

The efficacy of hiring credits in distressed areas

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One slide presentation

▶ **What we do**

- Estimate the effect of hiring tax credits on employment and unemployment

▶ **How we do it**

- Exploit unique institutional setting in North Carolina
 - ▶ Counties assigned different credit amounts based on an economic distress ranking
- Compare counties that received different tax credits
 - ▶ Across tiers that determine credit amounts (differences in differences)
 - ▶ Across distress rank cutoffs that determine tiers (regression discontinuity)

▶ **What we find**

For a \$10,000 a year credit

- Increases in employment levels of around 3 %
- Decreases in unemployment rate of around 0.7 percentage points

Effectiveness of Hiring Tax Credits

- ▶ Demand side intervention
- ▶ Effectiveness may vary across areas and over the economic cycle
 - Limited effectiveness in average times and areas: Bartik (2001), Neumark and Grijalva (2015)
 - More effective during recessions under rigid wages. Neumark (2013)
 - More effective in permanently depressed areas. Kline and Moretti (2013), Amior and Manning (2015)
- ▶ Place based policy: May only induce labor reallocation
- ▶ May result in wastage / churning

Difficulties in Evaluating Hiring Tax Credits

- ▶ Program assignment endogenous by design: Credits given to distressed counties
- ▶ Mean reversion may bias estimates (Ashenfelter's Dip)
- ▶ Mixed evidence in previous studies: Freedman (2013) Neumark and Grijalva (2015), Chirinko and Wilson (2016)

North Carolina's Hiring Tax Credits

- ▶ Rank 100 counties according to economic distress
 - ▶ Ranking components: Unemployment rate, household income, population growth, property values.
- ▶ Assign different credit amounts based on ranking.
- ▶ Focus on 1996 wave of the program, first tiers.

Credit size by distress rank (Dollars per year)

Years	Distress									
	10	20	30	40	50	60	70	80	90	100
1998-1995	2,800									
1996-2006	12,500	3,000-4,000			1,000			500		
2007-2013	12,500				5,000			750		

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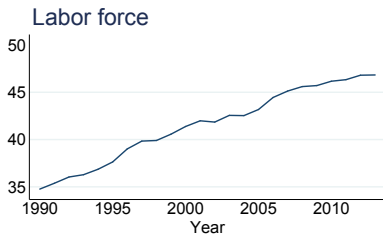
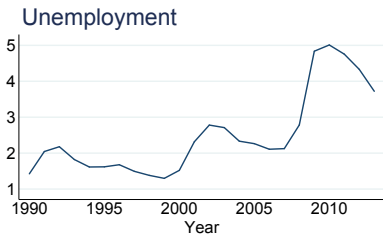
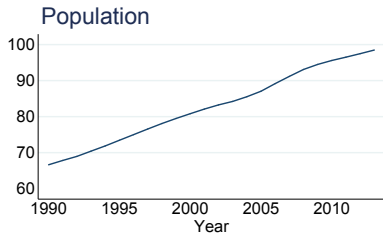
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William S. Lee Act 1996-2006

- ▶ \$12,500 dollars for 10 most distressed counties
- ▶ Industry targeting: Manufacturing, wholesale trade, warehousing, data processing
- ▶ Overrides for distress ranking based assignment from 2000
 - ▶ Low population or high poverty
 - ▶ Keep the program for at least two years.
- ▶ 28 counties receive subsidy by 2006

County level labor market variables

Averages per county (Thousands)

