

Knowledge About Future Job Loss and Implications for Unemployment Insurance

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- Why is there not a robust private market for unemployment/job loss insurance?
 - Like health, life, disability, car, home, pet health, iPhone water damage, etc...
 - Why doesn't Aetna have an unemployment insurance division?
- Large literature studying “optimal” government provision of UI
 - Absence of private market not micro-founded
 - If a private market doesn't exist, doesn't that mean no one's willing to pay for UI?
 - Does providing a microfoundation change the formula for optimal benefits?

Overview of the Paper

- Part 1: Private Information is the reason the private market doesn't exist
 - Use information contained in subjective probability elicitations (Hendren 2013)
 - Quantify cost of adverse selection if contracts were offered:
 - 70% markup (Non-parametric lower bound)
 - 300% markup (Semi-parametric point estimate)

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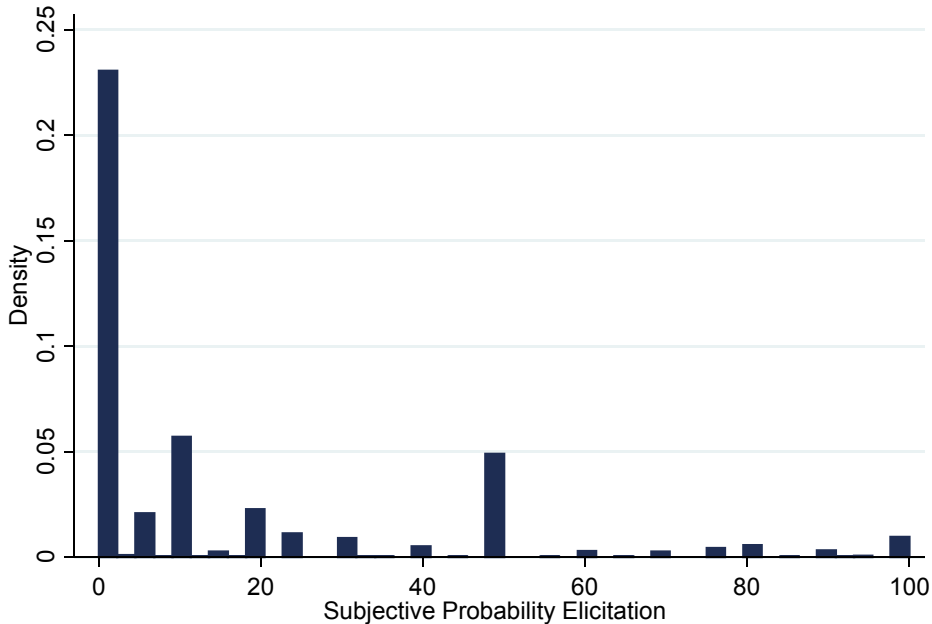
- Part 1: Private Information is the reason the private market doesn't exist
 - Use information contained in subjective probability elicitations (Hendren 2013)
 - Quantify cost of adverse selection if contracts were offered:
 - 70% markup (Non-parametric lower bound)
 - 300% markup (Semi-parametric point estimate)
- Part 2: Implications for optimal UI policy
 - In response to *potential* job loss, individuals reduce consumption and increase spousal labor supply
 - Causal effect of event on marginal utilities (i.e. Baily formula) no longer sufficient
 - Want insurance against information, not just event
 - Provide new methods to identify ex-ante value of insurance
 - Exploit ex-ante response to information

1 Private Information as Micro-Foundation for Market Non-Existence

2 Optimal UI

- Use data from Health and Retirement Study (1993-2013)
 - Survey asks subjective probability elicitation, Z
 - *“What is percent chance (0-100) that you will lose your job in the next 12 months?”*

Histogram of Subjective Probability Elicitations



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 - Start with controls for demographics + job characteristics
 - Demographics (gender, age quadratic, census division, year)
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 - Add additional controls for health, unemployment history, etc.

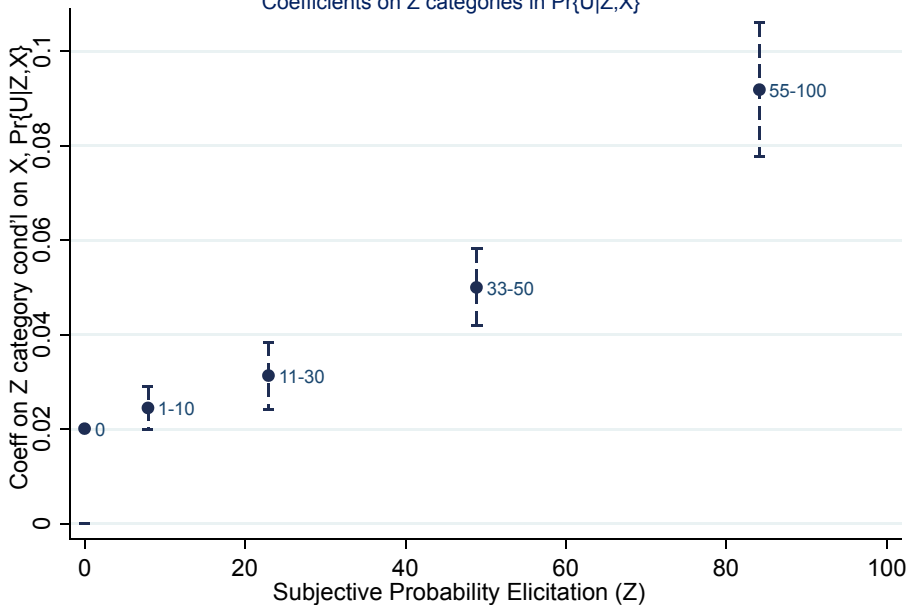
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 - Add additional controls for health, unemployment history, etc.
- Bin Z into groups, χ_j , (0, 1-10, ...)
 - Regress U on X and bins to construct:

$$P_Z = \Pr \{U|X, Z\} = \beta X + \sum_j \zeta_j 1 \{Z \in \chi_j\}$$

Predictive Content of Elicitations about Future Unemployment

Coefficients on Z categories in $\Pr\{U|Z,X\}$



Quantifying Private Information

- Paper considers general model of unemployment risk
 - When can one provide insurance that pays \$1 if U occurs?

