The Efficacy of Hiring Credits in Distressed Areas

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Research Summary

- **What we do**
  - Estimate the effect of place-based 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
    - Across distress rank cutoffs that determine tiers
- **What we find**
  - For a $9,000 per hire credit:
    - Decreases in unemployment rates of around 0.5 percentage points
    - Increases in employment levels of around 3%

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 areas
- Mean reversion may bias estimates (Ashenfelter's Dip)
- Mixed evidence in previous studies: Freedman (2013) Neumark and Grijalva (2015), Chirinko and Wilson (2016), Cahuc et al. (2018)

North Carolina's Hiring Tax Credits

- Rank 100 counties according to economic distress
  - Ranking components: Unemployment rate, income per capita, population growth
- Assign different credit amounts based on ranking. Firms must keep payroll numbers up
- Focus on 1996 wave of the program, first two tiers

Credit size by distress rank (Dollars per year)

	Distress									
Years	10	20	30	40	50	60	70	80	90	100
1988-1995	2,800									
1996-2006	12,500	3,000-4,000				500-1,000				
2007-2013	12,500				5,000				750	

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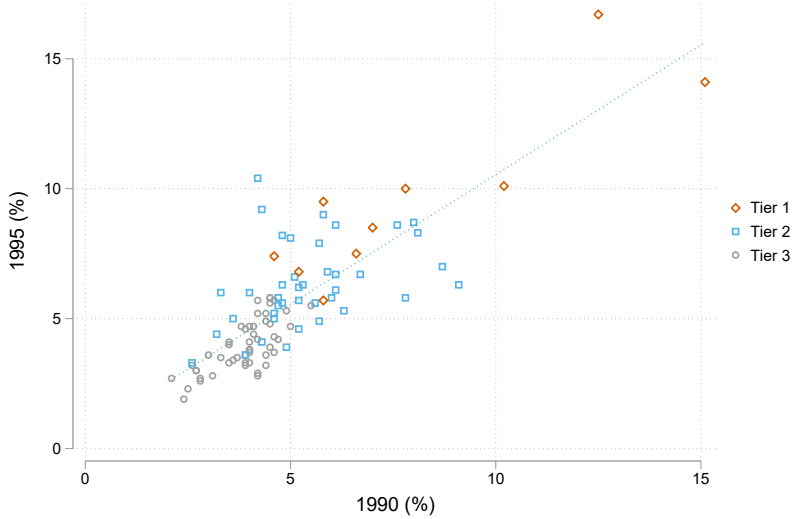
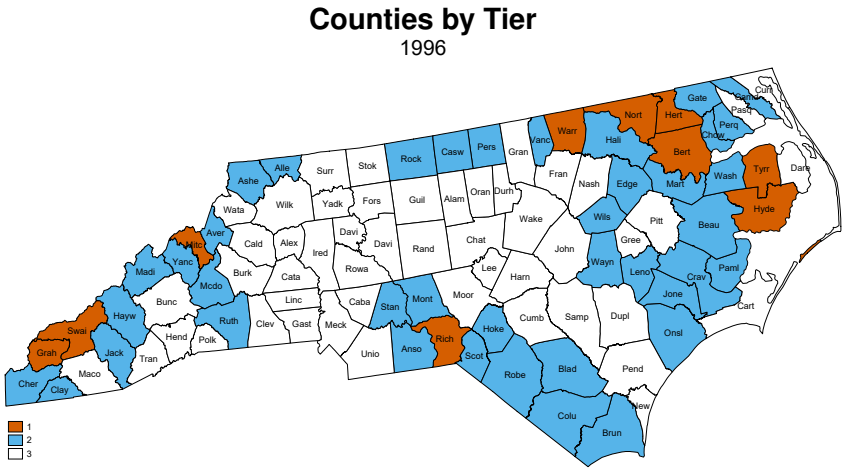
Unemployment Rate Distribution and Persistence across NC Counties



