Frictional Adjustment to Income Tax Incentives: An Application to the Earned Income Tax Credit

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(2) What are the consequences for measurement and policy?

- Adjustments take time: long run $>$ short run
- Implications for "excess burden" calculations

Here's what we do

(1) Use county-level variation in awareness of the EITC (Chetty, Friedman and Saez, 2013)

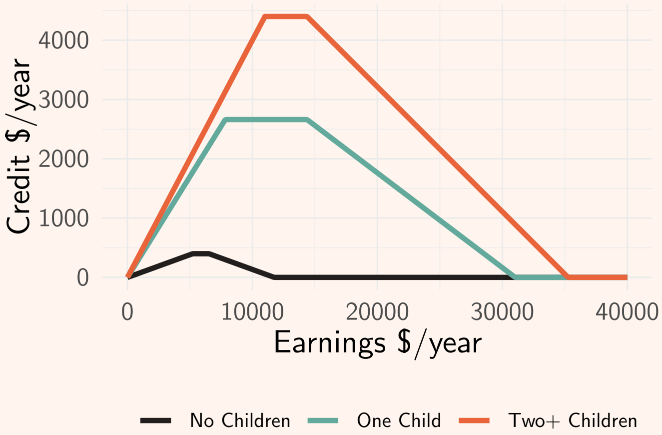
- **Compare**: eligible to ineligible as awareness↑ (diff-in-diff)
- $E \uparrow$, $EE \uparrow$, accepted wages $\leftarrow$

(2) Estimate model of labor market with undirected search and hours constraints (Shephard, 2017)

- fit evidence from step (1)

(3) Conduct counterfactuals to compare long vs short run

Background: Earned Income Tax Credit



- Expansions well-studied
- Largest federal cash transfer program

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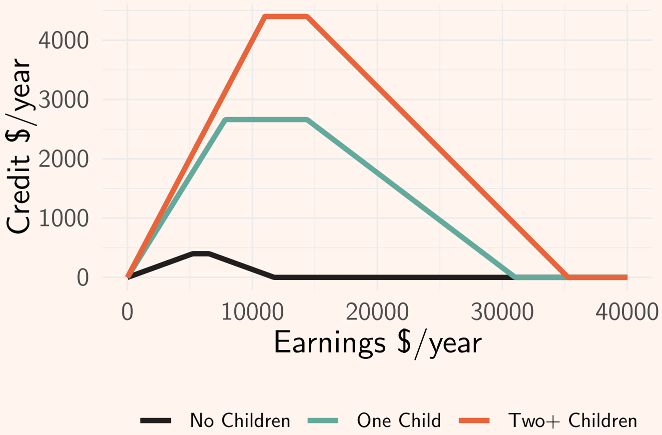

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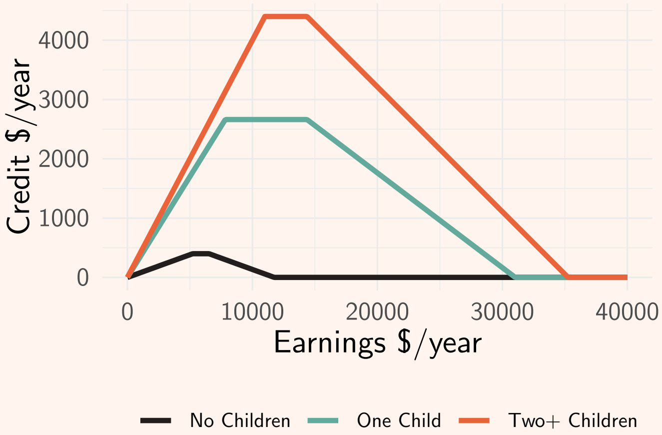
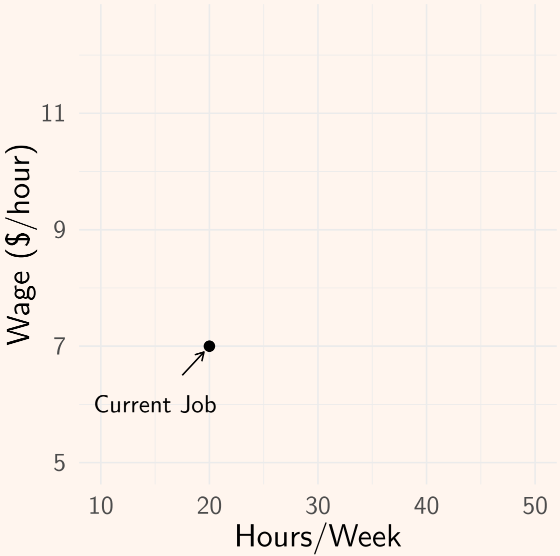