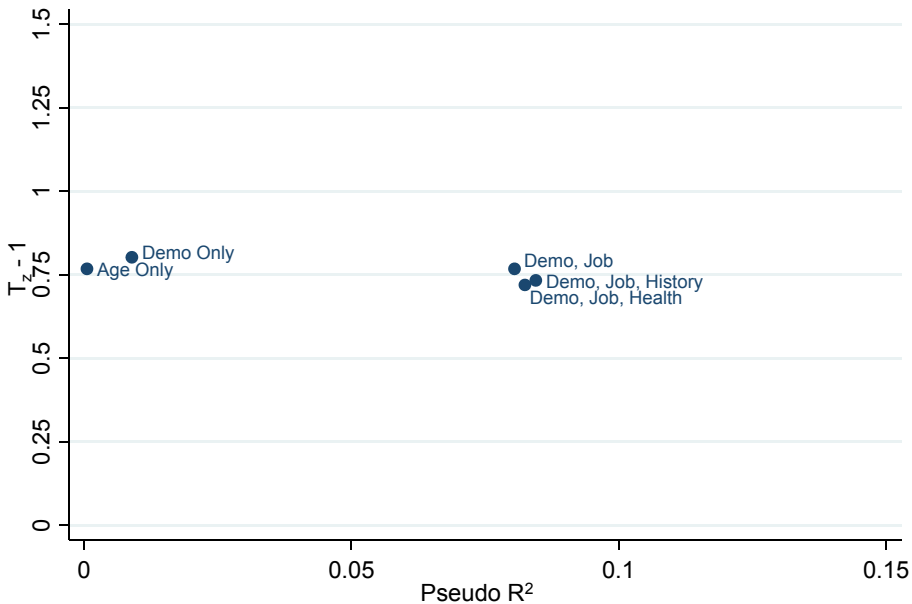
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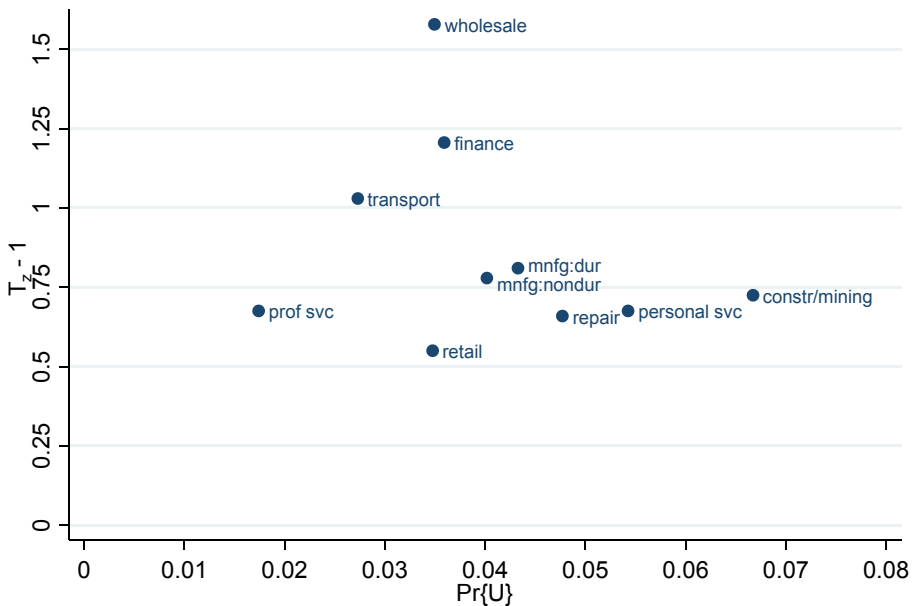
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- Can use distribution of predicted values to provide non-parametric lower bound on this markup
 - Without any assumptions about elicitation error
 - Need elicitation to be not more informative than true beliefs
 - Need true beliefs (not elicitation) to be unbiased

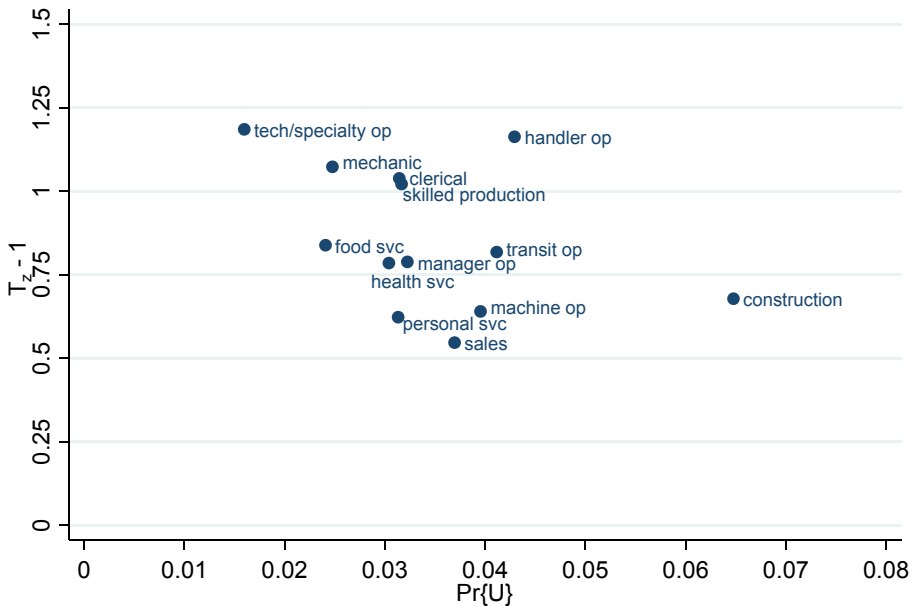
Lower Bounds for $E[T(P)]-1$ using Alternative Controls



