14.472 Public Finance II

Topic IIIb: Empirics: Value of Insurance

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Fall 2020

Outline

1. Brief background on UI [DONE]
2. Theory: Optimal benefit and duration level (Baily/Chetty) [DONE]
3. Empirics: Taking Baily / Chetty to Data
    1. LHS: Gap in MUs across states [**UP NEXT]**
    2. RHS: Fiscal externality from insurance on government budget

Baily Chetty (Refresher)

- Formula offers a potential road map for empirical work: to tell you if locally should raise or lower benefits:

$$\frac{u'(b) - u'(w - \tau)}{u'(w - \tau)} = \varepsilon_{ue,b} \tag{1}$$

- RHS: Elasticity of duration of ue wrt benefits. Or more generally, inpact of bneefit on government budget (in principle, empirics are straightforward).
- LHS: Gap in MU across states (harder)
  - Estimating willingness to pay for a non-traded good (recall "analyzing markets that don't exist")

Estimating Gap in Marginal Utilities

- How much of a markup would individuals be willing to pay for UI insurance? $\frac{u'(c_u)-v'(c_e)}{v'(c_e)}$
  - Recall with full insruance the "gap" would be 0
- Six (!) approaches (and counting)
  - Approach #1: Impact of unemployment on consumption (Gruber 1997; Hendren 2017)
  - Approach #2: Ex-ante impact of learning about unemployment on consumption (Hendren 2017)
  - Approach #3: Impact on labor supply of indirectly affected spouse (Fadlon and Nielsen forthcoming)
  - Approach #4: Liquidity vs. Moral Hazard benefit response (Chetty 2008)
  - Approach #5: Reservation wages (Shimer and Werning 2007)
  - Approach #6: Estimate WTP directly (Landais et al. 2017)
- Comparison across approaches: Landais and Spinnewijn (2018)
  - Plus a seventh (?!) bounding approach: how MPC varies across states

Approach #1: Impact of Unemployment on Consumption

- Intellectual history: huge moral hazard lit pointing out distortions caused by UI
  - See e.g. Krueger and Meyer (2002) for a literature review
- What about the benefits side? Enter Gruber (1997):
  - Estimates consumption smoothing benefits of UI
    - Hugely important for asking the question not being asked
    - A new point – prior lit just focused on documenting distortions
  - Combines these estimates with existing moral hazard estimates and plausible risk aversion values to implement baily formula
    - Goes beyond demonstrating that "consumption smoothing benefits exist" to try to make welfare statements

Gruber (1997) Overview

- Two main parts to paper:
  - How does consumption change when becomes unemployed (how "smooth" is consumption)?
  - Combines consumption-smoothing estimates with existing moral hazard estimates and “plausible” risk aversion values to implement an approximation to the Baily formula

Using consumption drops for LHS of Baily

$$\frac{u'(b) - u'(w-\tau)}{u'(w-\tau)} = \varepsilon_{ue,b} \tag{2}$$

- Quadratic approximation to utility (when $u'''(c)$~0): i.e. First order Taylor expansion u'(c_u) around u'(c_e):
- Optimal benefit rate b is implicitly defined by

$$\frac{\gamma \Delta c}{c} \sim \varepsilon_{ue,b}$$

where $\frac{\Delta c}{c} = \frac{c_e - c_u}{c_e} \approx \log(c_e) - \log(c_u)$

and $\gamma = \frac{u''(w-\tau)}{u'(w-\tau)}(w-\tau)$ i.e. coeff of rel risk aversion

- Key: in principle we can estimate these three components empirically (or at least most of them...):
  - Elasticity of ue wrt benefits
  - Drop in consumption when become ue
  - Risk aversion

Some comments on this approximation

$$\frac{\gamma \Delta c}{c} \sim \varepsilon_{ue,b}$$

- Quadratic approximation assumes no precautionary savings motive
  - Chetty 2006 shows this can lead to quite a bit of bias (formula only holds exactly for quadratic utility); can extend formula to include coefficient of relative prudence to improve approximation
- Assumes no state dependent utility (equating MU of consumption means equating consumption)
  - Finkelstein, Luttmer and Notowidigdo (2013) show this can have big effects on optimal benefit level (why?)
- Real issue: where are you going to get γ?!

Estimating Consumption Drops with UE

- Gruber (1997) estimates $\frac{\Delta c}{c}$using first diference impact of unemployment on consumption expenidture (food expendtiure) in the PSID
  - Sample of hh where head was employed last year and is now unemployed (panel = key bc dep var is change in consumption)
  - Key dependent variable: Food consumption
- Finds a 6-10% drop in consumption (food expenditure) upon unemployment

Implication

- Baily-Chetty formula implies that at optimum :

$$\gamma \frac{\Delta c}{c_e} = \varepsilon_{ue,b}$$

- Having estimated $\frac{\Delta c}{c_e}$, Gruber uses
  - estimate of ε from Meyer (1990)
    - Ideally estimate all the parameters you need internally to your paper
    - Do consumption smoothing and ue duration estimates come from same population / same source of variation
  - γ – takes "range of plausible values" of 1 – 4 (or more. . . !)
- Results
  - for $\gamma < 2$, optimal benefit level is lower than current level (i.e. LHS $<$ RHS)
  - However,for γ~4 current benefit level ~optimal (two sides ~equal)

Sensitivity of results to assumption about risk aversion

- Hard to estimate this parameter
  - See e.g. Cohen and Einav (1997) for one approach and discussion of some others (race track bettors; jeopardy players; labor supply. . .)
  - There is a great deal of uncertainty about this parameter ("plausible" values range from 1 (in macro) to 50+ (equity premium puzzle))
- Moreover risk preferences may vary across contexts
  - Size of risk (Rabin 2000; Chetty and Szeidl (2007) on consumption commitments – may be locally much more risk averse than globally where can undue your cons commitments)
  - Context-specific risk preferences? (e.g. Barseghyan et al. 2011, Einav et al. 2012)
  - [Aside: Gruber measures food consumption not total consumption. Need the "right" curvature. . . i.e. curvature of utility wrt food cons.]
- How useful is an "empirical formula" when very hard to pin down one of the parameters?

"Endogenous" consumption smoothing

- Lack of knowledge about risk aversion even more concerning given that consumption smoothing likely endogenous to level of risk aversion
- Chetty and Looney (JPubEc 2006):
  - US and Indonesia have similar smoothness of consumption following an UE shock
    - Very little social insurance in Indonesia
- Does Baily formula imply if UI is at optimal level in US, don't need social insurance in Indonesia (same consumption smoothing without social insurance)

"Endogenous" consumption smoothing (con't)

- US and Indonesia have similar smoothness of consumption following an UE shock
  - Very little social insurance in Indonesia
  - More and less efficient forms of consumption smoothing
  - In US smooth through spousal labor supply and savings; in Indonesia, by e.g. pulling kids out of school and setting them to work
  - If you are very poor / very near subsistence level, you become effectively very risk averse
    - will do anything to maintain a minimum consumption including highly inefficient smoothing
  - So can't just "import" a common risk av. param in difft contexts
- Relatedly: "cost" of crowd out of self insurance varies
  - How inefficient is the crowded out consumption smoothing mechanism?
  - So evidence of what is crowded out may be relevant (if unsure about risk aversion...)
  - but otherwise, not clear why it matters "what is crowded out" by UI (e.g. savings, spousal labor supply etc)

Estimating Consumption Drops with UE: Hendren (2017)

- Gruber (1997) estimates $\frac{\Delta c}{c}$ using first diference impact of unemployment on consumption expenidture (food expendtiure) in the PSID
  - Finds a 6-10% drop in consumption (food expenidture) upon unemployment
- Hendren (2017) re-estimates this in PSID, showing result visually
  - Does not restrict to those who become unemployed
  - Regresses change in log consumption on a series of leads and lags for periods relative to when became unemployed:

Estimating Consumption Drops with UE: Hendren (2017)

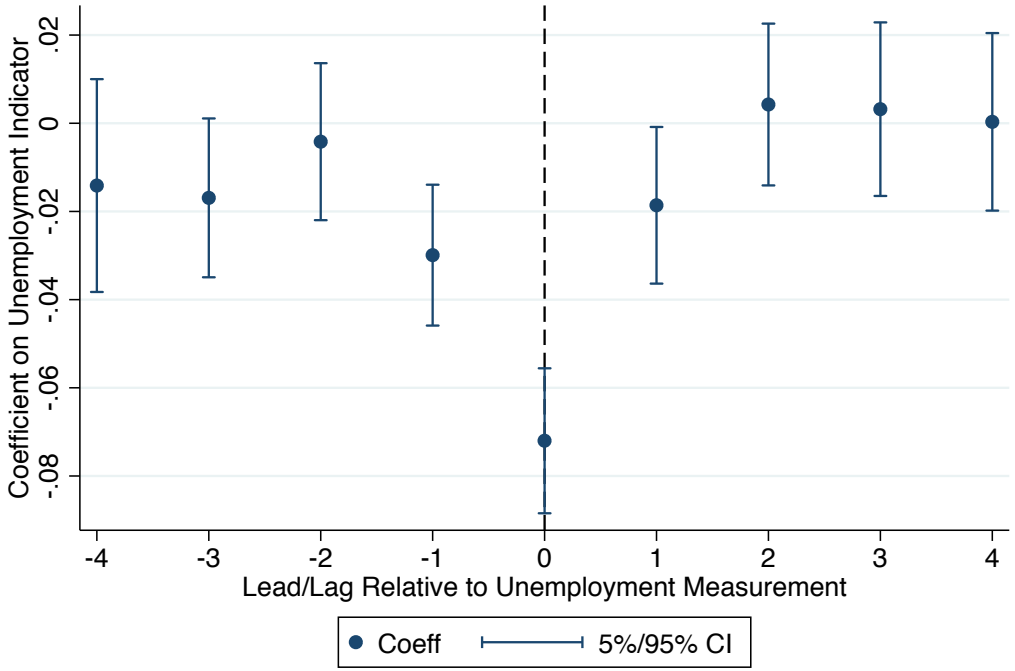
- Hendren (2017) in PSID regresses $\log(c_{i,t}) - \log(c_{i,t-1})$ on $U_{i,t-k}$: leads and lags of indicators for whether unemployed in year $t-k$:

$$\log(c_{i,t}) - \log(c_{i,t-1}) = \alpha_k + \Delta_k^{FD} U_{i,t-k} + \Gamma_k X_{i,t} + \nu_{i,t}$$

-
  - where $U_{i,t}$ is and indicator for being unemployed in survey year t
  - key coefficients are Δ_k^{FD} which measure average difference in consumption growth in period t for those who are and are not unemployed in period $t-k$
  - To control for other life-cycle or aggregate trends in consumption growth, includes a full set of year dummies and cubic in household age in $X_{i,t}$
- Runs separate regressions for each value of $k = -4, -3, \ldots, 4$
  - Plots coefficients Δ_k^{FD}

Impact of UE on Consumption Growth

FIGURE IV: Impact of Unemployment on Consumption Growth



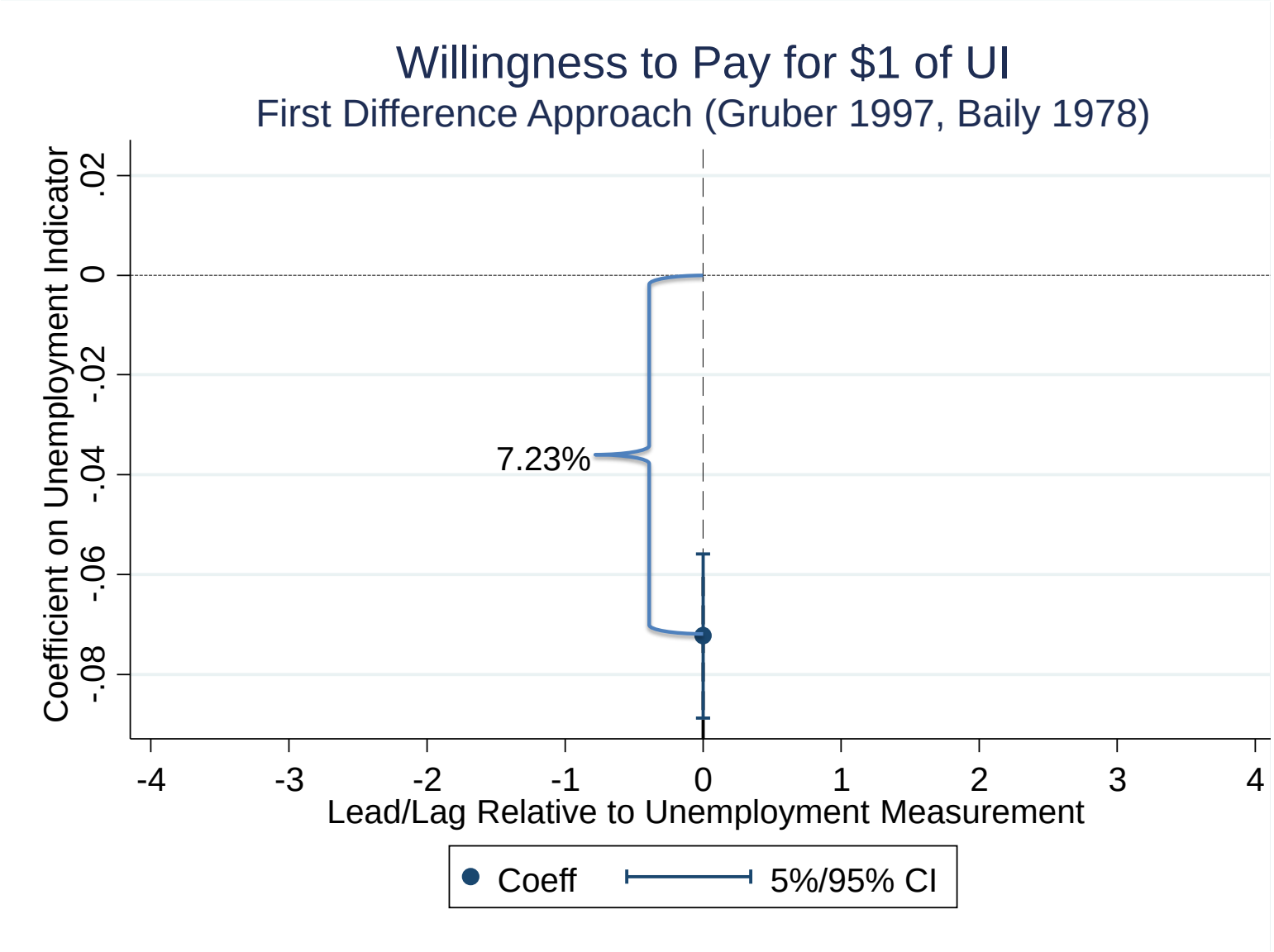
Notes: These figures present coefficients from separate regressions of leads and lags of the log change in food expenditure on an indicator of unemployment, along with controls for year indicators and a cubic in age. Data is from the PSID with one observation per household per year. Unemployment is defined as an indicator for the household head being unemployed. Following Gruber (1997) and Chetty et al. (2005), food expenditure is the sum of food in the home, food outside the home, and food stamps. The horizontal axis presents the years of the lead/lag for the consumption expenditure growth measurement (i.e. 0 corresponds to consumption growth in the year of the unemployment measurement relative to the year prior to the unemployment measurement). The sample is restricted to household heads who are employed in $t-1$ or $t-2$.

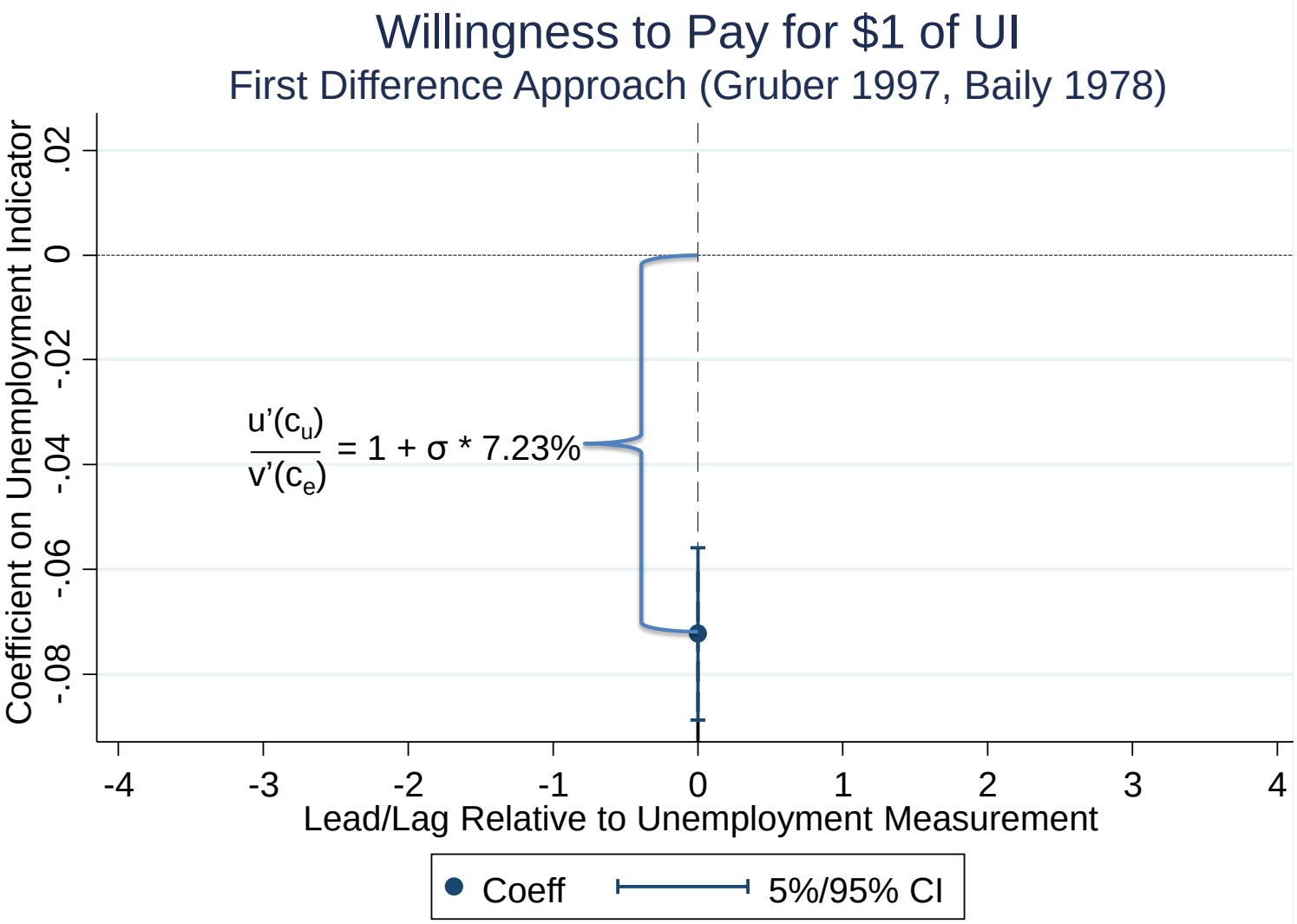
Findings

- 7-8% drop in consumption at onset of unemployment
  - Consistent with prior estimates (e.g. Gruber 1997)
- But what's up with those pre-trends?
  - 2-3% reduction in consumption in the year prior to unemployment!

Does drop in consumption when become ue under-estimate consumption decline due to UE?