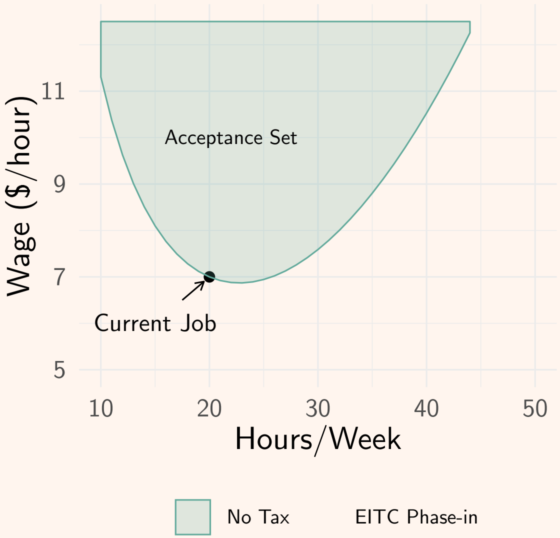
- Expansions well-studied
- Largest federal cash transfer program
- Intensive margin ambiguous
- Note incentive to bunch

Basic Mechanism



- Consider search over hours/wages

Basic Mechanism



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- Over time, climb job ladder.

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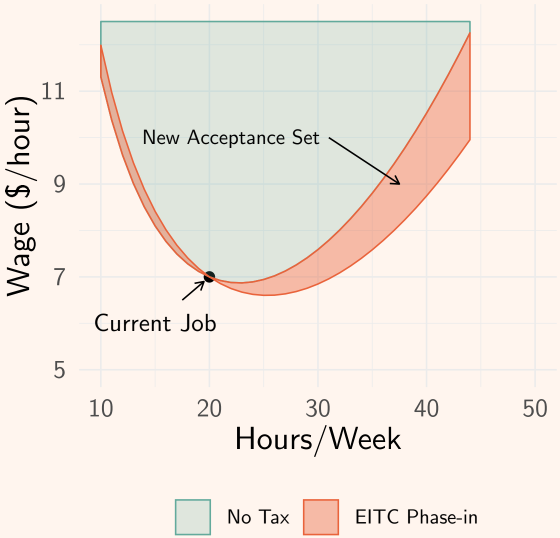

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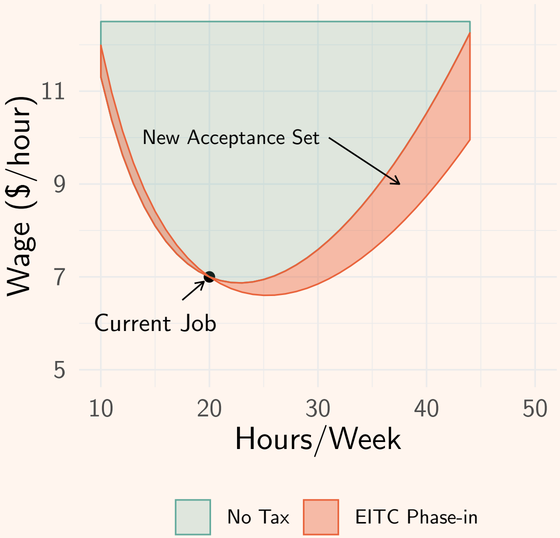