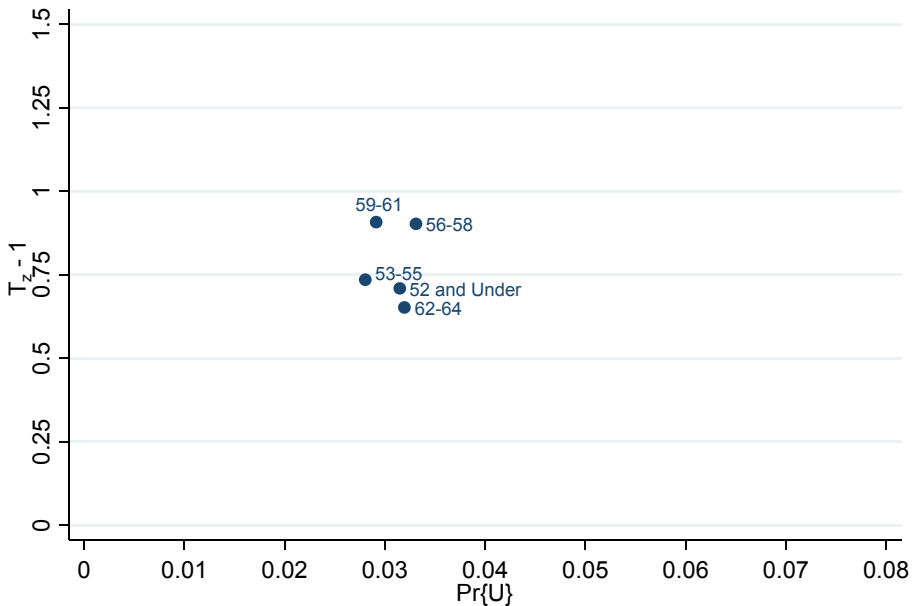
Lower Bounds for $E[T(P)]-1$ by Industry



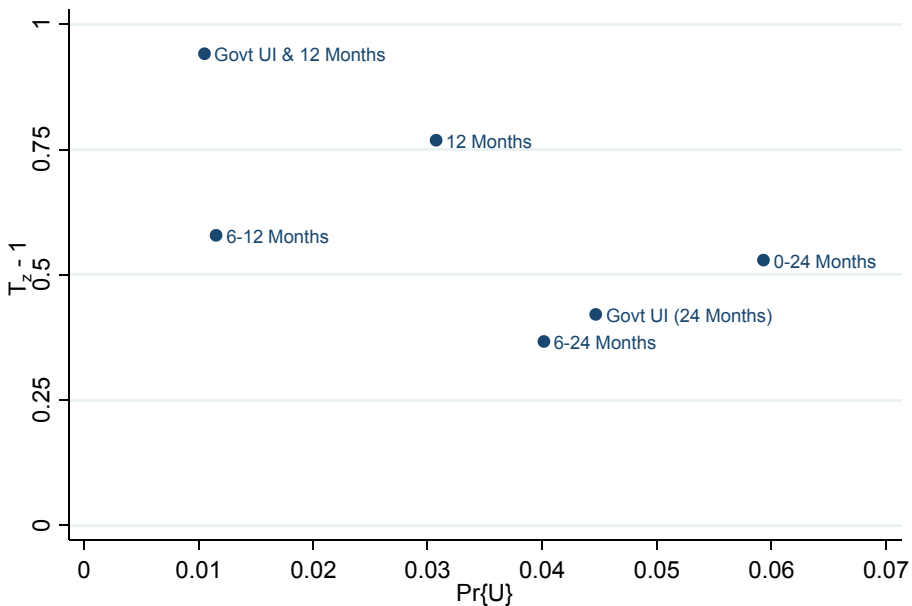
Lower Bounds for $E[T(P)]-1$ by Occupation