- Gruber (1997) looks at drop in consumption when become unemployed
- But Hendren finds drop in consumption prior to unemployment
  - Suggests looking only at "on impact" effect of ue on consumption change underestimates causal impact of unemployment
- Suggest that may underestimate LHS of Baily-Chetty formula
  - proposes a scaling of consumption drop at time of unemployment


Willingness to Pay for $1 of UI
First Difference Approach (Gruber 1997, Baily 1978)
Coefficient on Unemployment Indicator
.02
0
-.02
-.04
-.06
-.08
7.23%
-4
-3
-2
-1
0
1
2
3
4
Lead/Lag Relative to Unemployment Measurement
Coeff
5%/95% CI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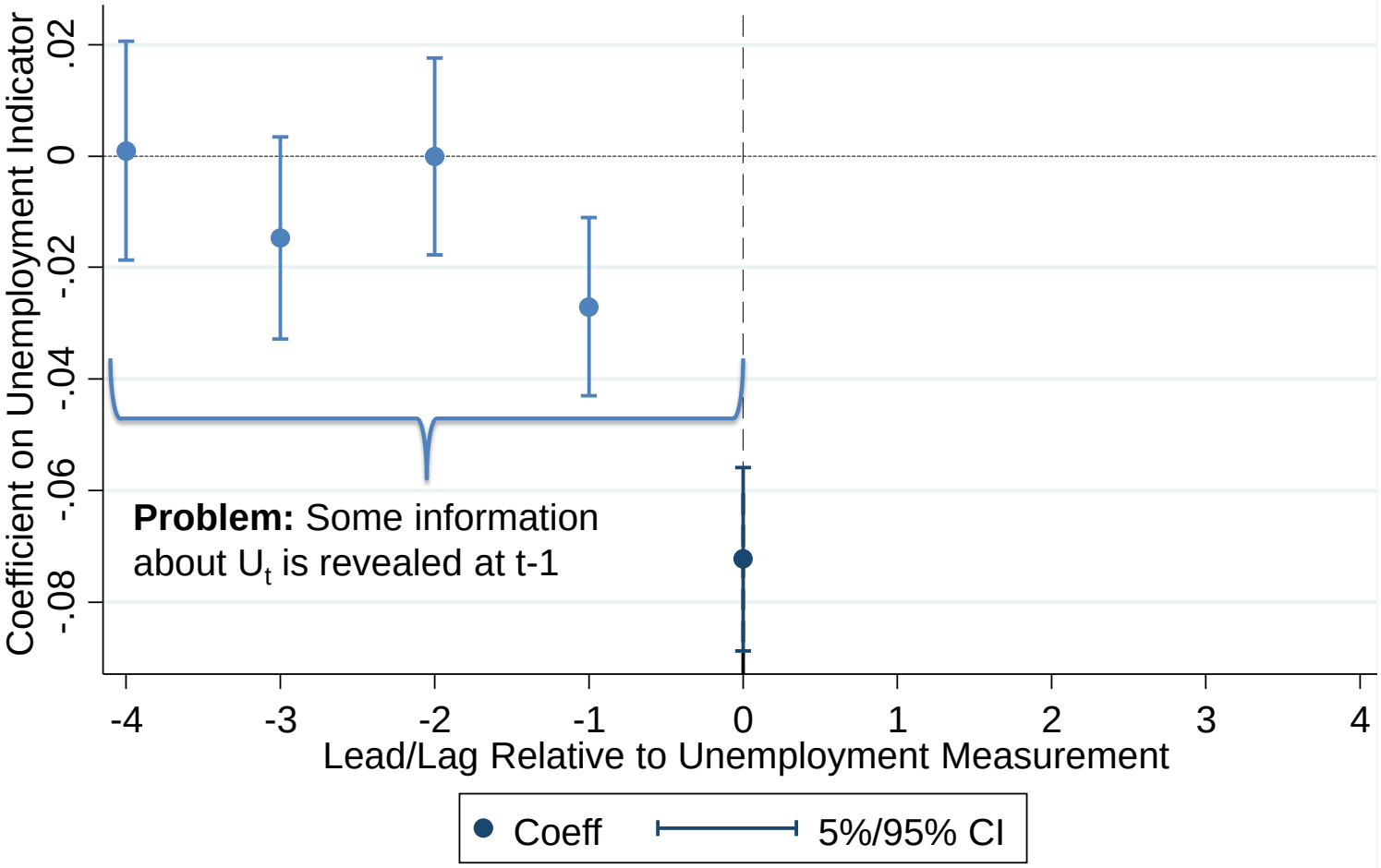
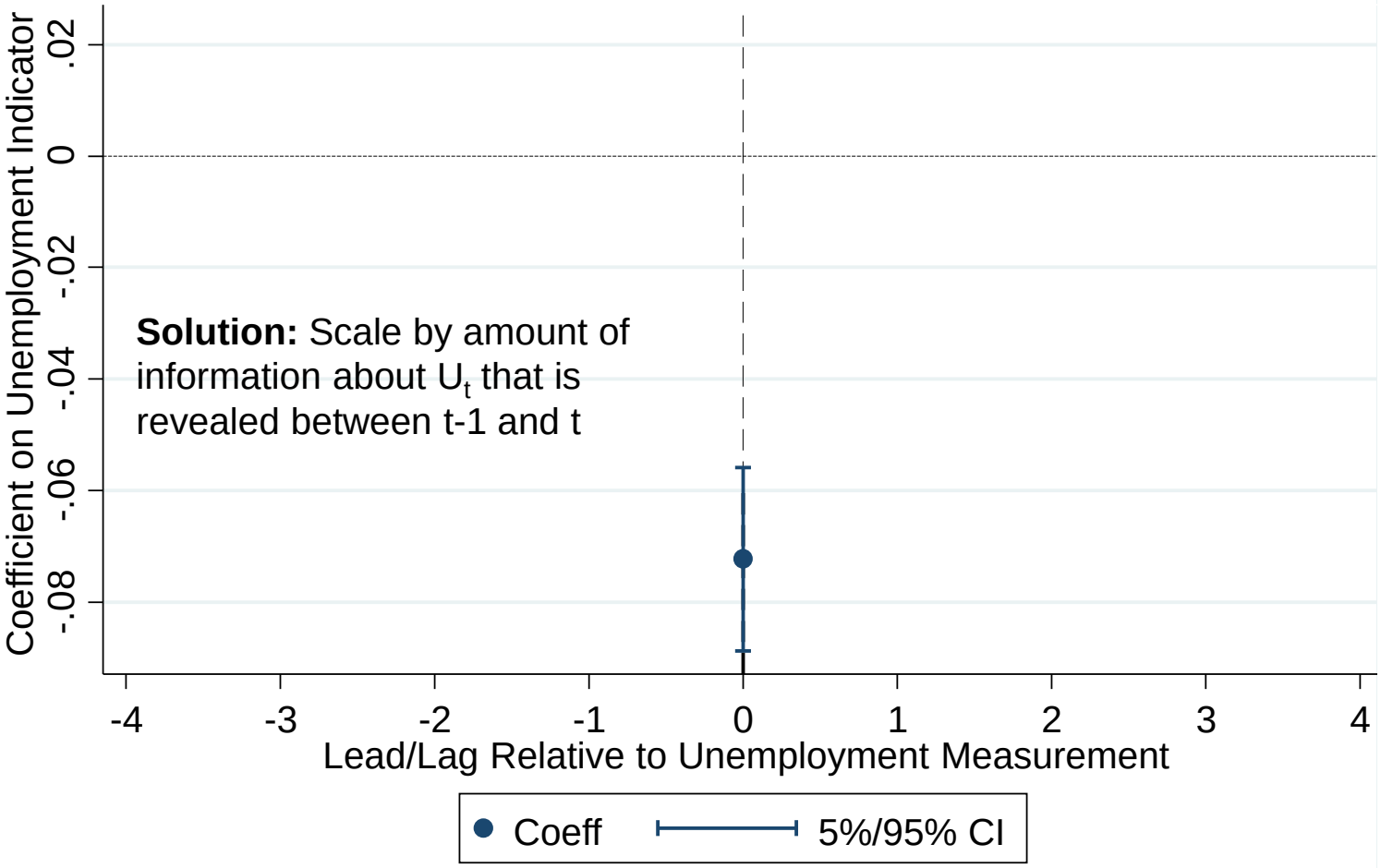
Hendren (2017): Scale By Information Revealed



Problem: Some information about U_t is revealed at t-1

Hendren (2017): Scale By Information Revealed



Scaling drop in consumption to account for future job loss

- Hendren (2017) **Proposition 1**: Causal Effect of unemployment on consumption given by

$$\frac{\Delta c}{c} = \frac{\Delta^{FD}}{1-(E[P|U_t=1]-E[P|U_t=0]}$$

-
  - where Δ^{FD} is the "standard" meausure of drop in consumption when become unemployed
  - P represents beliefs about U_t measured in year $t-1$
  - Empirical implementation: regress Z (subjective probability of unemployment measured in $t-1$) on U_t
- Note: If no knowledge about U, then $E[P|U_t = 1] = E[P|U_t = 0]$ and the first difference estimate recovers average causal effect

Scaling drop in consumption to account for future job loss

- Hendren (2017) **Proposition 1**: Causal Effect of unemployment on consumption given by

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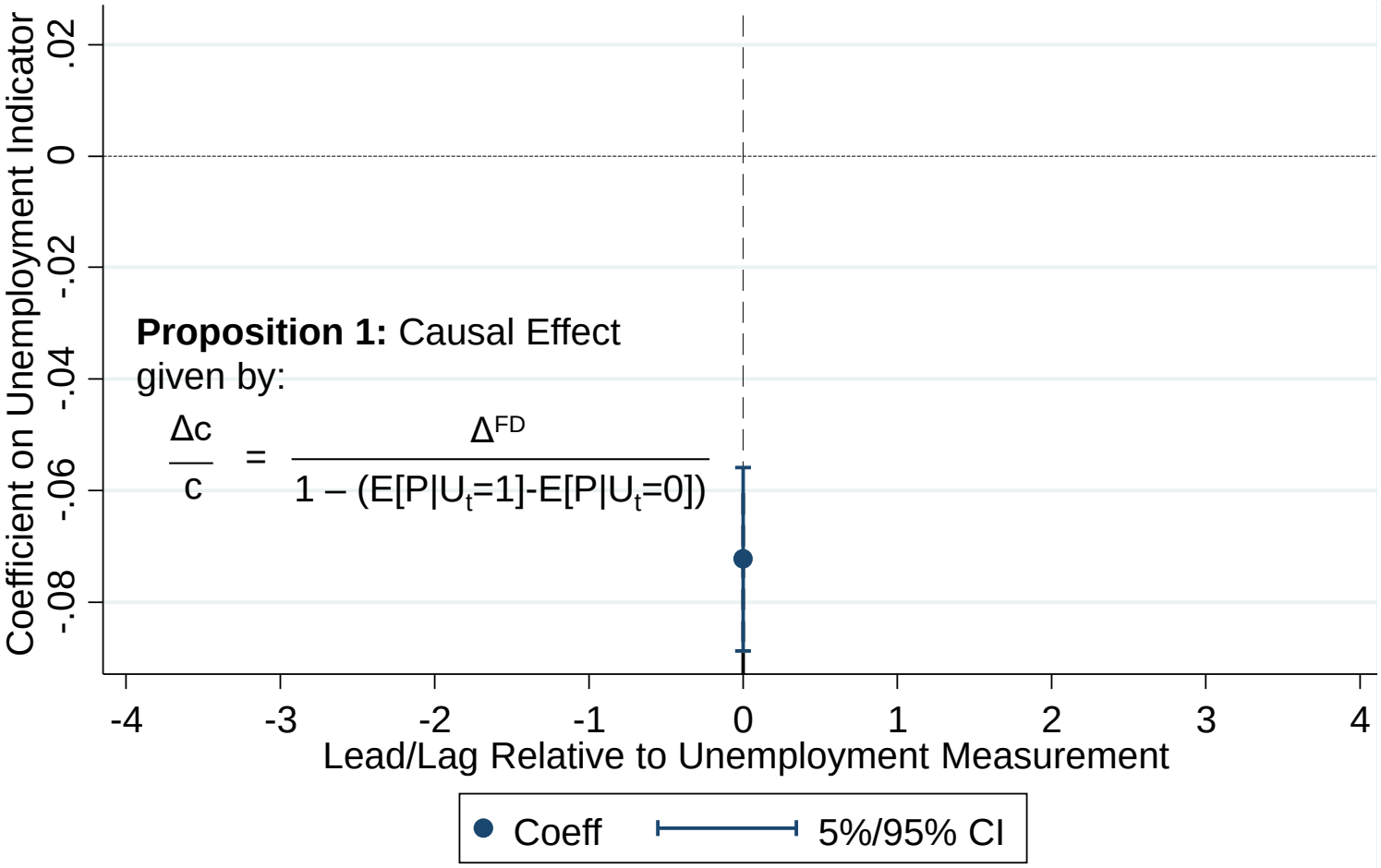
  - where Δ^{FD} is the "standard" meausure of drop in consumption when become unemployed
  - P represents beliefs about U_t measured in year $t-1$
- Key assumptions needed for proposition:
  - state independence (needed to infer difference in marginal utilties from differences in consumption levels multiplied by risk aversion)
  - optimal savings determined by standard Euler equation (provides link between ex ante consumnption response and causal effect of unemployment)
  - no systematic heterogeneity in causal effect of unemployment on consumption that is correlated with P

Hendren (2017): Scale By Information Revealed



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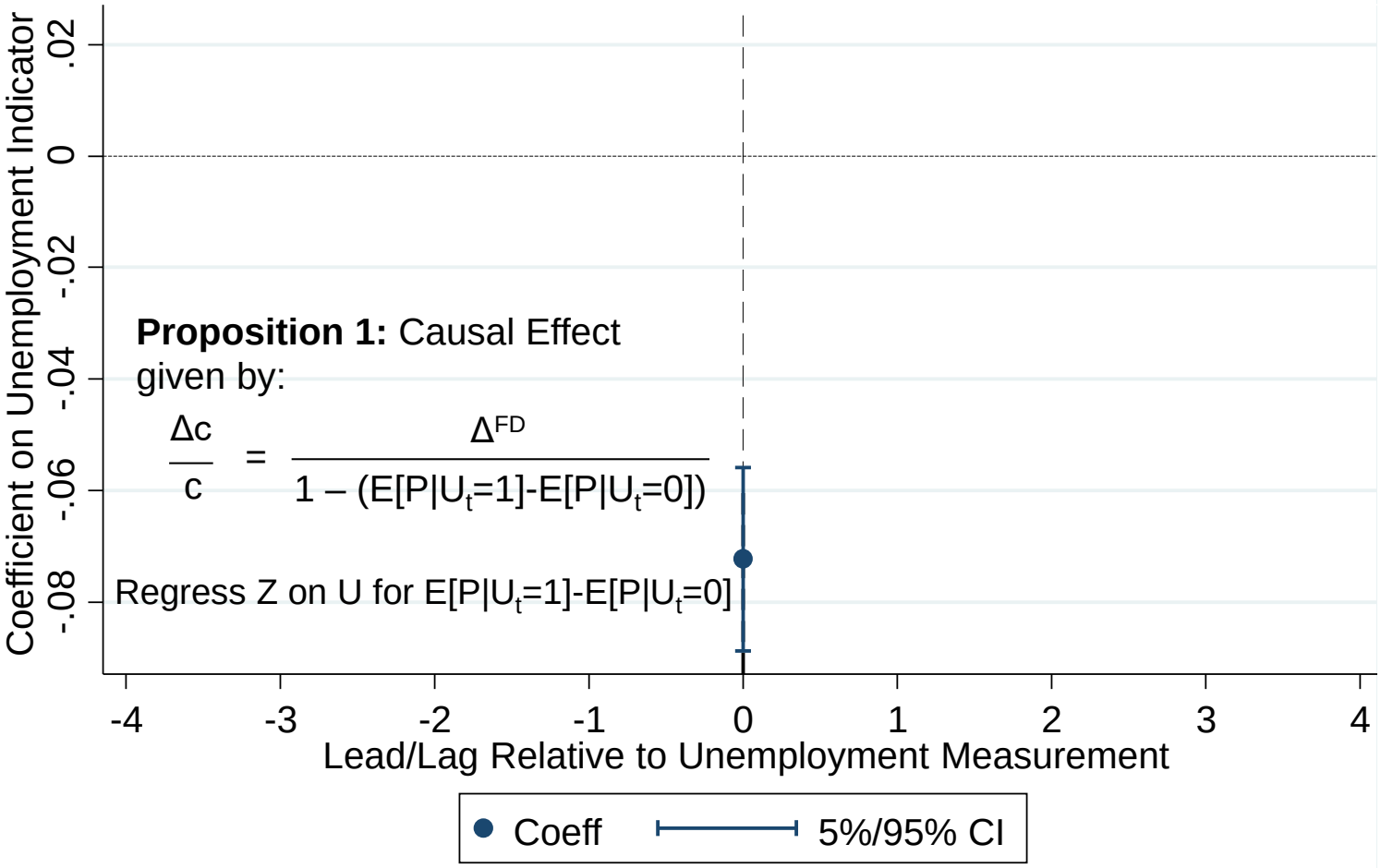

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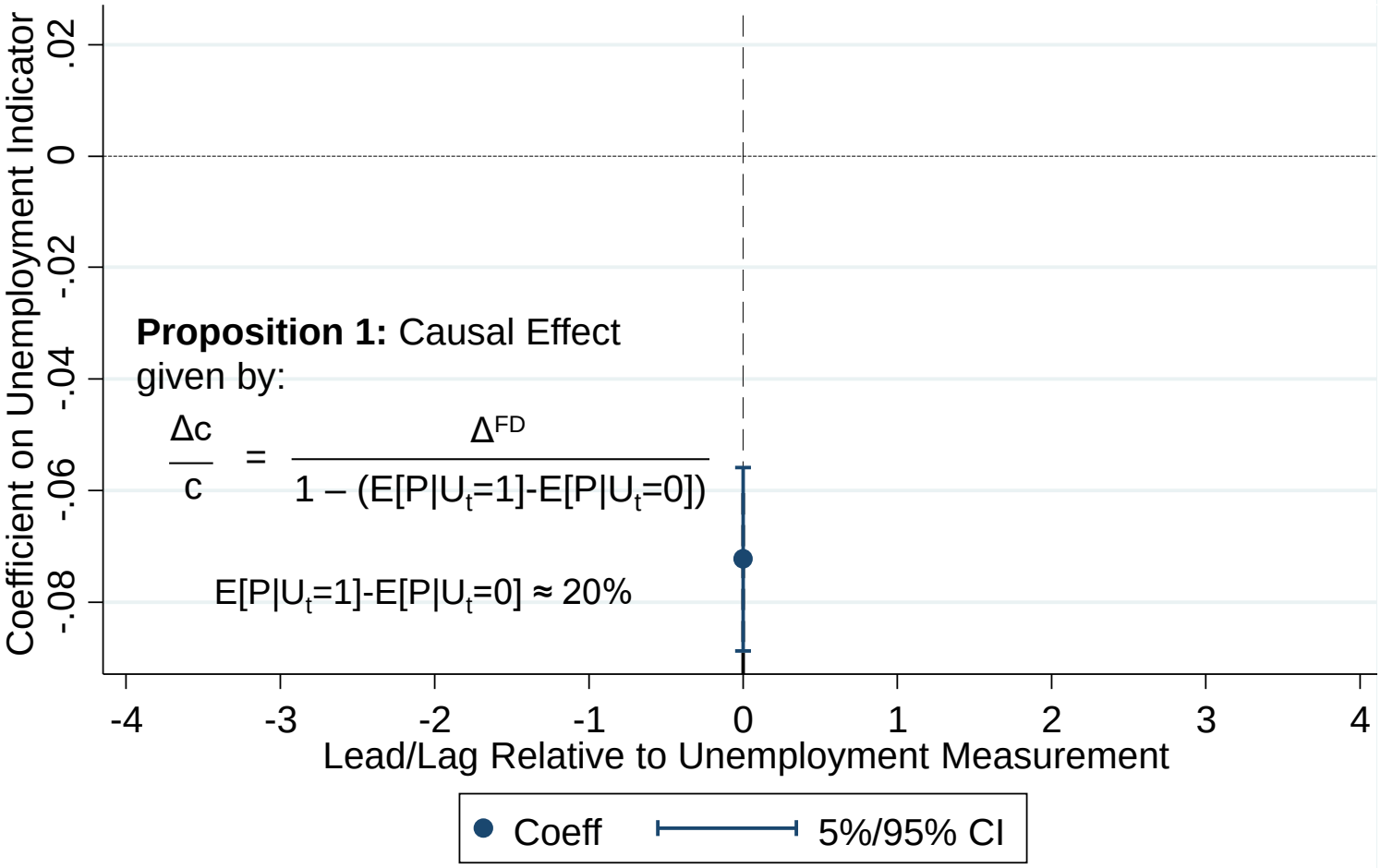

