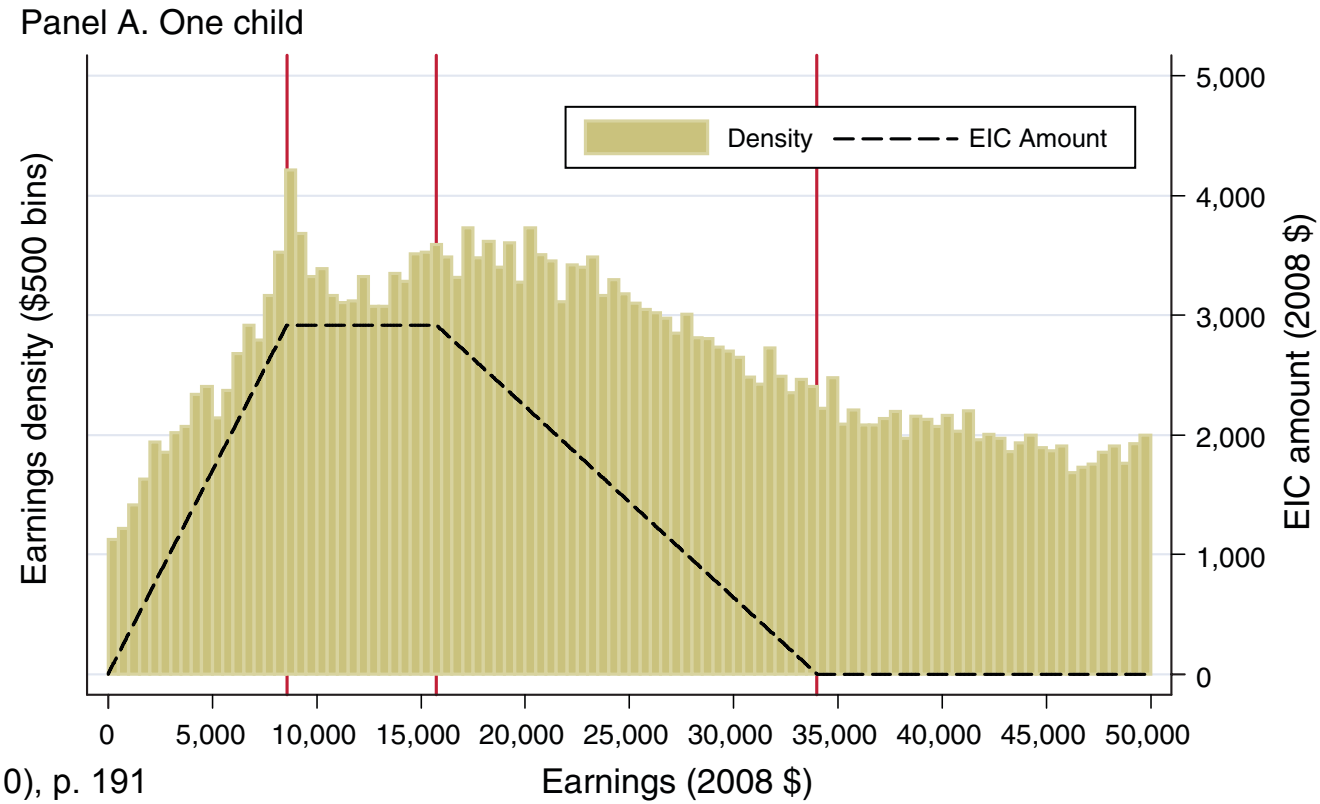
4) However, no bunching observed around all other kink points



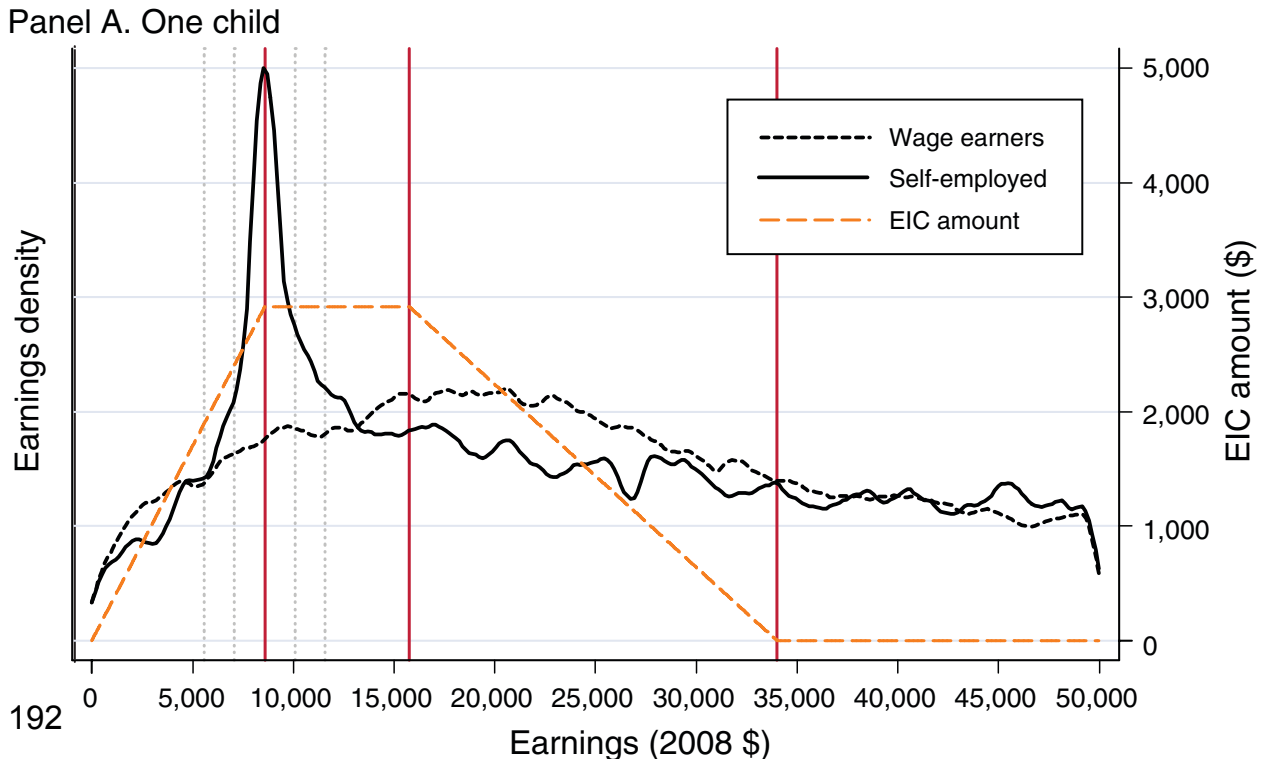
Source: Federal Govt



Source: Saez (2010), p. 191

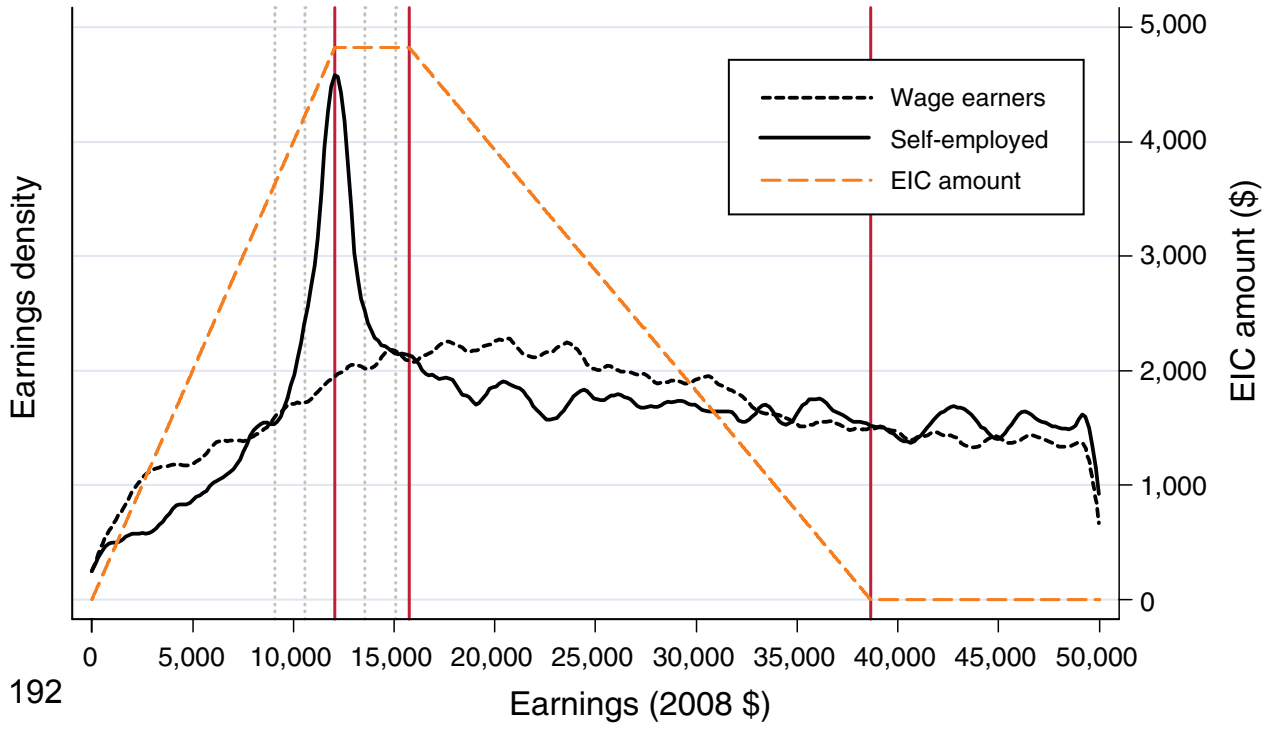


Source: Saez (2010), p. 191



Source: Saez (2010), p. 192

Panel B. Two or more children



Source: Saez (2010), p. 192

WHY NOT MORE BUNCHING AT KINKS?

1) True intensive elasticity of response may be small

2) Randomness in income generation process: Saez (1999) shows that year-to-year income variation too small to erase bunching if elasticity is large

3) Frictions: Adjustment costs and institutional constraints (Chetty, Friedman, Olsen, and Pistaferri QJE'11)

4) Information and salience

EITC BEHAVIORAL STUDIES

Evidence of response along extensive margin but little evidence of response along intensive margin (except for self-employed) $\Rightarrow$ Possibly due to lack of understanding of the program

Qualitative surveys show that:

Low income families know about EITC and understand that they get a tax refund if they work

However very few families know whether tax refund $\uparrow$ or $\downarrow$ with earnings

Such confusion *might* be good for the government as the EITC induces work along participation margin without discouraging work along intensive margin (Liebman-Zeckhauser '04, Rees-Jones and Taubinsky '16)

CHETTY, FRIEDMAN, SAEZ AER'13 EITC HETEROGENEITY

Use US population wide tax return data since 1996 (through IRS special contract)

1) Substantial heterogeneity in fraction of EITC recipients bunching (using self-employment) across **geographical areas**

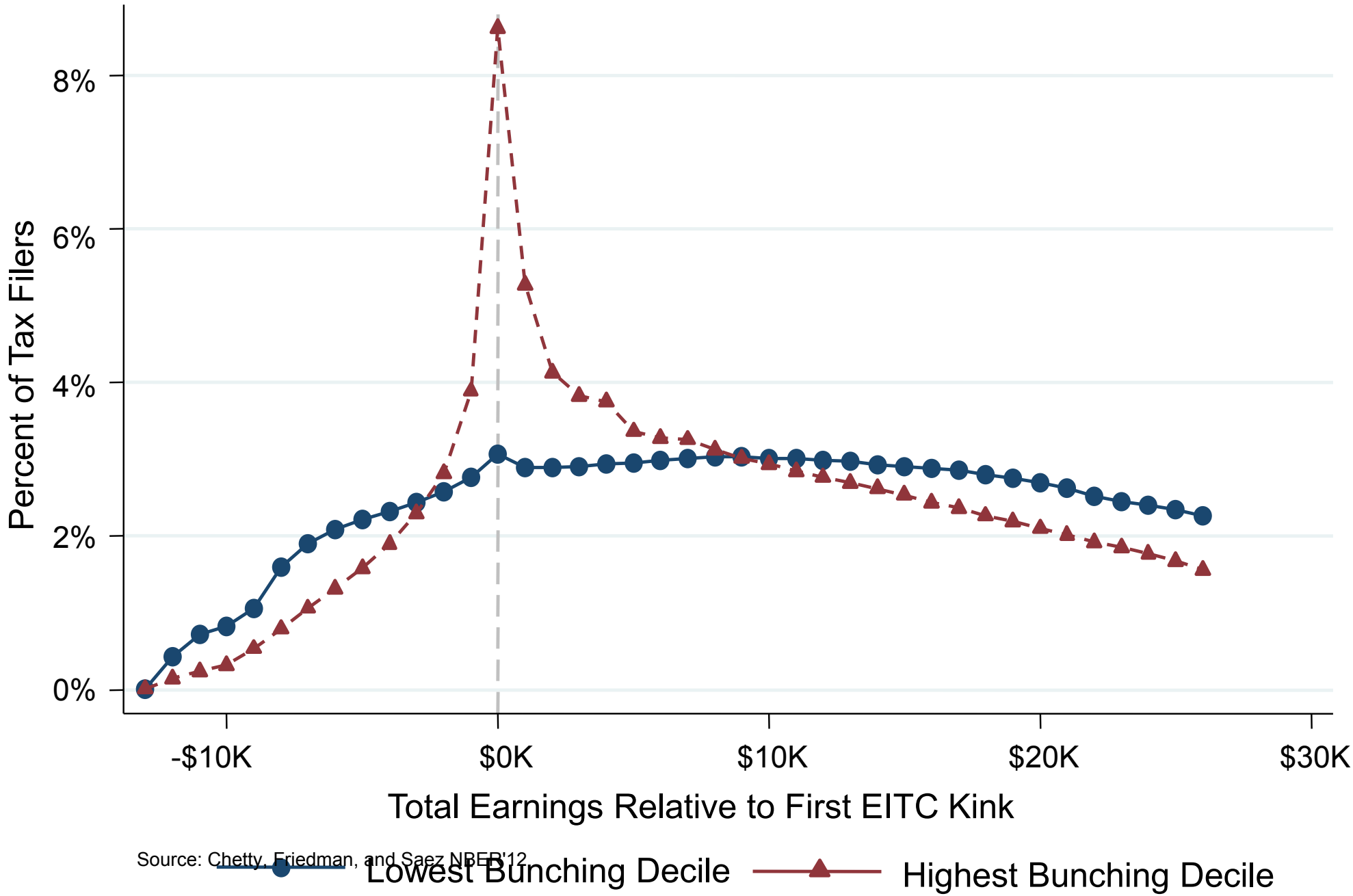
$\Rightarrow$ Information on EITC varies across areas and grows overtime

2) Places with high self-employment EITC bunching display **wage earnings** distribution more concentrated around plateau

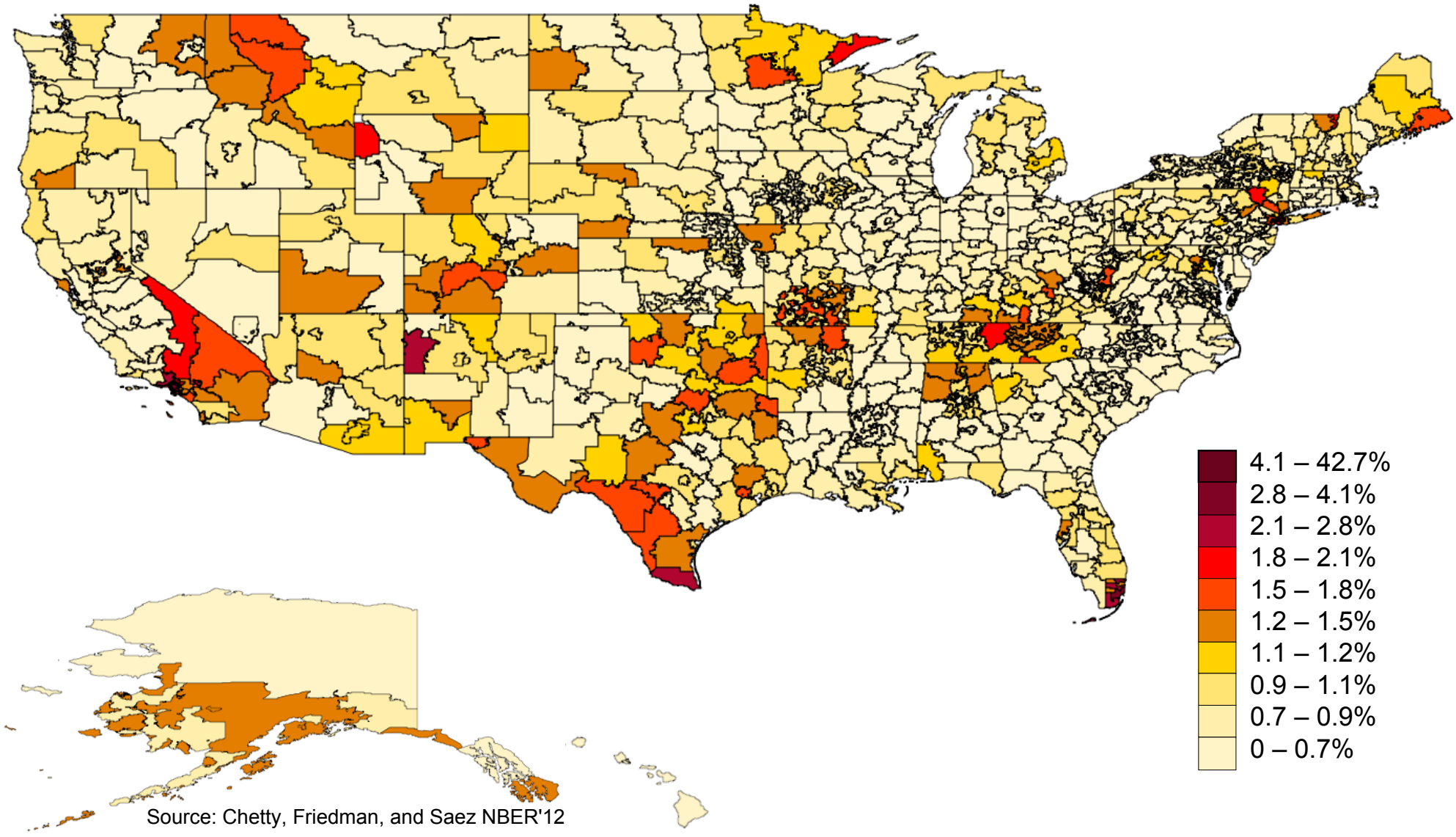
3) Omitted variable test: use birth of first child to test causal eff'EITC on wage earnings