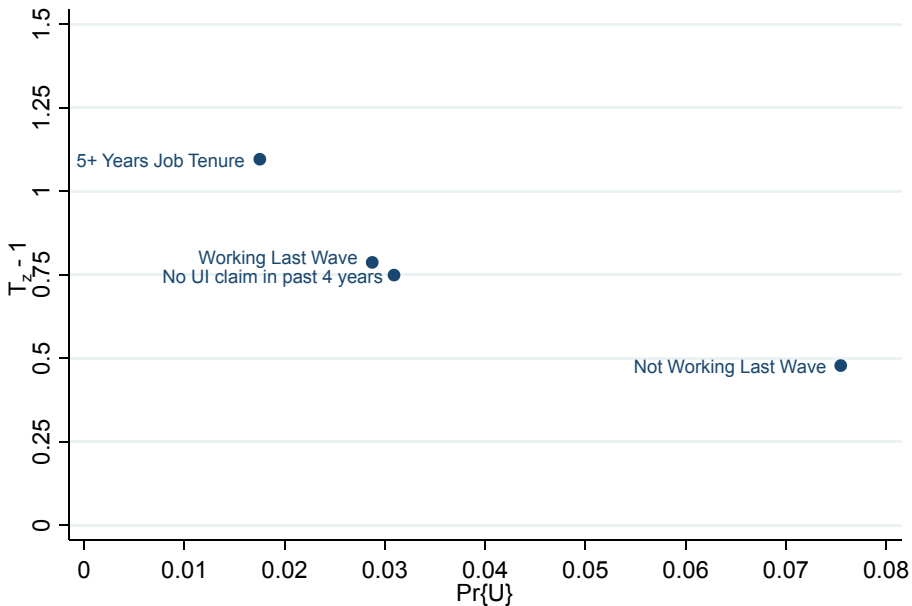
Lower Bounds for $E[T(P)]-1$ by Age



Lower Bounds on $E[T(P)]-1$ using Alternative U Definitions



Lower Bounds for $E[T(P)]-1$ for Low Risk Sub-samples



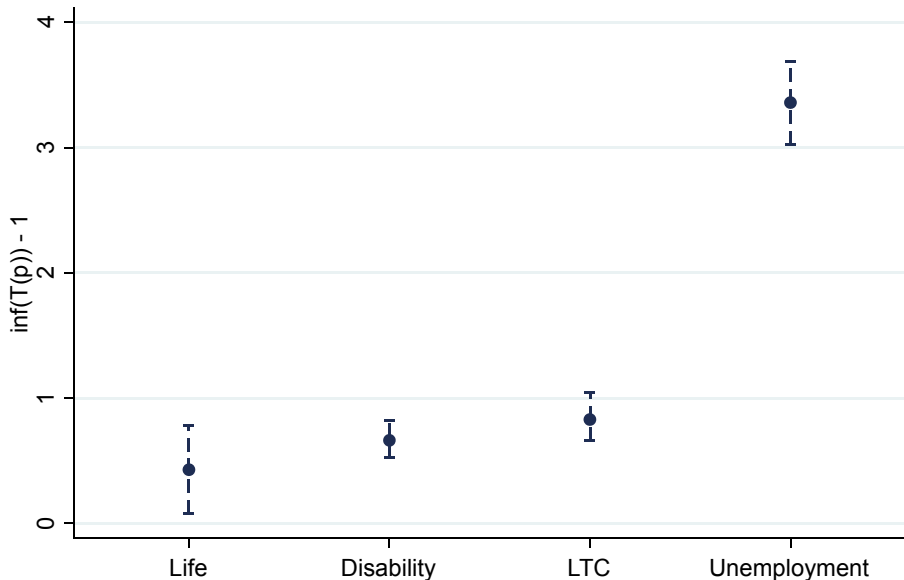
Minimum Pooled Price Ratio

<i>Specification</i>	Baseline	Alternative Controls	
		Demo	Health
	(1)	(2)	(3)
Inf T(p) - 1	3.360	5.301	3.228
s.e.	(0.203)	(0.655)	(0.268)
Controls			
Demographics	X	X	X
Job Characteristics	X		X
Health Characteristics			X
Num of Obs.	26,640	26,640	22,831
Num of HHs	3,467	3,467	3,180

Minimum Pooled Price Ratio

<i>Specification</i>	Sub-Samples					
	Age		Below	Above	Tenure	
	<= 55	> 55	Median Wage	Median Wage	> 5 yrs	<= 5 yrs
Inf T(p) - 1	3.325	3.442	4.217	3.223	4.736	3.739
s.e.	(0.306)	(0.279)	(0.417)	(0.268)	(0.392)	(0.336)
Controls						
Demographics	X	X	X	X	X	X
Job Characteristics	X	X	X	X	X	X
Num of Obs.	11,134	15,506	13,320	13,320	17,850	8,790
Num of HHs	2,255	3,231	2,916	2,259	2,952	2,437

Comparison of $\inf T(p)$ to Other Markets



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 - Conflates uncertainty realization with event realization
 - Raises both theoretical and empirical issues

- Let p denote probability of unemployment
- Optimality formula:

$$W = \frac{E \left[\frac{p}{E[p]} u' (c_u (p)) \right] - E \left[\frac{1-p}{E[1-p]} v' (c_e (p)) \right]}{E \left[\frac{1-p}{E[1-p]} v' (c_e (p)) \right]} = FE$$

where W is the ex-ante markup individuals are willing to pay

- FE remains the aggregate fiscal externality from increasing benefits
- Causal effect of U on marginal utilities works for those with $p = E[p]$
 - Differs from canonical formula if marginal utilities of income vary with p
 - Higher if high $p \rightarrow$ high marginal utilities (in either state)

- Empirical issues

- Common to look at 1-year consumption changes to measure

$$\frac{u' - v'}{v'} \approx \sigma \frac{\Delta c}{c}$$

- Euler equation

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

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- What is the value of insurance to those who learned p ex-ante?

The Value of Insurance to the Informed

- Consider welfare experiment:

$$\begin{aligned} W^{\text{ex-ante}} &= \frac{v'(c_{pre}(1)) - v'(c_{pre}(0))}{v'(c_{pre}(0))} \\ &\approx \frac{\frac{d}{dp} v'}{v'} \approx \frac{d \log(v')}{dp} \end{aligned}$$

Note $W^{\text{ex-ante}} \approx W$ if ex-post consumption response is small

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- Consumption

$$\frac{d \log(v')}{dp} \approx \sigma_v \frac{d \log(c_{pre})}{dp}$$

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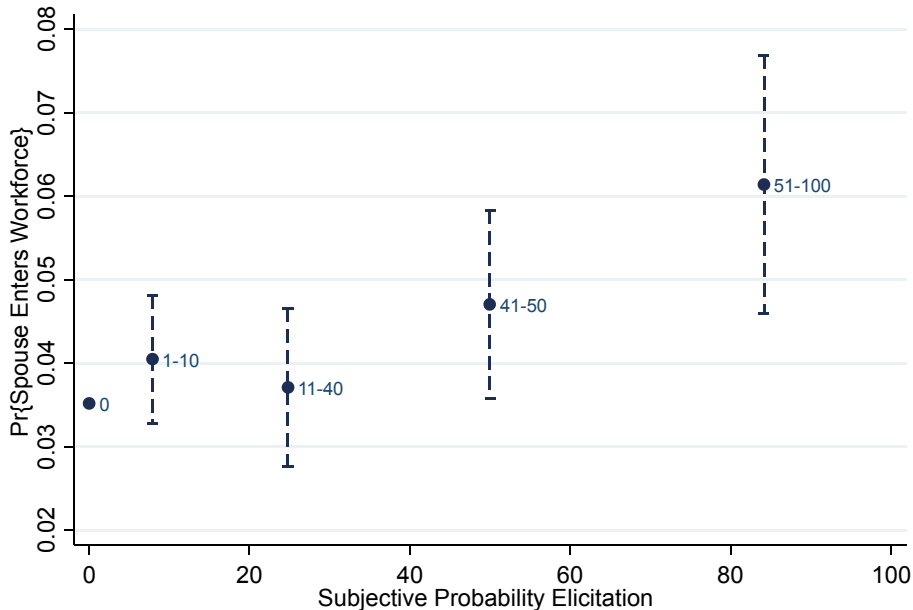
- Spousal extensive margin labor supply

$$\frac{d \log(v')}{dp} \approx \frac{1}{\epsilon^{\text{semi}}} \frac{d[LFP^{\text{Spouse}}]}{dp}$$

Spousal Labor Supply Response

- Sample of households who stay married in $t - 1$ and t
- Focus on labor market entry
- Define an indicator for a spouse not in labor force last period and in labor force this period
 - On average, about 4% of spouses go from not working to working
 - Paper also looks at exit
 - Evidence of correlated shocks on exit
 - Suggests current approach may under-state response if opportunity set held fixed

Relationship between Potential Job Loss and Spousal Labor Supply



Welfare Calculation: Spousal Labor Supply Response

<i>Specification:</i>	Baseline	U=0	HH FE	Ind FE	2yr Lag ("Placebo")
<i>Estimation of dL/dZ</i>					
Elicitation (Z)	0.0273**	0.0270**	0.0267*	0.0312	0.00792
s.e.	(0.0112)	(0.0116)	(0.0146)	(0.0230)	(0.0102)

Mean Dep Var	0.04	0.04	0.04	0.04	0.04
Num of Obs.	11049	10726	11049	11049	11049
Num of HHs	2214	2194	2214	2214	2214

- Assume $\epsilon^{semi} = 0.5$

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- Need to correct for measurement error in Z

$$\frac{dLFP}{dP} = \frac{dLFP}{dZ} \frac{var(Z)}{var(P)}$$

- Again, use information in the joint distribution of Z and L

$$var(P) \approx cov(L, Z)$$

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<i>Welfare Calculation</i>					
Total/Signal Var	11.00	11.00	11.00	11.00	
bootstrap s.e.	(1.41)	(1.37)	(1.32)	(1.32)	
Implied WTP ($\epsilon^{\text{scmi}} = 0.5$)	0.6**	0.59**	0.59**	0.69*	
bootstrap s.e.	(0.26)	(0.26)	(0.29)	(0.39)	

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- Does consumption respond to learning about unemployment?