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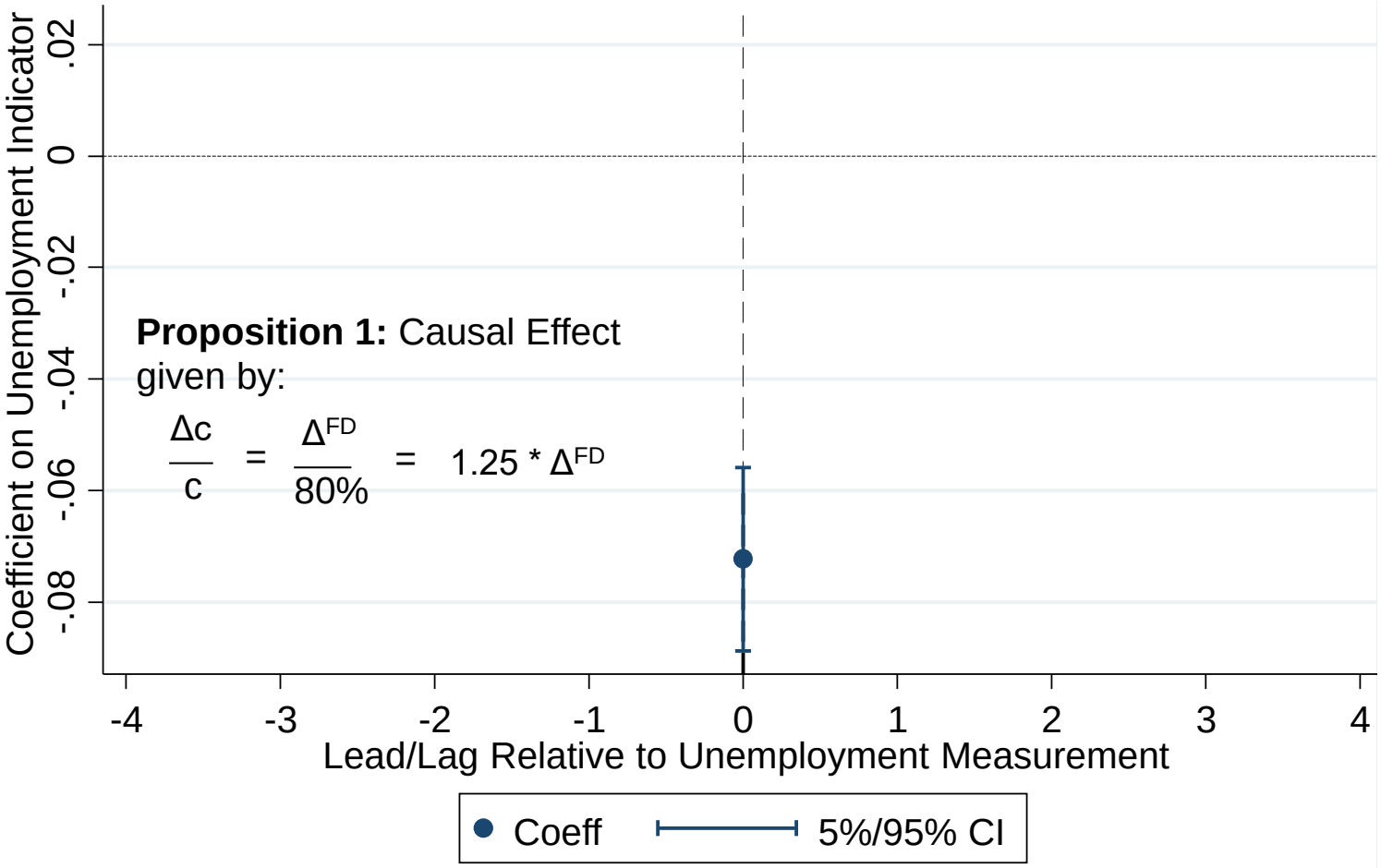

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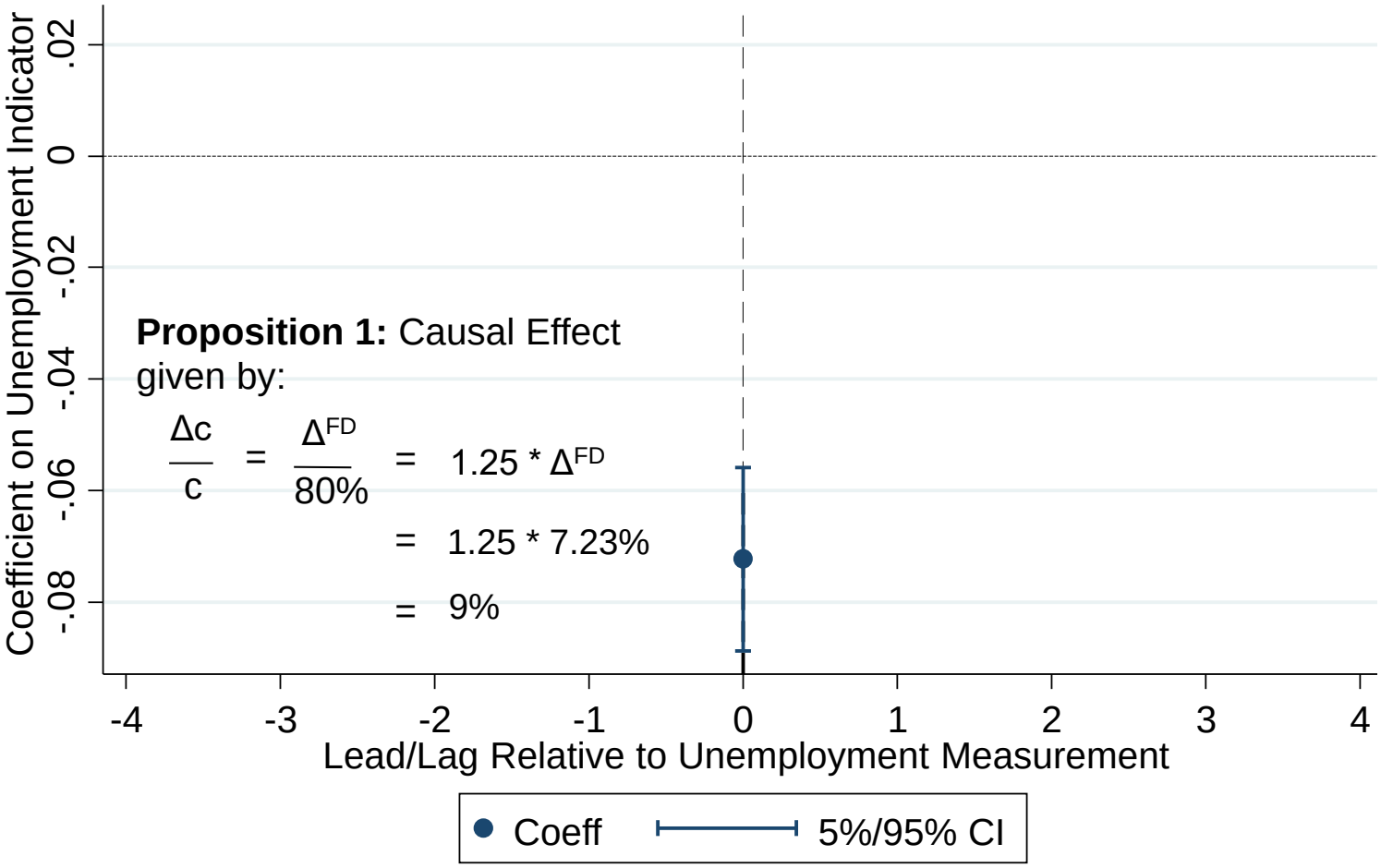

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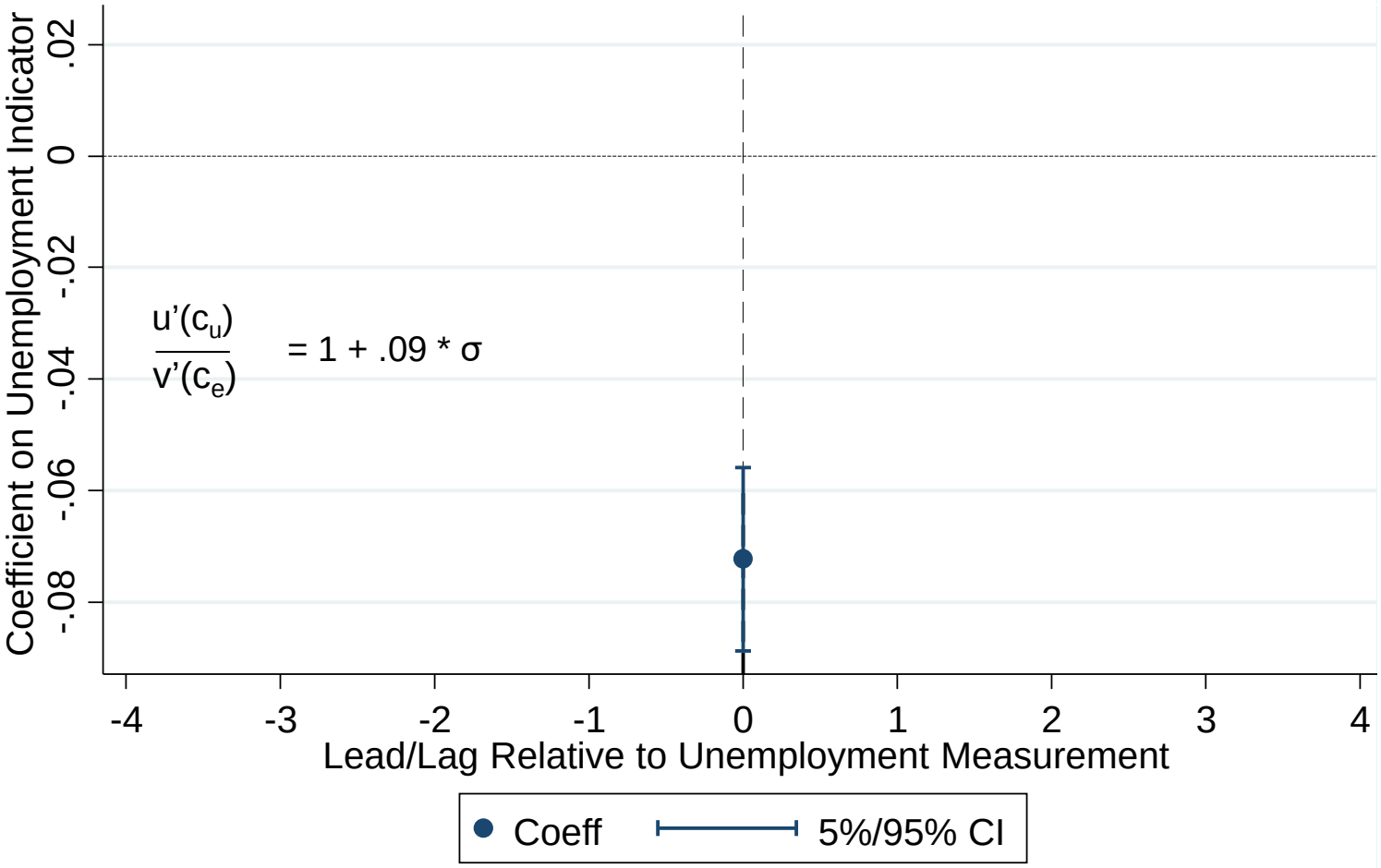

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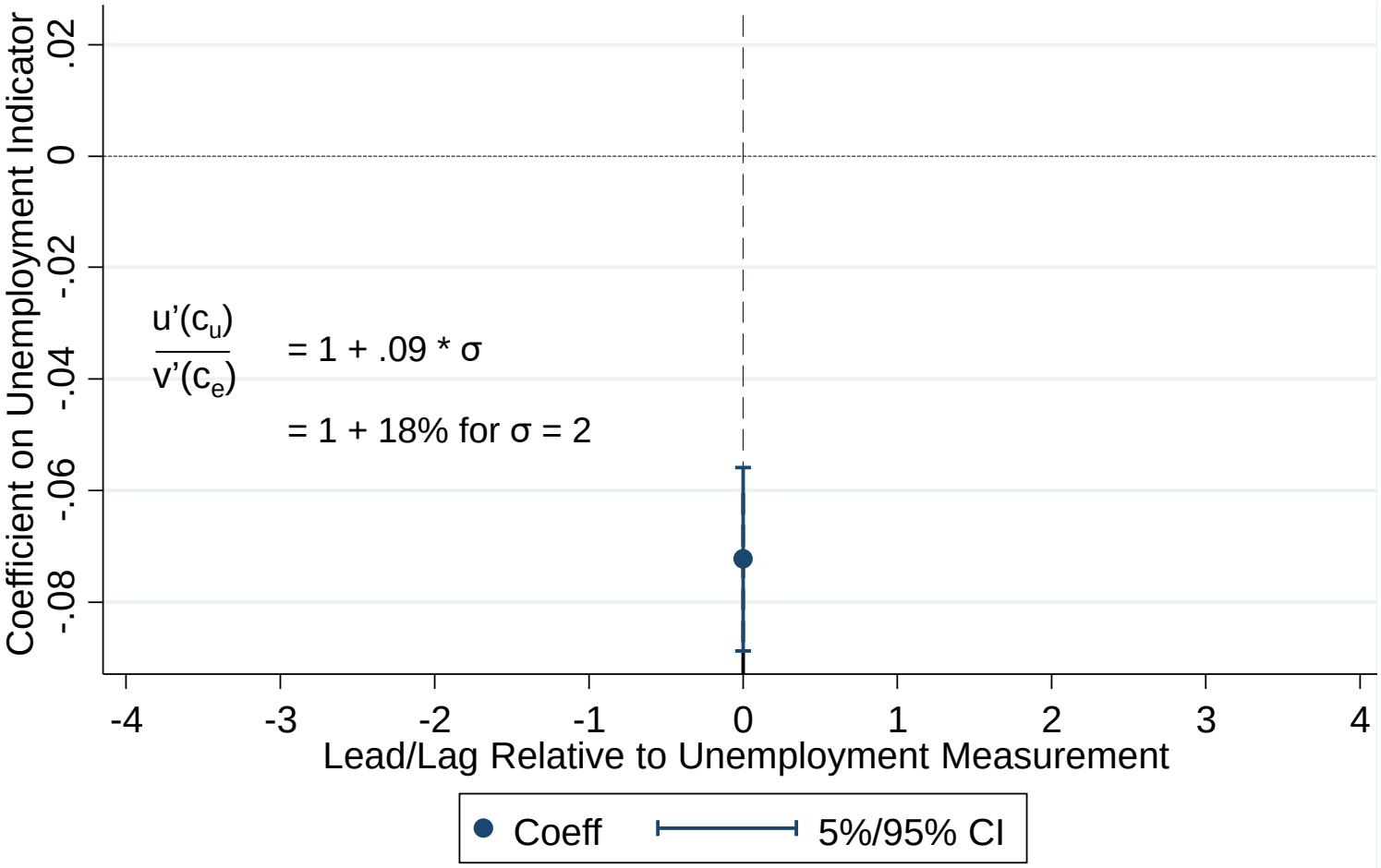

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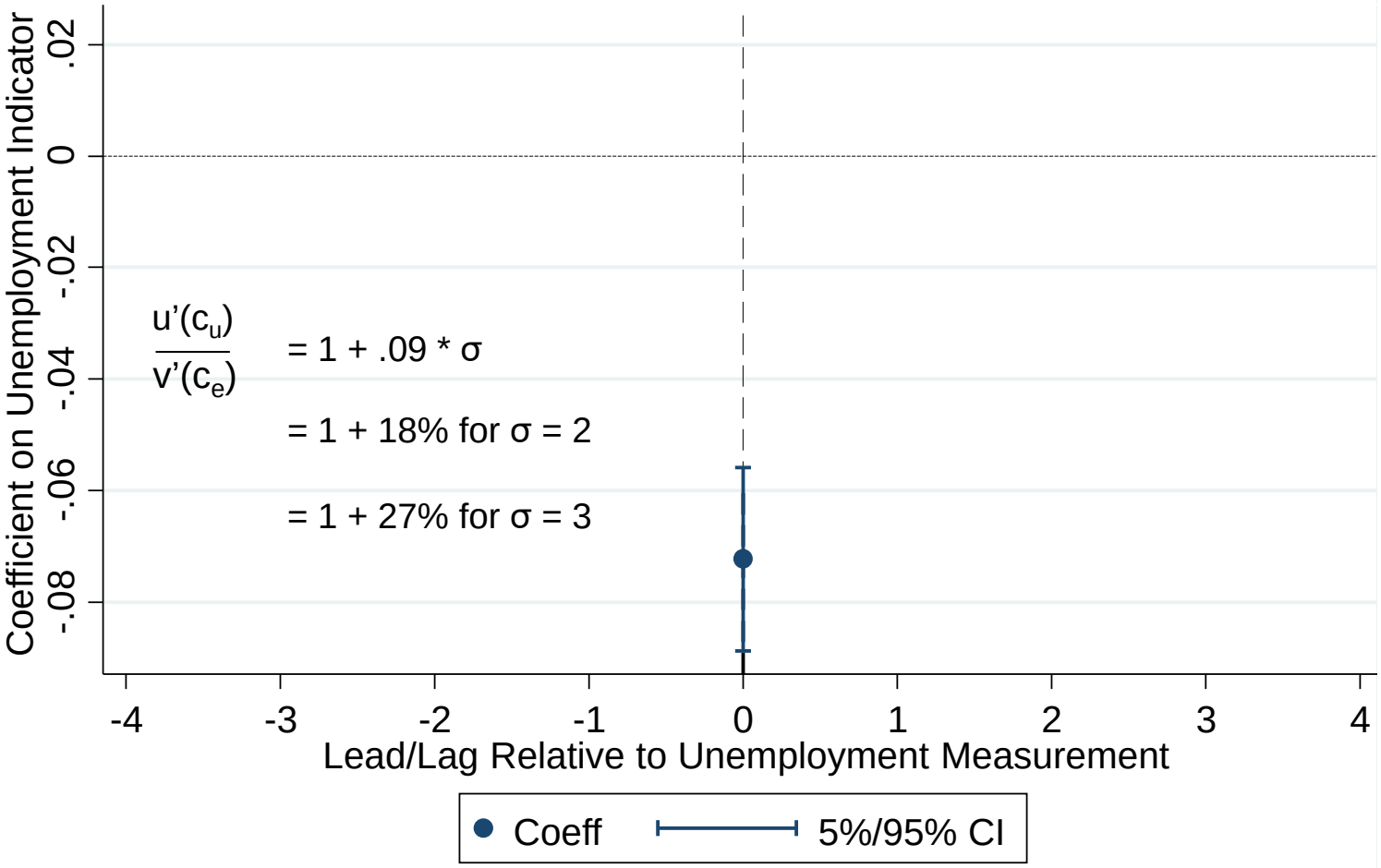


Recap: Challenges with Approach #1 (Consumption drops)

- Measuring consumption
  - Paucity of data and of broad-based measures
  - Challenges in handling durable goods
  - Work-related consumption (e.g. car)
  - Typically measure expenditures not consumption and these may not be the same
    - Aguiar and Hurst (2005): when unemployed or retire can substitute home production / lower prices so expenditures may go down even if consumption does not (state-dependent prices)
- Measuring *change* in consumption due to ue confounded by anticipated job loss (Hendren 2017)
- Required assumptions about utility function
  - State dependent utility (or lack thereof)
  - Risk aversion
    - And note that (endogenous) consumption drop and risk aversion may be negatively correlated (Chetty and Looney 2006)