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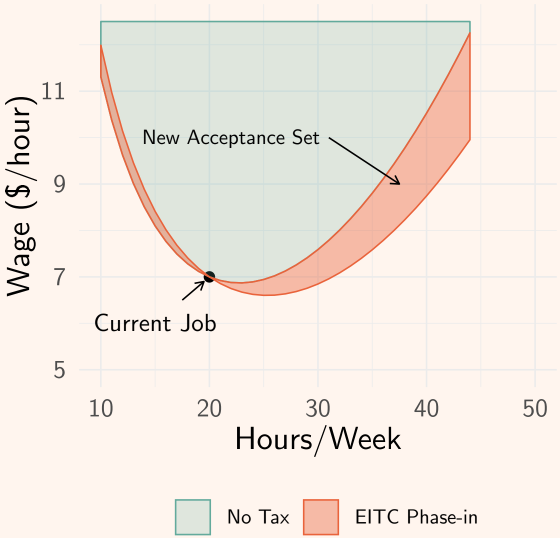

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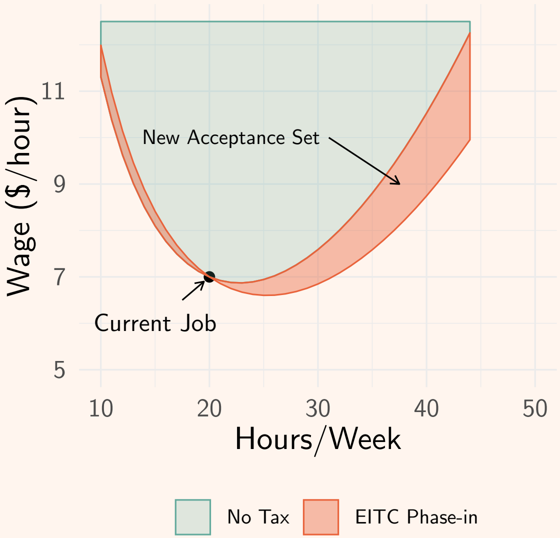


- Consider search over hours/wages
- Over time, climb job ladder.
- Tax adjusts incentives (acceptance set)
- OTJ search $\rightarrow$ slow adjustment
- EE up (unambiguous)
- Also adjust through $E \rightarrow U \rightarrow E$

Evidence

Empirical Strategy: Classic Approach

Model:

$$\mathbb{E}[Y_i | K_i, T_{t(i)}] = \mu_{t(i)} + \gamma_0 K_i + \gamma_1 K_i T_{t(i)}$$

- $K_i \in \{0, 1\}$ indicates dependent children (eligibility)
- $T_t \in \{0, 1\}$ indicates presence/expansion of tax at t
- Source of variation: introduction of tax (time)
- Assume: stable differences over time t (diff-in-diff)
- Eissa, Kleven and Kreiner (2008); Eissa and Liebman (1996)

Empirical Strategy: This Approach

Model:

$$\mathbb{E}[Y_i | K_i, A_{c(i)}] = \mu_{c(i)} + \gamma_0 K_i + \gamma_1 K_i \pi_{c(i)}$$

- $K_i \in \{0, 1\}$ indicates dependent children (eligibility)
- $\pi_c \in [0, 1]$ indicates fraction aware of tax in county c
- Source of variation: county differences in awareness
- Assume: stable differences across counties