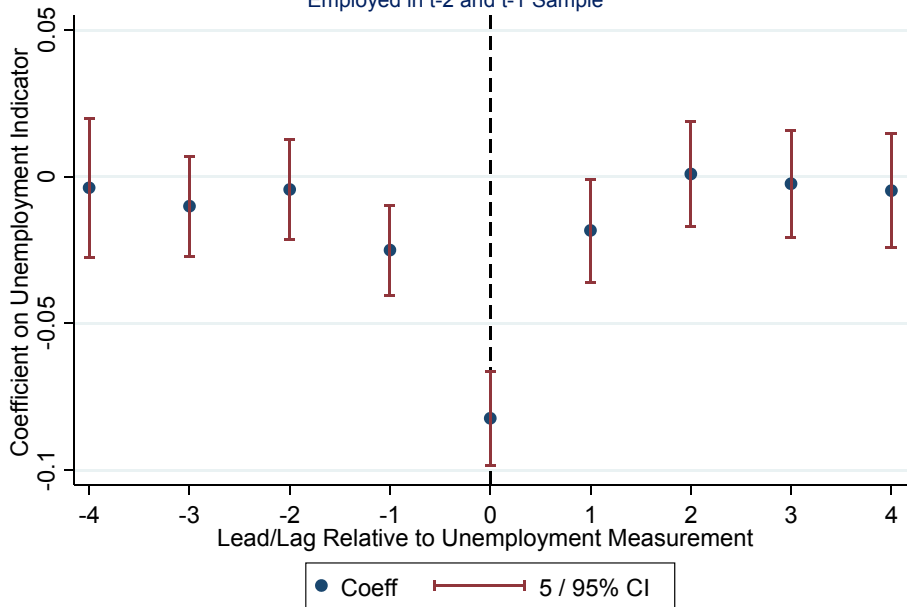
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- Problem: Don't observe consumption and elicitation at same time in HRS
- Solution: 2-sample IV
 - Evolution of beliefs in HRS
 - Evolution of food consumption in PSID (Gruber 1997, Stephens (2001), Chetty and Szeidl (2007), ...)

- Follow data construction in Gruber (1997) and Chetty and Szeidl (2007)
 - Restrict to heads of household
 - Measure food expenditure as in + out + stamps
- Define consumption growth $g_t = \log(c_t) - \log(c_{t-1})$
 - Regress g_{t-1} on U_t + controls (age cubic, year dummies)
 - Restrict the sample to those not unemployed in $t - 2$ and $t - 1$

Impact of Unemployment on Consumption Growth

Employed in t-2 and t-1 Sample



Impact of Future Job Loss on Consumption

<i>Specification:</i>	Full Sample	Employed t-2 and t-1	Controls for Needs	Fixed Effects	Over 40 Sample	(2) With Outliers
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Impact of Unemployment on $\log(c_{t,2}) - \log(c_{t,1})$</i>						
Unemp	-0.0336***	-0.0250***	-0.0264***	-0.0243*	-0.0262*	-0.0231*
s.e.	(0.00570)	(0.00942)	(0.0102)	(0.0133)	(0.0157)	(0.0121)
Specification Details						
Sample Employed in t-2 and t-1		X	X	X	X	X
Controls for change in log needs (t-2 vs t-1)			X	X	X	
Individual Fixed Effects				X		
Num of HHs	11055	10042	8869	8869	4772	10156

Scaling by the “First Stage” of Information Revelation

- Reduced form

$$\Delta^{RF} = 0.025$$

- Need “first stage”

- First stage: How much do people learn in year $t - 2$ vs $t - 1$?

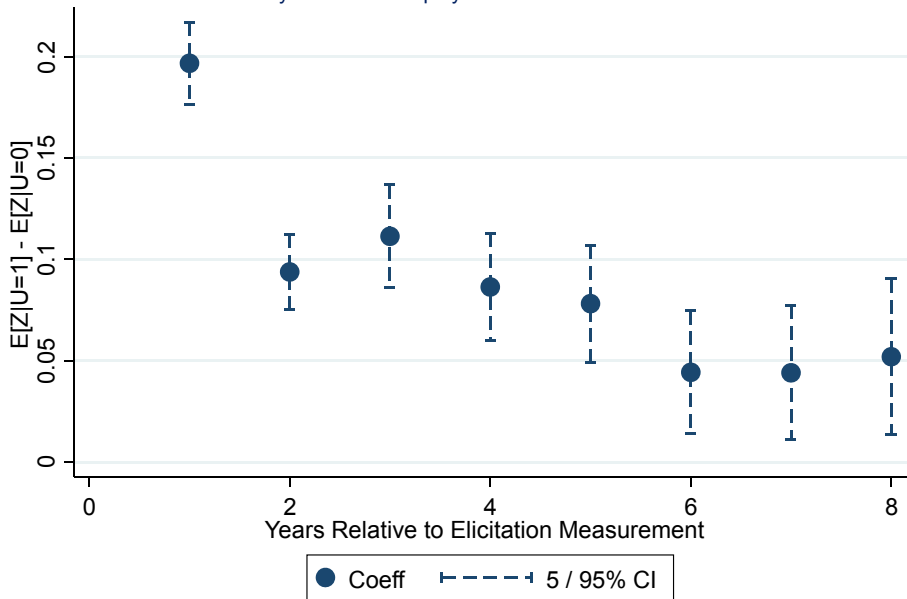
$$\begin{aligned} \Delta^{\text{First Stage}} &= \underbrace{E [P_{t-1,t} | U_t = 1] - E [P_{t-1,t} | U_t = 0]}_{\text{Knowledge in } t - 1 \text{ about } t} \\ &\quad - \underbrace{E [P_{t-2,t} | U_t = 1] - E [P_{t-2,t} | U_t = 0]}_{\text{Knowledge in } t - 2 \text{ about } t} \end{aligned}$$