$\Rightarrow$ Evidence of wage earnings response to EITC along intensive margin

Earnings Distributions in Lowest and Highest Bunching Deciles

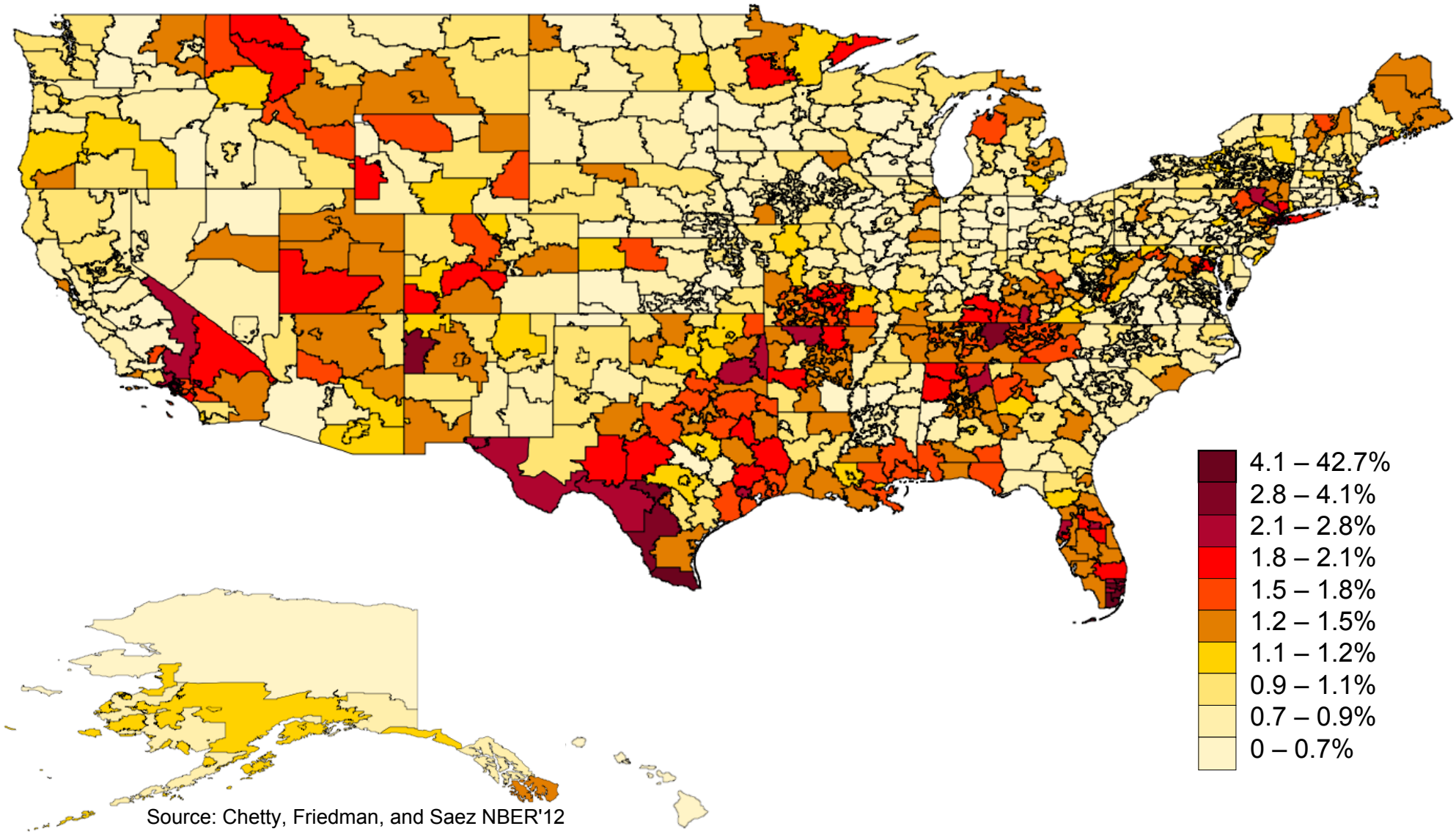


Fraction of Tax Filers Who Report SE Income that Maximizes EITC Refund in 1996



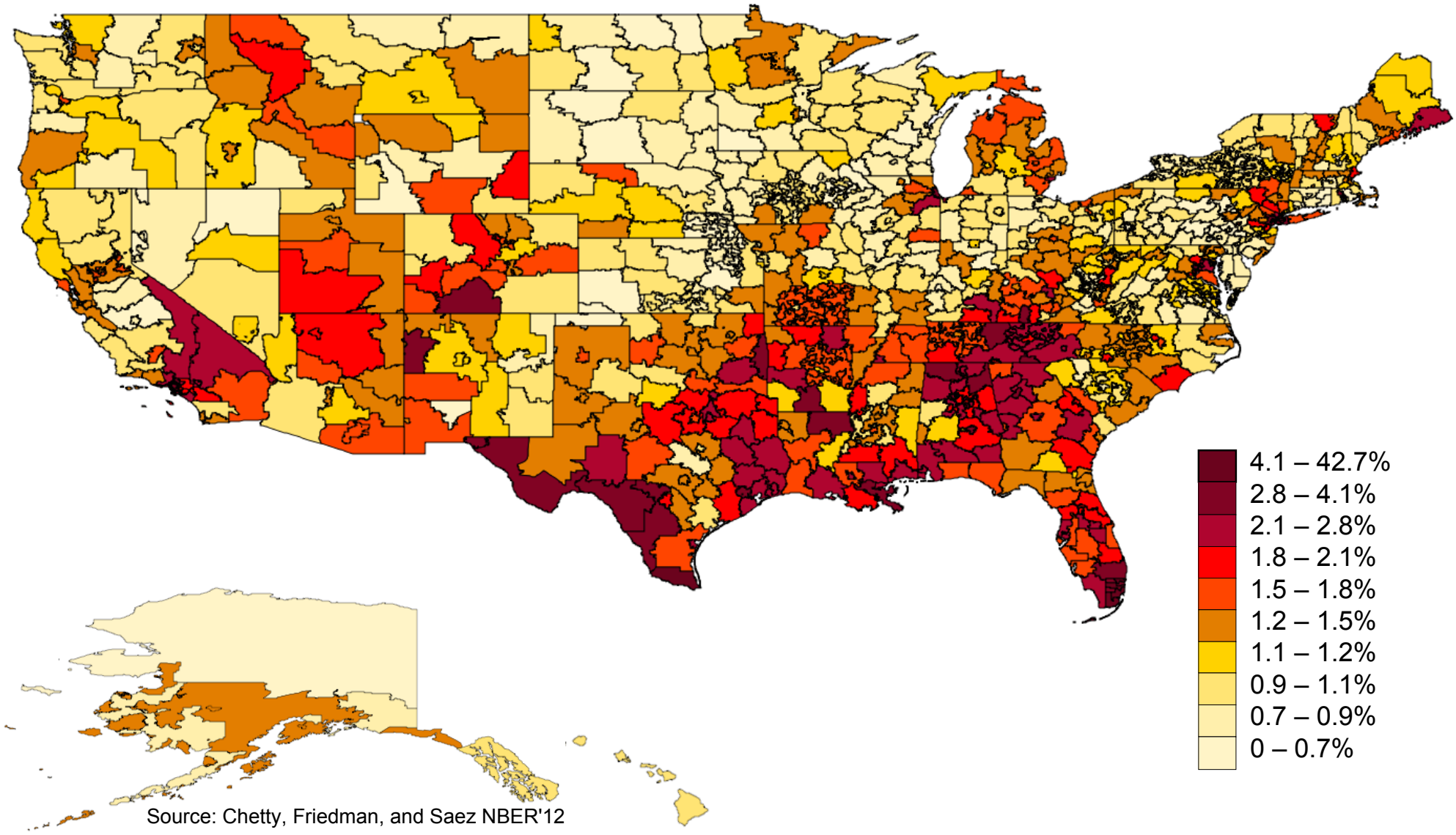
Source: Chetty, Friedman, and Saez NBER'12

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



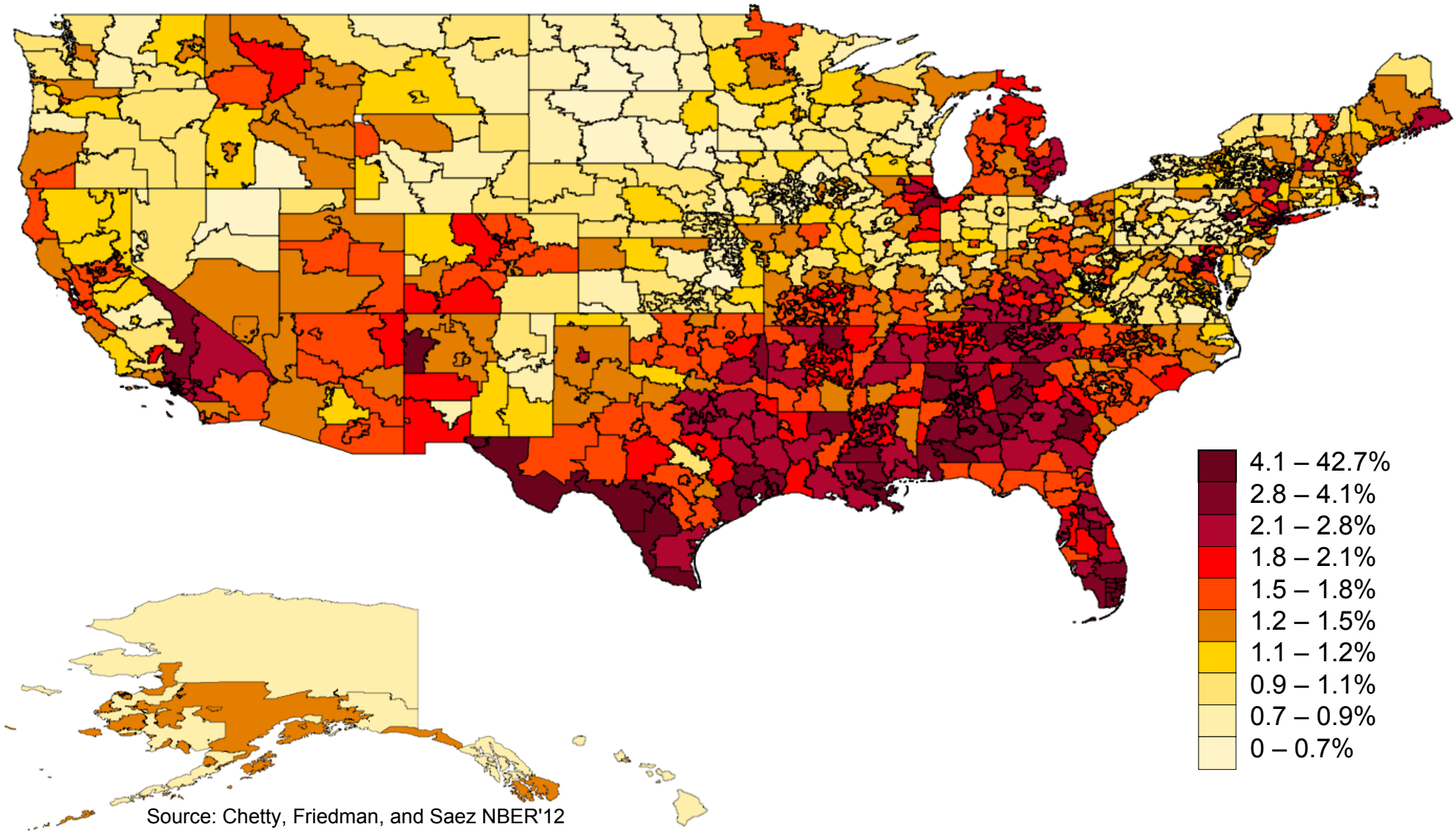
Source: Chetty, Friedman, and Saez NBER'12

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



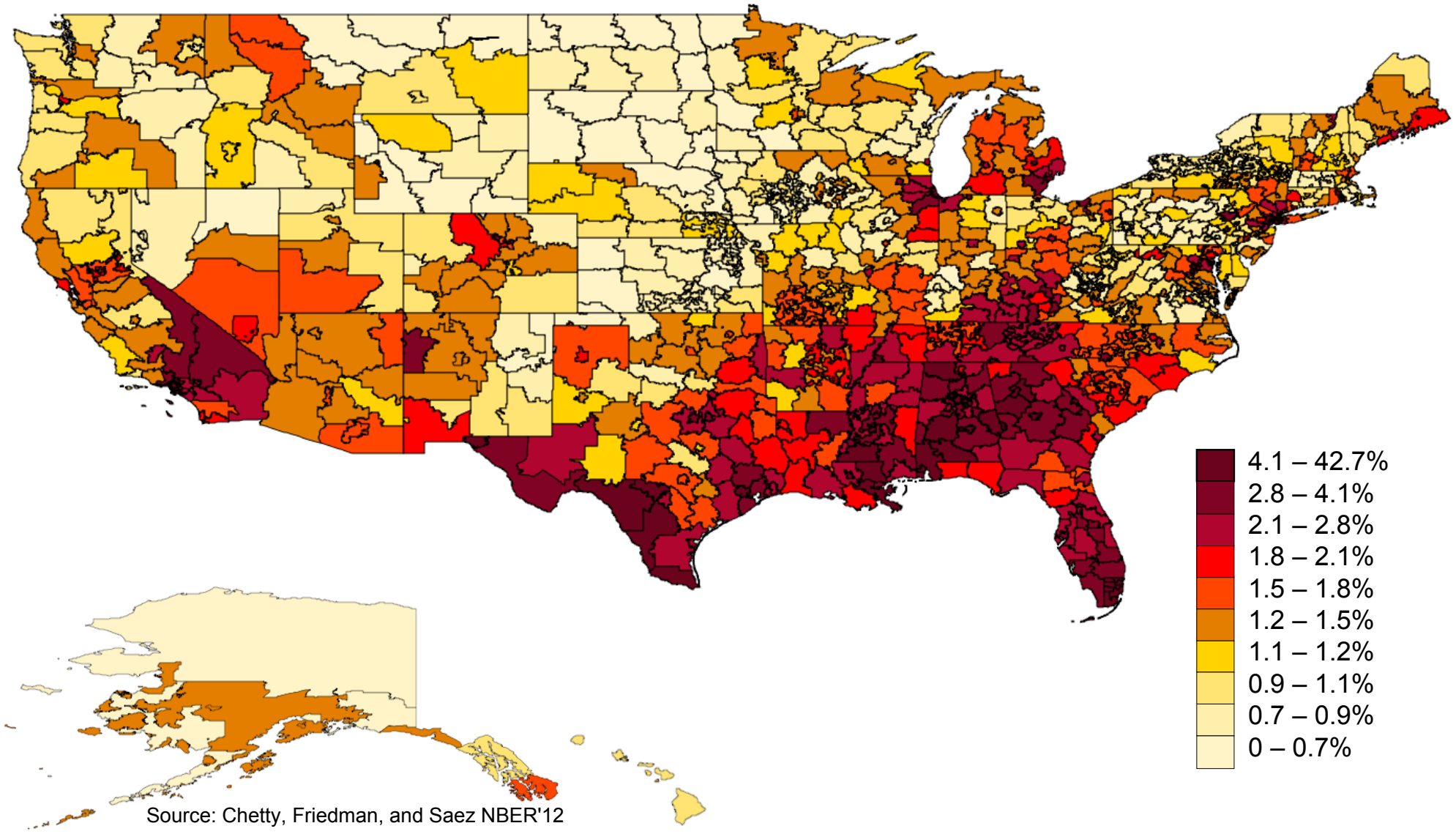
Source: Chetty, Friedman, and Saez NBER'12

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



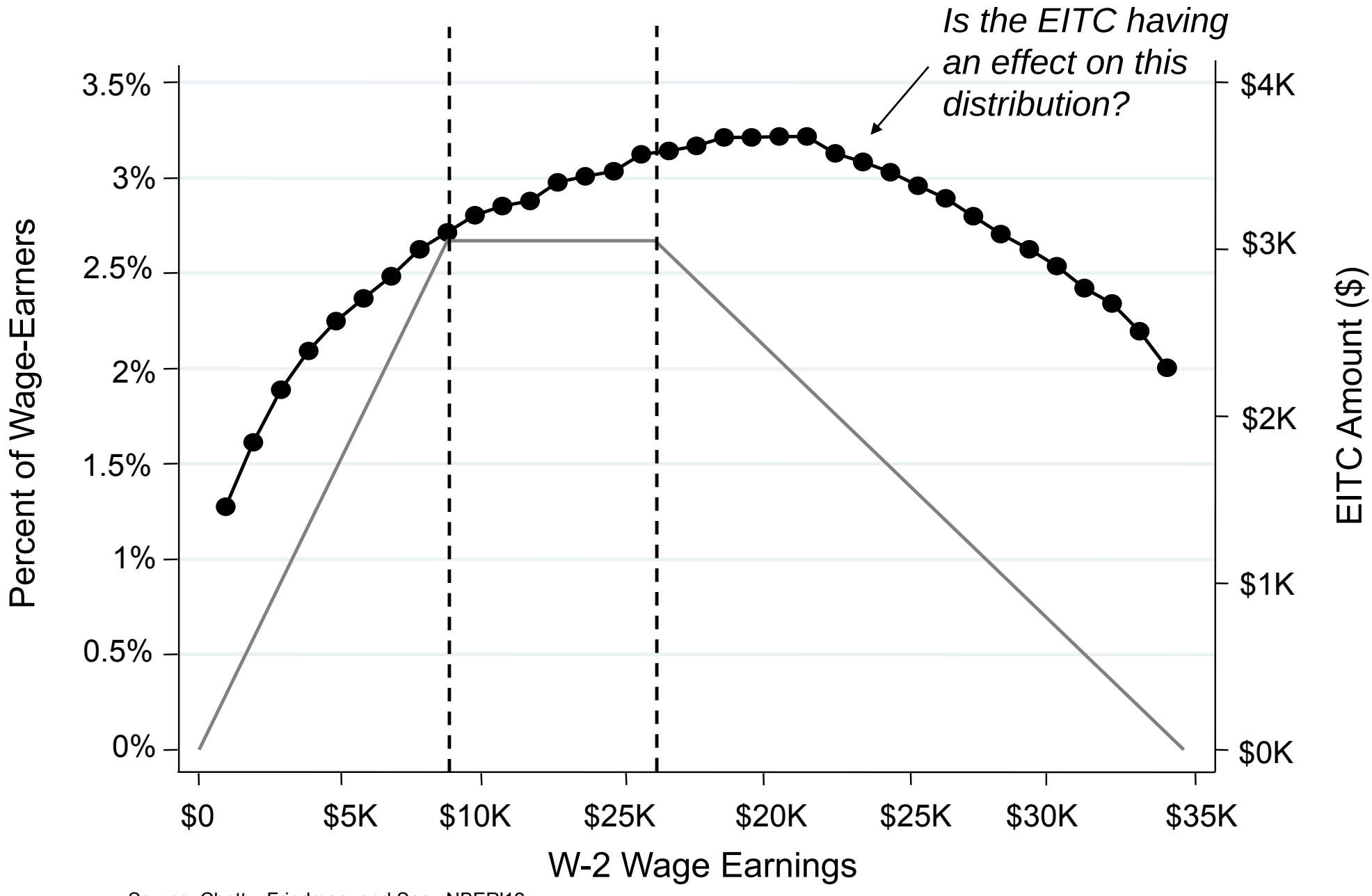
Source: Chetty, Friedman, and Saez NBER'12