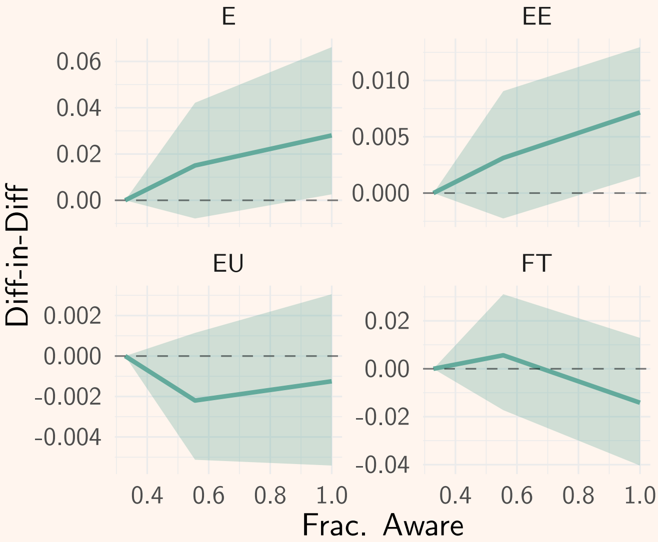
Measuring "Awareness"

- Chetty, Friedman and Saez (2013) introduce B_{zt}: excess bunching of self-reported earnings
  - z: 3-digit zip $\rightarrow$ B_{ct} using census pop counts
- Extensively validate as proxy for awareness
- Finite mixture model:

$$\log(B_{ct}) = \mu + \beta \log(\pi_{k(c)}) + \epsilon_{ct}, \;\; k(c) \in \{1, 2, ..., K\}$$

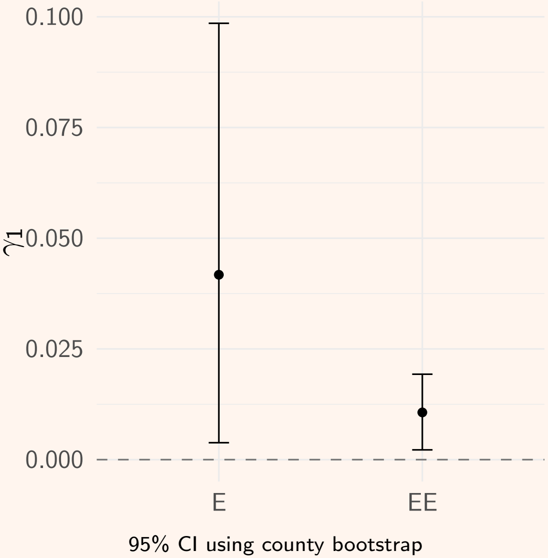
- Normalizations: $\beta = 1$ (scale), $\pi_K = 1$ (location)

Significant effects on employment and employer-employer transitions



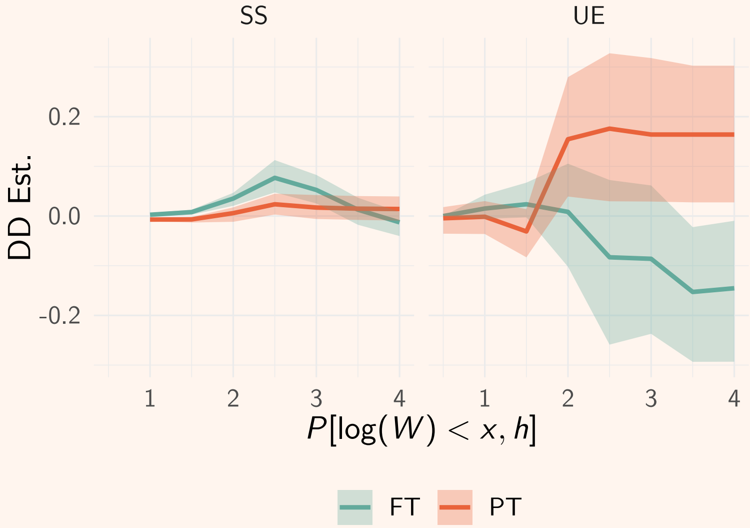
- CPS Monthly Files: 2003-2008
- Unmarried women aged 18-50 (non-military)
- EE, $E \uparrow \checkmark$

Total effects on employment and employer-employer transitions



- Regression analog look
- Placebo outcome: race, marital status
- Placebo treatment: 3+ kids