- Assume measurement error in Z uncorrelated with U

$$E [Z | U] = E [P | U]$$

- Natural for $E [Z_{t-1} | U_t]$
- Likely attenuated for $E [Z_{t-2} | U_t]$ because Z_t elicits information about U_{t+1} , not U_{t+2}

$E[Z|U=1] - E[Z|U=0]$
by Year of Unemployment Measurement



"2-Sample IV" Welfare Calculation

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Individual Fixed Effects				X		
Num of HHs	11055	10042	8869	8869	4772	10156

<i>Split-Sample IV Welfare Calculation</i>						
$\Delta_{\text{First Stage}}$	0.100	0.100	0.100	0.100	0.100	0.100
bootstrap s.e.	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
d[$\log(c_{\text{pre}}(p))$]/dp (2-sample 2SLS)	0.35***	0.26***	0.28***	0.26**	0.27*	0.24**
s.e.	(0.06)	(0.09)	(0.10)	(0.13)	(0.16)	(0.12)
W ^{ex-ante} ($\sigma = 2$)	0.7***	0.52***	0.55***	0.53**	0.54*	0.48**
s.e.	(0.11)	(0.19)	(0.20)	(0.27)	(0.31)	(0.24)

- Private information explains absence of private UI market
 - Lower bounds on markups in excess of 50% across subsamples
 - Point estimates around 300%
- People respond to knowledge about future unemployment
 - Individuals respond to potential job loss by decreasing consumption and increasing spousal labor supply
- Response to information provides method to estimate WTP for social insurance
 - WTP of 50-60% with $\sigma = 2$ and $\epsilon^{semi} = 0.5$
 - Suggests non-trivial value of social insurance for set who learned ex-ante

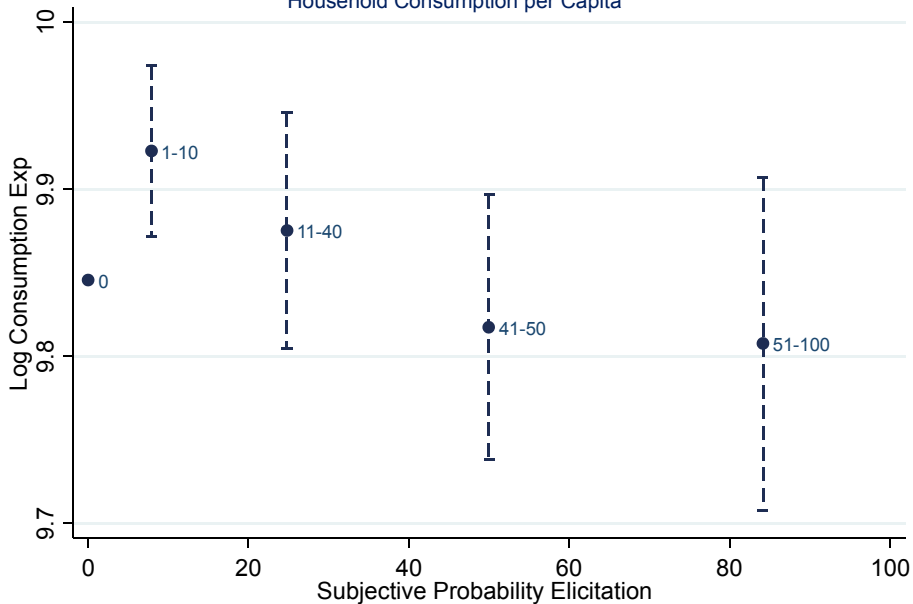
3 Appendix

Ex-Post Consumption Approach

- Test #1: Do c_u and c_e vary with p ?
- Use consumption mail survey in HRS conducted in year after main survey
 - 10%(!) sub-sample
 - Regress ex-post consumption $\log(c)$ on ex-ante Z
 - Recall: Z has large focal point bias at zero
 - Controls for wages, census division, year, age, gender, marital status, and unemployment status

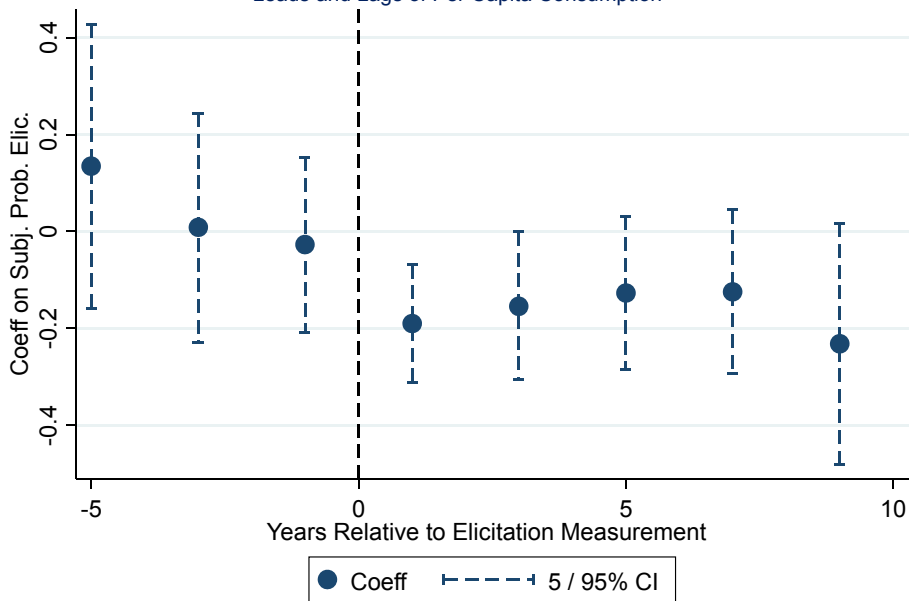
Relationship between Potential Job Loss and Consumption

Household Consumption per Capita



Relationship between Potential Job Loss and Consumption

Leads and Lags of Per Capita Consumption



Consumption vs. Potential Job Loss (Z)