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

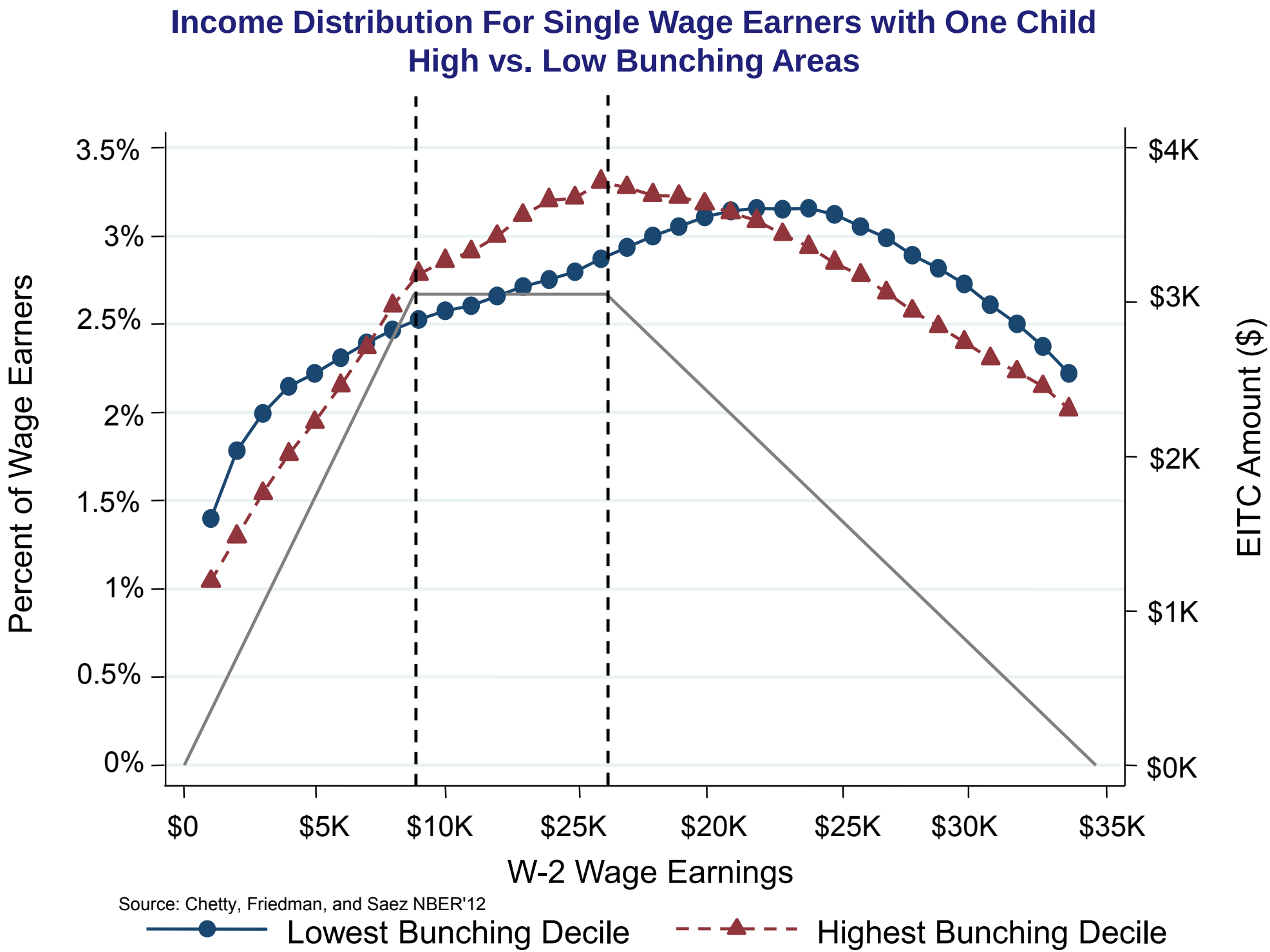


Source: Chetty, Friedman, and Saez NBER'12

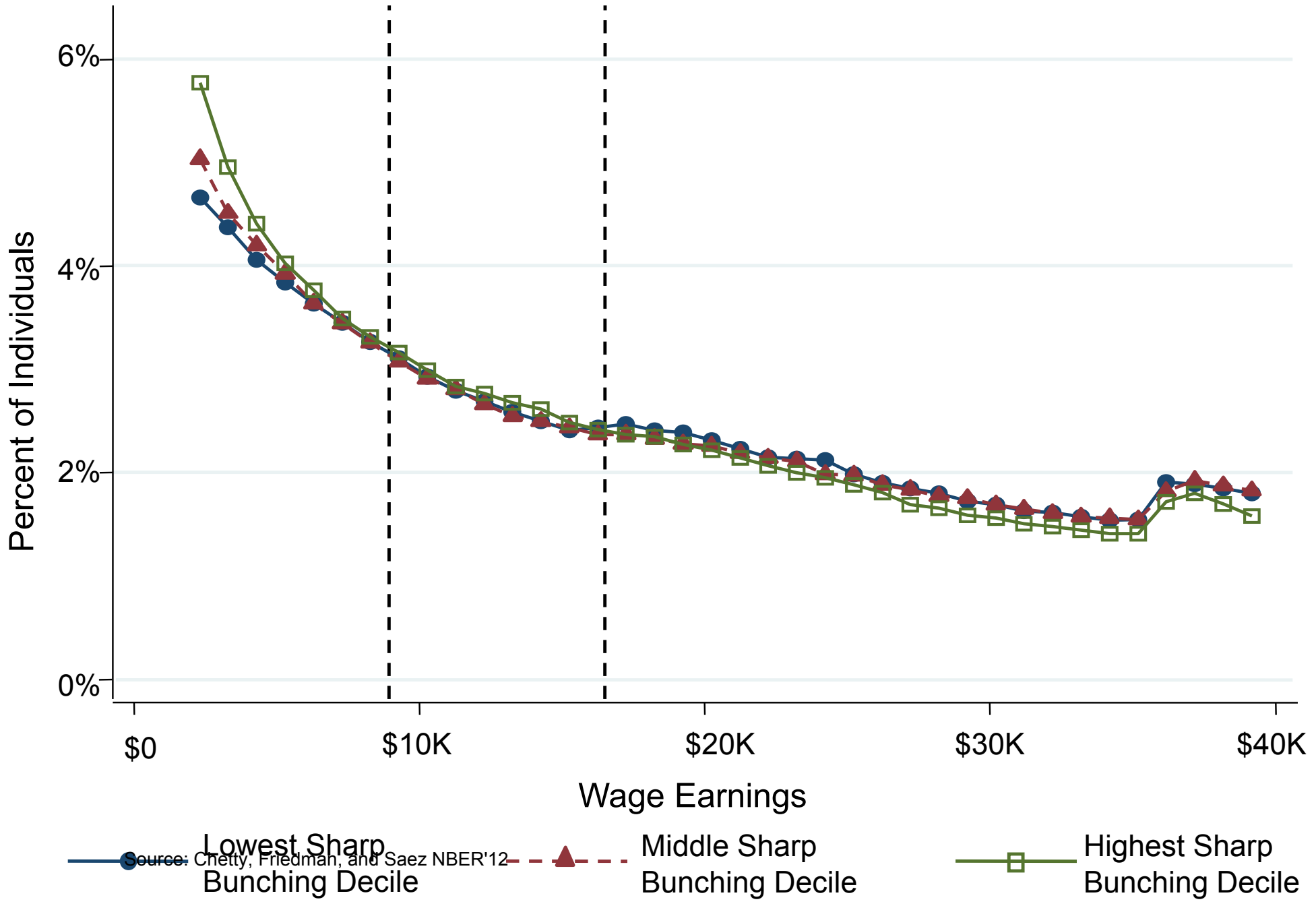
Income Distribution For Single Wage Earners with One Child



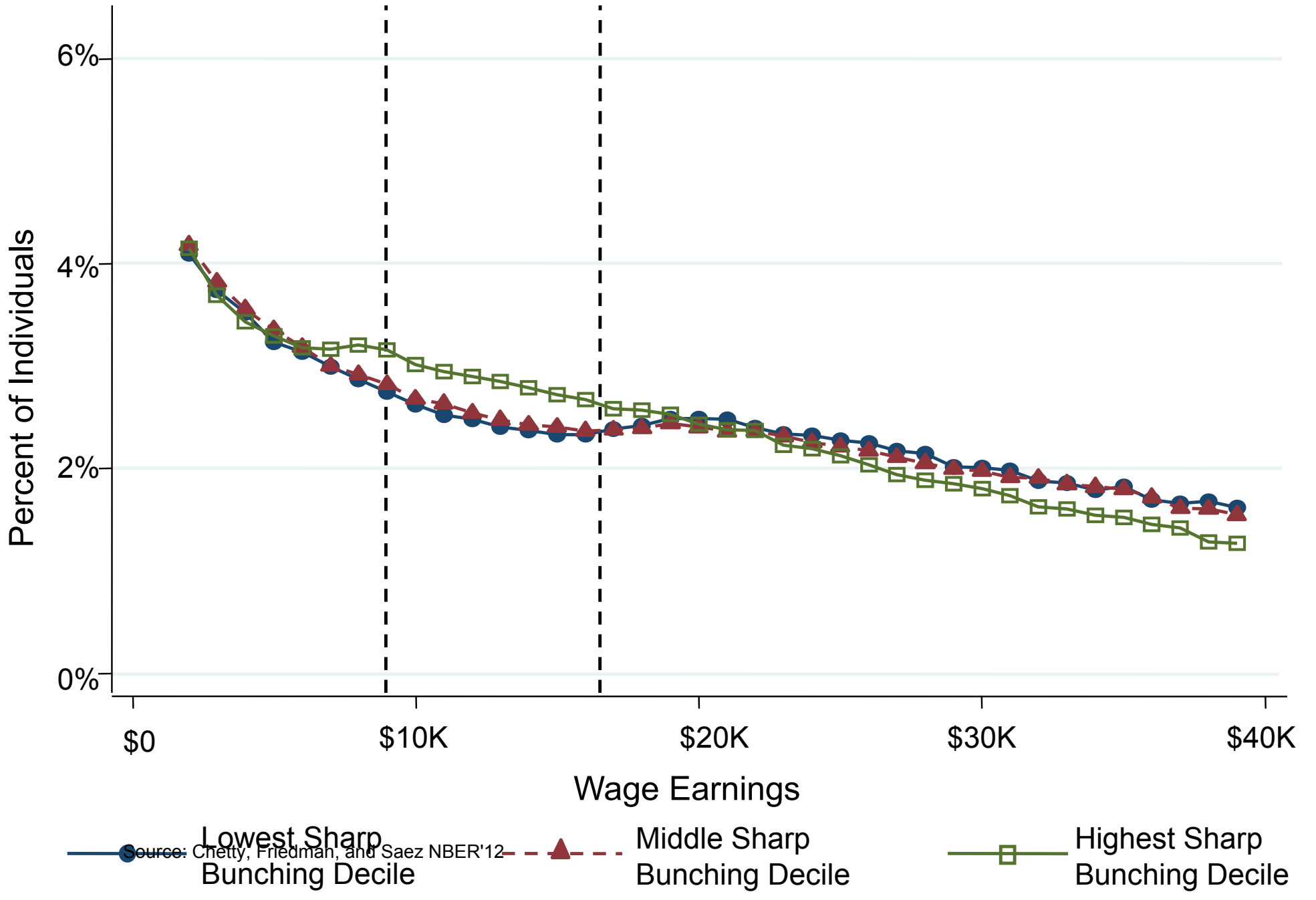
Source: Chetty, Friedman, and Saez NBER'12


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
$0
$5K
$10K
$25K
$20K
$25K
$30K
$35K
W-2 Wage Earnings
Source: Chetty, Friedman, and Saez NBER'12
Lowest Bunching Decile
Highest Bunching Decile

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



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



IMPLICATIONS OF ROLE OF INFORMATION

Empirical work:

Information should be a key explanatory variable in estimation of behavioral responses to govt programs

When doing empirical project, always ask the question: did people affected understand incentives?

Cannot identify structural parameters of preferences without modeling information and salience

Normative analysis:

Information is a powerful and inexpensive policy tool to affect behavior

Should be incorporated into optimal policy design problems

VALUE OF ADMINISTRATIVE DATA

Key advantages of admin data (in most advanced countries such as Scandinavia):

1) Size (often full population available)

2) Longitudinal structure (can follow individual across years)

3) Ability to match wide variety of data (tax records, earnings records, family records, health records, education records)

US is lagging behind in terms of admin data access [hard to match across agencies]

Private sector also generates valuable **big data** (Google, Credit Bureaus, personnel/health data from large companies)

ADVANCE EITC

Recipients get EITC with tax refund in a single annual refund in Feb year $t+1$ which seems suboptimal: (a) free interest loan to govt and (b) harder to smooth consumption [surveys show that primary use of tax refund is to pay overdue bills]

Tax filers have option to use Advance EITC to get part of EITC in the paycheck by filing a W5 form with employer [reverse of tax withholding]: take up extremely low ($<$2%)

Possible explanation: (a) Information, (b) Lack of employer cooperation, (c) Risk of owing taxes if not EITC eligible, (d) Tax filers like big refunds, (e) Inertia (default is no Advance EITC)

ADVANCE EITC

Jones AEJ-AP'10 carries a randomized experiment with large employer to encourage take-up and gets significant but very small take-up effect suggesting that (a) [Information] and (b) [Employer cooperation] cannot explain low take-up

(d) [Love of refunds] seems plausible but (1) not supplied by market absent refunds [employers could also pay part of wages as annual lumpsum], (2) A-EITC use has not increased with EITC expansions

(c) [Risk of owing taxes] and (e) [Inertia] are likely part of the explanation

Interesting research topic: Have big tax refunds fueled low income credit [tax refund loans, payday loans, etc.]? Are big refunds useful forced saving mechanisms?

Biden expanded Child Tax Credit was 50% monthly

BUNCHING AT NOTCHES

Taxes and transfers sometimes also generate **notches** (=discontinuities) in the budget set

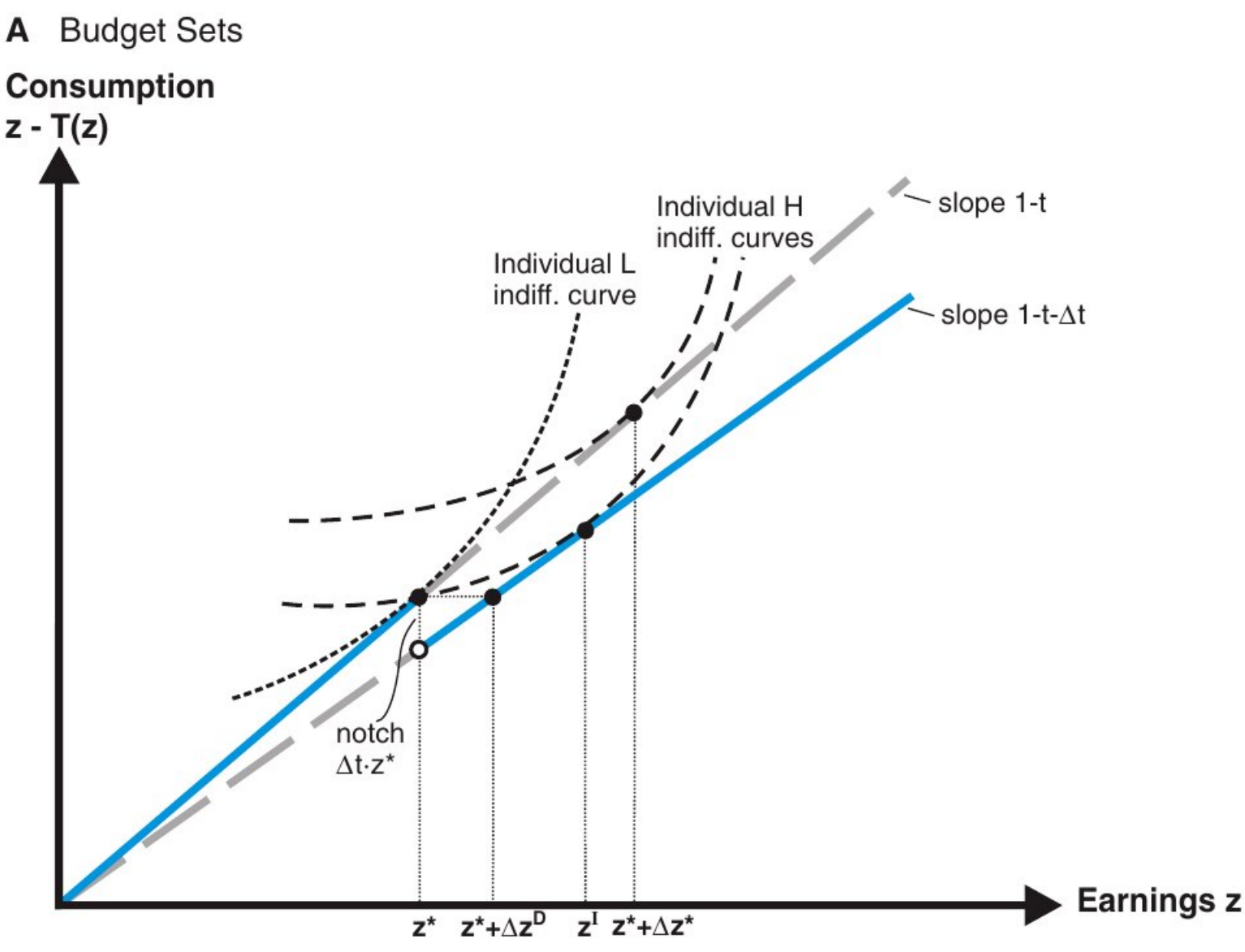
Such discontinuities should create bunching (and gaps) in the resulting distributions

Kleven and Waseem QJE'13 pioneered tax notch analysis in the case of the Pakistani income tax where **average** tax rate jumps

$\Rightarrow$ Bunching below the notch and gap in density just above the notch

Recently Londono-Velez and Avila (2020) use notch analysis to study wealth tax in Columbia

They show clean prior-year counterfactual overcoming the Blomquist et al. '21 critique. (With a single cross-section, need to make assumptions about the counterfactual distribution (which is unknown)).