Estimating Gap in Marginal Utilities

- How far are we from full insurance / how much of a markup would individuals be willing to pay for UI insurance? $\frac{u'(c_u)-v'(c_e)}{v'(c_e)}$
- Approach #1: Impact of unemployment on consumption (Gruber 1997; Hendren 2017)
- Subsequent approaches try to address various limitations of consumption-based approach
  - Approach #2: Ex-ante impact of learning about unemployment on consumption (Hendren 2017) **[up next]**
  - Approach #3: Impact on labor supply of indirectly affected spouse (Fadlon and Nielsen forthcoming)
  - Approach #4: Liquidity vs. Moral Hazard benefit response (Chetty 2008)
  - Approach #5: Reservation wages (Shimer and Werning 2007)
  - Approach #6: Estimate WTP directly (Landais et al. 2017)

Approach #2: Ex-ante responses to unemployment

- Approach #1: compares consumption **across states of the world**
  - Original (Gruber 1997) and most common approach so far
- Approach #2: Compare ex-ante responses **within states of the world** (Hendren 2017)
  - Key insight: individuals make choices today (savings, spousal labor supply etc) based on probability of future job loss and extent of insurance in that case

Hendren (2017)

- Uses drops in consumption (in response to learning one might lose job) while currently employed to reveal WTP for supplemental UI
- Euler equation for optimal savings decision:

$$v'(c_{pre}(p)) = pu'(c_u(p)) + (1-p)v'(c_e(p))$$

- Comments:
  - If know today will lose job tomorrow, will equate marginal utility of consumption today with marginal utility of consumption when unemployed
  - If know today will not lose job tomorrow, will equate marginal utility of consumption today to marginal utilization of consumption when employed
  - Therefore, difference in marginal utilities across employed and unemployed states can be inferred from size of consumption response to an increase in the likelihood of job loss (multiplied for coefficeint of relative risk aversion)

Hendren (2017)

- Euler equation for optimal savings decision:

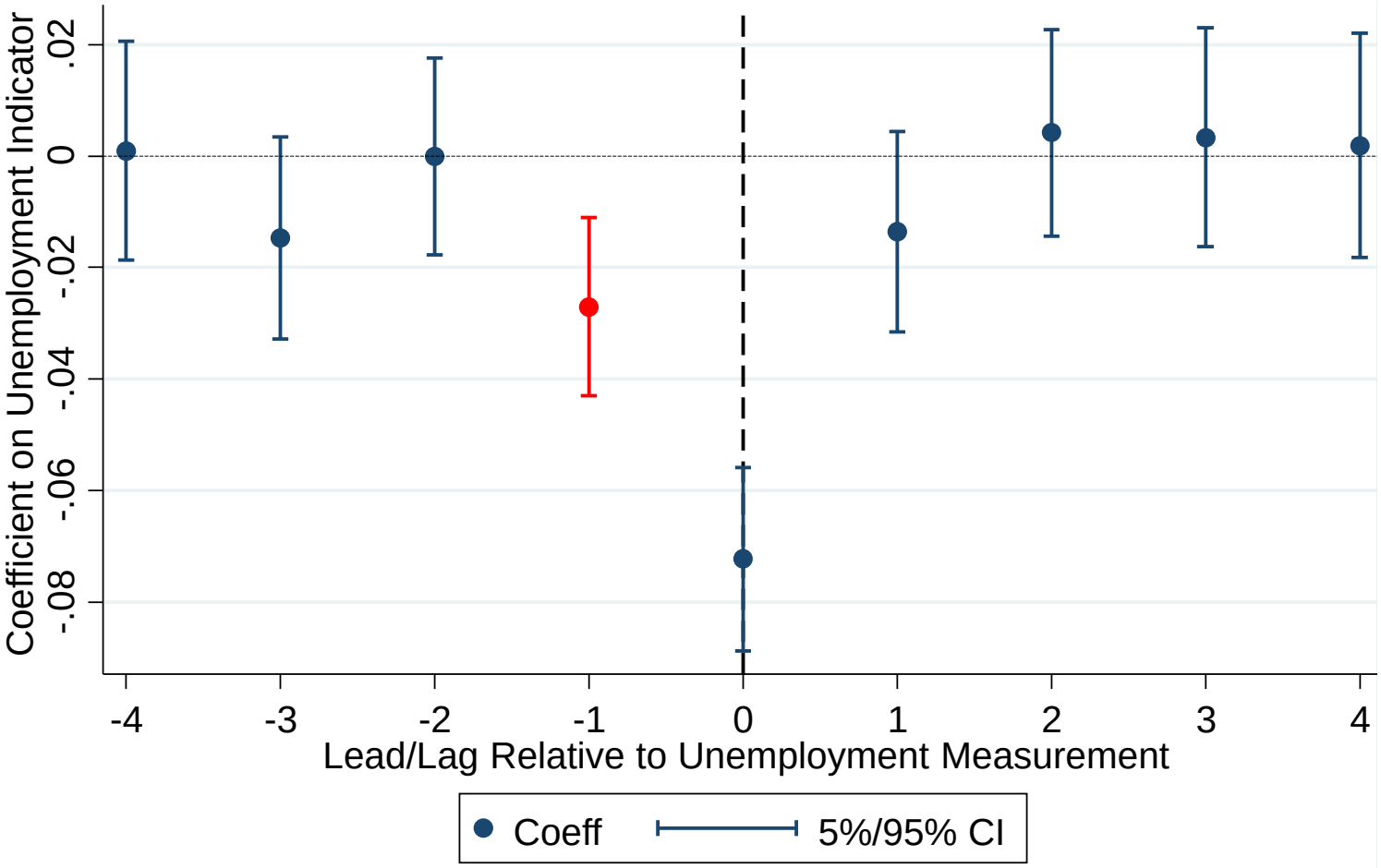
$$v'(c_{pre}(p)) = pu'(c_u(p)) + (1-p)v'(c_e(p))$$

- Key idea: difference in marginal utilities across employed and unemployed states can be inferred from size of consumption response to an increase in the likelihood of job loss
  - Euler equation: The marginal utility of consumption today equals the expected marginal utility of consumption in the future
  - If marginal utility is higher when unemployed (i.e. individuals are under-insured: $u' > v'$) learning you might lose your job should cause individuals to cut back on current consumption to save for future consumption
- Therefore drops in consumption prior to becoming unemployed / ex-ante responses he shows indicates individuals are not fully insured against risk of job loss

Hendren (2017)

- Uses drops in consumption (in response to learning one might lose job) while currently employed to reveal WTP for supplemental UI
- Difference in marginal utilities across employed and unemployed states can be inferred from size of consumption response to an increase in the likelihood of job loss (multiplied for coefficeint of relative risk aversion)
  - If have full insurance (marginal utilities equalized across states) change in p will not affect c_{pre}
- Because the measured consumption response (change in consumption prior to unemployment to change in probability of future unemployment) is within the state of being employed, can have arbitrary state dependence (vs Approach #1)

Hendren (2017): Exploit Ex-ante Responses



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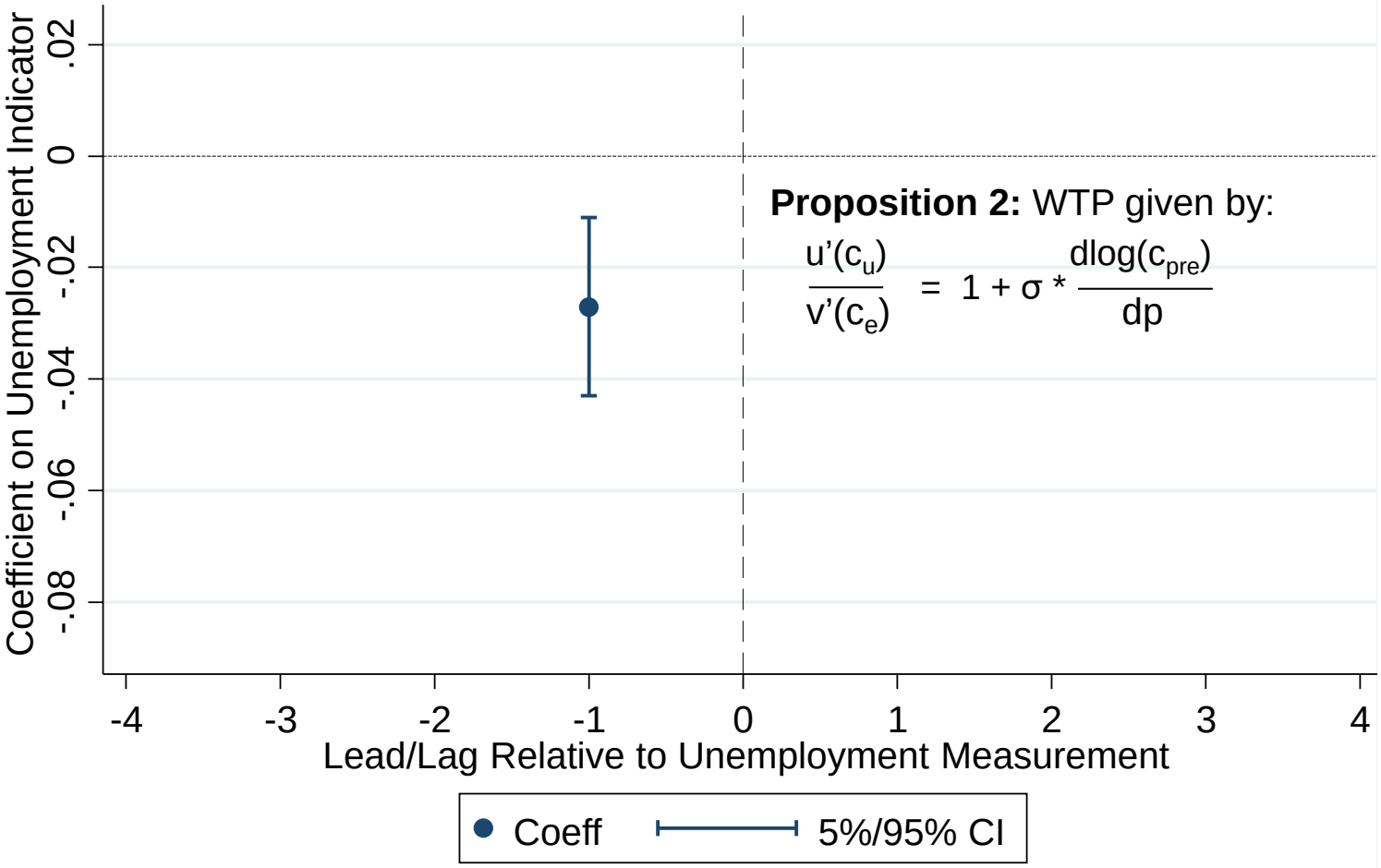
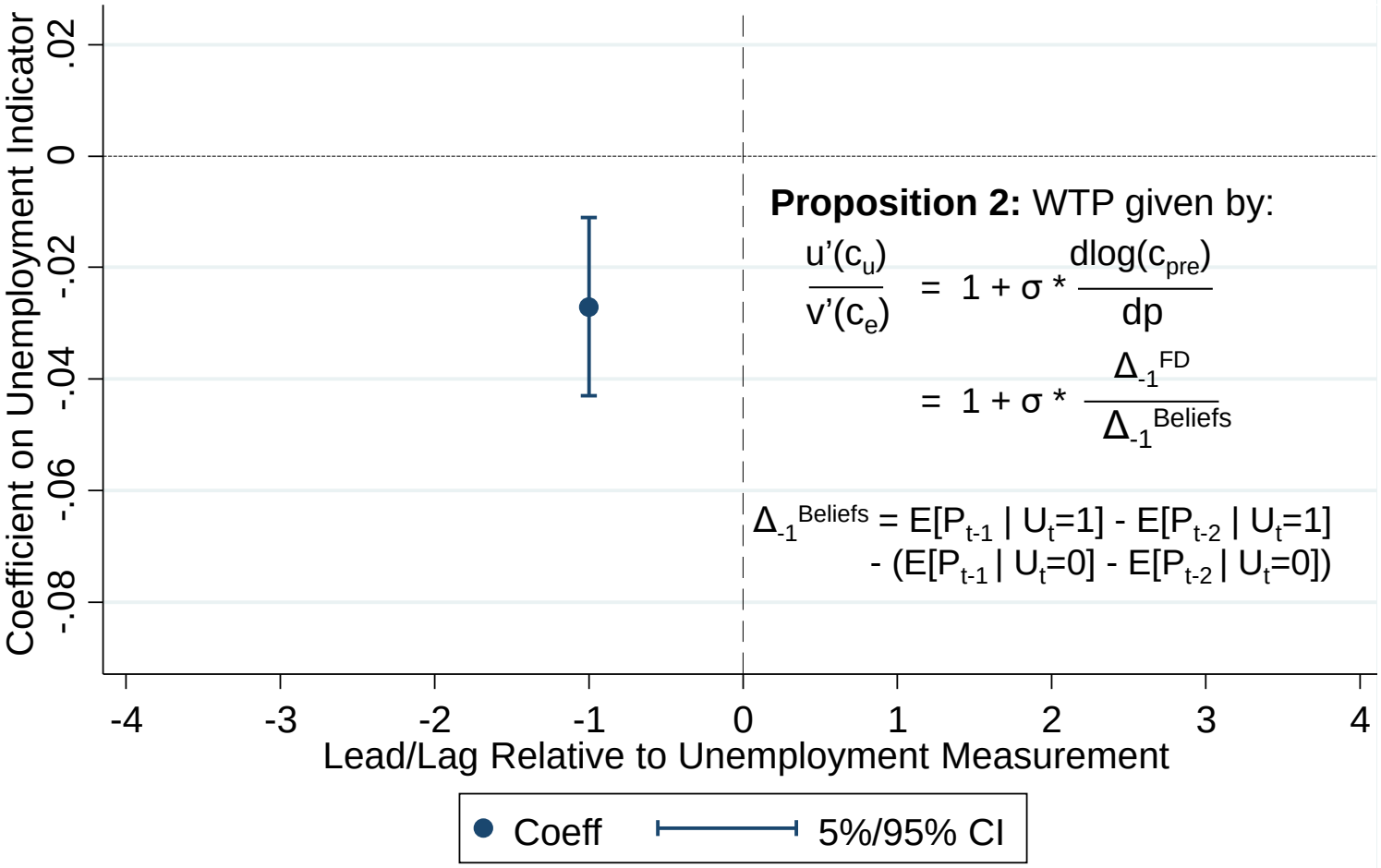


Proposition 2: WTP given by:

$$\frac{u'(c_u)}{v'(c_e)} = 1 + \sigma * \frac{d\log(c_{pre})}{dp}$$

Hendren (2017): Exploit Ex-ante Responses



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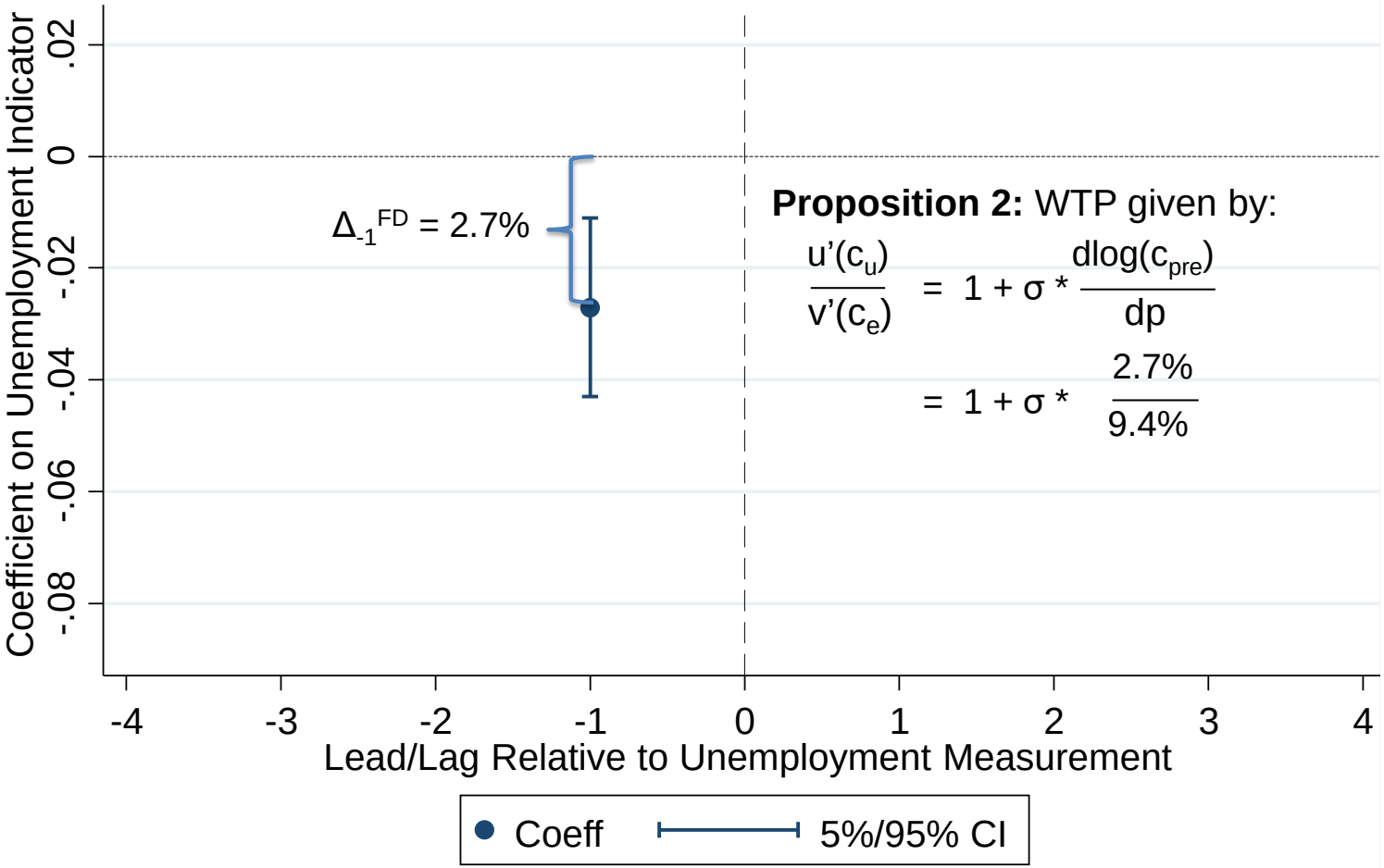
$$= 1 + \sigma * \frac{\Delta_{-1}^{FD}}{\Delta_{-1}^{Beliefs}}$$

$$\Delta_{-1}^{Beliefs} = E[P_{t-1} \mid U_t=1] - E[P_{t-2} \mid U_t=1] - (E[P_{t-1} \mid U_t=0] - E[P_{t-2} \mid U_t=0])$$