<i>Specification:</i>	Baseline (1)	HH Cons (2)	Sample Z > 0 (3)	Sample U = 0 (4)	Non-Durable Consumption (5)	No Controls (6)	No 1{Z=0} Control (7)
Elicitation (Z) s.e.	-0.160** (0.0781)	-0.110* (0.0596)	-0.171** (0.0777)	-0.162** (0.0783)	-0.162** (0.0789)	-0.345*** (0.0798)	-0.0401 (0.0659)
Elicitation * Unemp (Z*U) s.e.	-0.137 (0.268)	-0.421** (0.207)	-0.0771 (0.268)		-0.257 (0.303)	-0.0000475 (0.296)	-0.460** (0.218)
Elicitation of 0 (1{Z=0}) s.e.	-0.0893*** (0.0334)	-0.0587** (0.0279)		-0.0904*** (0.0334)	-0.120*** (0.0356)	-0.160*** (0.0365)	
Elicitation of 0 * Unemp (1{Z=0}*U) s.e.	0.338 (0.222)	0.161 (0.180)			0.307 (0.220)	0.191 (0.239)	
Unemp (U) s.e.	-0.0845 (0.165)	0.0862 (0.128)	-0.120 (0.164)	0 (.)	-0.0936 (0.164)	-0.181 (0.187)	0.118 (0.120)
Mean Dep Var	9.86	10.58	9.89		9.18	9.86	9.86
Num of Obs.	2,798	2,798	1,503		2,798	2,798	2,798
Num of HHs	862	862	579		862	862	862

#1 Ex-Post Consumption Approach: Translating to Welfare

- Two assumptions enable estimation of W :
 - Euler equation

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

- Minimal consumption impact of not losing your job: $E[c_e] \approx E[c_{pre}]$ (o.w. lower bound)
- Then:

$$W = \sigma_{cov} \left(\frac{-p}{\bar{p}}, \frac{c_e(p)}{\bar{c}_e} \right) \approx \sigma \frac{\text{var}(Z)}{\Pr\{L\}} \frac{\text{cov}(-Z, \log(c_e))}{\text{var}(Z)}$$

Welfare Calculation: Consumption vs. Potential Job Loss

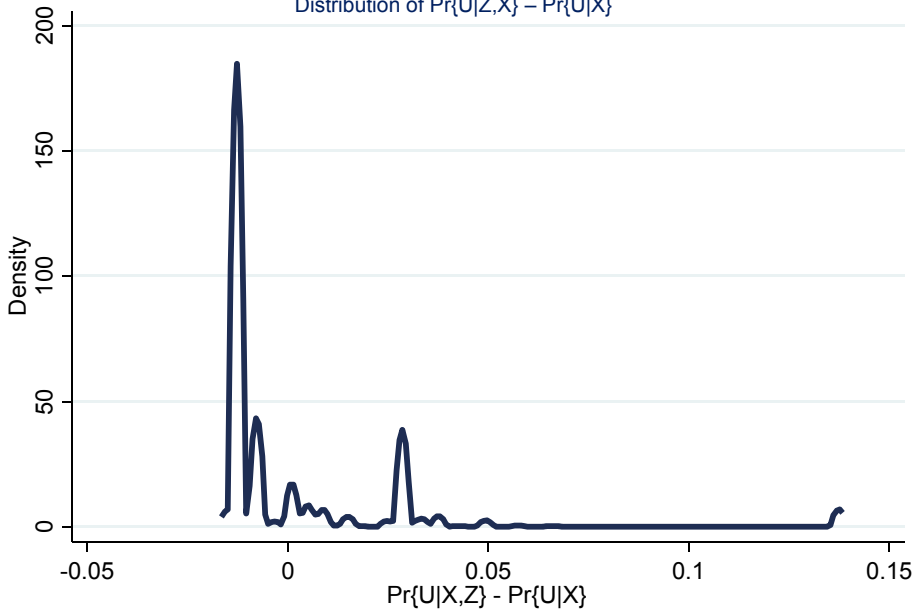
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s.e.	(0.0781)	(0.0596)	(0.0783)	(0.0789)	(0.0659)

<i>Welfare Calculation</i>					
Scaling Factor (Var(Z X) / Pr{L})	1.53	1.53	1.40	1.53	1.53
bootstrap s.e.	(0.15)	(0.15)	(0.15)	(0.14)	(0.15)
Cov(p/E[p],log(c _e))	0.25**	0.17*	0.23**	0.25**	0.06
bootstrap s.e.	(0.12)	(0.09)	(0.11)	(0.12)	(0.10)
Implied WTP (CRRA = 2)	0.49**	0.34*	0.45**	0.5**	0.12
bootstrap s.e.	(0.23)	(0.19)	(0.23)	(0.23)	(0.20)

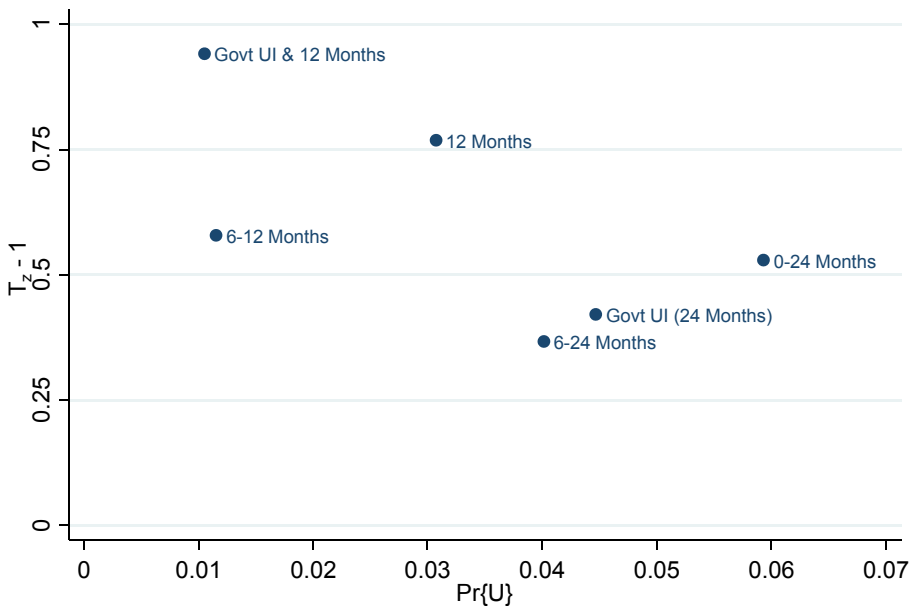
Mean Dep Var	9.86	10.58	9.87	9.18	9.86
Num of Obs.	2,798	2,798	2,696	2,798	2,798
Num of HHs	862	862	843	862	862