A Budget Sets
Consumption
z - T(z)
Individual H
indiff. curves
slope 1-t
Individual L
indiff. curve
slope 1-t-Δt
notch
Δt·z*
Earnings z
z*
z*+Δz^D
z^I
z*+Δz*

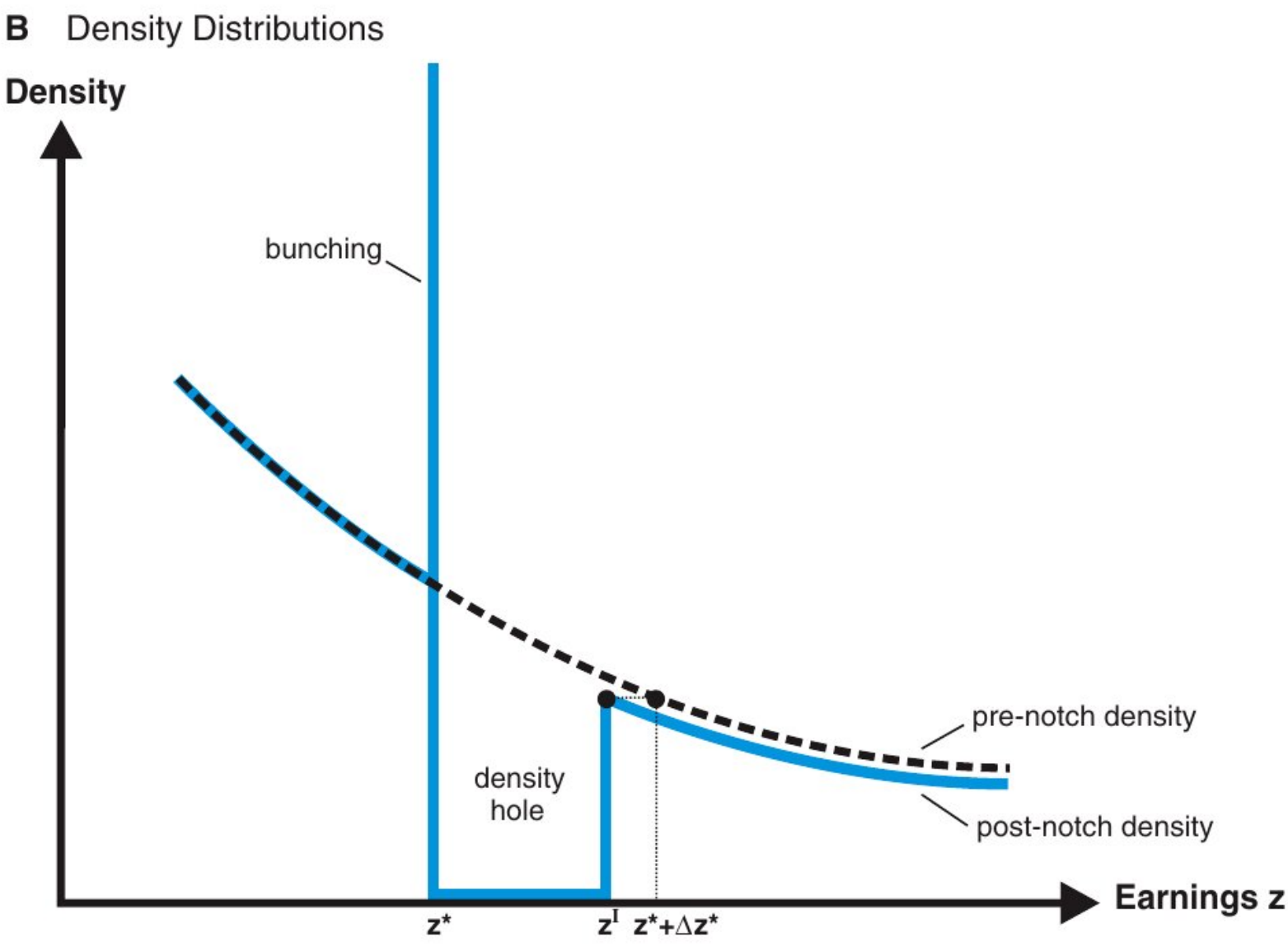
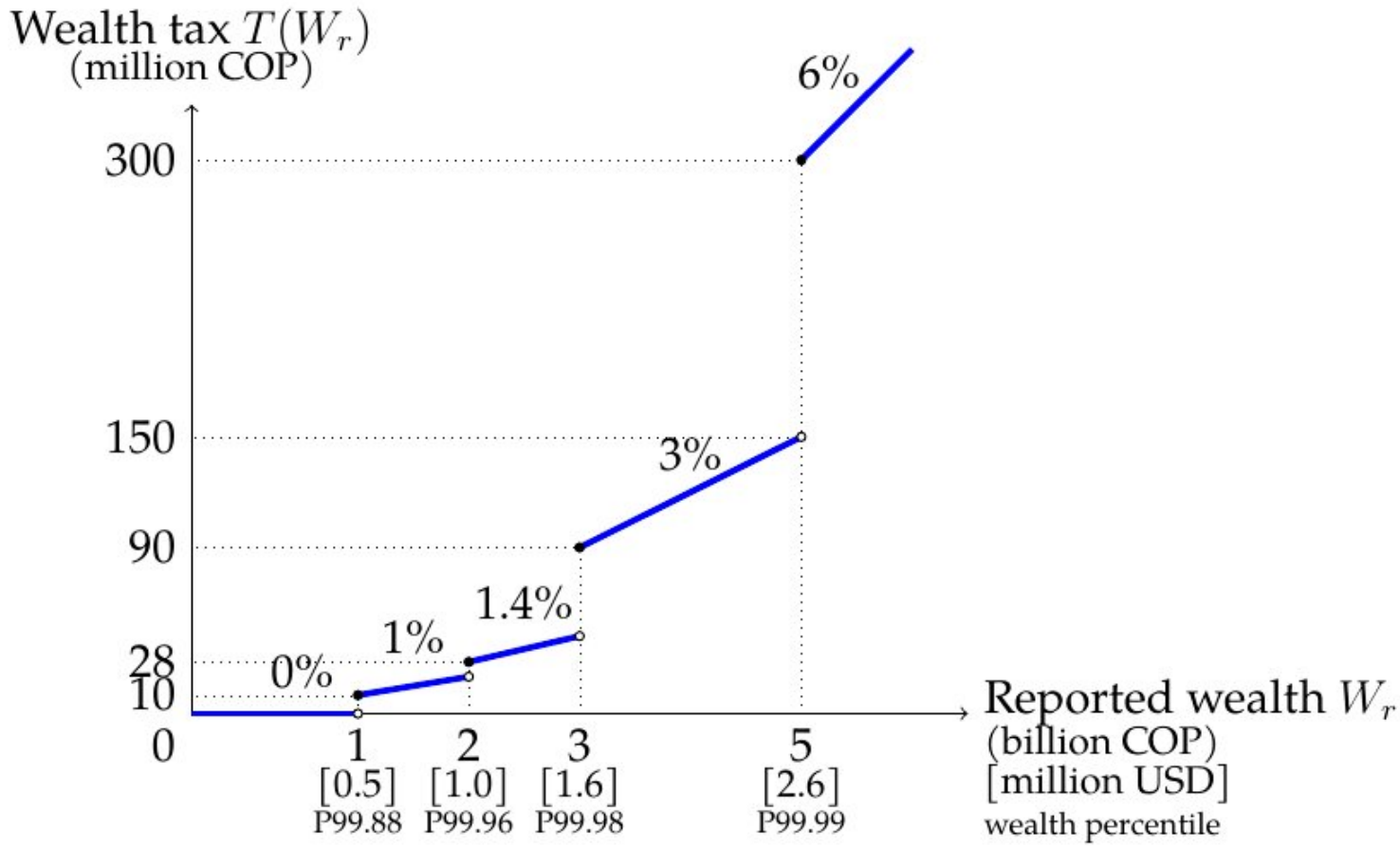

B Density Distributions
Density
bunching
density
hole
pre-notch density
post-notch density
Earnings z
z*
z^I
z*+Δz*

Figure 1: The Personal Wealth Tax Schedule in Colombia

(a) Wealth Tax Liability as a Function of Reported Wealth (FY 2010)



(b) Evolution of Statutory Annual Wealth Tax Rates by Bracket Cutoff

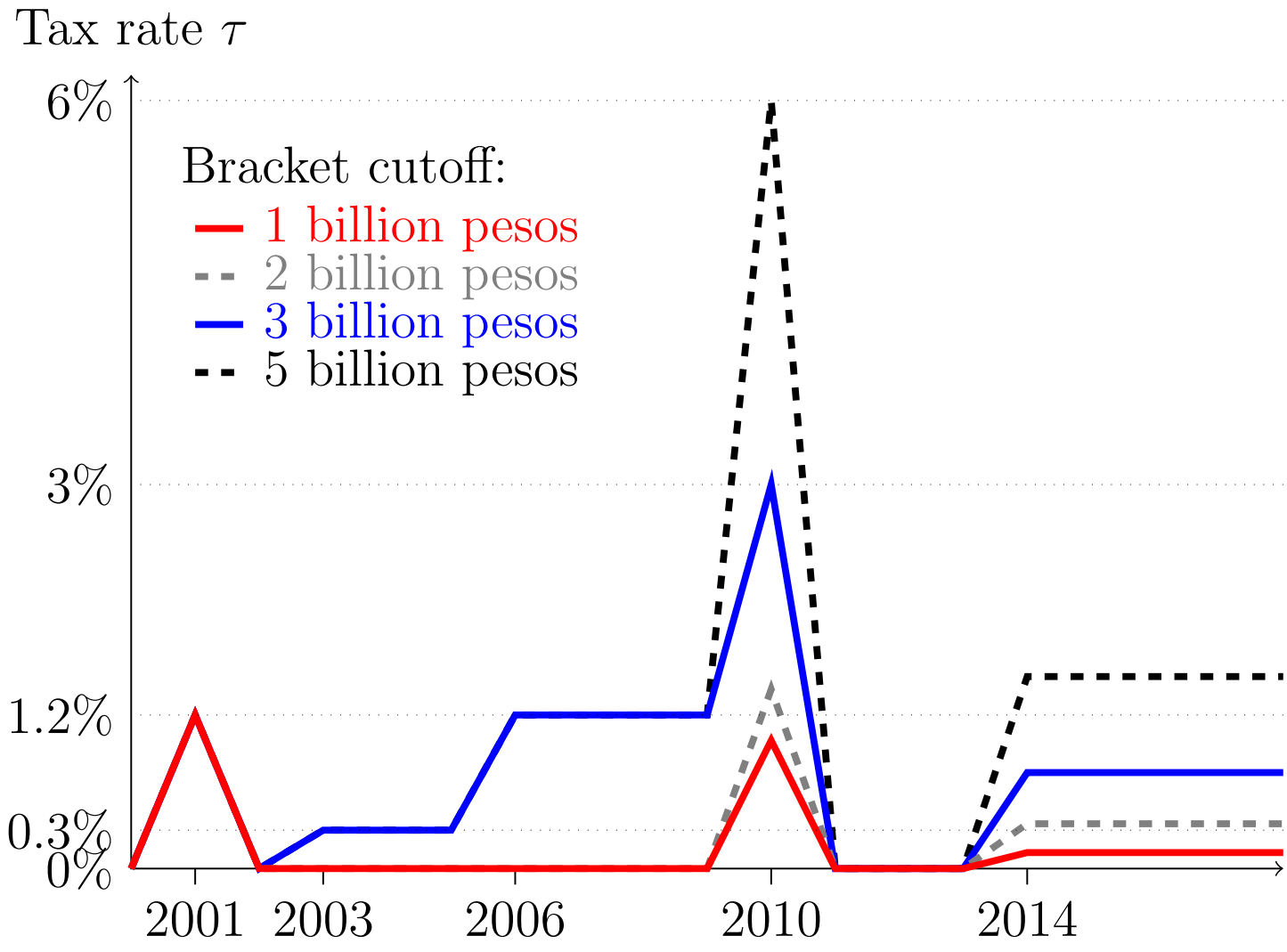
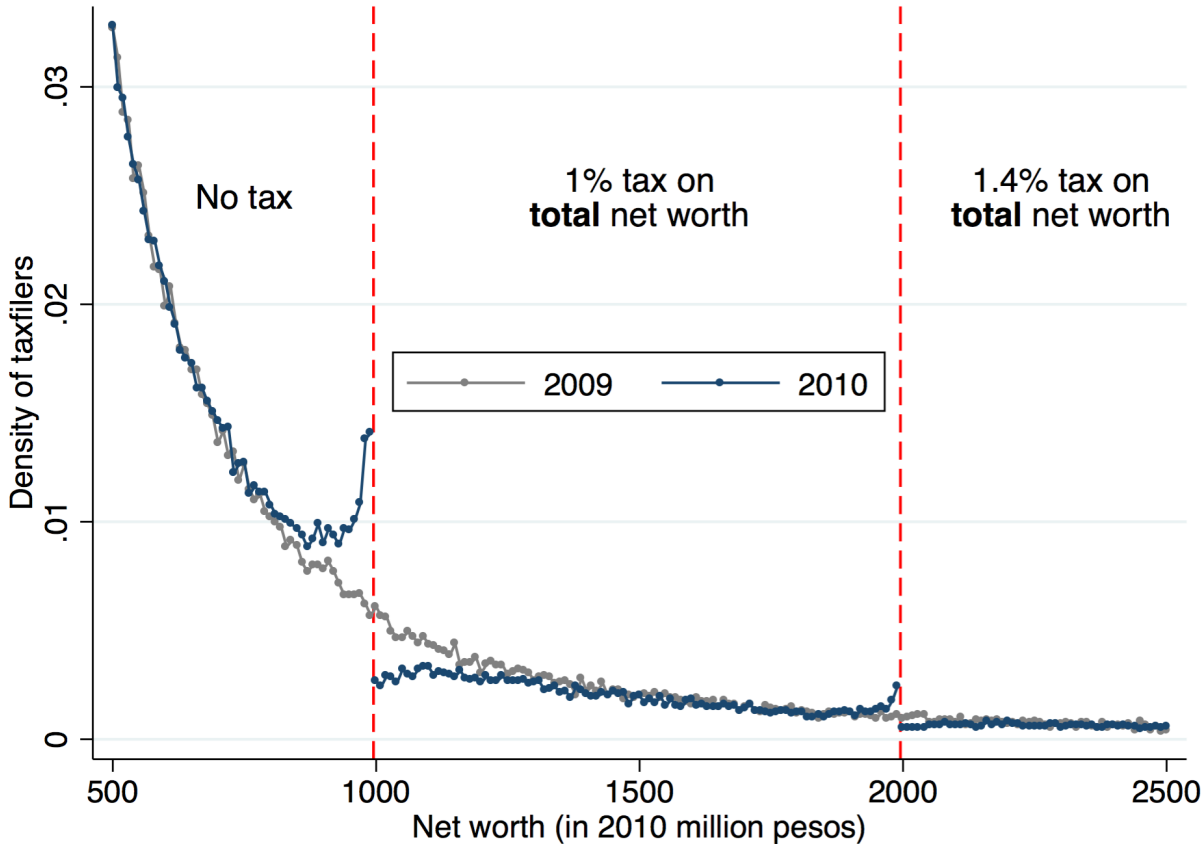


Figure 2: Distribution of Reported Net Worth in 2009 (Before Reform) and 2010 (After Reform)



Notes: This figure overlays the distribution of tax filers by reported net wealth before and after a reform introduced two wealth tax notches at 1 and 2 billion pesos (red vertical lines), as depicted in Figure 1. These notches imply that wealth tax liability jumps discontinuously, as illustrated in Figure 1. The figure shows that the distribution of individuals is smooth in the absence of wealth tax notches (2009). The two notches result in the immediate emergence of excess mass below the notch points, and corresponding missing mass just above them (2010). This

BUNCHING AT NOTCHES: ELASTICITY ESTIMATION

With optimization frictions (lack of information, costs of adjustment), a fraction of individuals fail to respond to notch

Kleven-Waseem use empirical density in the theoretical gap area to measure the fraction of unresponsive individuals

This allows them to back up the frictionless elasticity (i.e. the elasticity among responsive individuals)

The frictionless elasticity is much higher than the reduced form elasticity but remains still relatively modest

MANY RECENT BUNCHING STUDIES

Bunching method applied to many settings with nonlinear budgets with convex kink points or notches (Kleven '16 survey):

Individual tax (Bastani-Selin '14 Sweden, Mortenson-Whitten '19 US)

Payroll tax (Tazhidinova '15 on UK)

Corporate tax (Devereux-Liu-Loretz '14, Bachas-Soto '17)

Wealth tax (Seim '17, Jakobsen et al. '17, Londono-Velez and Avila '20)

Health spending (Einav-Finkelstein-Schrimpf '13 on Medicare Part D)

Retirement savings (401(k) matches)

Retirement age (Brown '13 on California Teachers)

Housing transactions (Best and Kleven, 2017)

Audit probabilities (Al-Karablieh, Koumanakos, and Stantcheva 2021)

General findings: (1) clear bunching when information is salient and outcome easily manipulable; comes most often from avoidance/evasion rather than real behavior (2) bunching is almost always small relative to conventional elasticity estimates

CORPORATE TAX EVASION: EVIDENCE FROM BUNCHING

Al-Karablieh, Koumanakos, and Stantcheva use universe of Greek tax returns to study how firms respond to a "self-assessment" (amnesty-type program)

If firms report a profit margin above a threshold, they are exempt from audit in that year.

Profit margin = profit/revenue

How can a firm meet its profit margin?

What is the desirable response for the tax authority? Which response is undesirable?

Possible pitfalls of this program?

Figure 3: Bunching at the €300,000 Revenue Cutoff

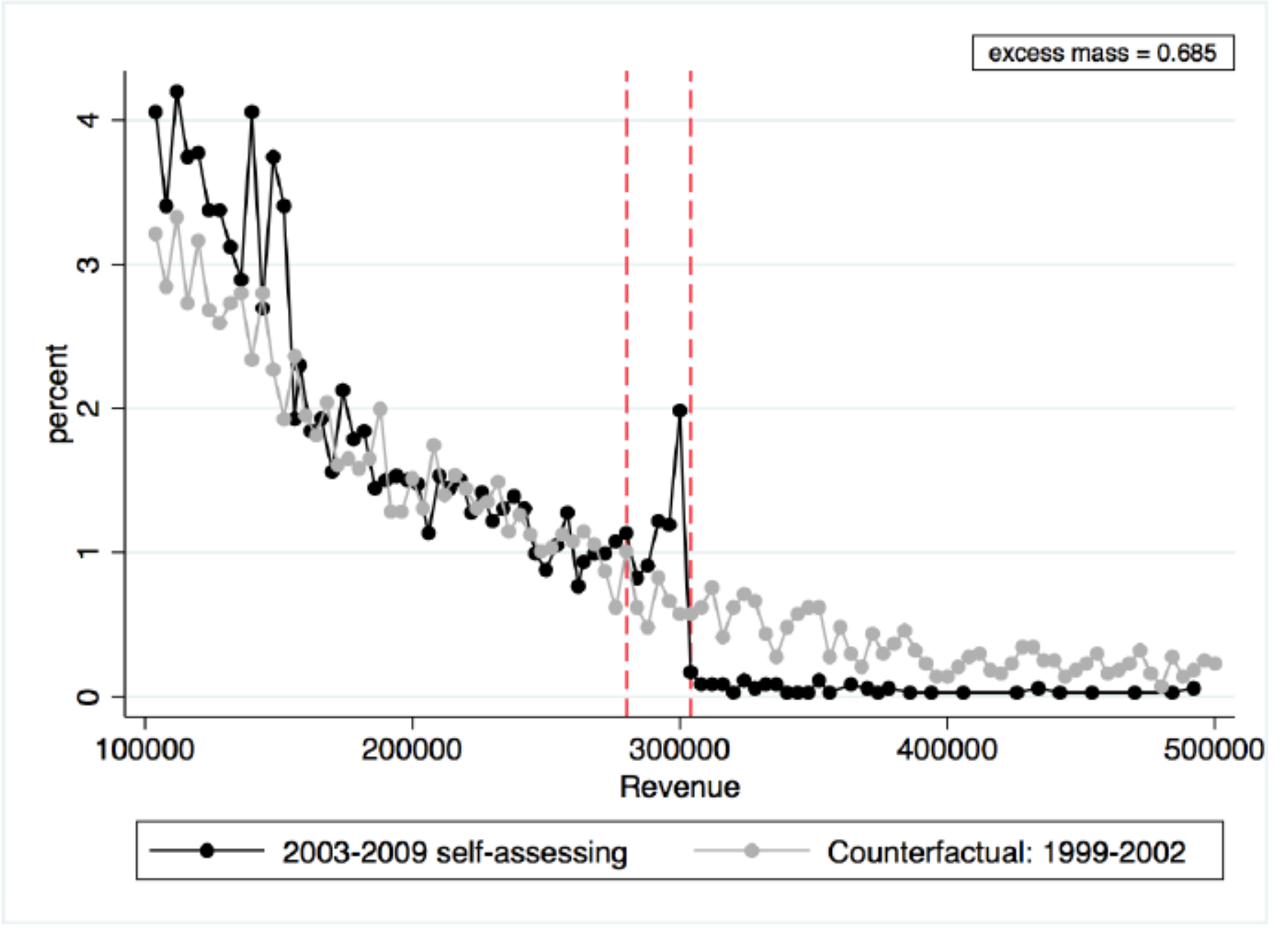
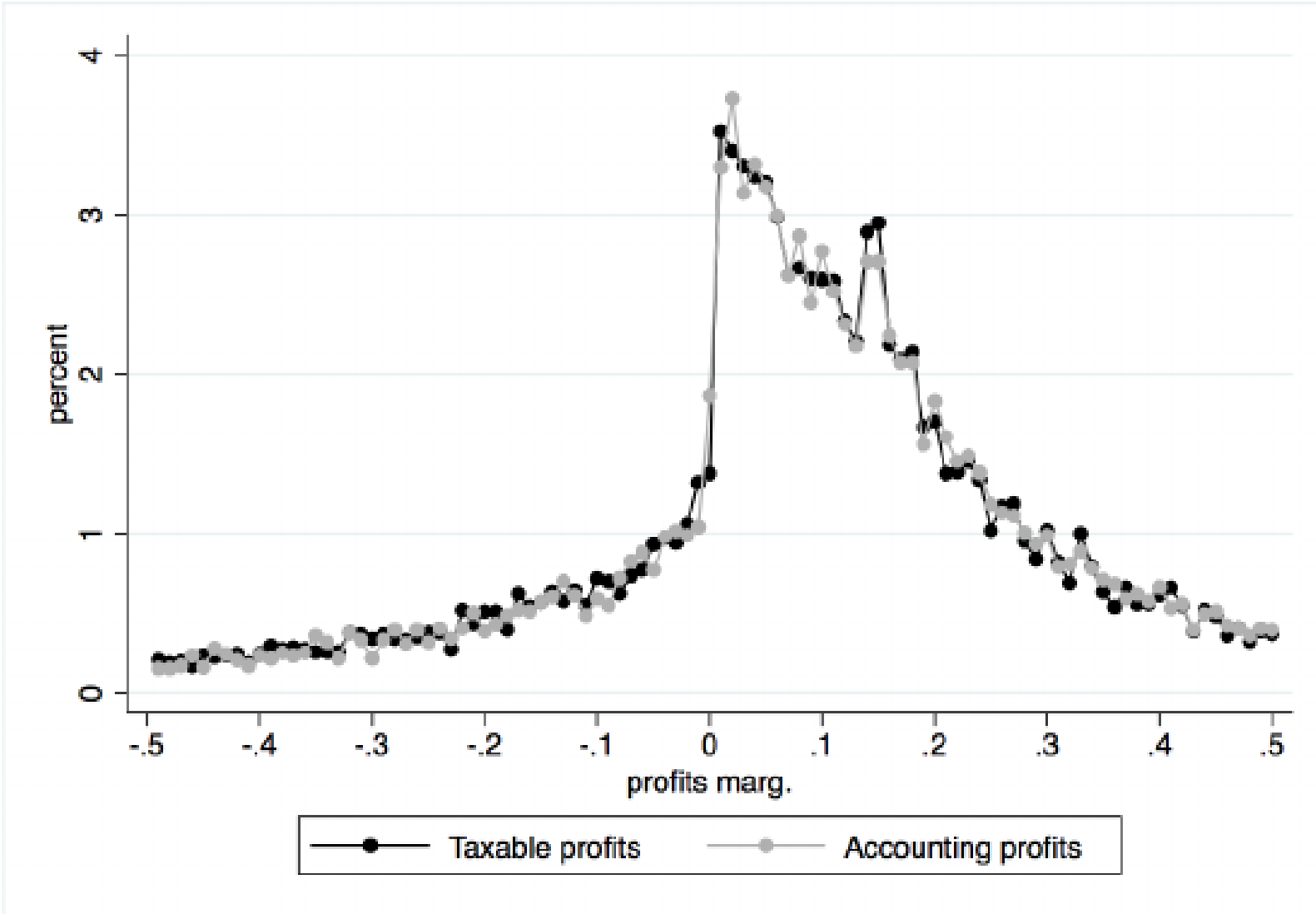