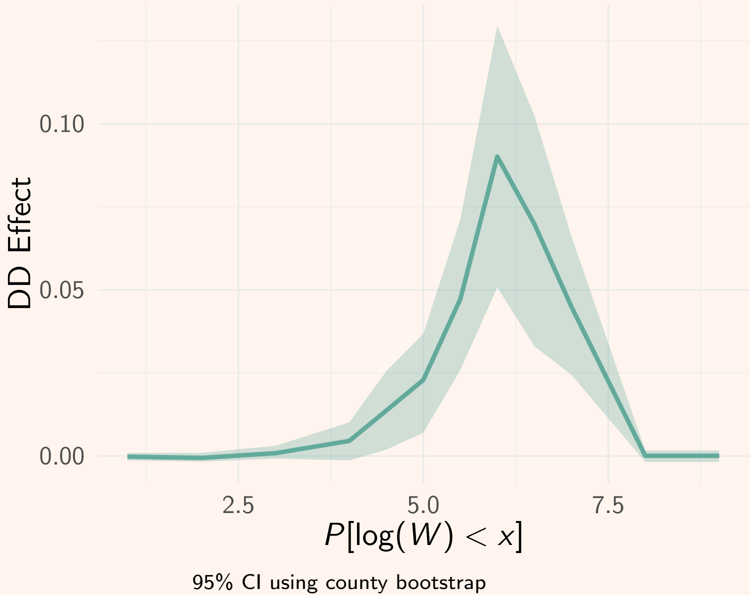
Steady state wages shift to left, more PT out of unemployment



- Steady state wage dist $\leftarrow$
- PT out of unemp $\uparrow$
- PT in steady state $\uparrow$
- SS effects: \$7-\$10/hr
- PT effects: <\$7/hr

95% CI using county bootstrap

Steady state earnings shift to left



- Steady state earnings dist $\leftarrow$
- Effect: $150-$500/week

Model

Model: Key Ingredients

- Time: continuous
- Preferences:

$$\text{utility} = T(\text{earnings}, \text{EITC awareness}, \text{kids}) - \text{cost of work}$$

  and discount future r,

- State: (kids? aware of EITC? county type? employment status?)

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kids:	$f \in \{0, 1\}$
aware of EITC:	$a \in \{0, 1\}$
employment status:	$e \in \{0, 1, 2\}, w \in \mathbb{R}^+$
county type:	$k \in \{1, 2, 3\}$

Model: Key Ingredients

- Time: continuous

- Preferences:

$$z = T(w, a, f) - \alpha e$$

  and discount future r, $\alpha \sim H(\cdot|f)$

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Model Dynamics

- Some stuff happens at a constant poisson rate:

$\lambda_{0,k}$	Unemployed receive job offers
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δ_k	Jobs are destroyed
ζ	Exit eligible group
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- Search is undirected. Draw earnings and hours (fixed) from distribution:

$$(w, e) \sim F_{k,W,e} \rightarrow \; z \sim F_{k,Z|\alpha}$$

Model Solution

- Reservation utilities:

$$z_\alpha^* = T(0,0,0) + (\lambda_0 - \lambda_1) \int_{z_\alpha^*} \frac{\tilde{F}_{Z|\alpha}(z)}{r + \zeta + \delta + \lambda_1 \tilde{F}_{Z|\alpha}(z)} dz$$

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- Solution:
  1. Fix α, f: easy to characterize steady state $G_{\alpha,f}$ over $(z,a) \rightarrow (w,e,a)$.
  2. Integrate over $\alpha \rightarrow G_f$
  3. Exogenous distribution of jobs $\Gamma(p,e)$ generates $F_{W,e}$ through wage posting (Shephard, 2017; Bontemps, Robin and Van den Berg, 1999)

Identification/Estimation

Nonparametric Identification

Result:

(1) Steady state wages + UE wages + EE wages $\rightarrow$ $F_{W,e}$, dist of res wages

(2) E, EE, EU $\rightarrow \delta, \lambda_0, \lambda_1$

(3) Res wage equation + dist. of res wages $\rightarrow$ H

(4) Invert Γ from firm foc (Bontemps, Robin and Van den Berg, 1999)