Predictive Content of Elicitations about Future Unemployment

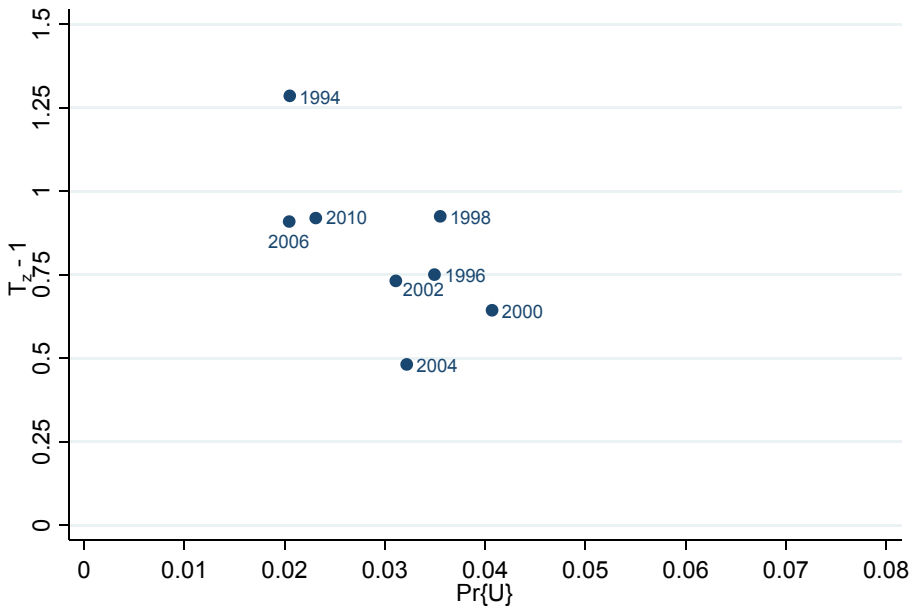
Distribution of $\Pr\{U|Z,X\} - \Pr\{U|X\}$



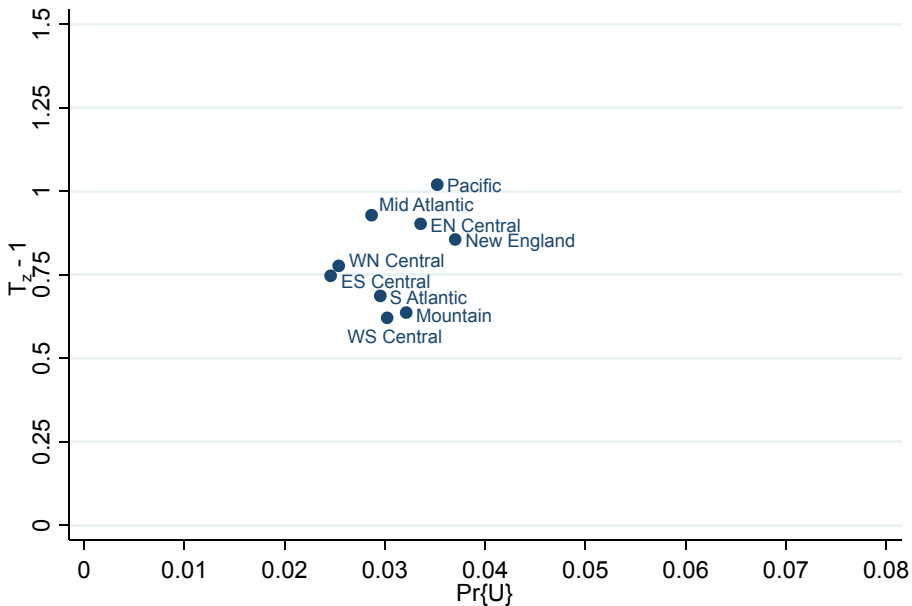
Lower Bounds on $E[T(P)]^{-1}$ using Alternative U Definitions



Lower Bounds on $E[T(P)]-1$ by Year

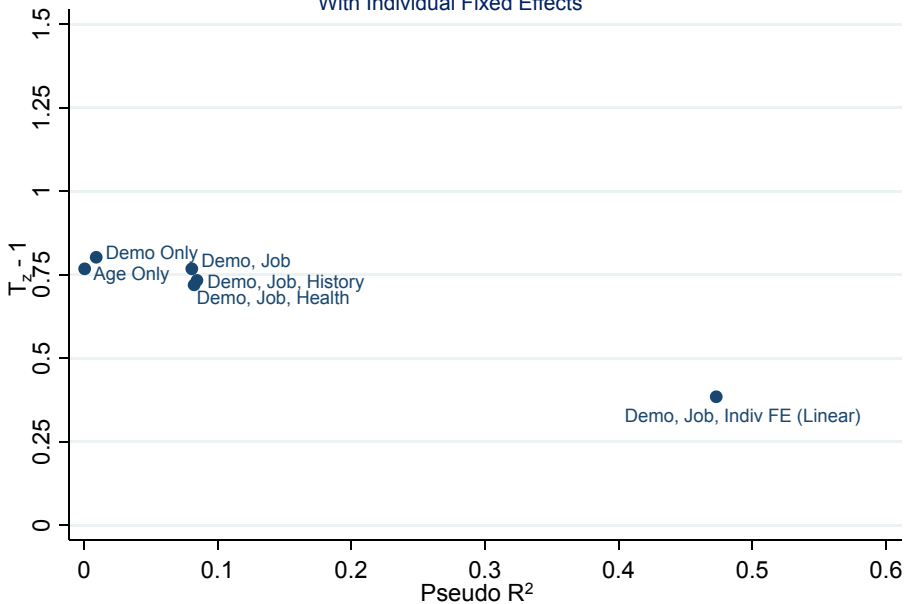


Lower Bounds on $E[T(P)]-1$ by Census Division



Lower Bounds for $E[T(P)]-1$ using Alternative Controls

With Individual Fixed Effects



Impact of Unemployment on Log Household Income