Figure 4: Graphical evidence for responses to self-assessment

A. Distribution of profit margins in years in which firms ***do not self assess***



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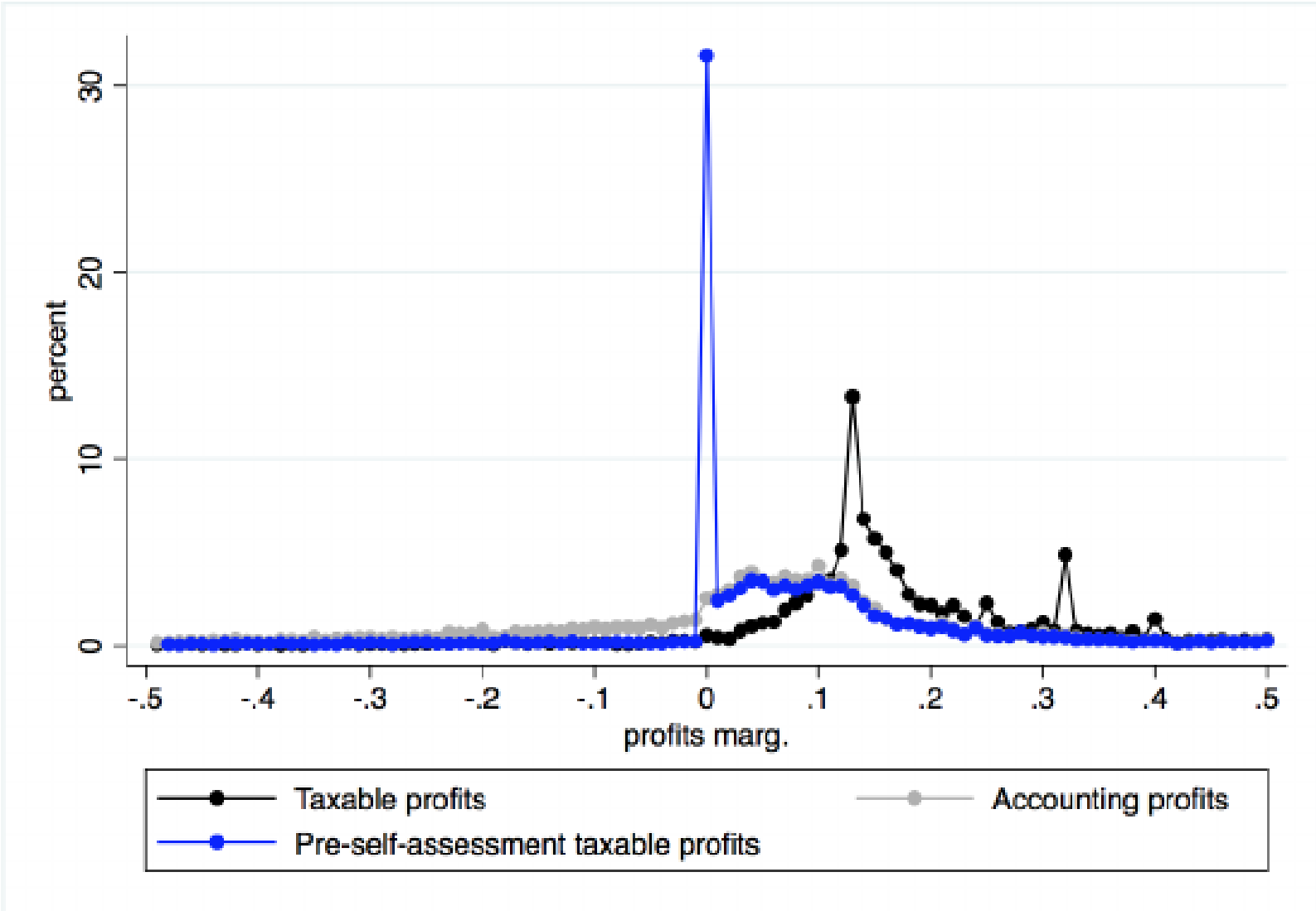
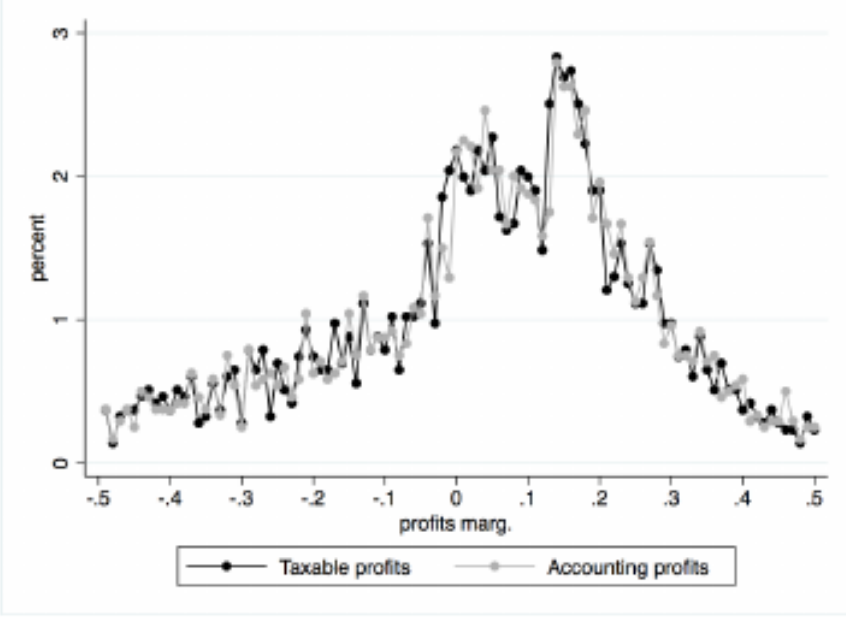


Figure 5: Profit margins of firms in the accommodation and food industry

In years in which they do not self-assess



In years in which they self-assess

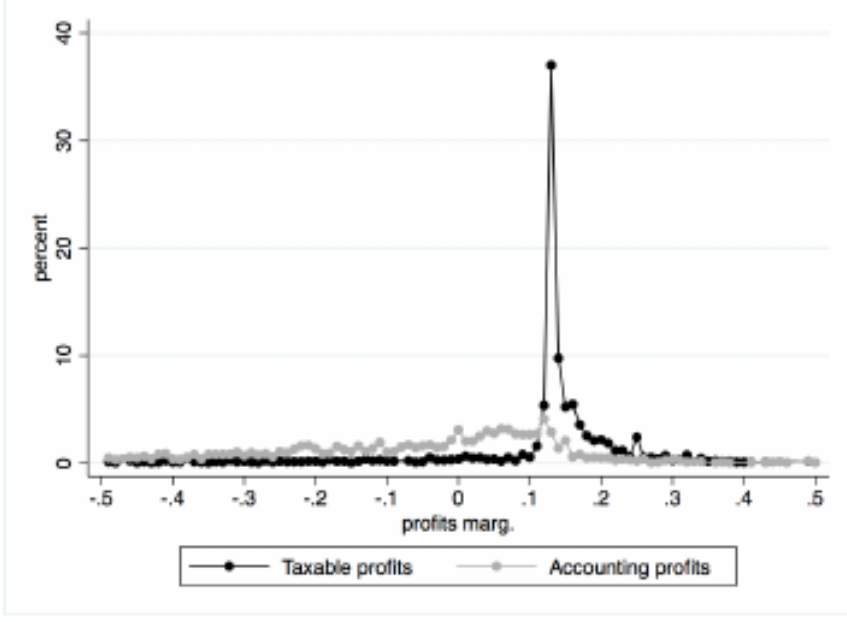
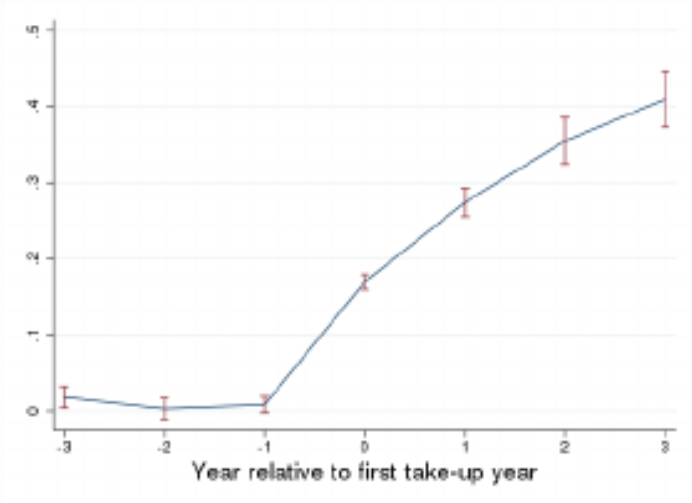
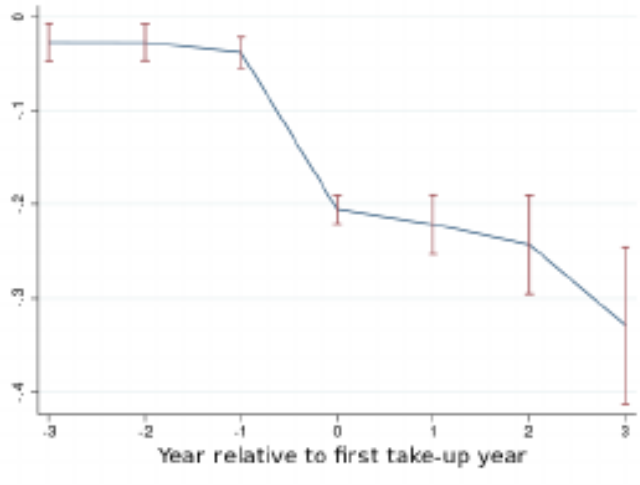


Figure 6: Event study of responses to self-assessment

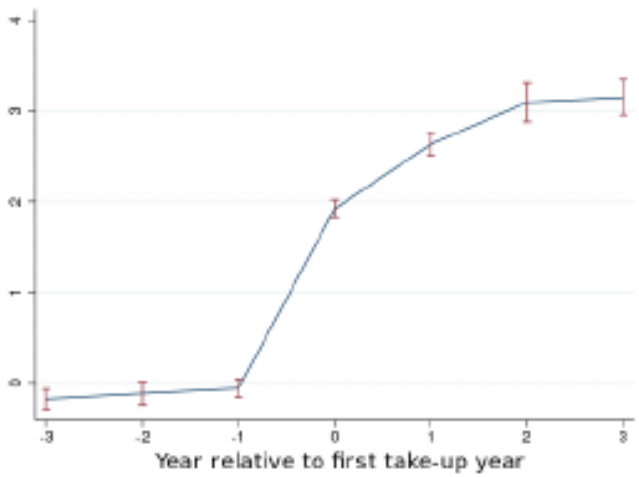
A. Taxable Profit Margins



B. Log Revenue



C. Log Taxable Profits



Intertemporal Labor Supply: High Frequency

Frisch elasticity e^F: changing wages in a single period and keeping marginal utility of income λ constant

Compensated static elasticity e^C: changing wages in all periods but keeping utility constant

Uncompensated static elasticity e^U: changing wages in all periods with no compensation

$$\text{Theoretically: } e^F > e^C > e^U$$

Frisch elasticity is of central interest for calibration of macro business cycle models:

Real business cycle model requires huge elasticity to generate realistic employment fluctuations

INTERTEMPORAL SUBSTITUTION: TAX HOLIDAY IN ICELAND

In 1987, Iceland transitioned from paying taxes on previous year's income to current income

To avoid double taxation during transition, no tax charged over 1987 incomes

Average tax rate of 14.5% in 1986, 0% in 1987, 8% in 1988

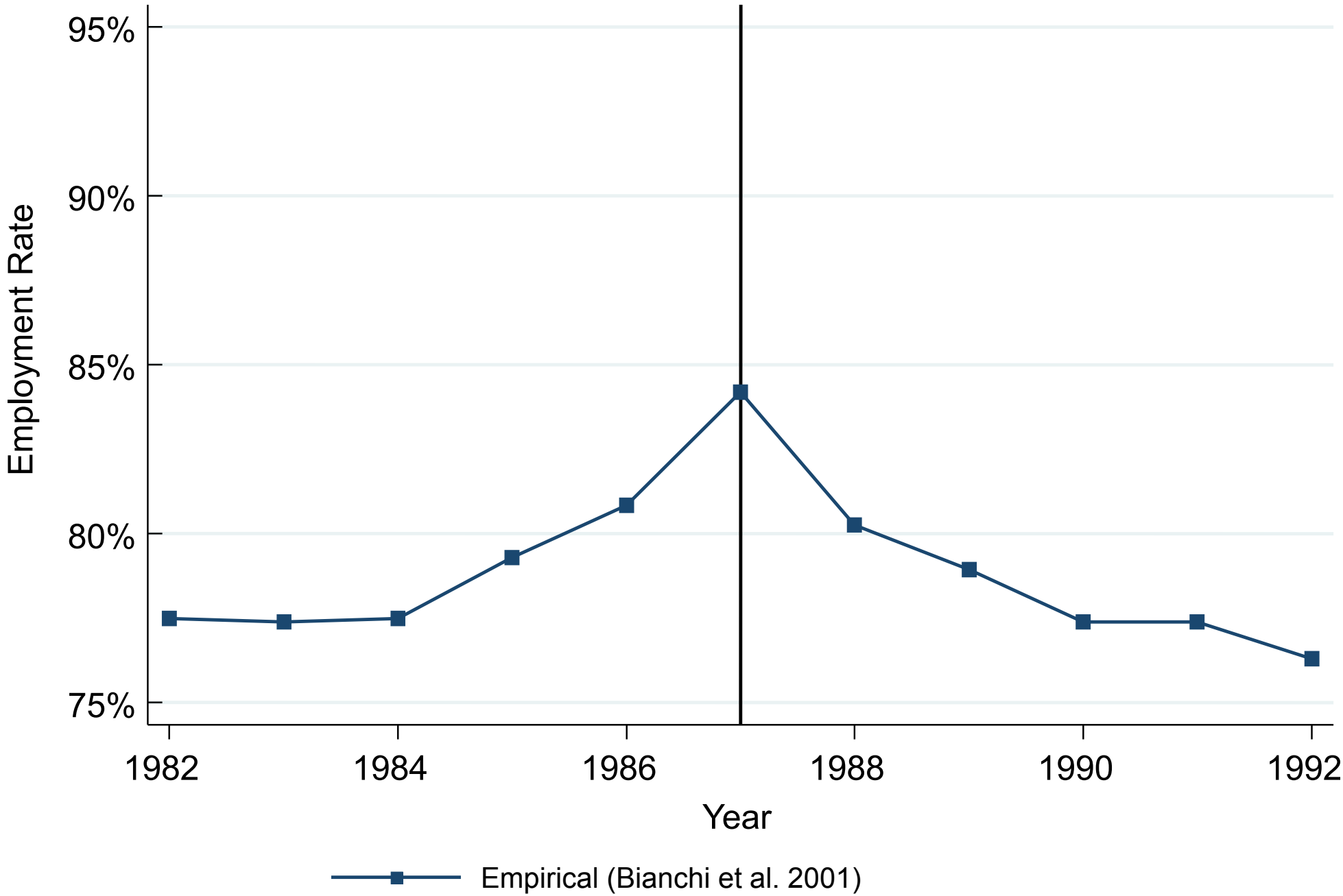
Reform announced in late 1986 $\Rightarrow$ unanticipated temporary tax change

Temporary change in incentives $\Rightarrow$ ideal quasi-experiment to intertemporal substitution elasticity (work hard in 1987, take a break in 1986 or 1988)

Bianchi et al. AER'01 look at employment effects [hard to know what counterfactual is]

Sigurdsson (2020) compares high (big tax cut) vs. low earners (small tax cut) and finds larger response among high earners [but possible that high earners are more elastic to start with]

Figure 1a: 1987 Tax Holiday in Iceland



Tax Holiday in Swiss Cantons

Martinez, Saez, Siegenthaler '21 study tax holidays in Swiss cantons also created by a transition to pay-as-you earn

Key advantage: different cantons transitioned at different times (creating staggered tax holidays across cantons)

Key findings:

(a) precise zero effect on extensive margin

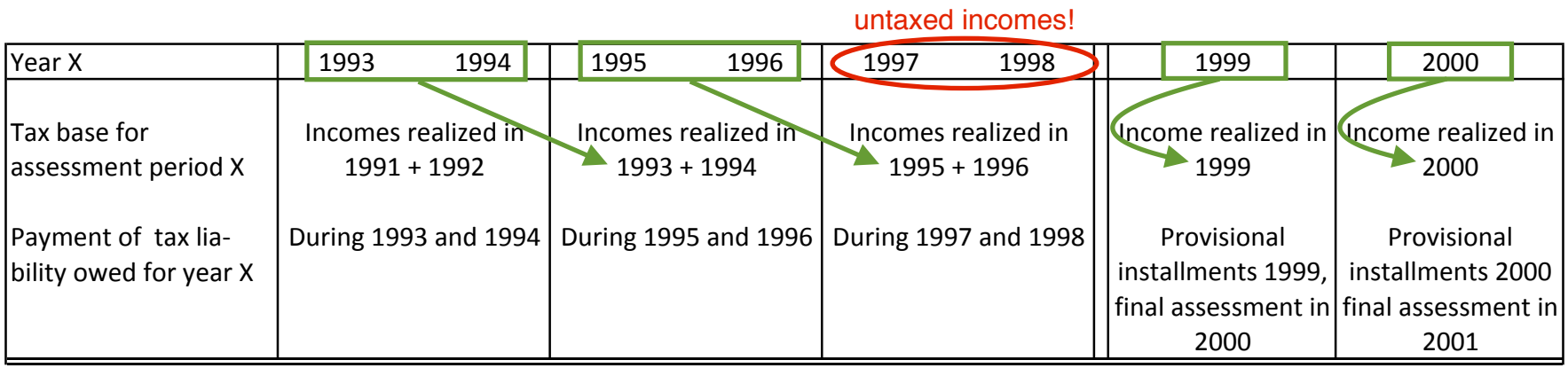
(b) some effects on intensive margin for high wage earners and self-employed (possibly avoidance rather than real)

Why smaller effects in Switzerland than Iceland? Iceland sold tax holiday as opportunity to work more (Switzerland did not)

1990s Income Tax Reform in Switzerland

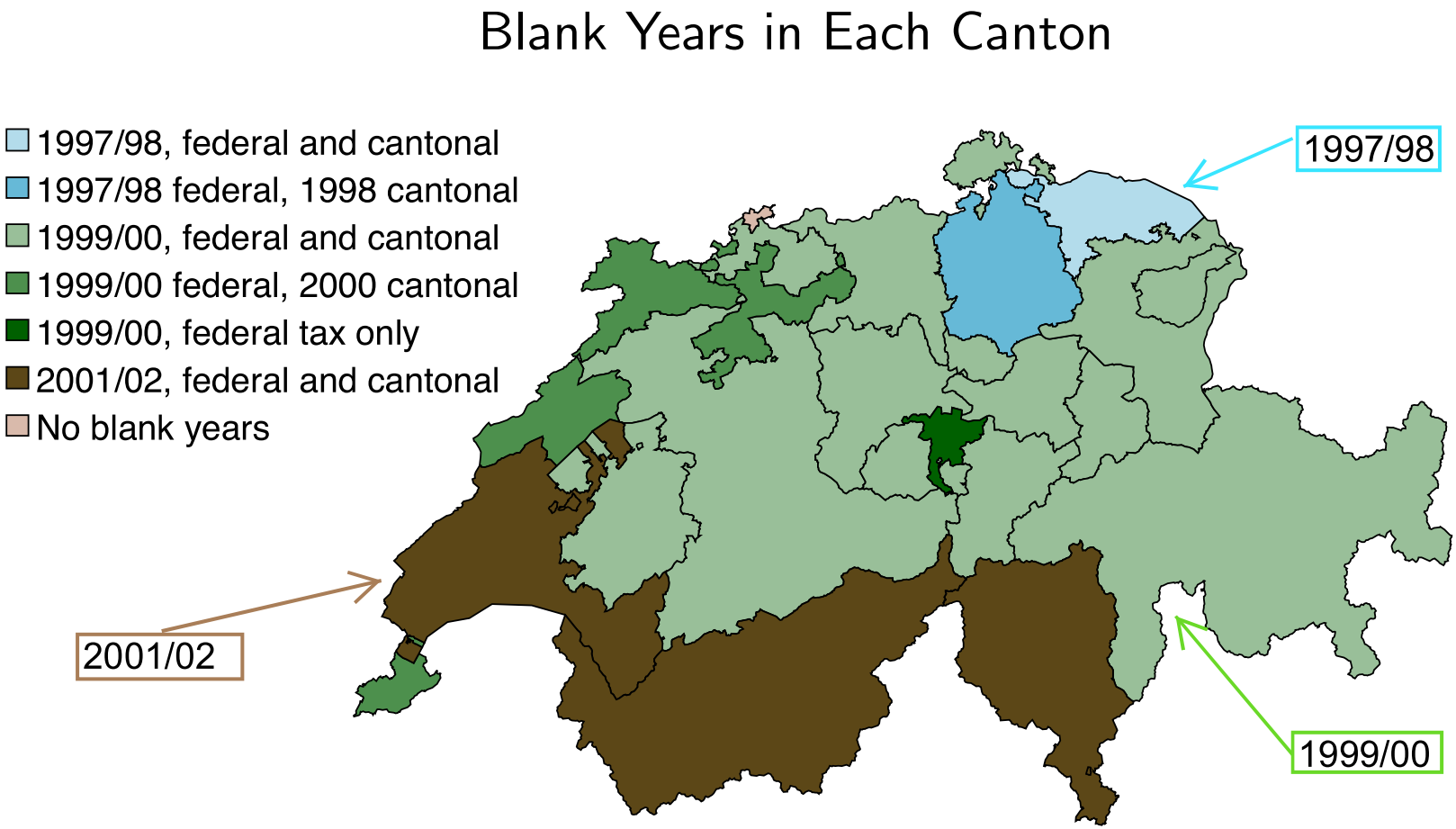
Transition from retrospective taxation to annual pay-as-you-earn

- Reasons: modernizing, simplifying and harmonizing
- Side effect: incomes earned during the two years prior to the change remained untaxed (blank years, tax holiday)

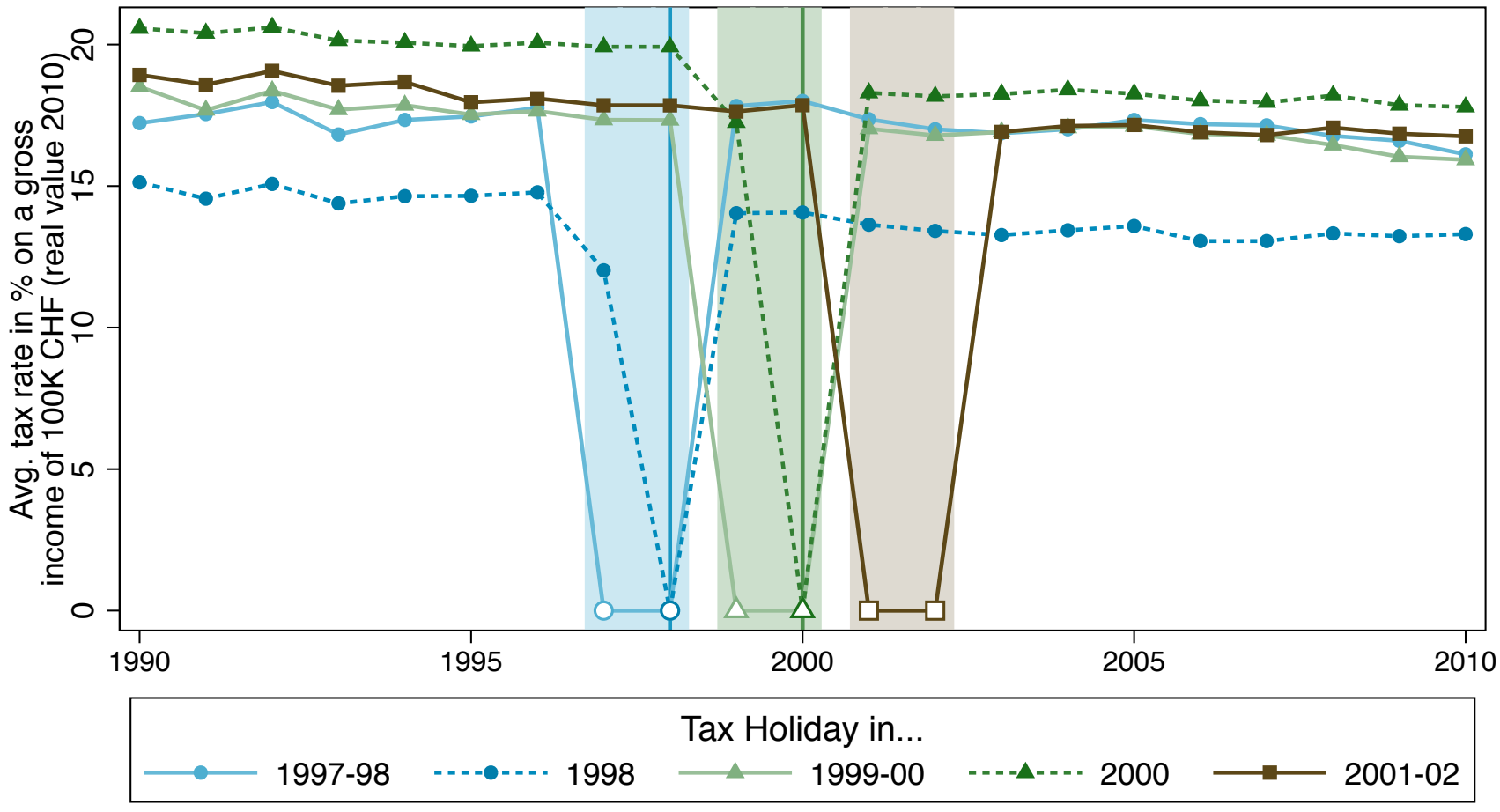


- Cantons chose different years to change: 1999, 2001, and 2003

Timing of the Reform

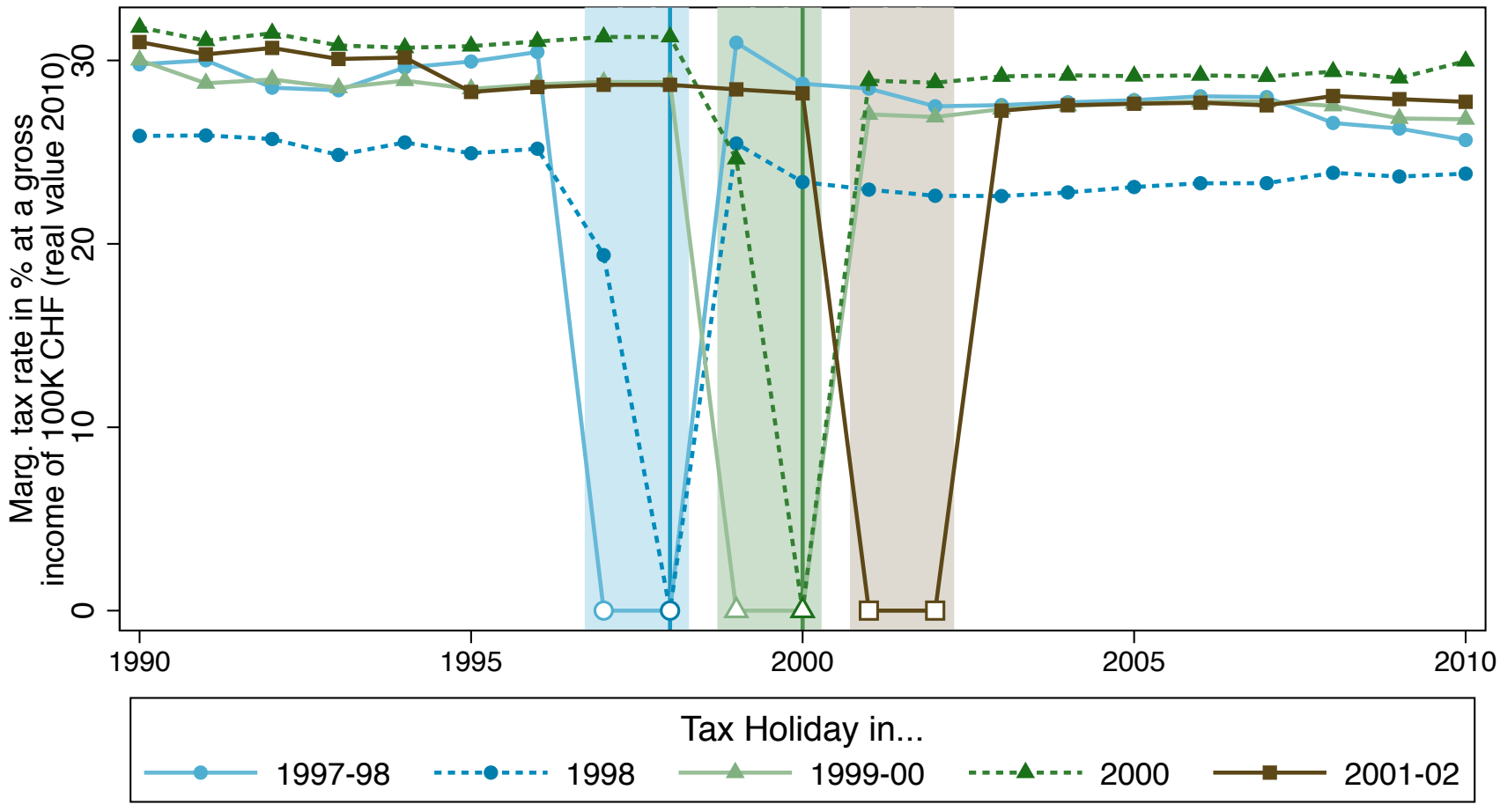


Average Income Tax Rates over Time



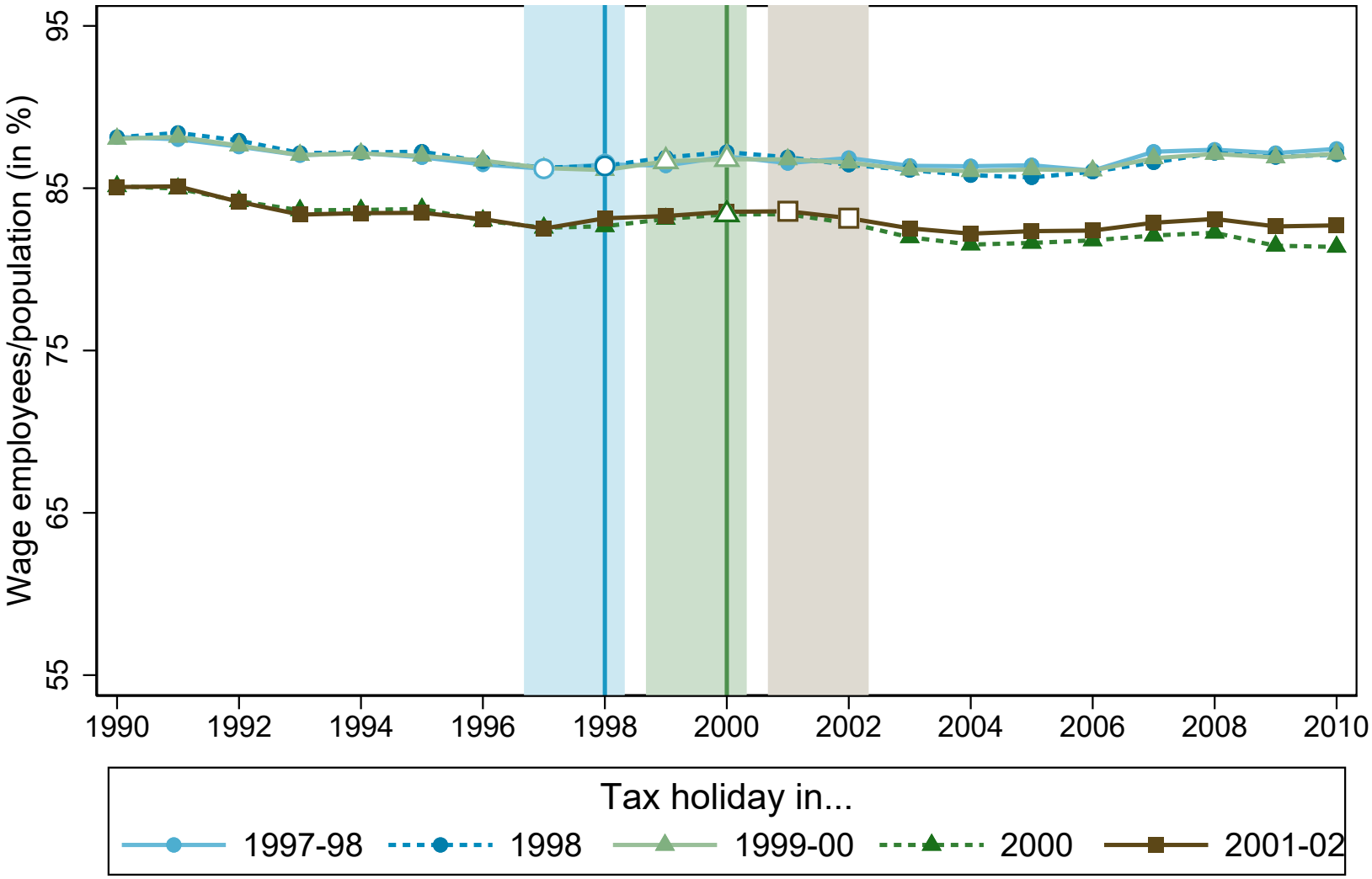
Total federal, cantonal and municipal tax, single taxpayer; weighted by municipality population.