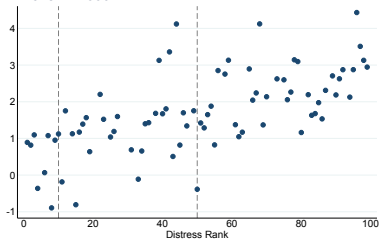


Research Design

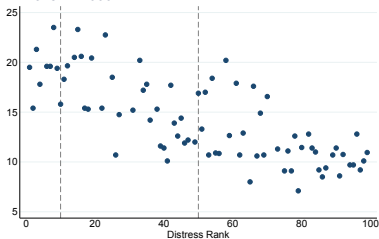
- ▶ Ranking weakly correlated with trends in outcome variables before the program
- ▶ Estimation methods
 - ▶ Differences in differences (DD): Compare counties across tiers
 - ▶ Regression discontinuity (RD): Compare counties on either side of tier cutoffs
- ▶ Outcomes:
 - ▶ Log employment
 - ▶ Unemployment rate

Covariates and Outcome Growth by Ranking, 1996

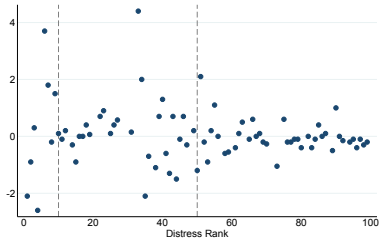
Population Growth
Wave 1 - 1996



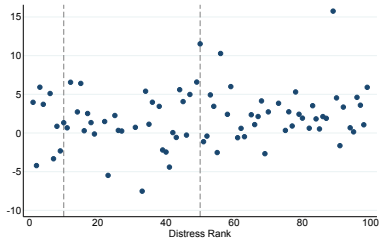
Poverty Rate
Wave 1 - 1996



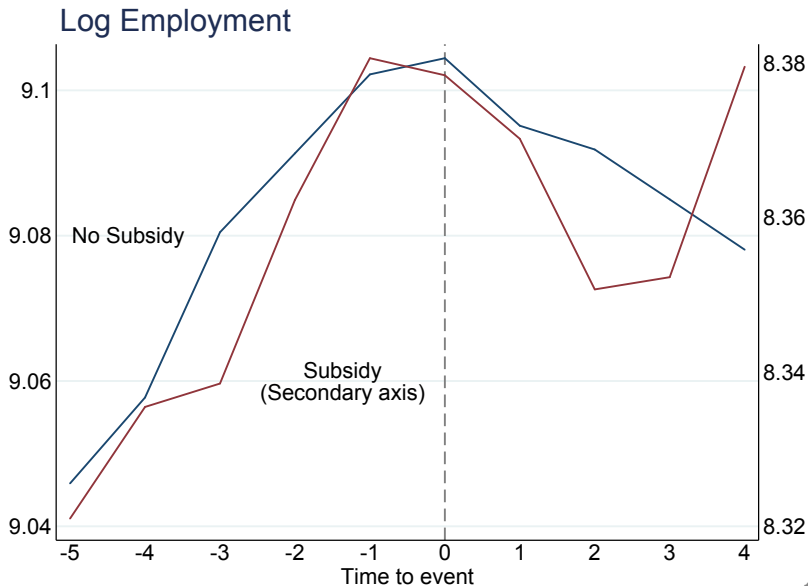
Unemployment Rate - One Year Difference
Wave 1 - 1996