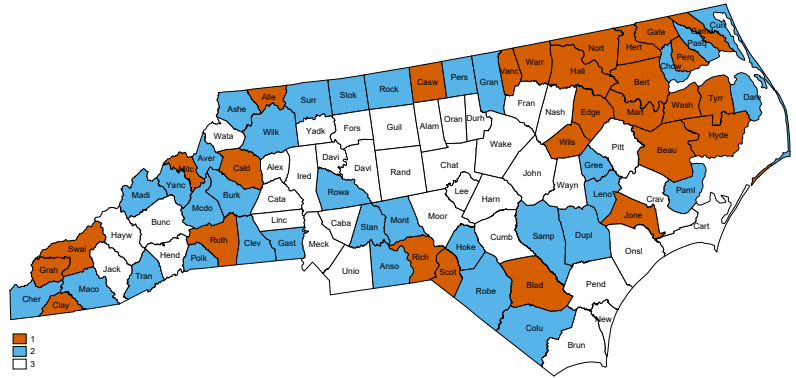
William S. Lee Act 1996-2006

- $12,500 dollars for 10 most distressed counties
- Industry targeting: Manufacturing, wholesale trade, warehousing, data processing

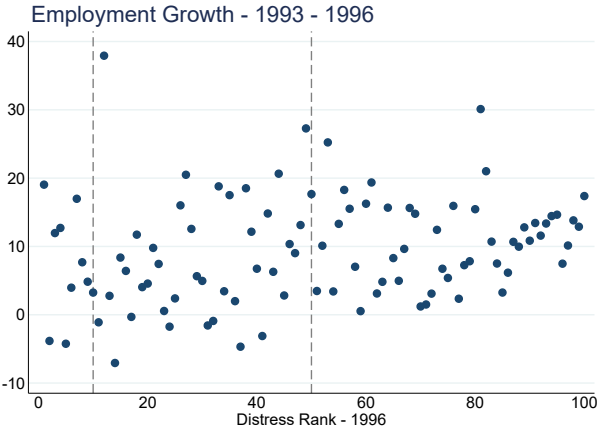


William S. Lee Act 1996-2006

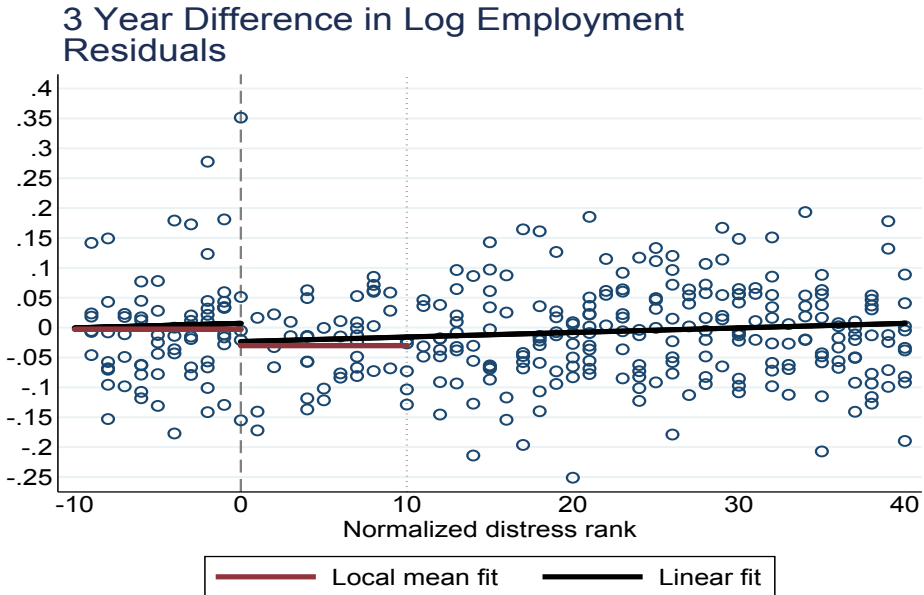
- Overrides for distress ranking based assignment
  - Low population or high poverty
  - Keep the program for at least two years
- 28 counties receive largest subsidy by 2006