Hendren (2017): Exploit Ex-ante Responses

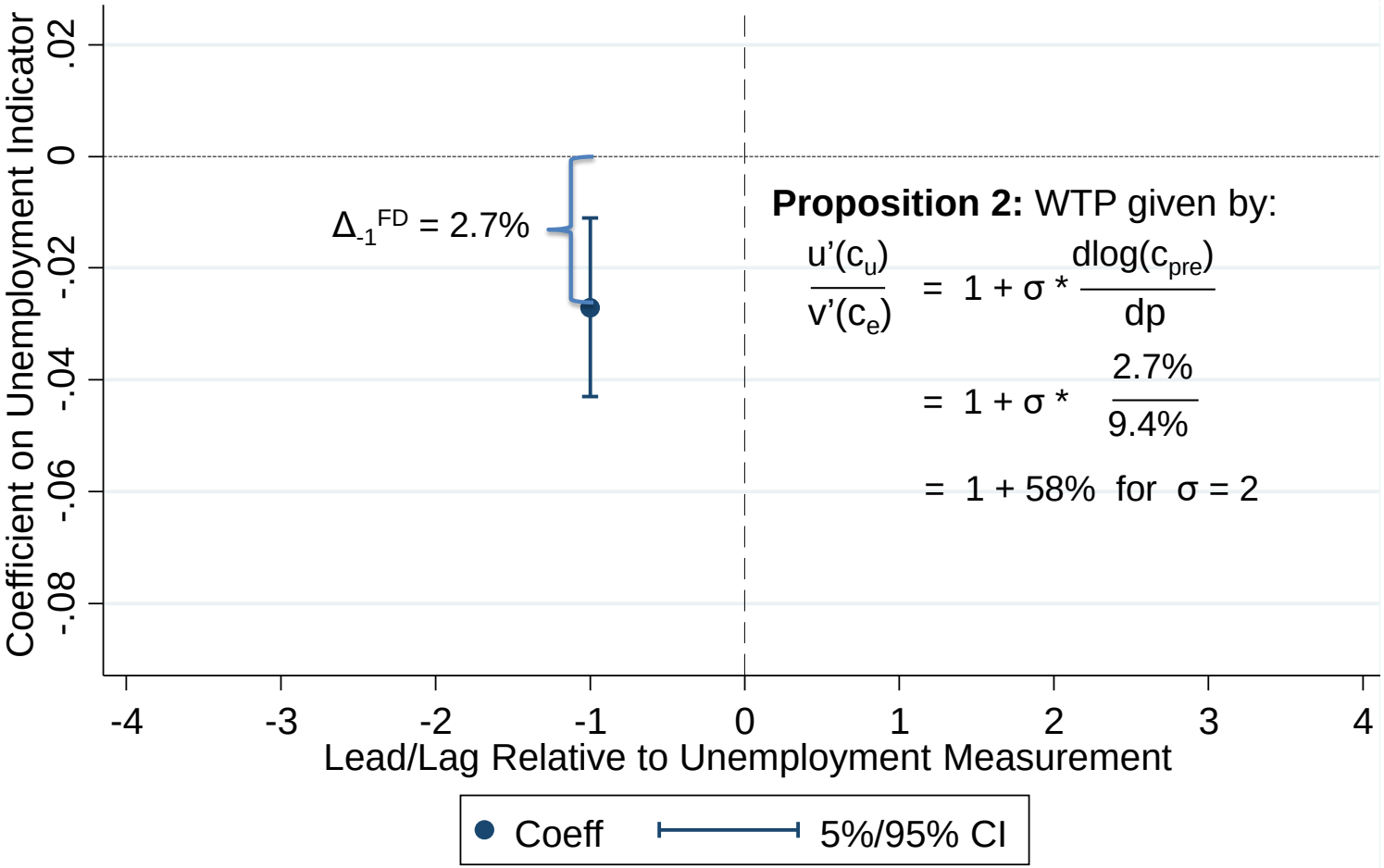


Proposition 2: WTP given by:

$$\frac{u'(c_u)}{v'(c_e)} = 1 + \sigma * \frac{d\log(c_{pre})}{dp}$$

$$= 1 + \sigma * \frac{2.7\%}{9.4\%}$$

Hendren (2017): Exploit Ex-ante Responses



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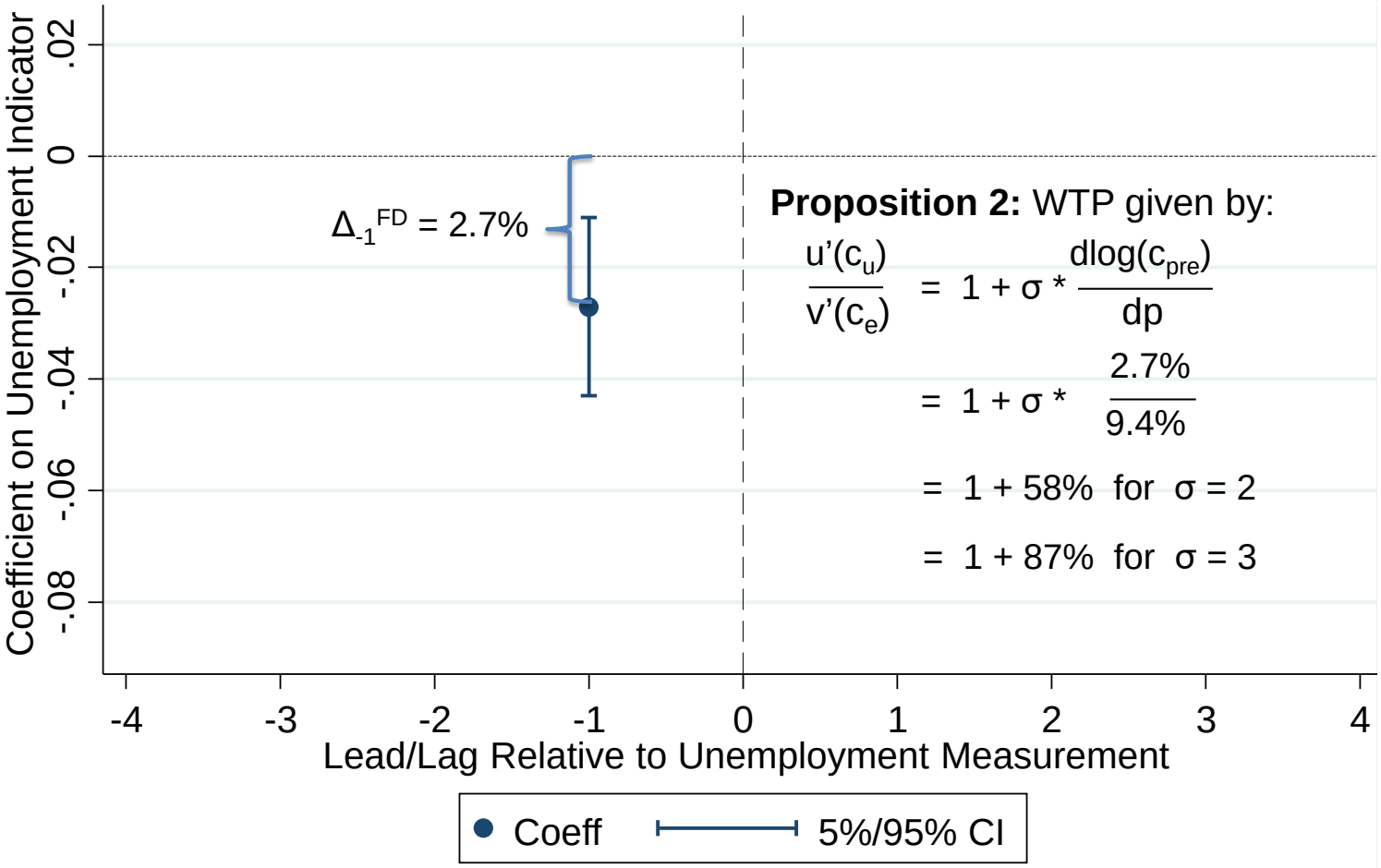
$$= 1 + 58\% \text{ for } \sigma = 2$$

Hendren (2017): Exploit Ex-ante Responses



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$$= 1 + \sigma * \frac{2.7\%}{9.4\%}$$

$$= 1 + 58\% \text{ for } \sigma = 2$$

$$= 1 + 87\% \text{ for } \sigma = 3$$

Uses estimates for several exercises

- To estimate LHS of Baily formula / value of marginal increase in benefit levels
- To ask: Could private supplemental UI exist?
  - Estimates amount of private information based on subjective probabilities
  - Computes pooled price ratio (a la Hendren 2013 EMA) - average costs of all those who are worse risks
  - Assumes a coefficient of risk aversion and concludes markups due to adverse selection (i.e. pooled price ratio in excess of own risk) exceed willingness to pay (measured by LHS of Baily)
- Concludes that privately-traded supplemental UI market would unravel due to adverse selection
  - More challenging question: what if public UI didn't exist?

Estimating Gap in Marginal Utilities

- How far are we from full insurance / how much of a markup would individuals be willing to pay for UI insurance? $\frac{u'(c_u)-v'(c_e)}{v'(c_e)}$
- Approach #1: Impact of unemployment on consumption (Gruber 1997; Hendren 2017) [done]
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Approach #3 Labor Supply of Indirectly Affected Spouse

- Fadlon and Nielsen (JPubEc forthcoming)
- Trying to estimate gap in marginal utilities across states of nature without using consumption data
  - See challenges to using consumption data (difficult to measure broadly; how to handle durbles, home production etc)
- Idea: If households jointly optimize, spousal labor supply response to shocks can be used to measure welfare gains of more generous government insurance benefits
  - Spouses work to point where *own* marginal disutility from working equals *each* household member's valuation of additional consumption from spousal earnings increase
  - Amount to which household labor supply responses to shocks / self insured is related to degree to which formal insurance is lacking

Labor Supply of Indirectly Affected Spouse

- Idea: If households jointly optimize, spousal labor supply response to shocks can be used to measure welfare gains of more generous government insurance benefits
  - Spouses work to point where *own* marginal disutility from working equals *each* household member's valuation of additional consumption from spousal earnings increase
  - Amount to which household labor supply responses to shocks / self insured is related to degree to which formal insurance is lacking
- Formula for LHS of Baily in terms of spousal labor supply:

$$\frac{u_i'(c_i^b) - u_i'(c_i^g)}{u_i'(c_i^g)} = \frac{v_2'(l_2^b) - v_2'(l_2^g)}{v_2'(l_2^g)}$$

- Intuition: use household optimality conditions to infer degree to which households are able to smooth marginal utility of ocnsumption from degree to which they are able to smooth marginal disutility of spousal labor supply

Implementation

- Take a quaadratic approximation to member 2's labor disuitlity around l_2^g:

$$\frac{u_i'(c_i^b) - u_i'(c_i^g)}{u_i'(c_i^g)} \cong \varphi \frac{l_2^b - l_2^g}{l_2^g}$$

- where $\varphi = \frac{v_2''(l_2^g)}{v_2'(l_2^g)} l_2^g$
- Parallel to Consumption based approach. here we multiply change in spousal labor supply in response to shock by rate of change in spouse's disutility from additional work (which captures the utility "price" of the labor supply quantity fluctations across states)

Implementation

- Key advantage: Do not have to measure consumption
- Requires spouses are not at a corner
  - Intensive margin model assumes interior solution in spousal hours
  - Extensive marginal model requires the presence of marginal households
- Requires household optimization (and spouses!)
- Requires state-independent utility for indirectly affected spouse
- Just as previously we had to calibrate the utility curvature (risk aversion) now need to calibrate the rate of change of spousal disutility from additional work

Estimating Gap in Marginal Utilities

- How far are we from full insurance / how much of a markup would individuals be willing to pay for UI insurance? $\frac{u'(c_u)-v'(c_e)}{v'(c_e)}$
- Approach #1: Impact of unemployment on consumption (Gruber 1997; Hendren 2017) [done]
- Subsequent approaches try to address various limitations of consumption-based approach
  - Approach #2: Ex-ante impact of learning about unemployment on consumption (Hendren 2017) [done]
  - Approach #3: Impact on labor supply of indirectly affected spouse (Fadlon and Nielsen forthcoming) [done]
  - Approach #4: Liquidity vs. Moral Hazard benefit response (Chetty 2008) **[up next]**
  - Approach #5: Reservation wages (Shimer and Werning 2007)
  - Approach #6: Estimate WTP directly (Landais et al. 2017)

Approach #4

- Chetty (2008): An alternative approach to calculating optimal UI benefits / implementing Baily formula
  - Major motivation: get away from needing to measure consumption and make assumption about risk aversion
- Policy application: UI accounts

Overview of paper

- Develops an alternative formula to Baily formula for optimal benefit level that depends on ratio of liquidity effect to moral hazard effect
- Estimates liquidity effect and moral hazard effect of unemployment benefits
  - Estimates that ~60% of impact of UI benefits on durations is due to liquidity effect
- Plugging estimates into new formula finds that an increases in ue benefits from current rate (~50% rr) would produce small (positive) welfare gain
  - Vs Gruber results? (varied with risk aversion choice)

Simpified derivation of key result in Chetty (2008)

- Individuals experience an event (job separation / ue) with probability p, chosen with separable effort $\Psi(p)$
  - two states: employed state (e) and unemployed(ue)
  - probability of event p is decreasing in effort, with disutilty of effort Ψ
- Utility is given by:

$$pu(c_{ue}) + (1-p)u(c_e) - \Psi(p)$$

- So can think of individuals choosing effort or choosing p

Derivation (con't)

- Utility is given by:

$$pu(c_{ue}) + (1-p)u(c_e) - \Psi(p)$$

- Note that p multiplies the *level* of utility in each state of the world
- As a result, FOC for p relates the level of utilities in each state of the world to the marginal cost of effort:

$$u(c_{ue}) - u(c_e) = \Psi'(p)$$

Derivation (con't)

- FOC: $u(c_{ue}) - u(c_e) = \Psi^{'}(p)$
- Consider a comparative static in which assets (A) are increased. This is assumed to increase c_e and c_{ue} by an equal amount:

$$u^{'}(c_{ue}) - u^{'}(c_e) = \Psi^{''}(p)\frac{dp}{dA}$$

($\frac{dp}{dA}$ is change in chosen p in response to exogeneous change in assets)

- Consider comparative static in which benefits (b) are increased (c_{ue} increases) but the individual does not change c_e:

$$u^{'}(c_{ue}) = \Psi^{''}(p)\frac{dp}{db}$$

- Combining:

$$\frac{u^{'}(c_{ue})}{u^{'}(c_e)} = \frac{\frac{dp}{db}}{\frac{dp}{db} - \frac{dp}{dA}}$$
$$\frac{u^{'}(c_e) - u^{'}(c_{ue})}{u^{'}(c_e)} = \frac{\frac{dp}{dA}}{\frac{dp}{db} - \frac{dp}{dA}}$$

Chetty (2008)

$$\frac{u'(c_e)-u'(c_{ue})}{u'(c_e)} = \frac{\frac{dp}{dA}}{\frac{dp}{db}-\frac{dp}{dA}}$$

- LHS of Baily formula (difference in MU's across states) can be rewritten as a ratio of liquidity effect ($\frac{dp}{dA}$) to "moral hazard" effect $\frac{dp}{db}$
- The bigger the role of the liquidity effect (relative to the total moral hazard effect) the larger the optimal benefits

What happened to risk aversion?

- Consumption drops (Gruber 97) representation of Baily requires risk aversion, liquidity effect (Chetty 2008) does not. Why?
- Ratio of liquidity to moral hazard elasticities related to risk aversion. . . .
  - Highly related to Chetty 2006 AER (estimating risk aversion from labor supply responses. . .)

Why is formula intuitive (and also not)?

$$\frac{u'(c_e)-u'(c_{ue})}{u'(c_e)} = \frac{\frac{dp}{dA}}{\frac{dp}{db}-\frac{dp}{dA}}$$

- Intuitive: Value of liquidity
  - Insurance is more valuable if it relaxes liquidity constraints
- Not intuitive: why does one need to isolate the impact of liquidity per se on behavior to capture this?
  - Value of insurance (WTP) is a function of first derivatives (MRS)
  - Behavioral response (elasticities) reflect second derivatives (how MUs *change*)
    - derivative of the FOC with respect to liquidity
    - How did we manage to write WTP (LHS of Baily) as a function of second derivatives (elasticities)?
  - In general welfare impact of insurance depends on first derivative of utility function (marginal utility of consumption) while how behavior changes with change in budget set depends on second derivative

Intuition?

- How did we manage to write WTP / value (= LHS of Baily) as a function of second derivatives (elasticities)?
- Key is that p does not enter utility function directly - it multiplies utility function:

$$pu(c_{ue}) + (1-p)u(c_e) - \Psi(p)$$

- So $u(c, x)$ has been written $xf(c)$
  - Quite restrictive
  - Natural when p is a probability (this is the vNM utility structure)
  - But what about when we think of p (as in empirical work) as duration of ue rather than its incidence
  - e.g. if searching for a job requires gas money, then this structure is violated
- In addition, key assumption that disutility of search effort $\Psi(p)$ is additively separable from utility of consumption
  - Without additive separability, you'd get more terms
- Formula may not be robust?

Where do we go from here?

- Potenitally fruitful research project: under what conditions can we write MUs as elasticities?
  - Often want to know value of goods but only see behavioral changes, not WTP. So would be great if behavioral changes (elasticities) could tell us about value
- Hendren conjecture: requires additively separable effort cost (no complementarities between consumption and effort) + binary state variable
- Some takeaways:
  - "sufficient" statistics are sufficient *given the model*
  - Portability across contexts: what might be a reasonable model in one context may not be in another

Empirics

- Provides evidence from SIPP that most of the duration response to benefits is driven by those who are liquidity constrained

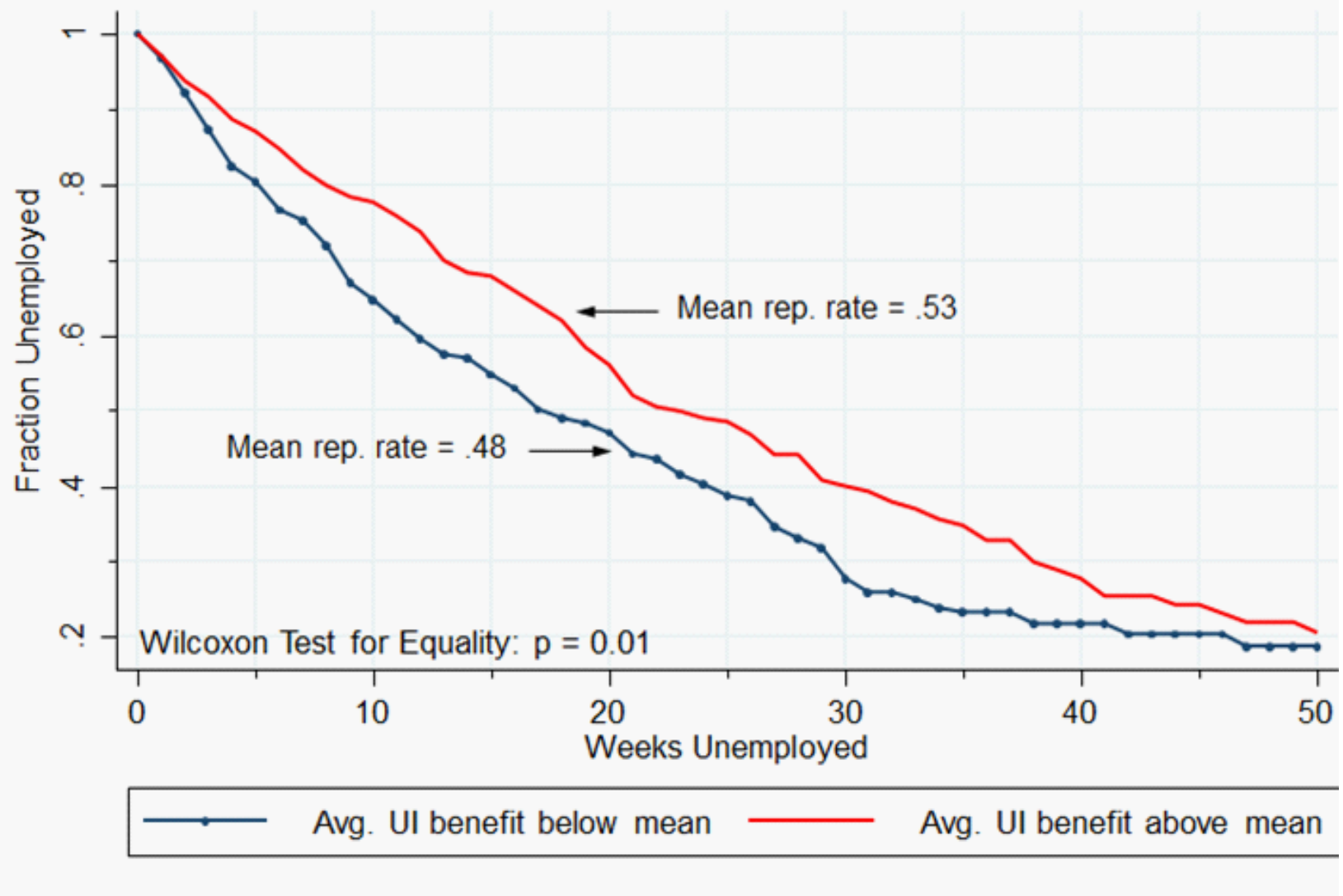
Approach 1

- SIPP (1985 – 2000)
  - Needs panel (vs e.g. CPS) in part bc needs pre ue wealth
  - Restrict to prime age males searching for a job and on UI in first month after job loss
- Standard state x year variation in ui benefits
  - Innovation: look at differential impact of benefits on ue duration by pre-ue wealth level
- Key finding: Impact of UI benefits on ue duration is declining as pre-ue wealth increases
  - Can't reject no effect for highest quartile wealth group
  - Suggests effect may be primarily a liquidity (vs moral hazard) effect
- Main results: visible in figures (now standard... at time relatively novel)