Marginal Income Tax Rates over Time



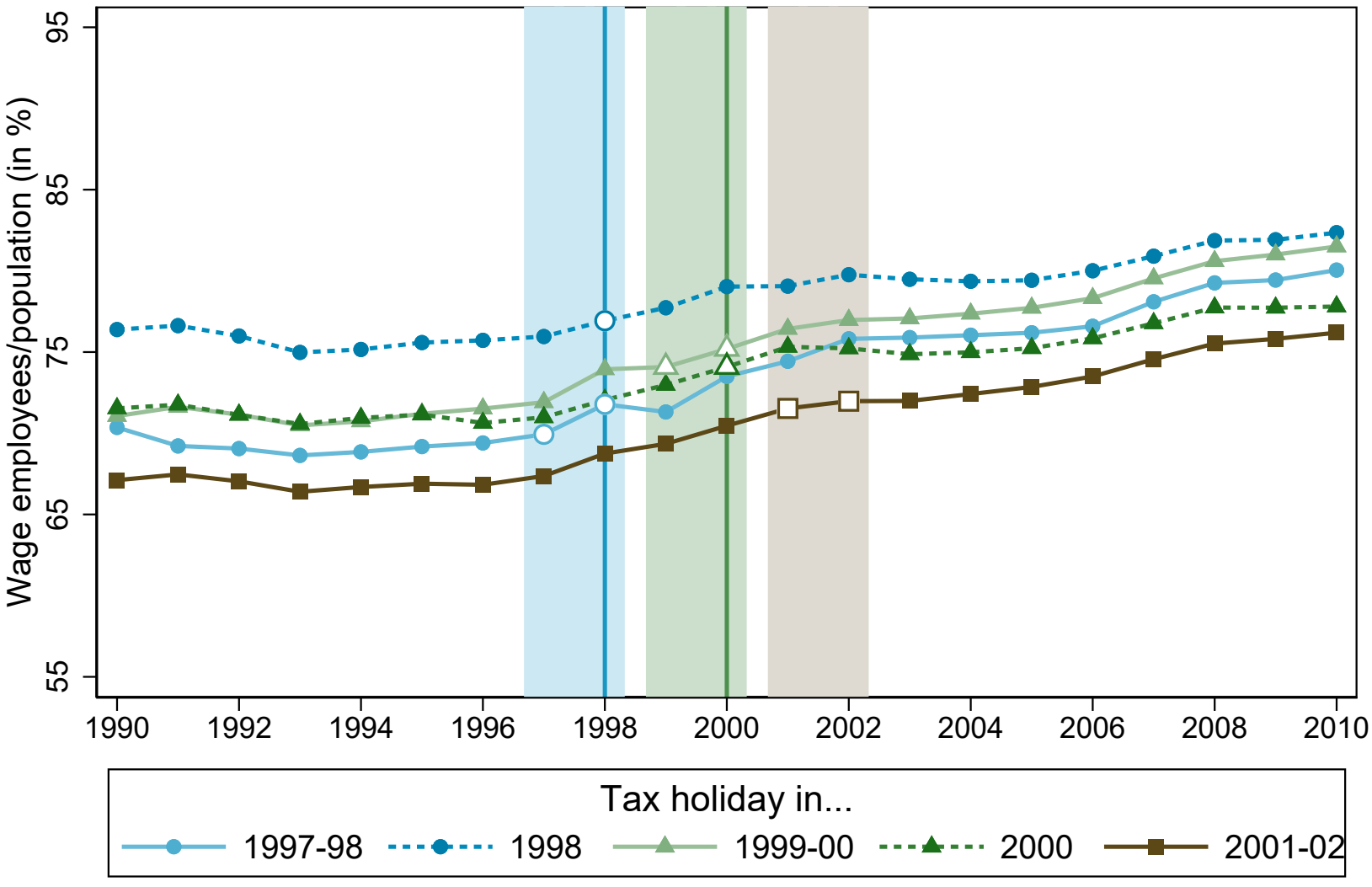
Total federal, cantonal and municipal tax, single taxpayer; weighted by municipality population.

Employment Rate: Men (age 20-60)



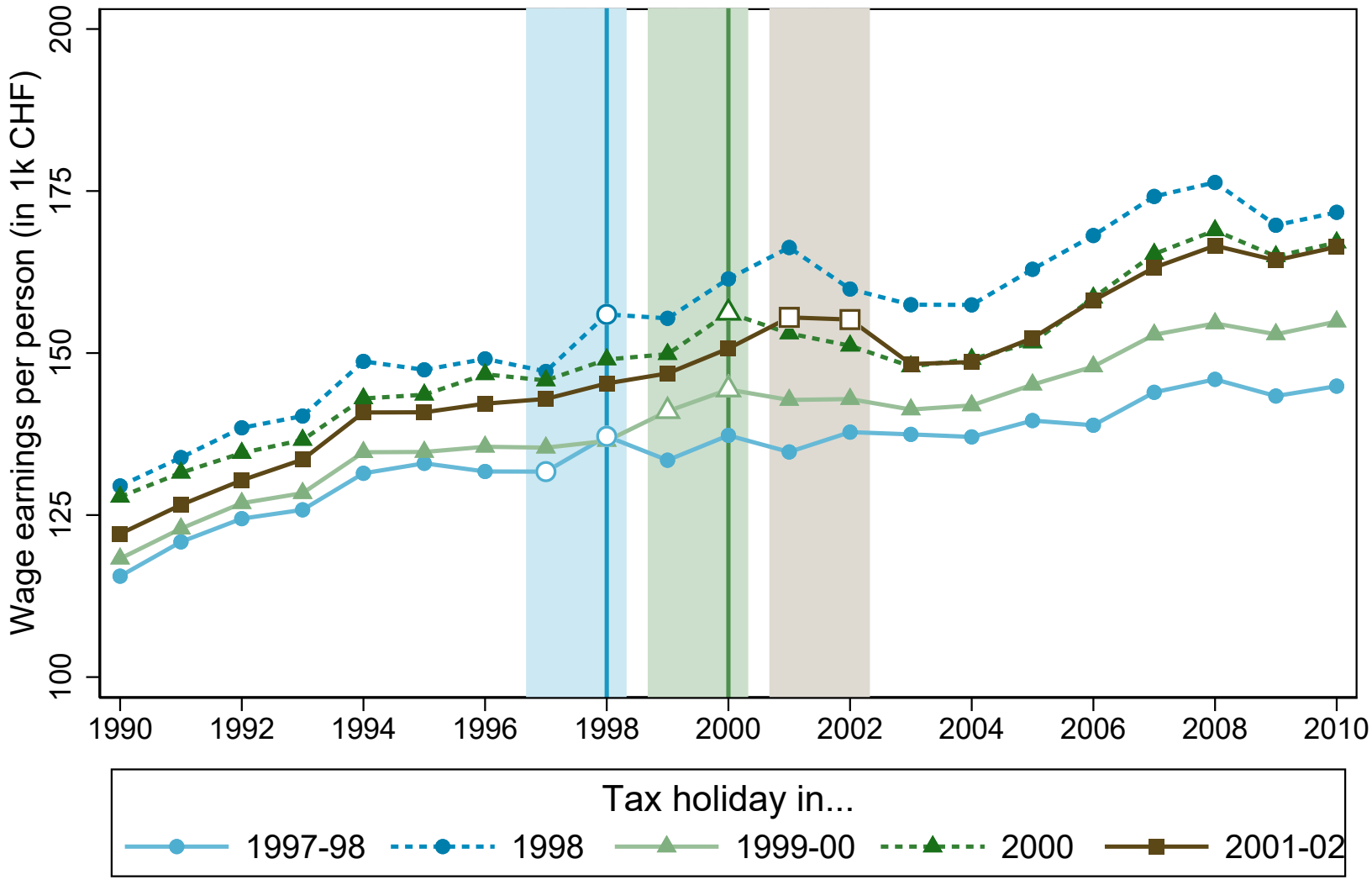
Data source: AHV-STATPOP

Employment Rate: Women (age 20-60)



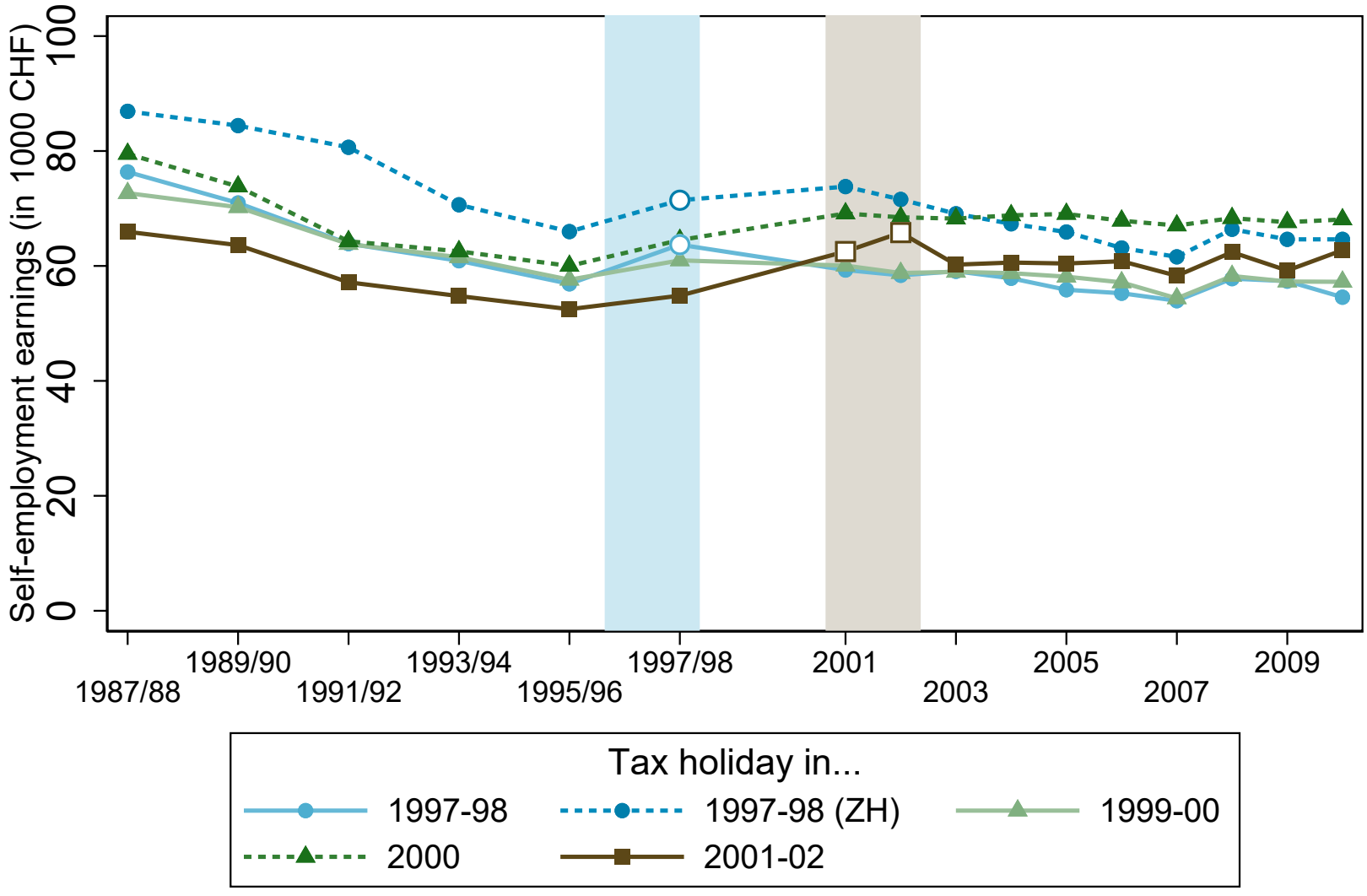
▸ unemployment rate

Average Wage Earnings: High-income Employees



High income: avg. real wage earnings in 1994-1996 $> 100k$ CHF/year

Mean Self-employment Earnings (excluding zeros)



Data source: AHV-STATPOP

SOCIAL DETERMINANTS OF LABOR SUPPLY

Concern that taxes funding social state could discourage work

Standard econ view: labor supply $l(w, R)$ coming out of $\max u(\underset{+}{c}, \underset{-}{l})$ st $c = wl + R$ is highly incomplete

Social determinants of labor supply:

a) Youth labor is regulated by labor laws/education

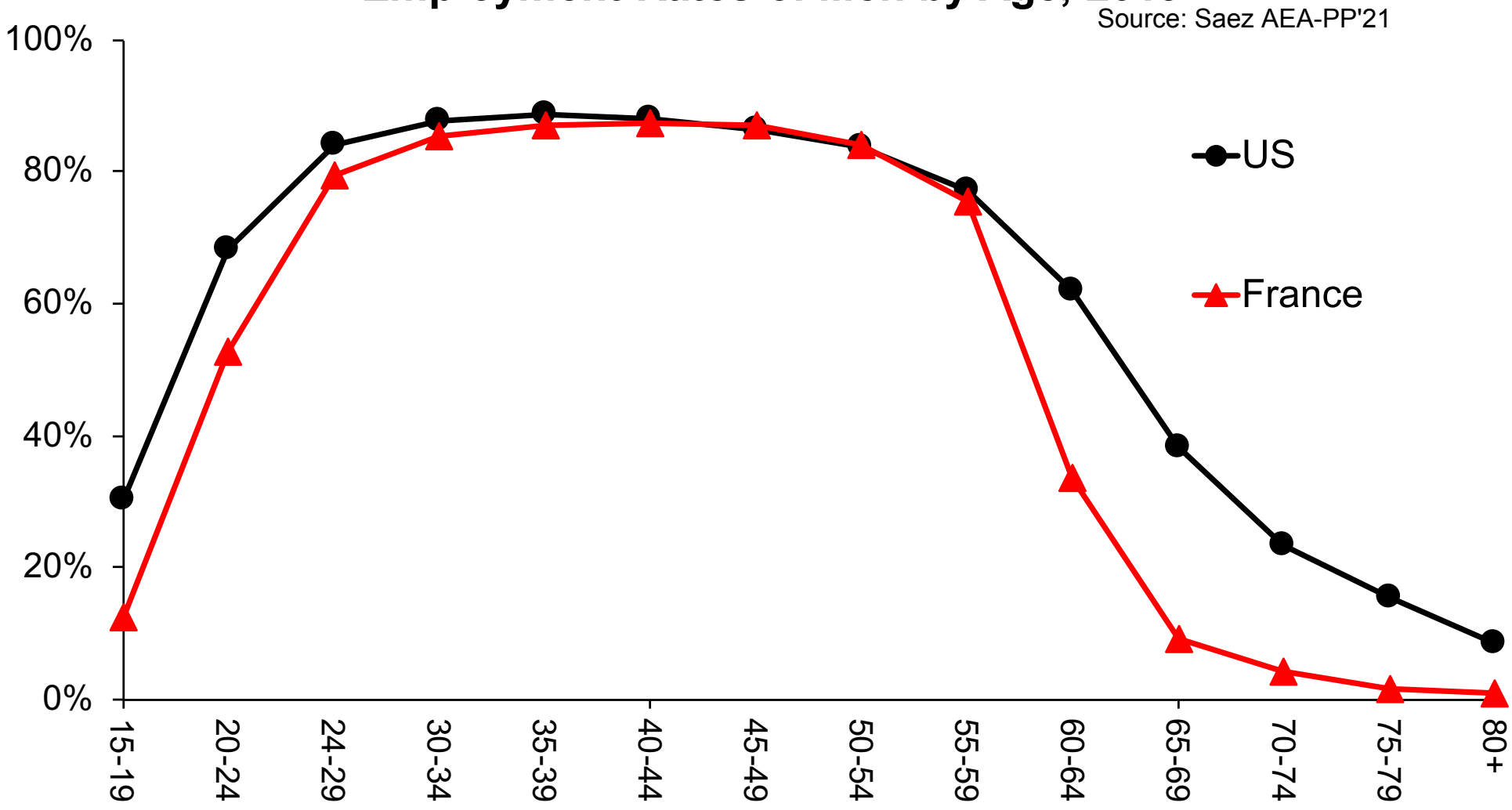
b) Old age labor regulated by retirement programs

c) Female market labor driven by norms + child care policy

d) Hours of work regulated by overtime + vacation mandates

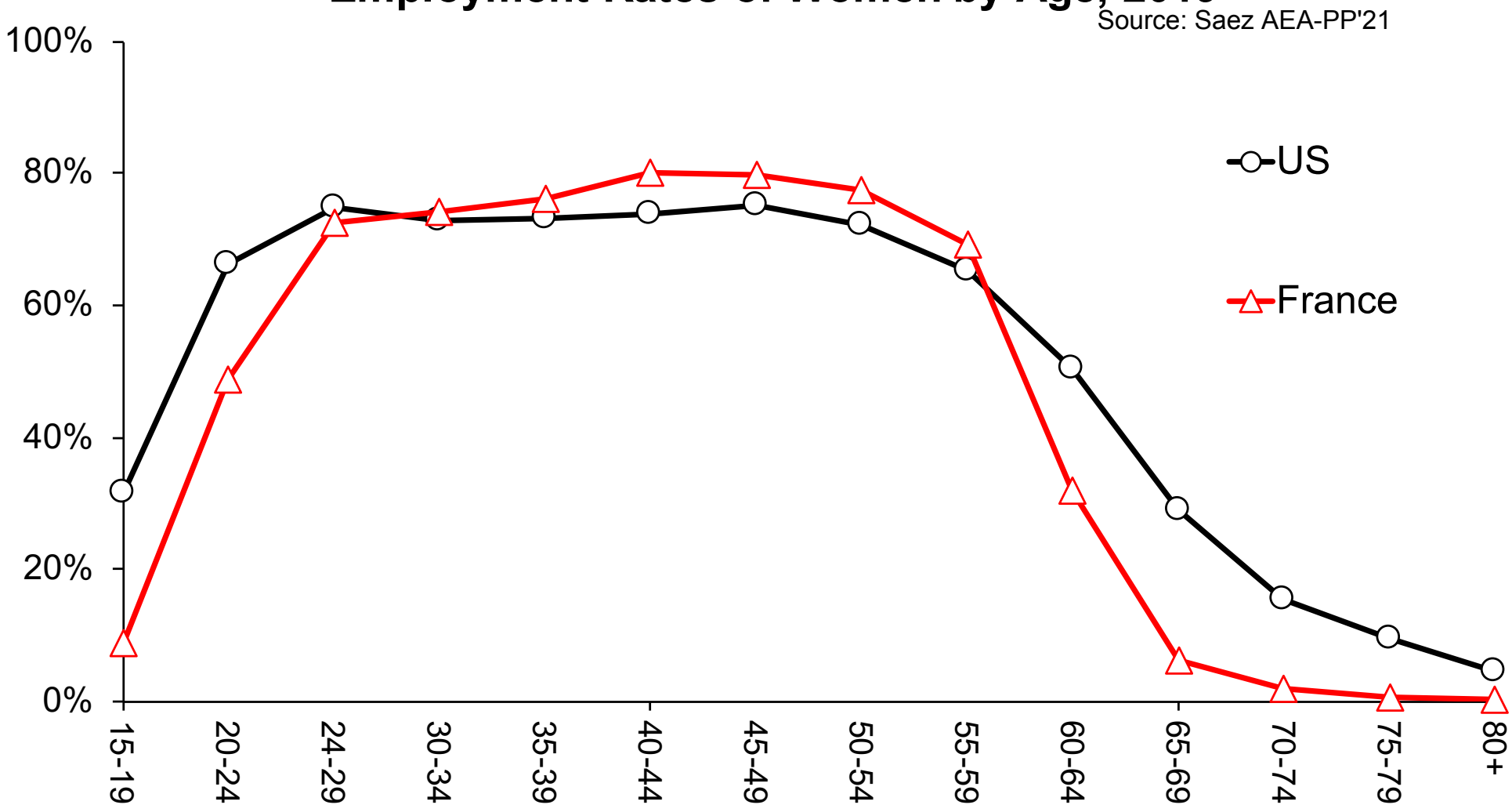
Social labor supply with "disutility" for youth, old, overtime labor

Employment Rates of Men by Age, 2019

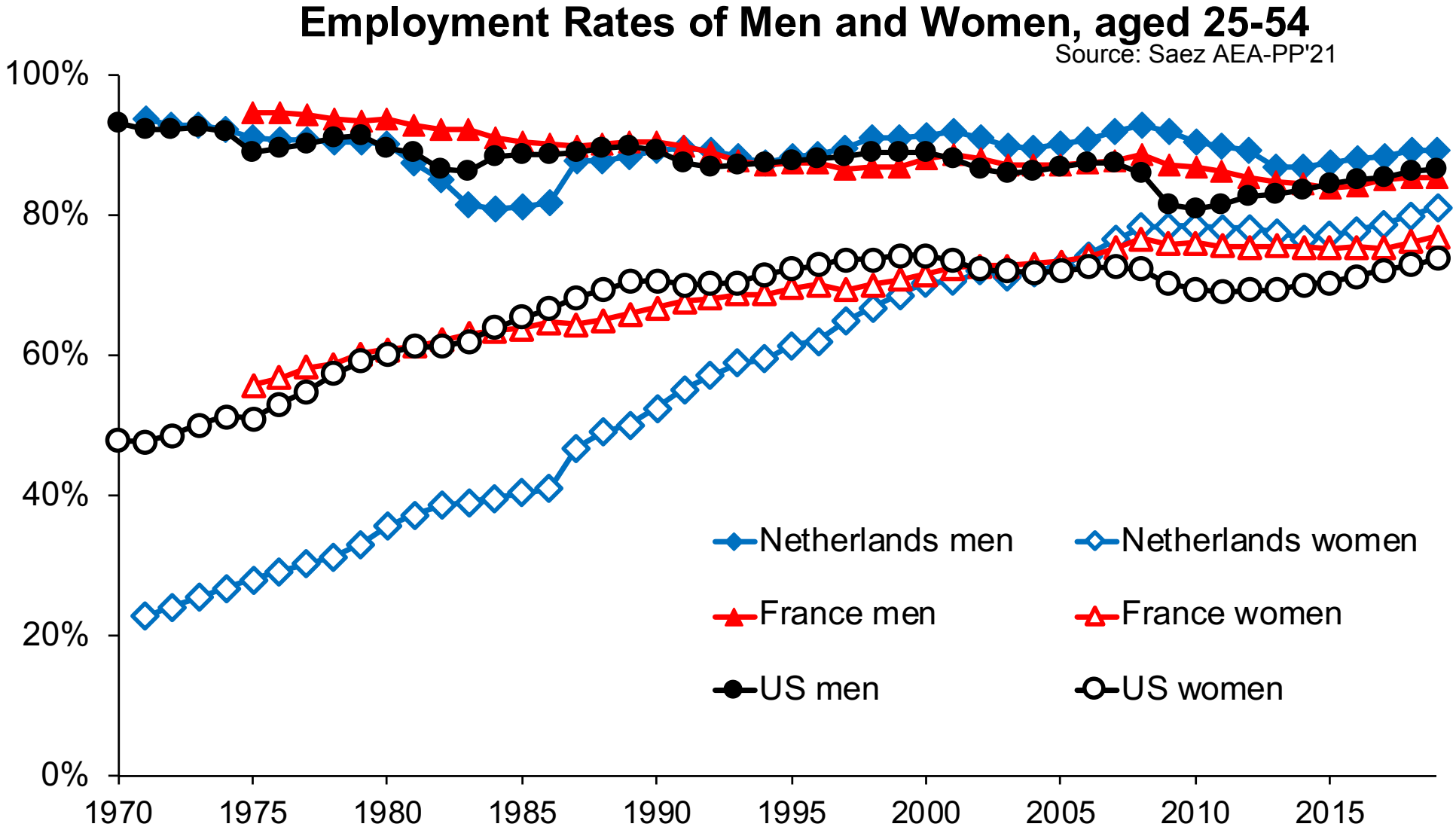


Source: OECD database online. Employment to population ratios.