Estimation

$$F_{W,e,k}(w,e) = \left(\rho_k \Phi\left(\frac{\log(w) - \mu_{W,1,k}}{\sigma_{W,1,k}}\right)\right)^{2-e} \left((1-\rho_k)\Phi\left(\frac{\log(w) - \mu_{W,2,k}}{\sigma_{W,2,k}}\right)\right)^{e-1}$$

$$H_k(\alpha|f) = \Phi\left(\frac{\log(\alpha) - \mu_{\alpha,f,k}}{\sigma_{\alpha,k}}\right)$$

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(2) Get $(\hat{\delta}_k, \hat{\lambda}_{0,k}, \hat{\lambda}_{1,k}, \hat{\mu}_{W,e,k}, \hat{\sigma}_{W,e,k}, \hat{\mu}_{\alpha,0,k}, \hat{\sigma}_{\alpha,k})$ from single mothers

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- Steady state employment rates (E_k)
- Monthly employer-employer transitions (EE_k)
- Monthly separation rate (EU_k)
- Distribution of wages and hours in steady state ($G^{ss}_{W,e,k}$)
- Distribution of wages and hours accepted out of unemployment ($G^{ue}_{W,e,k}$)

Estimation

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- Match E_k,EE_k,EU_k,$G^{ss}_{W,e,K}$,$G^{ue}_{W,e,k}$ for each k

(3) Get each $\hat{\mu}_{\alpha,k,1}$ by matching emp rates.

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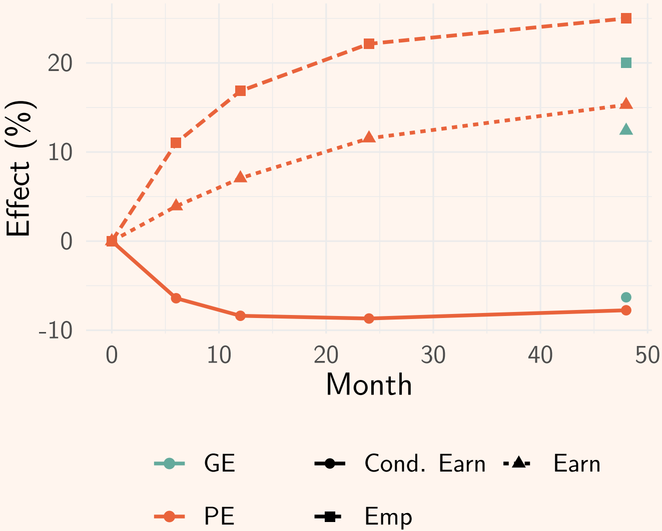
- Test for stable differences: $\mu_{\alpha,k,1} - \mu_{\alpha,k,0} = \mu_{\alpha,1,1} - \mu_{\alpha,1,0}$ ✓
- Validate: fit EE response also? ✓

Counterfactuals

Dynamic Effects of EITC



95% CI using county bootstrap

- Short run $\neq$ long run
- Non-monotone adjustments
- Small differences when doing GE

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$$EB_\gamma = \int \tau(w)\partial g(w)[\gamma]$$