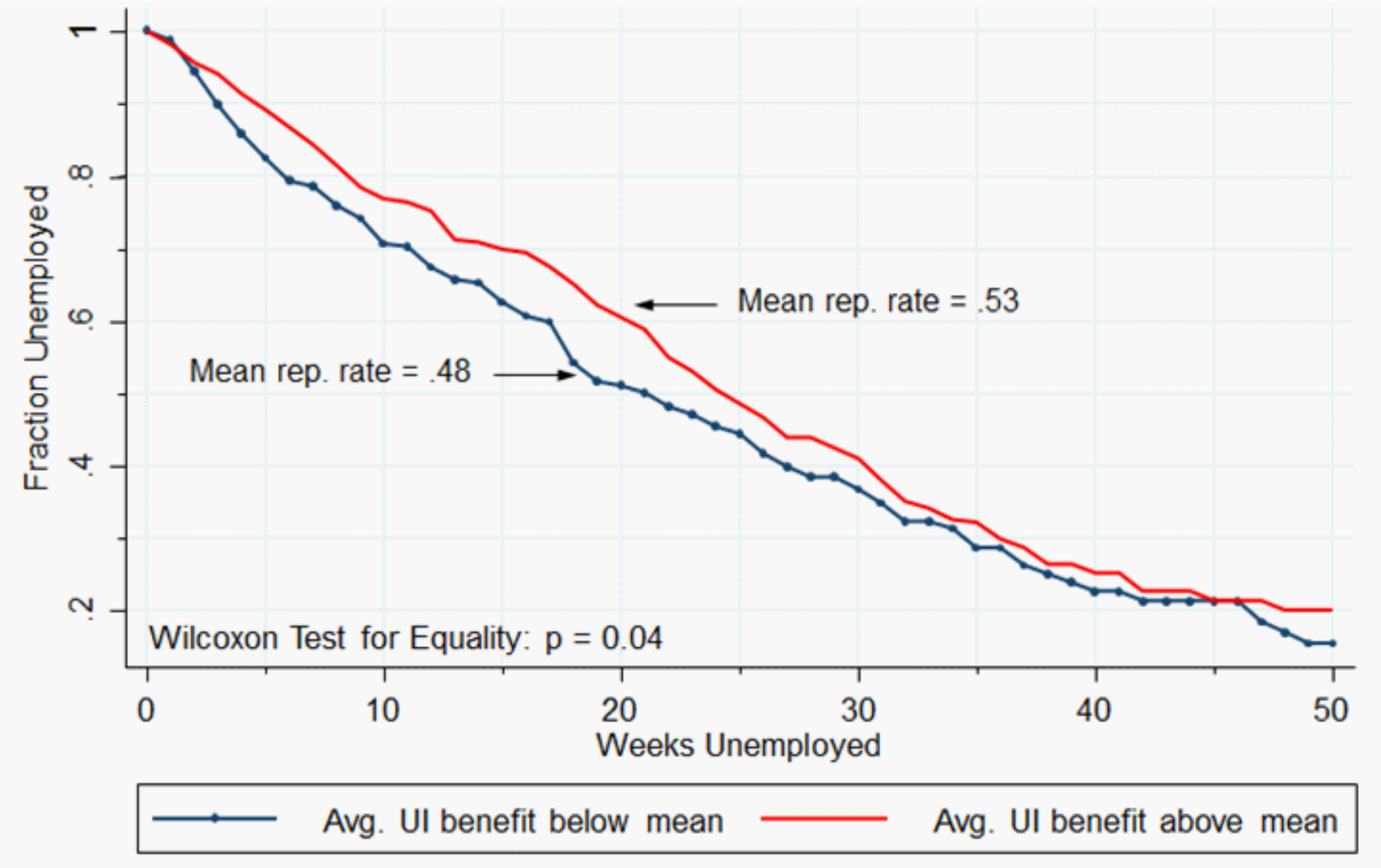
Graphical approach

- Divides sample by average UI benefit (state x year variation) into above vs below median benefits (and also by (pre-ue) wealth quartile)
- Plots UE duration separately for state-years above vs below median benefit levels, separately by wealth quartile
  - Always nice to begin with a simple cut of the data (although important to follow up with the more formal / careful analysis)
  - i.e. here we are pooling cross state and cross time variation and not using the DD as intended...

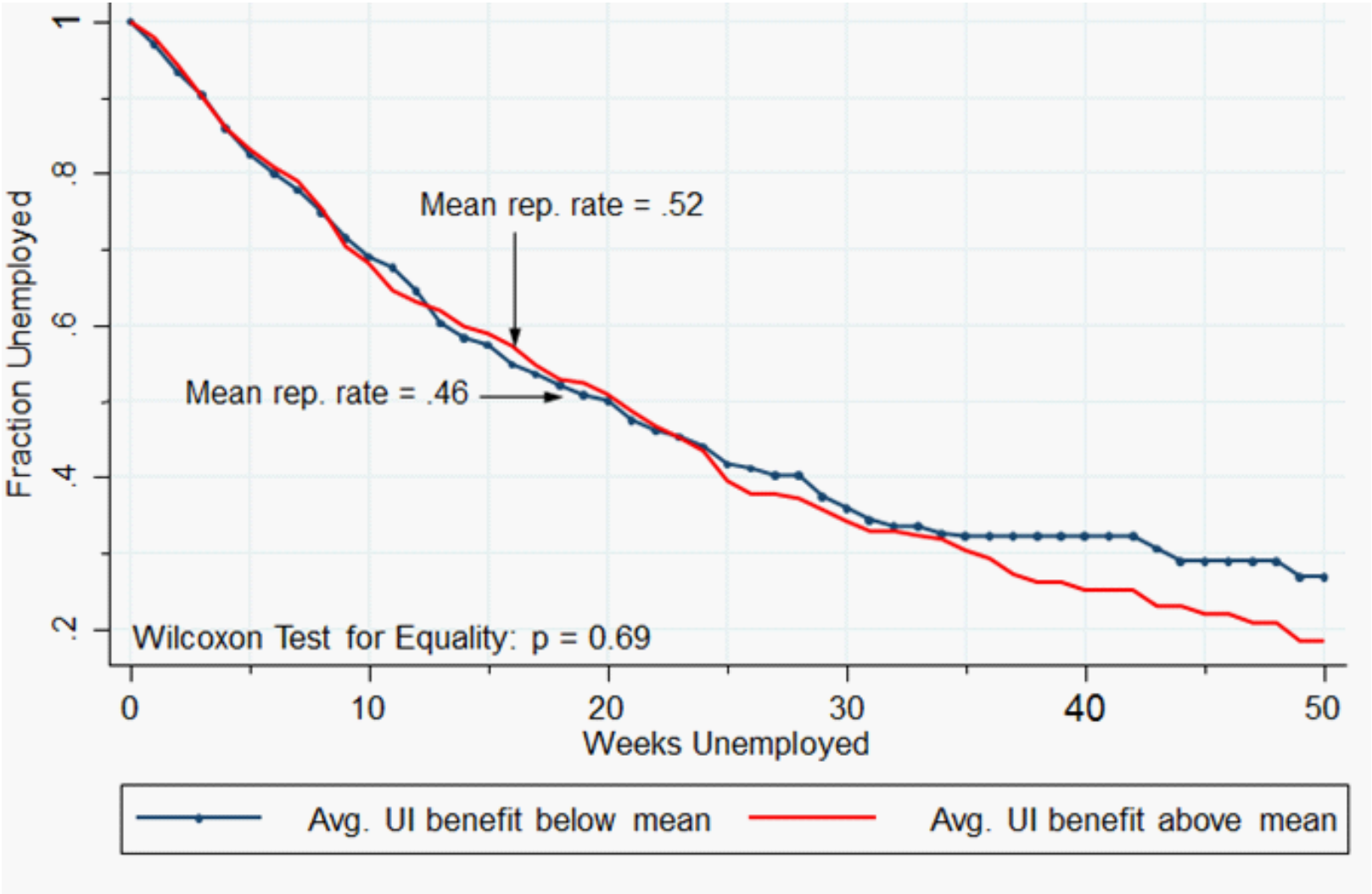
Effect of UI Benefits on Duration: Lowest Net Worth Quartile



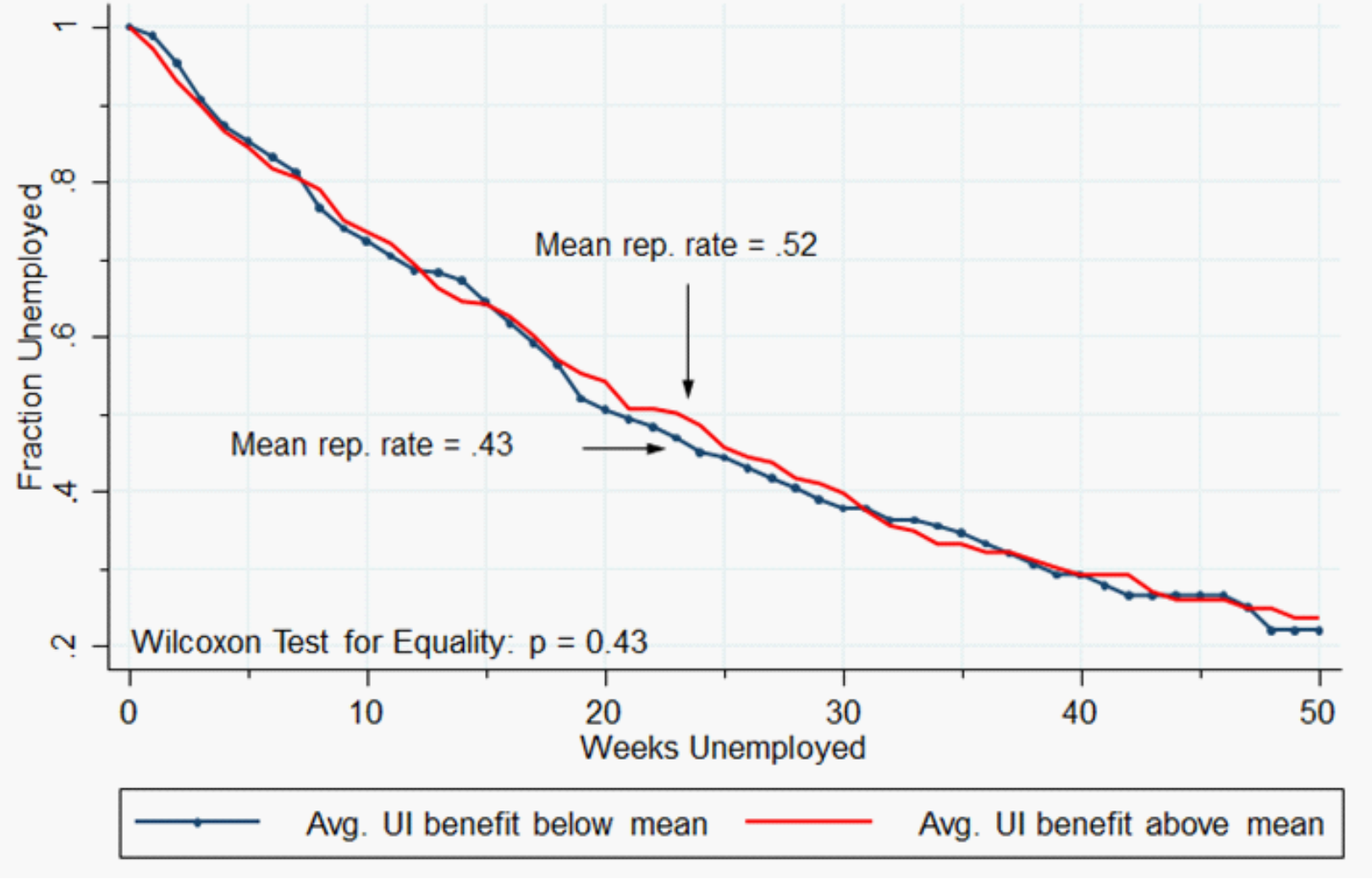
Effect of UI Benefits on Duration: Second Net Worth Quartile



Effect of UI Benefits on Duration: Third Net Worth Quartile



Effect of UI Benefits on Duration: Top Net Worth Quartile



Formal hazard model analysis

- Cox proportional hazard model. Hazard (h): probability of leaving ue at date t conditional on entering date t unemployed
  - Kiefer (1988 JEL) is very nice intro to hazard models.
- $\log h_{i,t} = \alpha_t + \beta_1 \log b_i + \beta_2 (t \times \log b_i) + \beta_3 X_{i,t}$
  - Alpha's are week fixed effects (specifying baseline hazard fully flexibly)
  - Effect of benefits (b) allowed to vary w duration (t)
  - Coefficient of interest β_1: elasticity of hazard wrt UI ben at beg. of spell
  - Theory is about impact of benefit on initial hazard (no clear prediction regarding time varying effect of UI on benefits)
  - X's include: state and year fe (for DD), other flexible controls (occupation and industry dummies, pre-ue wage, wealth, age, education etc)
    - How define benefits? (see next slide)

Formal hazard model analysis (con't)

- Cox proportional hazard model. Hazard (h): probability of leaving ue at date t conditional on entering date t unemployed
- $\log h_{i,t} = \alpha_t + \beta_1 \log b_i + \beta_2 (t \times \log b_i) + \beta_3 X_{i,t}$
  - How define benefits?
    - Baseline: avg ue benefits in state and year. Issue: picks up demographic differences across states (although tries to control for them)
    - Max weekly benefit
    - Predict individual wages based on demographics and then calculate benefits based on predicted wage, state and year
    - [Why not use simulated instrument a la Gruber? IV w hazard models... control function approach?]

Discussion: Identifying variation in UI benefit eligibility?

- replacement rate for which indivdiual i is eligible (b_i) depends on state, year, and past earnings history
  - Presumably people with different earnings would have difft change in consumption when become ue absent UI
  - Goal: isolate variation in b_i due to policy variation within states over time
- How to do this? i.e. How measure "UI" variable?
  - Max possible benefit rate (low first stage / low powered)
  - Average replacement rate for people in your state
    - Variation comes from rules and also state demographics
  - Simulated replacement rate
    - Instrument for UI replacement rate you are eligible for with "simulated" replacement rate

Simulated instruments (eligibility)

- Gruber (1997) uses simulated instruments to generate variation in benefit levels for which individuals are eligible
- Calculating simulated replacement rate:
  - Take a national sample of ue individuals and assign the whole sample to each state in that year
  - Using that state's rules that year calculate average replacement rate for whole national sample
  - Variation in RR coming only from legislative variation
    - Simulated state-year replacement rate is a function of legislated benefits for that state year, applied to a nationally uniform population
    - independent of the actual characteristics of individuals in that state-year
  - Instrument for replacement rate with simulated replacement rate
- Technique has many uses / applications
  - Idea of purging sample endogeneity / limiting to program variation through use common sample
  - Parsimonious way to summarize multi-dimensional programs (e.g. Medicaid eligibility)

Formal hazard model analysis (cont)

- $\log h_{i,t} = \alpha_t + \beta_1 \log b_i + \beta_2 (t \times \log b_i) + \beta_3 X_{i,t}$
- $\log h_{ijt} = \alpha_{tj} + \beta_{j,1} Q_{ij} \log b_i + \beta_{j,2} Q_{ij} (t \times \log b_i) + \beta_3 X_{ijt}$
  - Same model by stratified by asset quartile (Q_j)
  - $Q_{i,j}$ is an indicator variable for whether agent i belongs to quartile j of wealth distribuiton
  - $\beta_{j,1}$ is elasticity of hazard rate w.r.t UI benefit in quartile j of asset distribution
  - Key question: how does elasticity of ue hazard wrt UI vary by wealth quartile?

TABLE 2

Effect of UI Benefits: Cox Hazard Model Estimates

Marshallian elasticity	(1) Pooled Full cntrls	(2) Stratified No cntrls	(3) Stratified with Full Controls Avg WBA	(4) Max WBA	(5) Ind. WBA
log UI ben	**-0.527**				
	(0.267)				
Q1 x log UI ben		**-0.721**	**-0.978**	**-0.727**	**-0.642**
		(0.304)	(0.398)	(0.302)	(0.241)
Q2 x log UI ben		**-0.699**	**-0.725**	**-0.388**	**-0.765**
		(0.484)	(0.420)	(0.303)	(0.219)
Q3 x log UI ben		**-0.368**	**-0.476**	**-0.091**	**-0.561**
		(0.309)	(0.358)	(0.370)	(0.156)
Q4 x log UI ben		**0.234**	**0.103**	**0.304**	**0.016**
		(0.369)	(0.470)	(0.339)	(0.259)
Q1=Q4 p-val		0.039	0.013	0.001	0.090
Q1+Q2=Q3+Q4 p-val		0.012	0.008	0.002	0.062
Number of Spells	4529	4337	4054	4054	4054

10% increase in UI benefits reduces hazard (exit from ue) by 5.3%

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Comments

- Key finding: effect of UI benefits declines monotonically in net wealth
- Concern I: People with different asset levels may differ in other ways than their liquidity that affect their elasticity of ue wrt benefit levels (why do people choose difft asset levels?)
  - Relatedly, do not know what fraction of constrained group's behavioral response is liquidity vs. substitution effect unless assume substitution effect same for constrained and unconstrained groups (i.e. same preferences)
  - NB: a huge strength of paper is that Chetty is aware of and discusses this issue up front
    - Also tries an alternative strategy w its own (but different!) concern

Comments (con't)

- Concern II: are we measuring liquidity constraints?
  - Ideally want to identify those who are able to smooth consumption in response to temporary income shocks (i.e. can equate mu of consumption in ue and employed states)vs. those who cannot
  - Is liquid net wealth a good proxy for this?
    - Perhaps it is the people who are not liquidity constrained who don't feel the need to save! (i.e. the high net wealth people may be high net wealth precisely because they need to save bc borrowing is costly)!
    - Might say: but then how explain patterns? But see heterogeneous treatment effects issue. . .

Comments (con't)

- Concern II: are we measuring liquidity constraints?
  - Paper investigates robustness to other measures of constraints and finds similar results (nice)
    - Spousal work status: evidence that cons smoothing is lower (i.e. drop in cons when get ue is greater) among single earners.
    - Do you have a mortgage? If yes have less ability to smooth the remainder of your consumption than a renter (evidence in other papers that renters move not infrequently in response to ue but owners rarely sell houses. Although perhaps can borrow against home equity. . . ?)

Approach 2: Variation in severance pay

- Recall ideal experiment: randomly assign some job losers lump sum (non work contingent) payments and others traditional (work contingent) benefits
  - Compare subsequent unemployment durations
- In practice, some firms pay (lump sum) severance pay
  - Not contingent on subsequent work; therefore behavioral response picking up pure liquidity effect
  - Does not affect UI benefits
  - On average about one week of wages per year of service at firm
- Variation across firms in whether pay severance pay and amount of severance pay used to id liquidity effect
  - Major concern: this is not randomly assigned! Workers who receive severance pay may differ in other ways that is related to their expected unemployment duration

Data

- Finds neat data (another v nice feature of a good paper!)
  - Two surveys conducted by Mathematica on job losers that contain data on receipt of severance pay and self-reported time duration
- NB: Chetty notes that workers who receive severance pay look different from ones who don't on observables (see next slide)
  - Can control for observable differences but...