Employment Rates of Women by Age, 2019



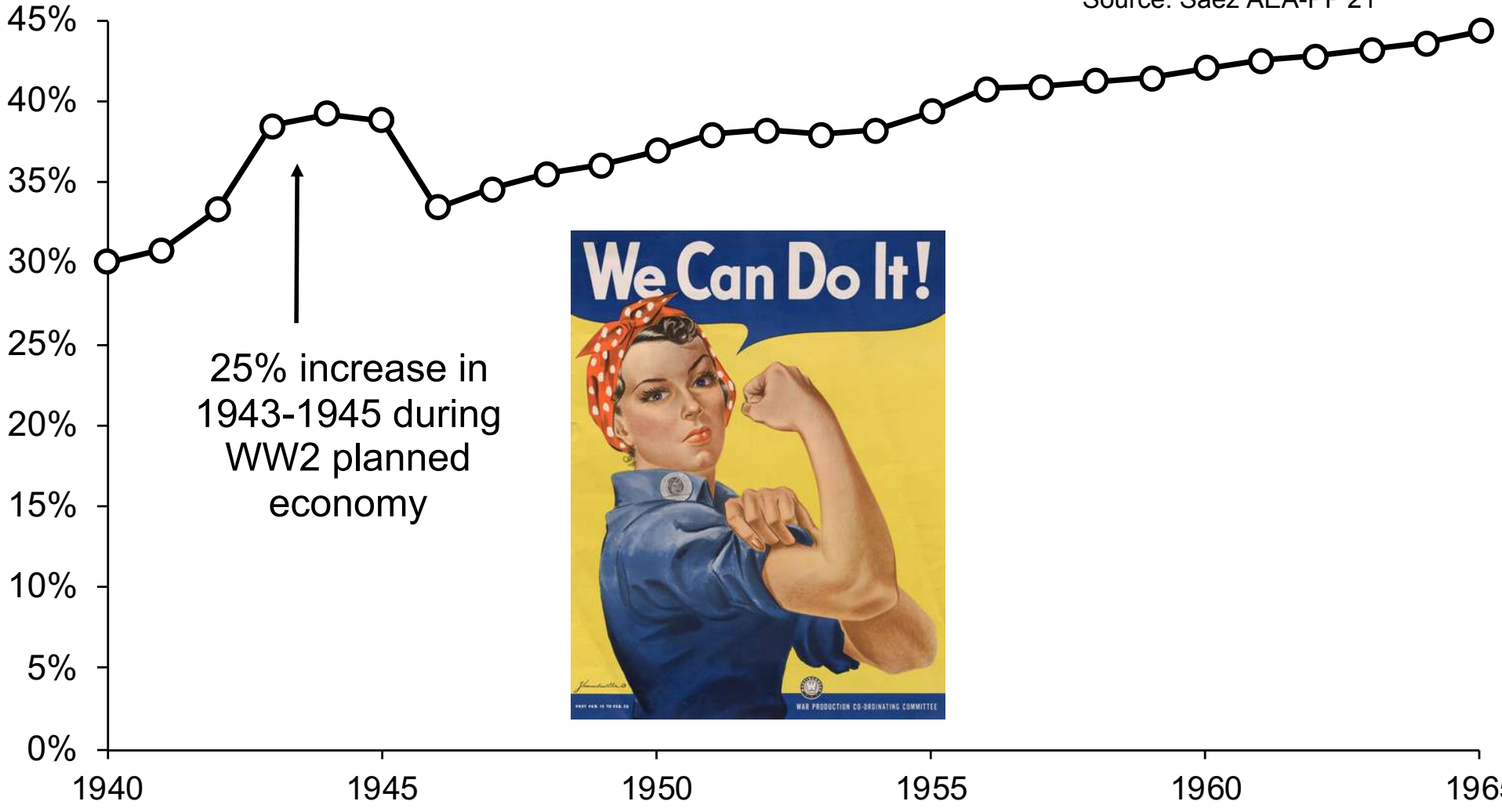
Source: OECD database online. Employment to population ratios.



Source: OECD database online.

US female labor force participation, age 16-64

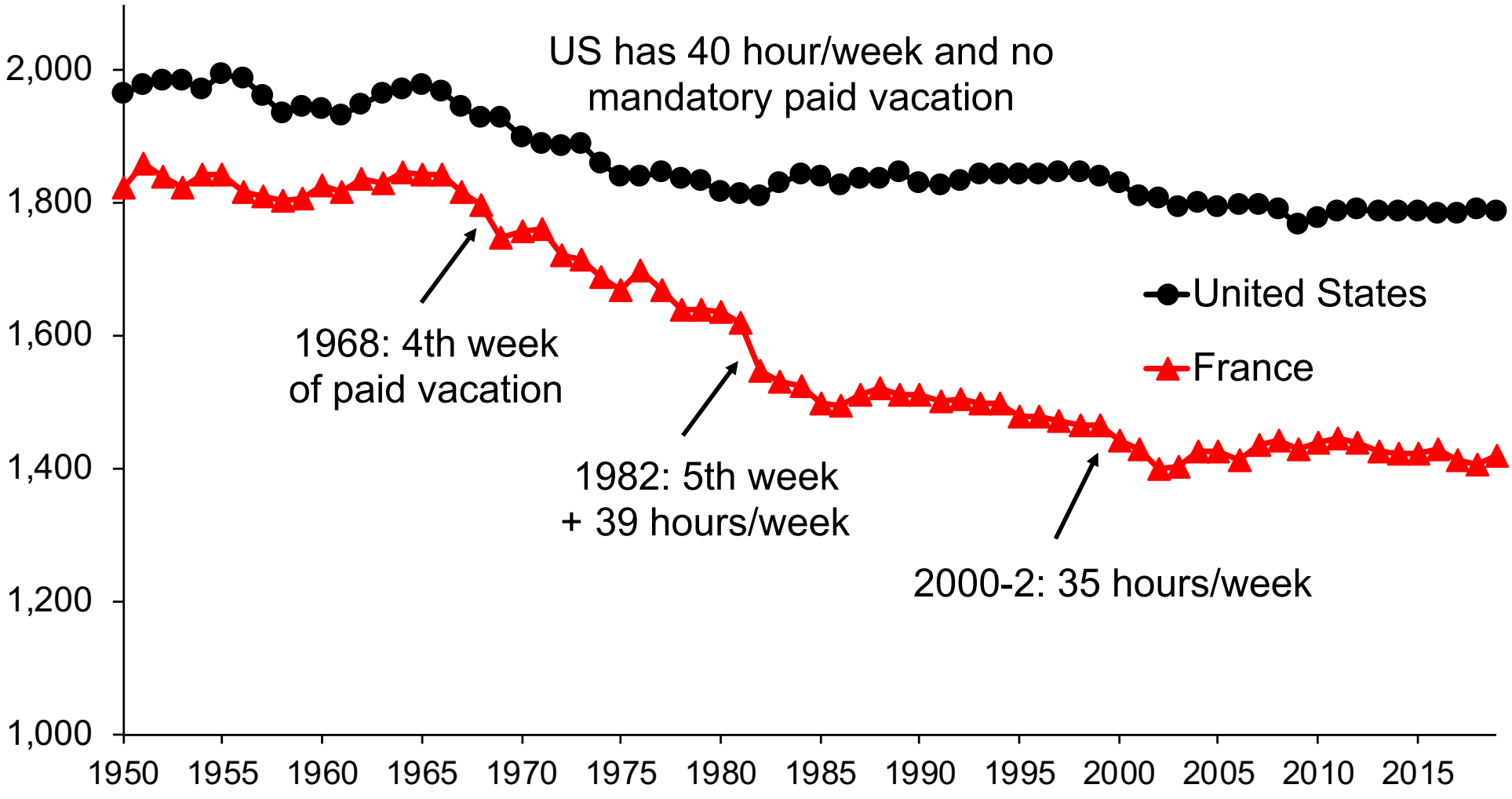
Source: Saez AEA-PP'21



Source: Historical Statistics of the United States (Current Population Reports).

Average Annual Hours of Work of Employees

Source: Saez AEA-PP'21



Source: OECD database online. Includes all ages, genders, and part-time, full-time, overtime.

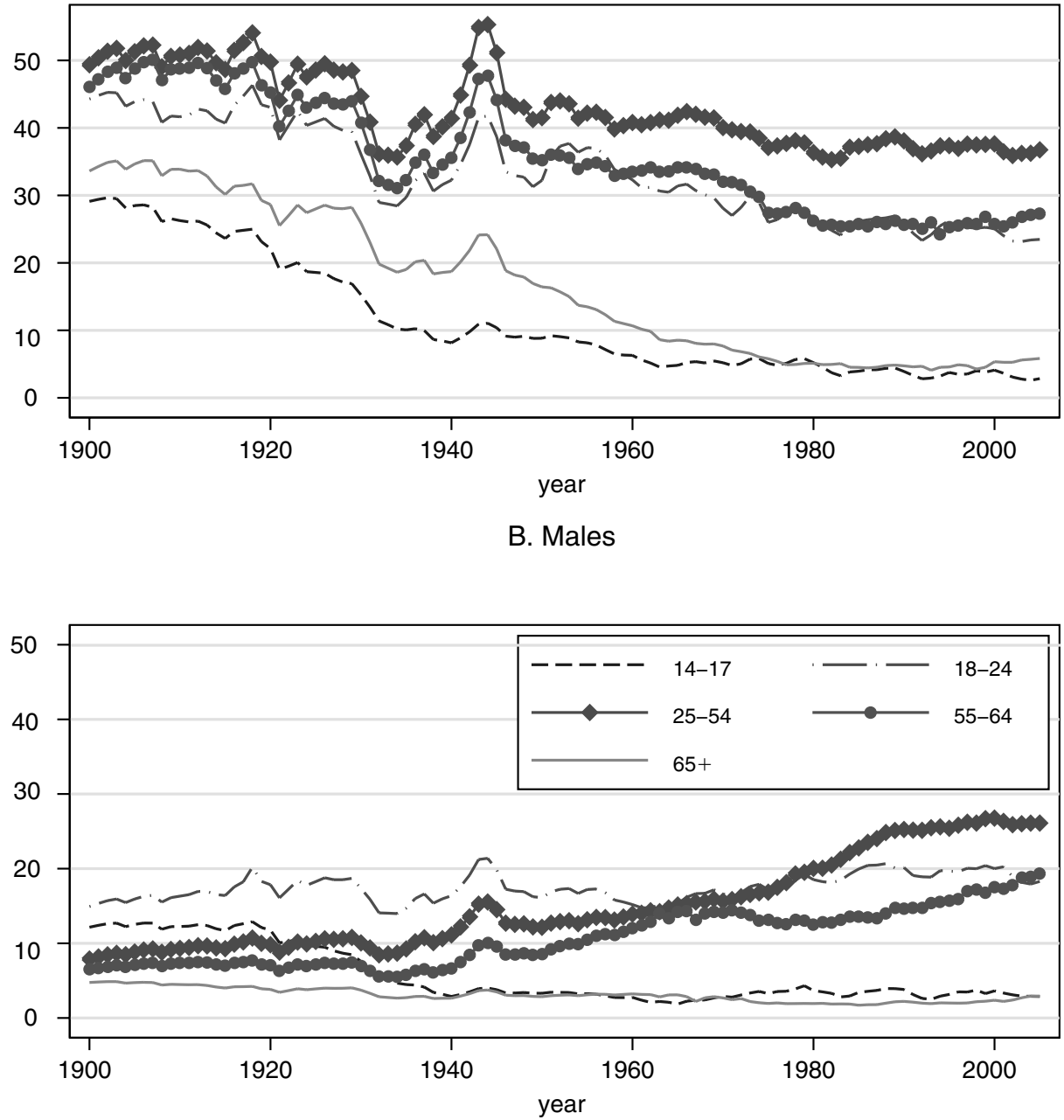


FIGURE 2. AVERAGE WEEKLY HOURS WORKED PER PERSON, BY AGE GROUP

LONG-TERM EFFECTS: EVIDENCE FROM THE ISRAELI KIBBUTZ

Abramitzky '18 book based on series of academic papers

Kibbutz are egalitarian and socialist communities in Israel, thrived for almost a century within a more capitalist society

1) Social sanctions on shirkers effective in small communities with limited privacy

2) Deal with brain drain exit using communal property as a bond

3) Deal with adverse selection in entry with screening and trial period

4) Perfect sharing in Kibbutz has negative effects on high school students performance but effect is small in magnitude (concentrated among kids with low education parents)

LONG-TERM EFFECTS: EVIDENCE FROM THE ISRAELI KIBBUTZ

Abramitzky-Lavy ECMA'14 show that high school students study harder once their kibbutz shifts away from equal sharing

Uses a DD strategy: pre-post reform and comparing reform Kibbutz to non-reform Kibbutz. Finds that

1) Students are 3% points more likely to graduate

2) Students are 6% points more likely to achieve a matriculation certificate that meets university entrance requirements

3) Students get an average of 3.6 more points in their exams

Effect is driven by students whose parents have low schooling; larger for males; stronger in kibbutz that reformed to greater degree

CULTURE OF WELFARE ACROSS GENERATIONS

Conservative concern that welfare promotes a culture of dependency: kids growing up in welfare supported families are more likely to use welfare

Correlation in welfare use across generations is obviously not necessarily causal

Dahl, Kostol, Mogstad QJE'2014 analyze causal effect of parental use of Disability Insurance (DI) on children use (as adults) of DI in Norway

Identification uses random assignment of judges to denied DI applicants who appeal [some judges are severe, some lenient]

Find evidence of causality: parents on DI increases odds of kids on DI over next 5 years by 6 percentage points

Mechanism seems to be learning about DI availability rather than reduced stigma from using DI [because no effect on other welfare programs use]

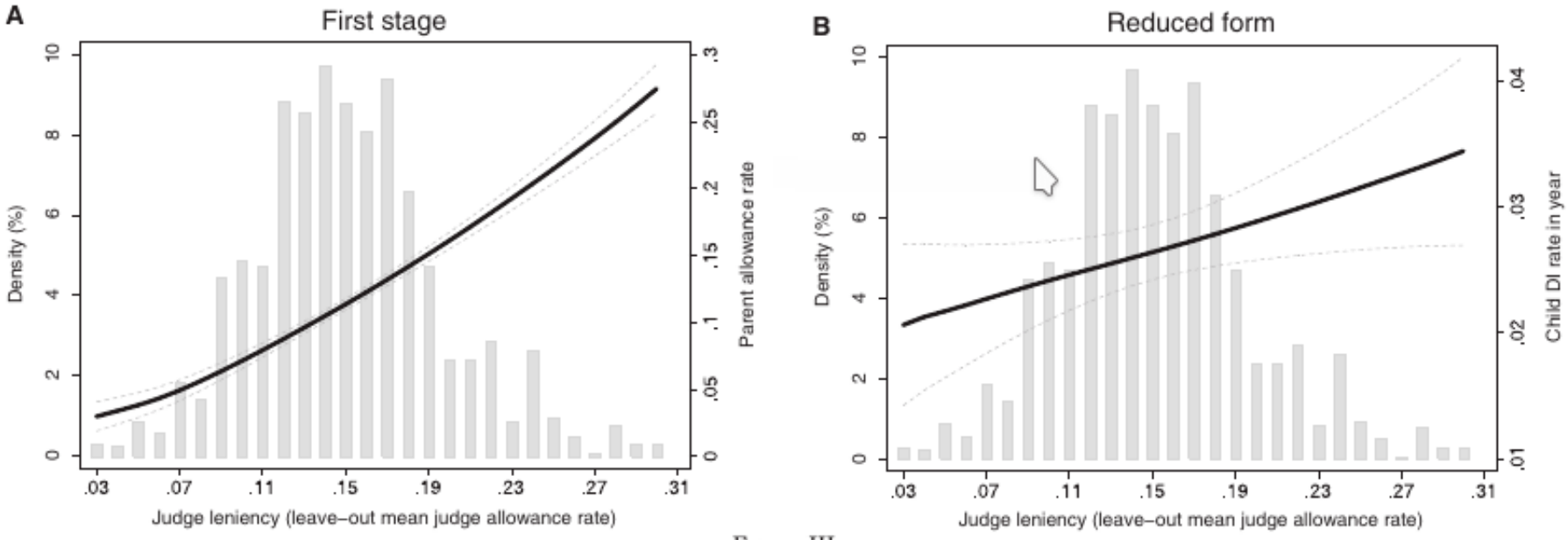


FIGURE III

Effect of Judge Leniency on Parents (First Stage) and Children (Reduced Form)

Baseline sample, consisting of parents who appeal an initially denied DI claim during the period 1989–2005 (see Section III for further details). There are 14,722 individual observations and 79 different judges. Judge leniency based on all cases a judge has ever handled, and not just the cases in our estimation sample. Panel A: Solid line is a local linear regression of parental DI allowance on judge leniency. Panel B: Solid line is a local linear regression of child DI receipt on their parent's judge leniency measure. All regressions include fully interacted year and department dummies. The histogram of judge leniency is shown in the background of both figures (top and bottom 1% excluded from the graph). Dashed lines represent 90% confidence intervals.

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