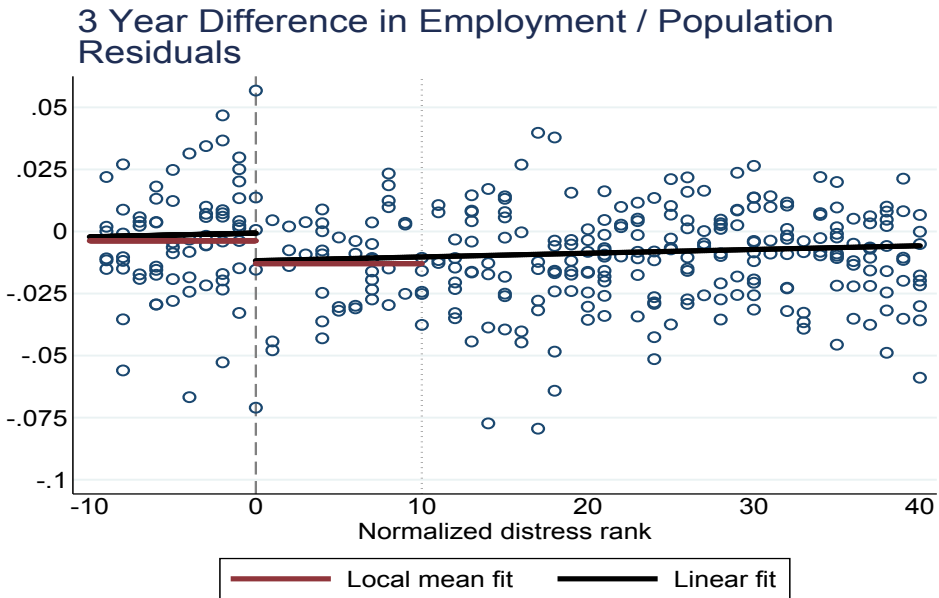
Outcome Measures Pre-program by Ranking



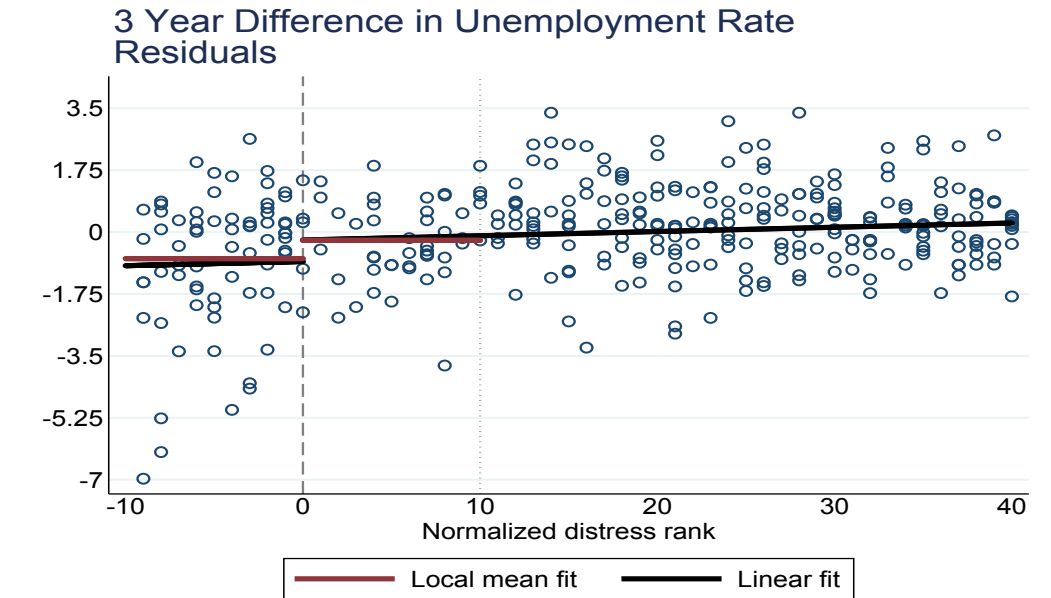
RD: Graphical Results - Log Employment



RD: Graphical Results - Employment/Population



RD: Graphical results - Unemployment



RD Estimation

$$Y_{ctk} = \gamma_c + \gamma_t + \gamma_k + \theta_k tier1_{c,t-k} + \nu_k f(rank_{c,t-k}) + \beta_k X_{c,t-k} + \varepsilon_{ctk}$$

- County c at time t measured k years after treatment designation
- Assume constant treatment effects: Effect size only depends on years since program starts
- Measure outcomes stretching from two years before to three years after each treatment designation
- Pool spans of observations: Cluster standard errors by county

RD Estimation - Further Assumptions

$$Y_{ctk} = \gamma_c + \gamma_t + \gamma_k + \theta_k tier1_{c,t-k} + \nu_k f(rank_{c,t-k}) + \beta_k X_{c,t-k} + \varepsilon_{ctk}$$

- Control function estimates: Keep $f()$ linear due to limited sample size
- Local estimates: Small neighbourhood around threshold (Cattaneo et al. 2015)
- Multiple thresholds: Focus on main treatment threshold of distress rank and exclude “defiers” from overrides due to low population, etc. (Wong et al. 2013)
- Dynamics: Disentangle indirect effects from changes in likelihood of receiving credits in the future (Cellini et al. 2010)
  - Intent-to-treat estimates and treatment-on-the-treated estimates

RD: Intent-to-treat Estimates

Dependent variable	1 yr later	2 yrs later	3 yrs later
Log employment	0.006	0.016	0.036**
	(0.013)	(0.015)	(0.017)
Employment/Population	0.002	0.005	0.012**
	(0.004)	(0.005)	(0.005)
Unemployment rate	0.188	-0.319	-0.507**
	(0.319)	(0.261)	(0.228)

N = 2,779

Standard errors clustered by county in parentheses

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

RD: Treatment-on-the-treated Estimates

Dependent variable	1 yr later	2 yrs later	3 yrs later
Log employment - IV	-0.065*	0.038	0.072**
	(0.038)	(0.031)	(0.031)
Employment/Population - IV	-0.016	0.010	0.023**
	(0.011)	(0.008)	(0.009)
Unemployment rate - IV	-0.130	-1.030**	-1.177*
	(0.622)	(0.496)	(0.610)