TABLE 3

Summary Statistics for Mathematica Data

	Pooled	No Severance (0.83)	Severance (0.17)
Percent dropouts	14%	15%	6%
Percent college grads	17%	13%	34%
Percent married	58%	56%	68%
Mean age	36.2	35.2	40.6
Median pre-unemp annual wage	$20,848	$19,347	$30,693
Median job tenure (years)	1.9	1.5	4.8

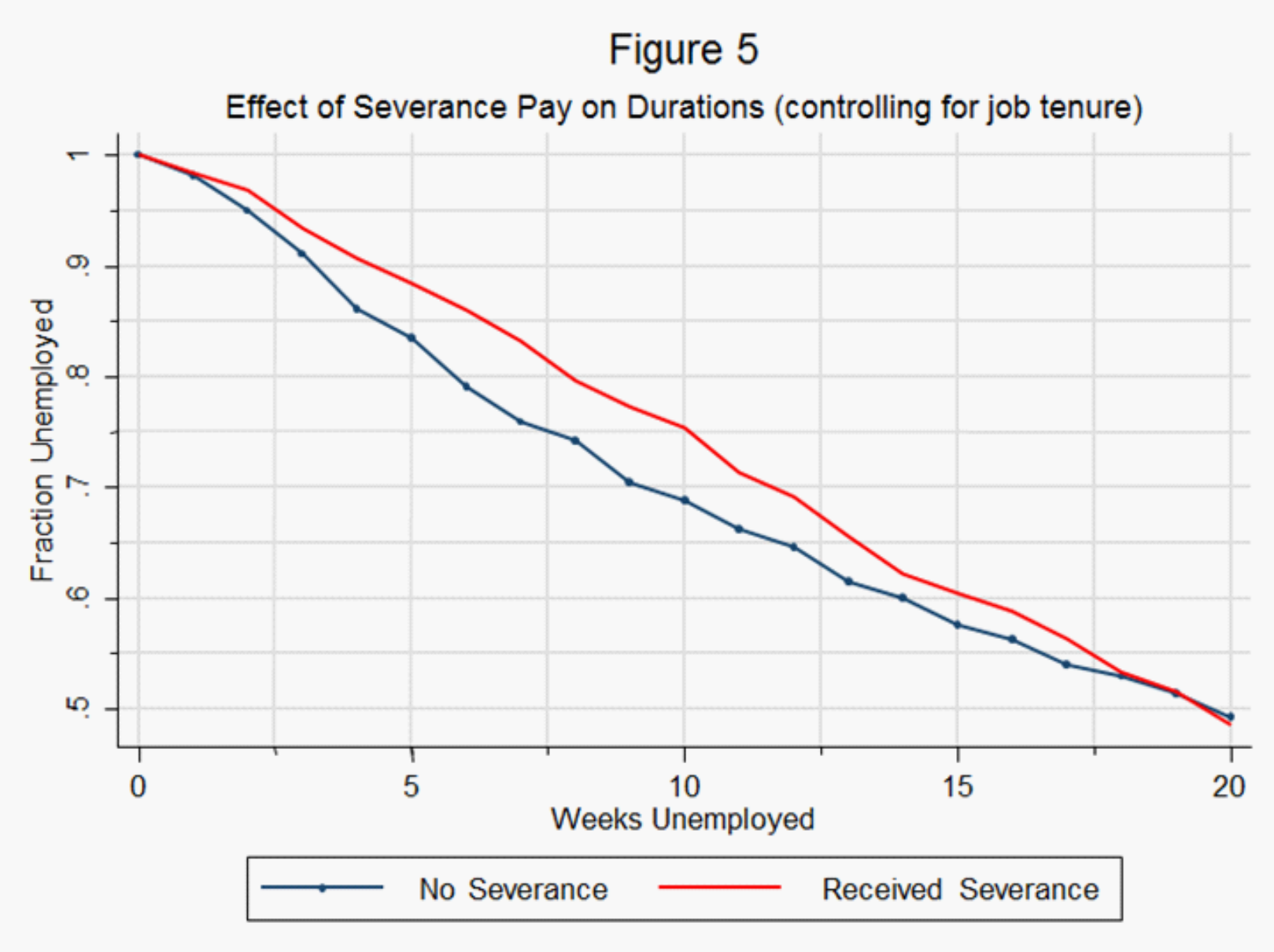
Figure 5
Effect of Severance Pay on Durations (controlling for job tenure)
Fraction Unemployed
1
.9
.8
.7
.6
.5
0
5
10
15
20
Weeks Unemployed
No Severance
Received Severance

Is effect of severance pay causal?

- Obvious concern: Receipt of severance pay correlated w other factors that are correlated with observables:
  - omitted variable bias
  - endogeneity: firms offer severance packages b/c finding new job difficult
- Three additional pieces of evidence consistent with a causal interpretation
  - Results not sensitive to controlling for rich set of covariates
  - Relationship between severance pay and duration much longer among "constrained" (assets below median) than "unconstrained" (assets above median)
    - again not clear that assets are a good measure of constraint
    - doesn't observe assets directly but predicts based on covariates (and asset-covariate relationship in SIPP)
  - Larger severance packages correlated with longer duration (intensive margin)
    - Variation in severance package comes from job tenure.

TABLE 4

Effect of Severance Pay: Cox Hazard Model Estimates

	Pooled	By Liquid Wealth	By Sev. Amt.
Severance Pay	**-0.233** (0.071)		
(Netliq < Median) x Sev Pay		**-0.457** (0.099)	
(Netliq > Median) x Sev Pay		**-0.088** (0.081)	
(Tenure < Median) x Sev Pay			**-0.143** (0.055)
(Tenure > Median) x Sev Pay			**-0.340** (0.119)
Equality of coeffs p-val		<0.01	0.03

N=2428; all specs. include full controls.

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Is effect of severance pay causal? (con't)

- Bonus round: Card, Chetty and Weber (QJE 2007)
  - Austrian system: eligibility for severence pay (not job contingent) based on discontinuous rule: People w 3+ years of job tenure are eligible, those w shorter job tenure are not
  - RD design
  - Estimates impact of severance pay on duration

Magnitude of moral hazard vs liquidity effect

- Doubling UI benefit reduces hazard rate by approximately 41%
  - Comes from state x year variation (average across groups)
  - See Table 2 column 1 (hazard model coeff on b is -0.51.
    - Exp(-0.53)-1 ~41%
- "Pure liquidity effect": Severance pay estimated to reduce hazard by approximately 21%.
  - Comes from estimates of effect of severance pay (Table 4)
  - So mixing different estimation strategies and samples...
  - Scaling: At mean spell length and mean job tenure, receipt of severance pay is equivalent to an 85% increase in UI benefit level
  - Cash grant equivalent to doubling UI benefit would reduce hazard by $21/0.85 = 25\%$
- Putting all together: Roughly 60% of UI-duration link due to liquidity effect
  - Durations rise largely because job losers have more cash-on-hand; not purely "gaming the system" because of distorted wage

Calibration: welfare implications

- Take these estimates & Chetty's new formula for optimal b
- Estimates welfare gain from (balanced budget) raising of weekly benefit level by $1 from current level in U.S. (50% wage replacement) is equivalent in utility terms to a 4 cent weekly wage increase for all workers, or $2.00 per year
  - Small but positive welfare gain from raising benefit level in U.S.
- NB: this is a local result
  - Formula tells you whether at an optimum and welfare gain associated with marginal change
  - Once again, would want more structure to go much further out of sample to get at optimal benefit level
    - E.g. elasticities estimated may not be the same at difft benefit levels so useful for marginal welfare effects (local policy change around observed value) vs. any policy change

Comment: Risk aversion

- Consumption drops (Gruber 97) representation of Baily requires risk aversion asmpt, liquidity effect (Chetty 2008) does not (ratio of liquidity to mh effect related to risk aversion):
- Gruber (1997) estimates that c(u)/c(e) ~0.9 so would need γ~5 to be consistent with 60% liquidity effect.
- Is γ~5 reasonable?
  - Wide range of risk aversion estimates
  - Seems "high" but depends on context.
    - Risk aversion may be higher in context of moderate shocks bc of consumption commitments.
    - May not be a universal "risk aversion" parameter (Einav, Finkelstein, Pascu and Cullen 2012)

Comment: policy implications

- If major benefit from UI is to provide liquidity / combat credit market failures, perhaps optimal UI policy should combine

  (1) loans to unemployed (to provide liquidity)
  with
  (2) traditional unemployment benefits (insurance against uncertain duration)

- Currently UE benefits play a dual role
  - Insure workers against uncertainty in finding a job
  - Provide workers with ability to consumption smooth while unemployed (given credit market failures)
- Best policy is usually the direct policy
  - If problem is credit market failure / liquidity, solve that directly
- See:
  - Shimer and Werning (2006) "liquidity and insurance"
  - Feldstein and Altman (1998) "unemployment insurance accounts"

UI Savings accounts

- Altman and Feldstein
- Required to save a fraction of wage income
- If lose job and eligible for UI, withdraw amount equal to regular UI benefits from personal account
  - So held harmless wrt current program
- If funds not sufficient to pay benefit, government lends necessary amount
- Key point: individuals who always have positive balance (and expect to remain positive) is residual claimant on funds and therefore internalizes effect of increased duration on budget constraint
  - At retirement age, funds are merged into individual's IRA (if die, bequeathable)
  - Individuals who expect to retire or die with negative balance (at which point govt cancels debt) face same incentive problem as under current system (but w/o the discipline that comes from employer experience rating)
    - They estimate that most insured ue would have positive balances

UI Savings accounts

- Overall seems a compelling idea
- Potential concerns:
  - Liquidity constraints among young
  - Less redistributive?

Estimating Gap in Marginal Utilities

- How far are we from full insurance / how much of a markup would individuals be willing to pay for UI insurance? $\frac{u'(c_u)-v'(c_e)}{v'(c_e)}$
- Approach #1: Impact of unemployment on consumption (Gruber 1997; Hendren 2017) [done]
- Subsequent approaches try to address various limitations of consumption-based approach
  - Approach #2: Ex-ante impact of learning about unemployment on consumption (Hendren 2017) [done]
  - Approach #3: Impact on labor supply of indirectly affected spouse (Fadlon and Nielsen forthcoming) [done]
  - Approach #4: Liquidity vs. Moral Hazard benefit response (Chetty 2008) [done]
  - Approach #5: Reservation wages (Shimer and Werning 2007) **[up next]**
  - Approach #6: Estimate WTP directly (Landais et al. 2017)

Approach #5: Reservation Wages

- Reservation wage: wage that would make agent indifferent about accepting a job immediately vs remaining unemployed (receiving benefits and random draws from wage offer distribution)
- Empirical literature on how UI increases reservation wages
  - Often interpreted as "moral hazard"
  - People don't take jobs becaue they have UI
- Shimer and Werning (QJE 2007)
  - Infer gap in marginal utilties across states from comparative statistics of reservation wages
- Key statistic: response of (after-tax) reservation wage to ui benefit levels
  - Encodes the marginal value of insurance because reservation wage directly measures expected value when unemployed
    - The higher the reservation wage, the higher the utility when ue
  - Raising benefits is desirable when it raises the (after-tax) reservation wage.
    - Nets two effects. . .

Shimer and Werning (2007)

- Raising benefits is desirable when it raises the (after-tax) reservation wage.
- Two effects of raising benefits:
  - Effect 1: Utility when unemployed (benefits): Higher benefits reduce cost of remaining ue and therefore raise the pre tax reservation wage
    - If the pre tax reservation wage is very responsive to UI benefits, raising UI benefits has a strong positive effect on workers' welfare
  - Effect 2: Utility when employed (taxes): Higher benefits must be funded by an increase in taxes when employed. The higher the ue rate or the more responsive it is to UI benefits, the greater is the need to raise the tax.
    - Formula nets this out by looking at responsiveness of after tax reservation wage to benefits.

Implementation

- Issue: How to measure reservation wages (and their response to benefits)?
  - Direct survey evidence - Feldstein and Poterba (1984); Krueger and Mueller (2011)
- How reliable? Esp since UI benefit levels don't seem to impact subsequent wage rates (Card et al. 2007)
  - In general we tend to be skeptical of what people say that they would do
- Finding: large welfare gain from raising benefits from current levels
  - Similar finding to Chetty (2008) vs Gruber (1997)
    - Recall though Gruber "conclusion" depends on choice of risk aversion.

Estimating Gap in Marginal Utilities

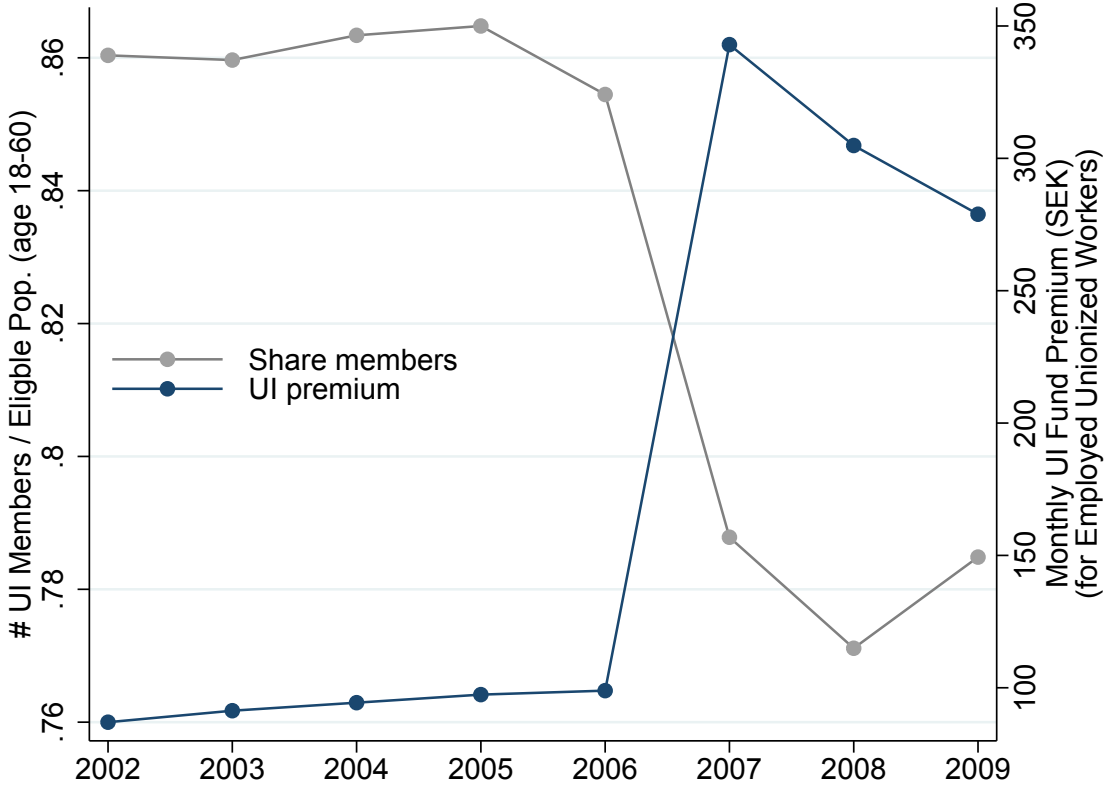
- How far are we from full insurance / how much of a markup would individuals be willing to pay for UI insurance? $\frac{u'(c_u)-v'(c_e)}{v'(c_e)}$
- Approach #1: Impact of unemployment on consumption (Gruber 1997; Hendren 2017) [done]
- Subsequent approaches try to address various limitations of consumption-based approach
  - Approach #2: Ex-ante impact of learning about unemployment on consumption (Hendren 2017) [done]
  - Approach #3: Impact on labor supply of indirectly affected spouse (Fadlon and Nielsen forthcoming) [done]
  - Approach #4: Liquidity vs. Moral Hazard benefit response (Chetty 2008) [done]
  - Approach #5: Reservation wages (Shimer and Werning 2007) [done]
  - Approach #6: Estimate WTP directly (Landais et al. 2017) **[up next]**

Approach #6: Measure WTP Directly

- Landais et al. (2017) "Risk-based selection in Unemployment Insurance: Evidence and Implications"
- Sweden has option to purchase supplemental UI through one's union
- 2007 reform changed prices

2007 Swedish Reform

Figure 11: Price Variation: evolution of premia **p** and of the fraction of workers insured around the 2007 reform



WTP: Bounds

- Recall they first used this setting and variation to test for adverse selection in private UI
- Now they go beyond testing for selection to assess welfare and policy implications: should we mandate supplemental UI?
- First implement bounds:
  - Upper bound on valuation: workers who do not buy supplemental coverage at lower (pre 2007) premiums have valuation less than this premium
  - Lower bound on costs of supplemental coverage for these workers: mechanical cost of more generous benefits, holding behavior constant (ignoring moral hazard)
- Find lower bound on cost is just below upper bound on valuation
- Suggests that with even a small moral hazard effect, these workers do not value coverage in excess of its costs
- Suggests imposing a universal mandate for supplemental UI on them would be inefficient

Estimating WTP

- Exploit price variation to identify marginal buyers and their costs
- 8 percent of workers who switch out of comprehensive UI in response to price increase value it at somewhere between pre-reform and post-reform price
- Unfortunately only observe demand and costs at two different prices so will have to do a fair amount of (linear) extrapolation
  - But with that can back out demand and cost curves (see Figure 16)
- Findings:
  - Full mandate not efficient (some value it at $<$ cost)
  - Large subsidies for supplemental UI optimal given presence of adverse selection

Findings

- Full mandate not efficient (some value it at $<$ cost)
- Large subsidies for supplemental UI optimal given presence of adverse selection
- Very nice paper: uses pricing variation and choices to
  - Test for adverse selection in a market with little / no prior evidence
  - Estimate LHS of Baily formula (Value of insurance)
  - Consider welfare impacts of alternative policy instruments (mandates vs. subsidies)

Putting it all together: Landais and Spinnweijn (2019)

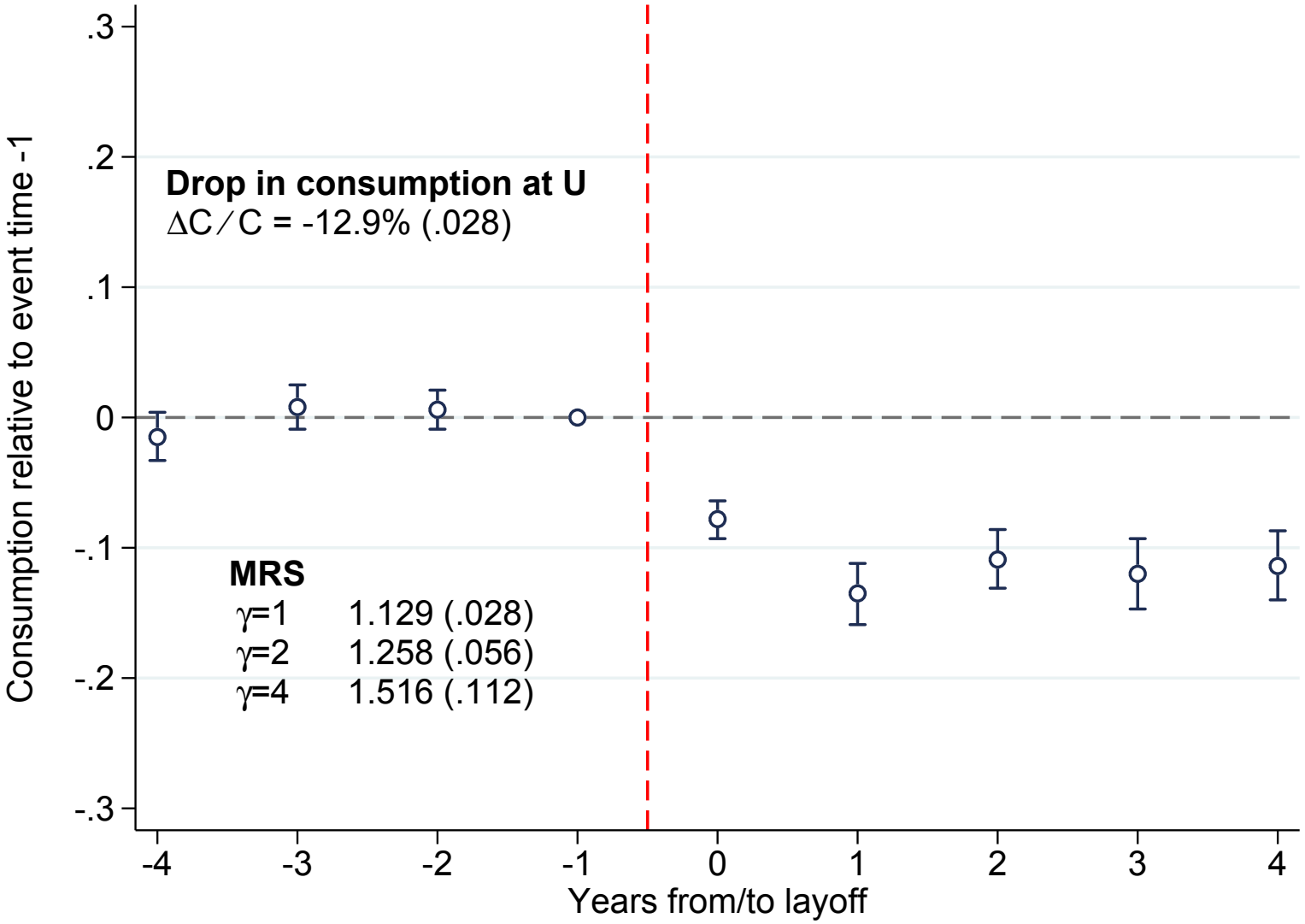
- Question is in title: "The Value of Unemployment Insurance"
- Same setting as their prior paper: Swedish supplemental UI
- Really nice feature of this paper: Implements *different approaches in same setting* (and similar populations) and compares
  - plus a seventh (?!) bounding approach: how MPC varies across states
- Use three difference approaches to estimate MRS - i.e marginal utility of consumption when unemployed / marginal utility of consumption when employed
  - What would full insurance imply for MRS?