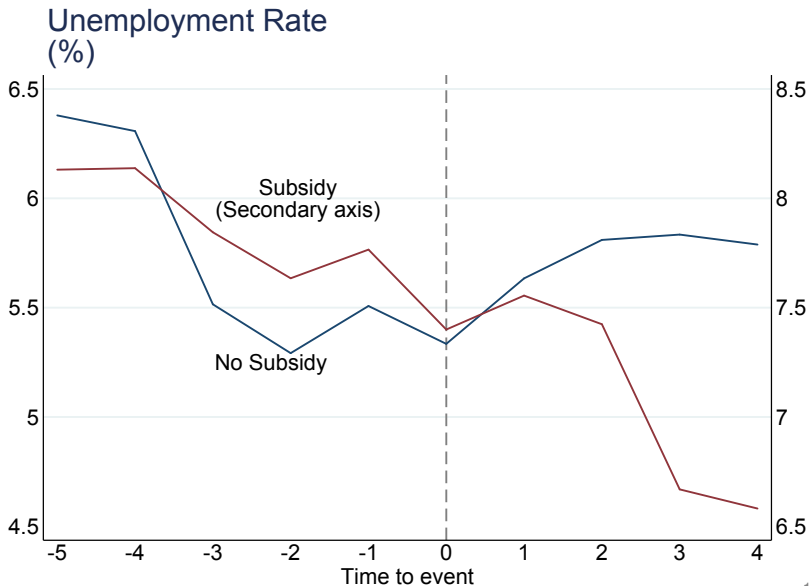
Employment Growth
Wave 1 - 1996



DD: Log Employment



DD: Unemployment Rate



DD: Estimation

$$Y_{ct} = \beta_0 + \gamma_c + \gamma_t + \sum_{k=0}^K \theta_k \text{tier1}_{t-k} + \beta X_{ct} + \varepsilon_{ct} \quad (1)$$

- ▶ Allow for lagged effects: Subsidy may take time to gain traction
- ▶ Also allows comparisons of counties with similar treatment history
- ▶ Controls: Lag $K + 1$ of dependent variables, population, labor force, distress rank, income per capita
- ▶ Allow for heterogeneous trends
- ▶ Few counties per regression: Clustered wild percentage-t bootstrap (Cameron et. al 2015)

DD Results: Employment

Dependent Variable: Log Employment

	(1)	(2)	(3)	(4)	(5)
Tier1	-0.00398** (0.0186)	0.00699 (0.0136)	-0.00174 (0.0129)	-0.00652 (0.00870)	0.00181 (0.00778)
Lag Tier 1		-0.0225 (0.0131)	-0.0282** (0.0143)	-0.0206** (0.00904)	-0.0175* (0.00913)
Lag 2 Tier 1		-0.00488 (0.00750)	-0.00892 (0.00802)	-0.0143 (0.00898)	-0.00959 (0.00774)
Lag 3 Tier 1		0.0208 (0.0164)	0.00440 (0.0175)	-0.00152 (0.0139)	-0.0000123 (0.0132)
R^2	0.991	0.994	1.000	1.000	1.000
N	714	588	588	588	546
Counties	42	42	42	42	42
County FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Group trends			Yes		
County trends				Yes	Yes
Controls					Yes

Clustered standard errors in parentheses. P-values from clustered wild percentage t bootstrap.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

DD Results: Unemployment

	Dependent Variable: Unemployment Rate				
	(1)	(2)	(3)	(4)	(5)
Tier1	-0.0532 (0.283)	0.264*** (0.187)	0.413** (0.194)	0.0724 (0.164)	0.0596 (0.148)
Lag Tier 1		-0.0793 (0.200)	0.0171 (0.188)	-0.121 (0.168)	-0.0310 (0.188)
Lag 2 Tier 1		-0.383 (0.216)	-0.314 (0.192)	-0.293*** (0.117)	-0.233* (0.119)
Lag 3 Tier 1		-0.956* (0.314)	-0.677*** (0.246)	-0.518*** (0.189)	-0.438** (0.174)
R^2	0.652	0.669	0.970	0.982	0.984
N	714	588	588	588	546
Counties	42	42	42	42	42
County FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Group trends			Yes		
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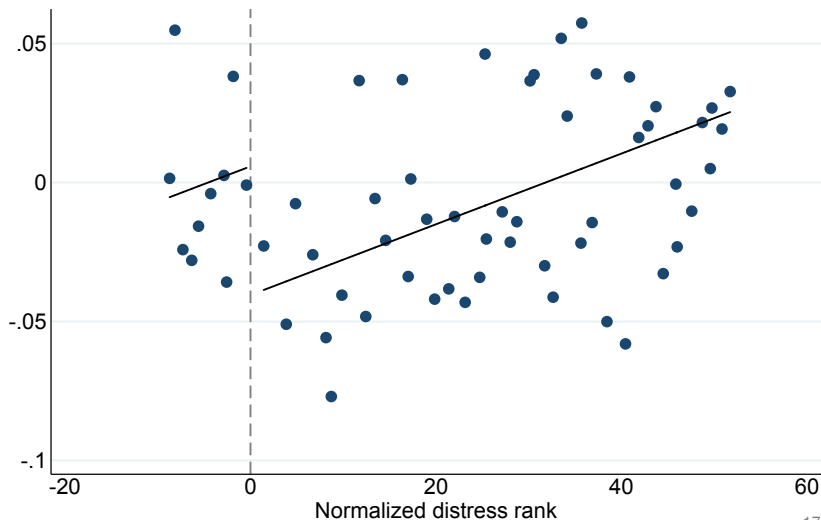
RD: Estimation