N = 770

Standard errors clustered by county in parentheses

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

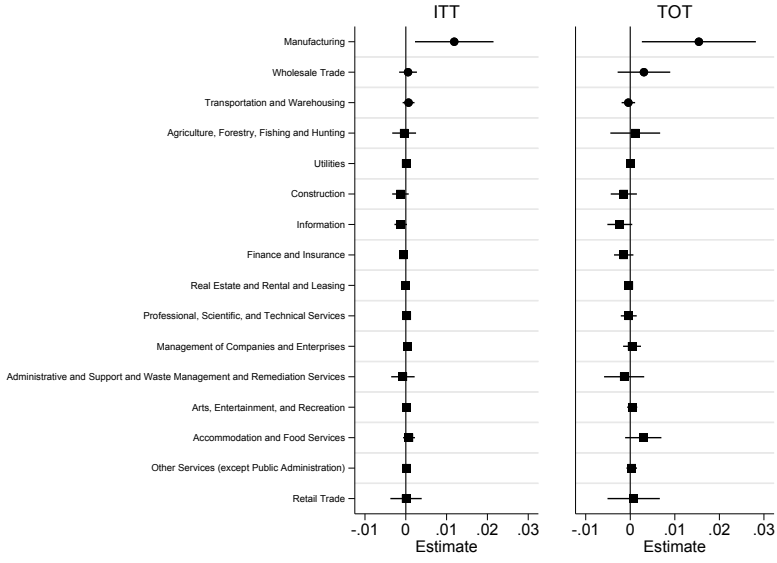
Local Estimates: 3 Years Later

Time Range	Window	Dependent Variable					
		Log Employment		Employment Population		Unemployment Rate	
1996-2006	6 ranks	0.053**	[0.018]	0.014**	[0.013]	-0.050	[0.884]
1996-2006	10 ranks	0.028*	[0.089]	0.010**	[0.022]	-0.508	[0.128]
1996-2006	20 ranks	0.025**	[0.042]	0.010***	[0.002]	-0.908***	[0.000]

P-values from randomization inference with 1000 replications in brackets.

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

Results across Industries: Employment/Population



Summary of Results

- For a credit difference of $9,000 per hire:
  - Around 3% higher employment
  - Around 0.5 p.p. lower unemployment rate

- Suggests hiring credits more effective in distressed areas

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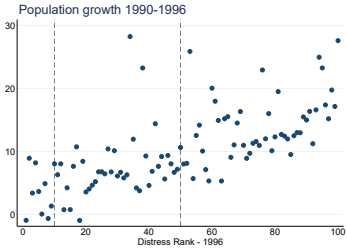
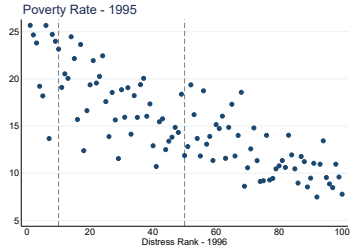
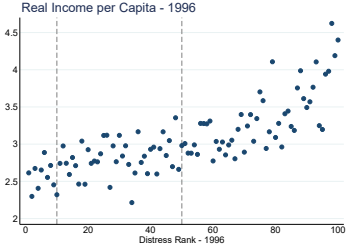
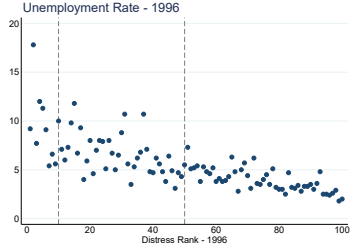
Distress Indicators by Ranking



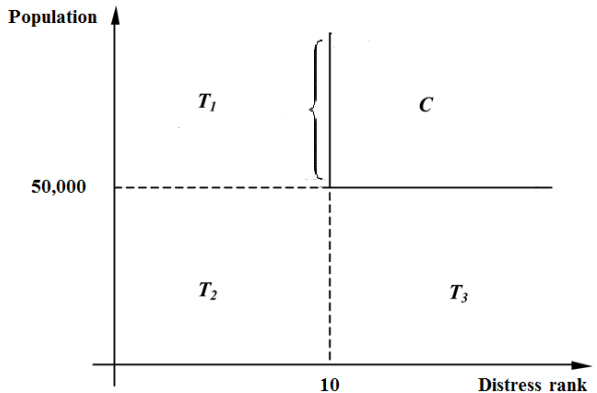






RD with multiple thresholds

Wong, Steiner, and Cook (2013) univariate approach:



- Focus on main treatment threshold of distress rank: exclude “defiers” from overrides due to low population, etc.
- Yields sharp RD: T_1 vs C. Alternatively, use fuzzy RD including the defiers

RD estimates: Other outcomes

	ITT - 3 years later	TOT - 3 years later
Log Employment	0.066	0.081
Target Industries	(0.043)	(0.073)
Log Employment	0.004	-0.007
Non-Target Industries	(0.025)	(0.034)
Employment/Population	0.014***	0.017**
Target Industries	(0.005)	(0.008)
Employment/Population	0.000	-0.000
Non-Target Industries	(0.004)	(0.007)
Log Hires	0.058	0.179**
Annual Total	(0.039)	(0.087)
Log Separations	0.037	0.134*
Annual Total	(0.038)	(0.070)

Clustered standard errors in parentheses

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