Comparison across two existing approaches

- Consumption based approach: drop in consumption when become unemployed
  - Recall key issues: must make assumptions about shape of utility function (e.g. risk aversion, state dependence) + measure consumption
- Choice-based approach: direct estimate of WTP using choices over supplemental UI
- Plus implements a third (new) approach that generates lower bound on WTP based on difference across states in marginal propensity to consume out of extra income

Consumption based approach

Figure 1: Estimated consumption dynamics around start of unemployment spell



Consumption-based approach

- Drop in consumption of ~12% (similar to existing literature)
  - Note in year 0, they are unemployed as of December so unemployed for some fraction of year
  - Don't seem to have much anticipatory response (vs. Hendren 2017)
- Implies relatively low value of marginal increase in benefits, even when assuming high levels of risk aversion
  - Even risk aversion of 4 yields only MRS of 1.51
  - interpretation: workers are willing to pay a markup of about 50% to transfer a dollar of consumption from employed to unemployed state

Choice Based Approach

- Direct estimate of WTP based on choices (demand) for supplemental UI
- Requires (exogenous) variation in premium
- Premium variation:
  - uniform premium charged to workers with different underlying risks of unemployment
- Underlying ue risk varies with observables (e.g. firm, tenure, interaction etc)
  - requires assumption that some shifters of unemployment risk are orthogonal to preferences (do not affect WTP except via costs)
- Why not use the prior premium variation?

Implementation

- Price to coverage ratio for an additional unit of insurance:

$$\frac{p_u}{p_e} = \frac{\tau_1 - \tau_0}{b_1 - b_0}$$

where p_s is the price of increasing resources in state s, b is benefits and τ is "premium", and basic coverage is (b_0, τ_0) and comprehensive coverage is (b_1, τ_1)

- Expected price per unit of coverage for indivdiual i

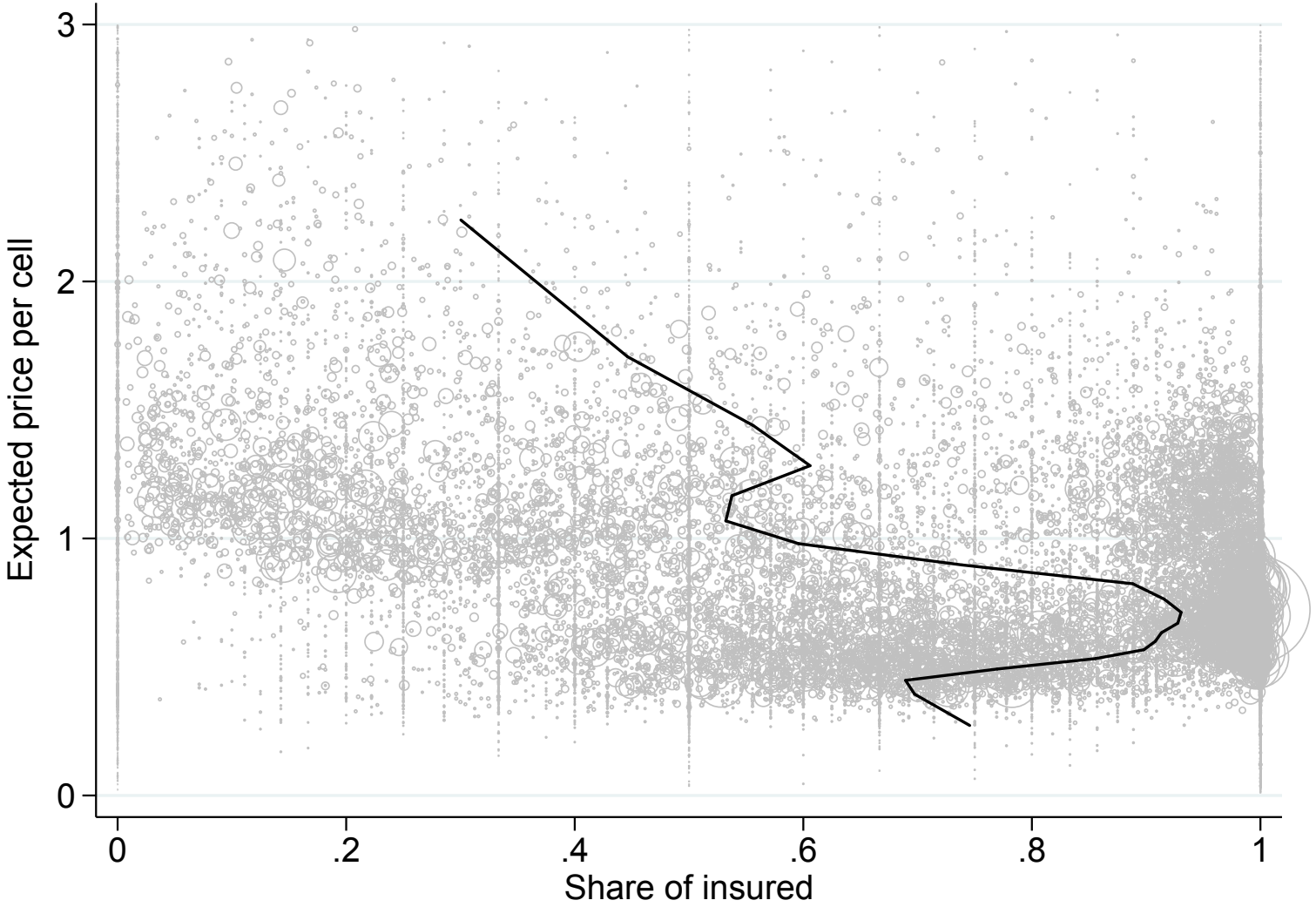
$$\widetilde{p}_i = \frac{p_u}{p_e} \frac{1 - \pi(Z_i)}{\pi(Z_i)}$$

where $\pi(Z_i)$ is predicted number of days unemployed in $t+1$, predicted from rich set of observables Z_i measured at t

- Observed substantial heterogeneith in π_i and hence in prices across individuals

First pass at a demand curve

Figure 6: Non-parametric Relation between Expected Price and Insurance Coverage



Estimating demand

- Non-parametric relatinoship is non-monotonic
- Presumably reflects
  - Noise
  - Some Z_i shift not only risk but also have independent effect on WTP
- Parametric model
  - Impose structure
  - Allow for a rich set of observables (X_i) to directly affect WTP, including various demographics (age, gender, income, education, region, industry etc)
- Identification relies on excluded instruments Z_i that affect predicted risk but don't independently affect MRS
  - e.g. job tenure ranking within establishment x occupation (bc LIFO rules)

Implementation

- Individual i buys comprehensive insurance at time t iff:

$$\alpha_i + X_{it}\beta - \gamma\widetilde{p}(Z_{it}) + \epsilon_{it} \geq 0$$

where α_i is a normally distributed fixed effect capturing individual preferences and ϵ_{it} is logistically distributed noise term

- - Structure: random effects Logit demand model for comprehensive coverage that is linear in price
- Generates corresponding MRS as function of estimated parameters:

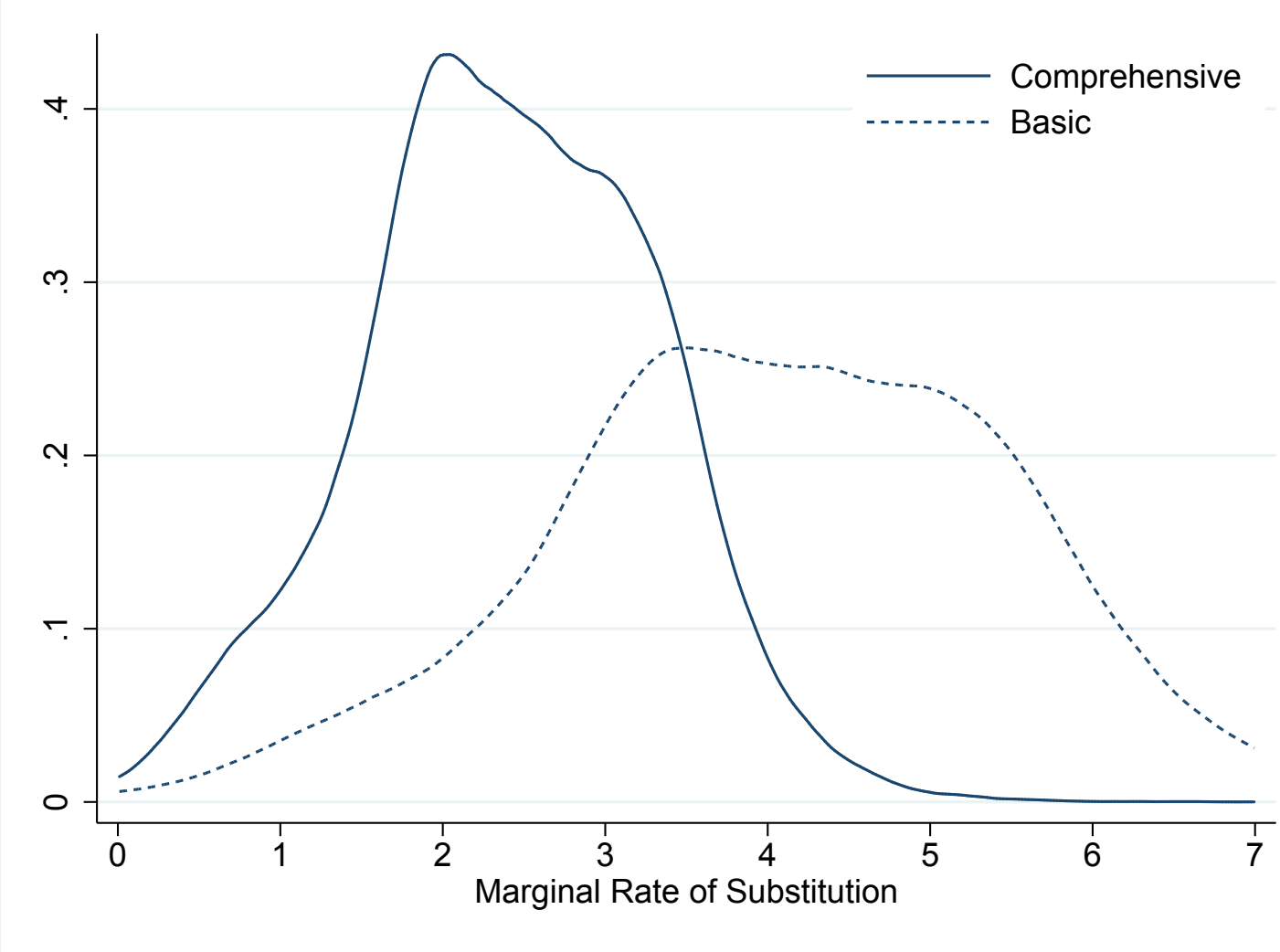
$$MRS(X_{it}) = \frac{\alpha_i + X_{it}\beta}{\gamma}$$

- (Comment) Moral hazard: Above approach uses predicted risk under comprehensive coverage, which could create downward bias of MRS if workers change effort under basic coverage
  - Get upper bound by redoing with workers' risk predicted under basic coverage

Results

Figure 7: Distributions of MRS from RP Structural estimation

A. Lower and Upper Bound in Baseline Risk Model



Comments

- Average MRS (under lower bound approach) =2.24
  - workers on average are willing to pay more than a 100% mark-up to get comprehenisve coverage
  - substantially higher than Consumption-Based estimates
- Substantial heterogeneity in MRS (above and beyond heterogeneity in unemployment risk)
  - For 75% of workers, MRS is higher than 1.7
  - For 25% it is higher than 3

Ex-post vs ex-ante measures

- Ex-post (Consumption based):
  - Observe impact of shock
  - Assume utility function
- Ex-ante ("Revealed preference)
  - Observe wtp to move $$ across states
  - Assumes revealed preference

Approach #7 (?!): Bounds based on State-Specific MPC

- Observed drop in consumption when become unemployed reflects both worker's preference to smooth consumption and price of consumption smoothing
  - Recall Chetty and Looney (2007)
  - This was a challenge for consumption-based approach
- In other words, a worker may smooth consumption less either bc the price is high or bc she care little about the drop
- Insight: can uncover state-specific prices through state-specific marginal propensity to consume (MPC) out of an extra dollar of income (dc_s / dy_s)
  - MPC reveals shadow cost of resource that is used on the margin
  - MPC will be higher in state s if state-specific price of consumption is higher

Framework

$$V = \pi(z)v_u(c_u, x_u) + (1 - \pi(z))v_e(c_e, x_e) - z$$

- c denotes consumption
- z denotes actions that can reduce ue risk, $\pi(z)$ is probability of ue, z is utility cost of effort
- x denotes actions that can be used to smooth consumption across states.
  - e.g. precautionary savings, access to credit, formal and informal insurance, household labor supply
  - x_s denotes resources used to increase or decrease consumption relative to state-specific income
  - p_s :price of increasing resources can be state dependent

Framework (con't)

$$V = \pi(z)v_u(c_u, x_u) + (1 - \pi(z))v_e(c_e, x_e) - z$$

- Agents maximize expected utility V subject to her state-specific budget constraint:

$$c_s = y_s + \frac{1}{p_s}x_s$$

- Therefore within a state, equate marginal utility of consumption and marginal utility cost of generating resources:

$$\frac{\partial v_s(c_s, x_s)}{\partial c} = -p_s \frac{\partial v_s(c_s, x_s)}{\partial x}$$

Bounds based on State-Specific MPC

- Insight: can uncover state-specific prices through state-specific marginal propensity to consume (MPC) out of an extra dollar of income (dc_s / dy_s)
  - MPC reveals shadow cost of resource that is used on the margin
  - MPC will be higher in state s if state-specific price of consumption is higher
- Within a state: optimizing agents equalize the marginal utility of consumption and the marginal cost of generating resources
- Therefore, across states, ratio of marginal utilities of consumption (i.e. MRS) is equal to the ratio of state-specific prices times the ratio of state-specific marginal utility cost of generating resources
- Result: Assuming preferences are separable, households are making optimal decisions, and marginal cost of generating resources is higher in the unemployed state, then

$$MRS \geq= \frac{MPC_u}{MPC_e}$$

Comments

- Attraction of approach: do not have to worry about confounders to consumption-based approach like work-related expenses, durables, home production opportunities
  - home production opportunities can be a reason that price of consumption is state-specific
  - work or on the job search related expenditures - which affect drop in c between employed and unemployed, do not change MPC and how it relates to state specific prices
- Limitations
  - A bound, not a point estimate
  - Assumption that marginal cost of generating resources is higher in the unemployed state
    - Seems reasonable: income lower, so use more state-specific resources
    - Or not: marginal disutility of my spouse working (generating resources) may be lower when I am unemployed and can do more home production
  - Need comparable exogeneous variation in income both when employed and unemployed to estimate state-specific MPCs

Implementation and Results

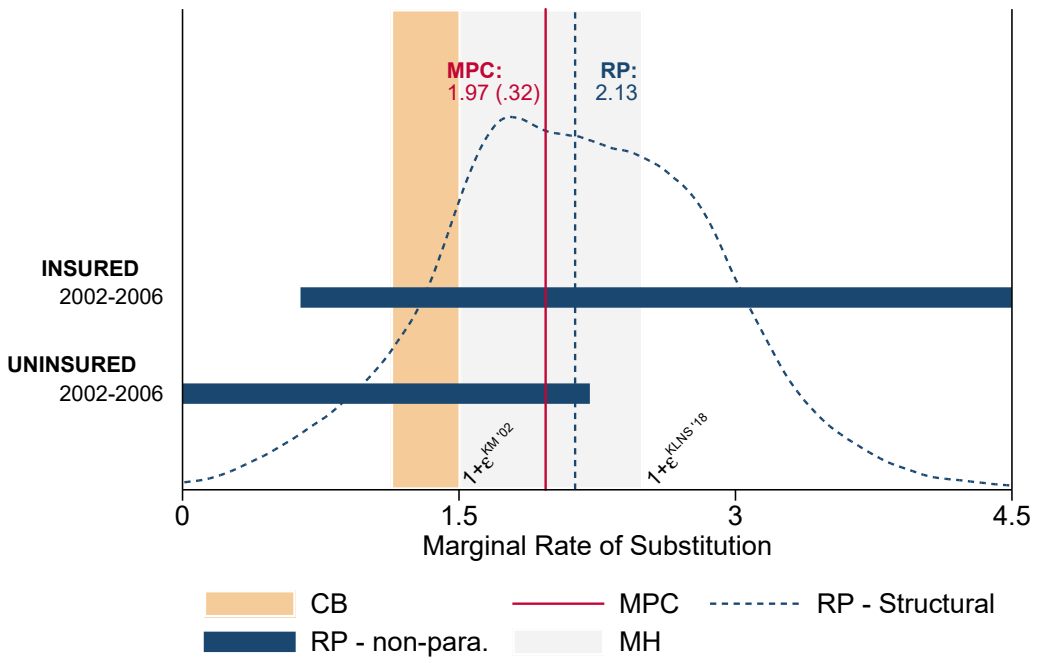
- Use variation in social assistance benefits within households (due to change in family structure and legislative changes over time within municipalities)
- Find substantially larger MCP when unemployed (~0.61) compared to when employed (0.44)

Comparison across approaches

- Consumption-based approach yields lowest value for UI benefits
- Approach based on MPC out of income when unemployed vs employed suggests a lower bound on value of UI benefits that is higher than Consumption-based approach even for risk aversion of 4
- Revealed prefernece approach suggests even higher value of UI benefits, as well as substantial heterogeneity

Comparison across approaches and to MH estimates

Figure 8: Comparison of MRS Estimates Across Different Approaches for the Baseline Sample



Notes: The graph summarizes the estimates of the MRS form different approaches. The region shaded in orange represent the range of MRS estimates using the drop in consumption of 12.9% and $\gamma \in [1; 4]$. The red line represents the estimates of MRS derived from the state-specific MPCs. The dashed line shows the distribution of MRS estimated using salient risk shifters, based on the predicted risks under comprehensive UI coverage. Its mean is represented by the vertical dashed line. Blue bars show the upper and lower bounds on MRS, using average predicted unemployement risk under basic and comprehensive coverage respectively. The area shaded in grey represents the moral hazard bounds estimated by Krueger and Meyer [2002] and Kolsrud et al. [2018].

Testing your understanding / my teaching

- One of your classmates wants to contribute to the literature on optimal UI benefit level. He/she has a really clean identification strategy to measure the impact of higher unemployment benefits on re-employment wages.
- But her curmudeonly advisor has scoffed "so what?"
- Help her out: Would an impact on wages enter the calculation for optional UI benefit levels? Where and why?