$$Y_{c,t+k} - Y_{c,t} = \beta_0 + \beta_t + f(\text{rank}_{c,t}) + \theta_k \text{tier1}_{c,t} + \beta X_{c,t} + \varepsilon_{c,t} \quad (2)$$

- ▶ Only on compliers, exclude defiers from overrides (Wong. et. al 2013)
- ▶ Constant treatment effects, treatment only depends on years since program starts
- ▶ Keep $f()$ linear, limited sample size for nonparametrics
- ▶ Dynamics: Current estimates don't disentangle indirect effects from changes in likelihood of receiving credits in the future (Cellini et. al. 2010)

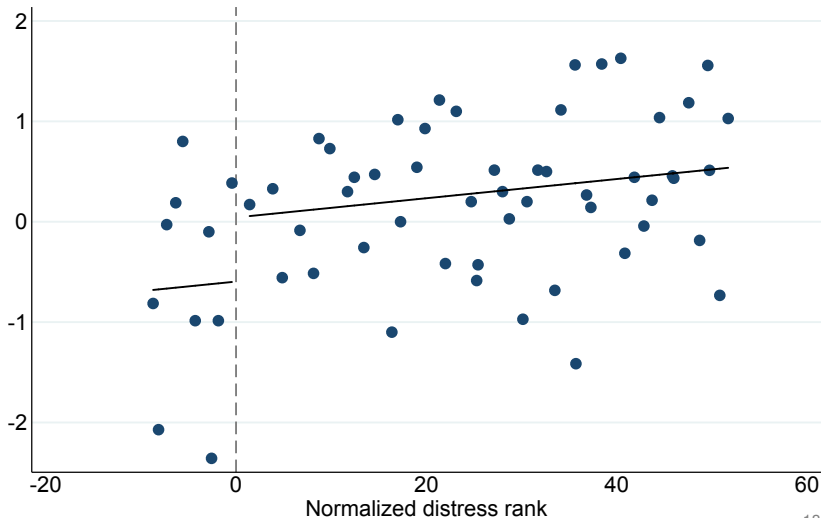
RD: Graphical results. Log Employment

3 Year Difference in Log Employment
Wave 1 - Tier 1 vs 2



RD: Graphical results. Unemployment

3 Year Difference in Unemployment Rate Wave 1 - Tier 1 vs 2



RD estimates - Employment

Dependent Variable: Log Employment			
	(1) 1 Year	(2) 2 Years	(3) 3 Years
Tier 1	-0.00407 (0.00749)	0.0199 (0.0127)	0.0309* (0.0181)
Distress Rank	-0.00000460 (0.000228)	0.000684* (0.000352)	0.00108** (0.000532)
<i>R</i> ²	0.110	0.205	0.237
<i>N</i>	406	367	329
<i>Counties</i>	70	66	66
<i>Controls</i>	Yes	Yes	Yes