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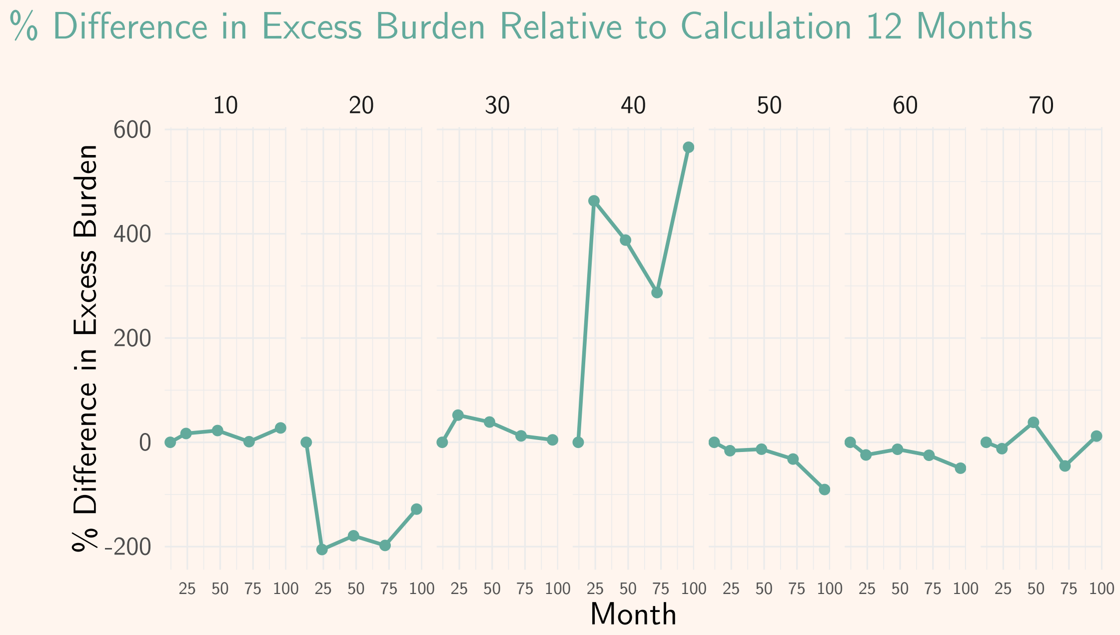
- We have seen that ∂g can depend on time horizon!
- Next slide: calculate EB for:

$$\gamma(w) = 1\{w \in B_q\}\tau(w)$$

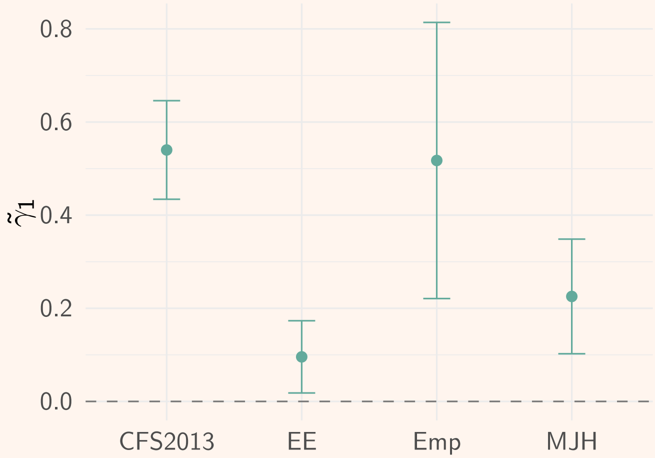
where B_q is the qth decile bin of wages


% Difference in Excess Burden Relative to Calculation 12 Months
10
20
30
40
50
60
70
600
400
200
0
-200
% Difference in Excess Burden
25
50
75
100
Month

Conclusion

- Response to taxes consistent with search frictions + hours constraints
- Search frictions affect adjustment to taxes (they take time)
- Immediate implications for measurement of elasticities (big differences!!)
- Tax elasticities key input for policy calculations (e.g. excess burden)
- In frictional labor markets, these formula don't work anyway

Results: $Y_i = \mu_{t(i)} + \delta_{c(i)} + X_i\beta + \gamma_0 K_i + \tilde{\gamma}_1 K_i B_{c(i)t(i)} + \epsilon_i$



- Note: scale not identified
- Robustness: sample selection
- Placebo outcome: race, marital status
- Placebo treatment: 3+ kids
- Employment effect comparable to Chetty, Friedman & Saez (2013).
- back

Bontemps, Christian, Jean-Marc Robin, and Gerard J. Van den Berg. 1999. "An Empirical Equilibrium Job Search Model With Search on the Job and Heterogeneous Workers and Firms." International Economic Review, 40(4): 1039–1074.

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