Clustered standard errors in parentheses

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RD estimates - Unemployment

Dependent Variable: Unemployment Rate			
	(1)	(2)	(3)
	1 Year	2 Years	3 Years
Tier 1	-0.277*	-0.565**	-0.628*
	(0.165)	(0.245)	(0.355)
Distress Rank	-0.00103	-0.00257	0.00249
	(0.00439)	(0.00670)	(0.00966)
<i>R</i> ²	0.487	0.587	0.629
<i>N</i>	406	367	329
<i>Counties</i>	70	66	66
<i>Controls</i>	Yes	Yes	Yes

Clustered standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Summary of results

- ▶ Sizable effects of hiring credits
- ▶ For a credit of 10.000
 - ▶ 3 % higher employment
 - ▶ 0.7 p.p lower unemployment rate
- ▶ Suggests hiring credits more effective in distressed areas
- ▶ Evidence of bias in difference in difference estimates

Conclusions and way forward

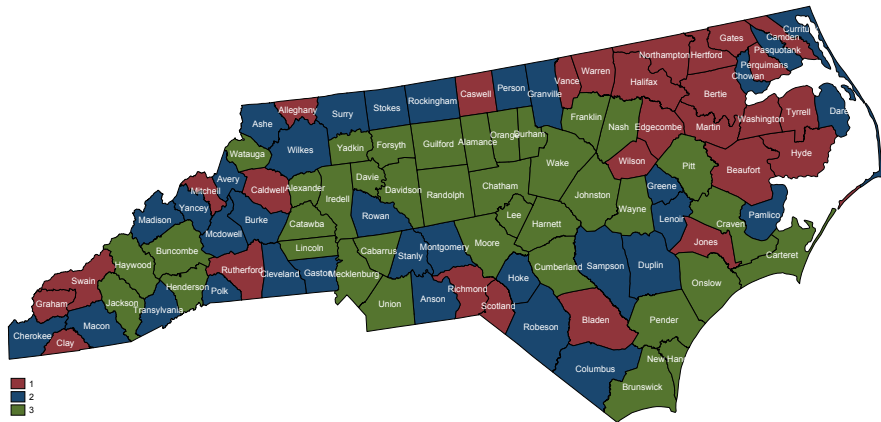
- ▶ Sizable effect of hiring credits at county level.
- ▶ Working on
 - ▶ Dynamic RD estimates
 - ▶ More flexible RD estimates with limited sample size
 - ▶ Spatial equilibrium effects

Thank you!

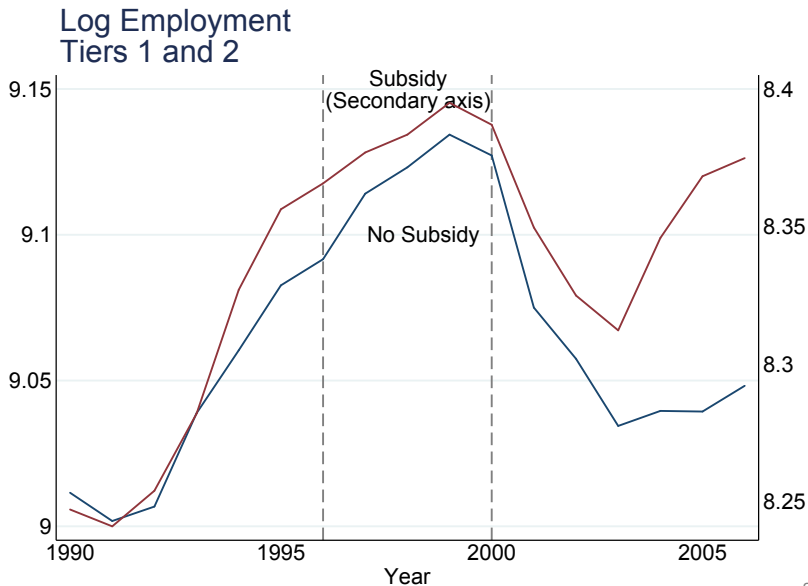
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Counties by tier, 2006



DD: Log Employment



DD: Unemployment Rate

