Firm Responses to State Hiring Subsidies: Regression Discontinuity Evidence from a Tax Credit Formula

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Introduction

Motivation

- S&L govs spend over \$45 billion each year to attract and retain businesses (Bartik 2019)
  - Occurs despite only limited evidence that policies are effective (Neumark and Simpson 2015)

- 3 key local design challenges:
  1. *Targeting*: hard to target marginal firms that would hire fewer workers *absent* a subsidy
  2. *Enforcement*: difficult to enforce sustained "net new" job growth beyond baseline
  3. *Tax Instrument*: unclear if negotiated contracts (e.g. HQ2), tax rates / base, most effective

- Even if subsidies $\uparrow$ local hiring out of unemployment, job quality, multipliers; trades off with displacement effects across jurisdictions
  - Policies could merely shift economic activity from one location to another, at high cost of tax competition (Chirinko and Wilson 2008)

This Paper: California Competes Tax Credit (CCTC)

- We examine firm responses to a “best practice” state hiring subsidy, CCTC: a $1.5 billion business location incentive program that includes:
  - *Audits:* annually audited job creation benchmarks over baseline (5 yrs)
  - *Clawbacks:* enforceable revenue recapture if benchmarks not met (includes 3 retention yrs)
  - *Price Discrimination:* initial applicant scoring is followed by discretionary tools to prioritize firms that would likely exit CA or limit hiring absent the credit

- CCTC’s formula-based applicant scoring lends itself to an RD design to study its effects

- Merge CCTC admin data with Census LBD establishment microdata to study effects on
  - establishment location, employment, and payroll growth w/in CA (including high-pov areas)
  - **substitution patterns** on national scale (test for reallocation *away from* high tax locations)

CCTC Background

The California Competes Tax Credit (CCTC)

- The CCTC is a state corporate income tax credit available to businesses that want to locate, stay, or grow, in California (2013 - present)
  - Credits are non-tradable / non-refundable, and can be applied in full to C-Corp liabilities, but only 1/3 toward S-Corp liabilities (concern with personal income pass-through)
  - CA has high flat corp income tax (8.84%)
- Businesses apply to Governor's Office of Business and Economic Development (GO-Biz), detailing annual CA hiring and investment commitments over a 5 year period
  - Payroll and investment are **net** over baseline, and investment includes qualified list of depreciable structures and equipment (not inventory)
- If awardee does not meet annual milestone, cannot claim credits that year. However, firms can claim credits in future years if they meet subsequent milestones

Application Review Process: Phase I (Rule-Based)

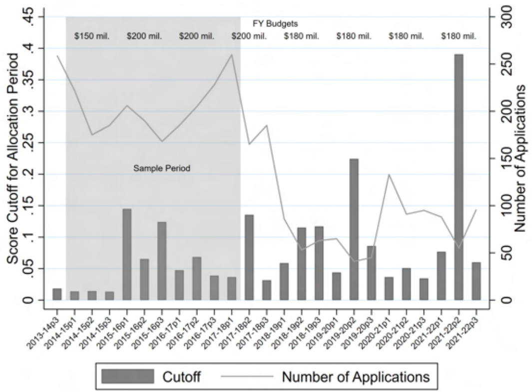
- CCTC applications reviewed in a **two-phase** process
  - The **first phase** relies on a quantitative *rule-based* (transparent) evaluation of the projected costs and benefits of the tax credits requested by an applicant
  - For each applicant i, a cost-benefit ratio "score" is calculated:

$$Score_i = \frac{Credits\ Requested_i}{Payroll_i + Investment_i} \tag{1}$$

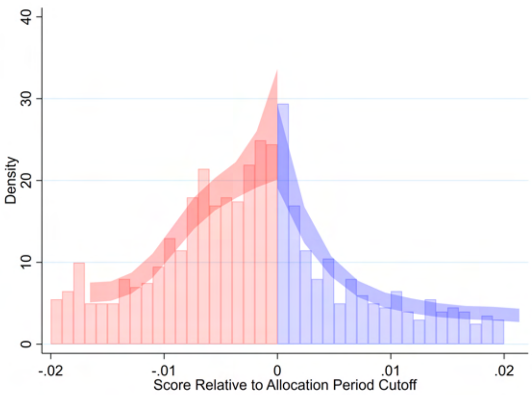
- Within each allocation period, applicants are ranked by score (low to high), and a cutoff is imposed at 200% of the total budgeted amount for that period
  - Applicants with scores above the cutoff are rejected, while those with scores below the cutoff proceed to the second (*discretionary*) phase of review
  - No way to manipulate because the cutoff depends on other applicants' credit requests

Score Cutoffs

(a) Score Cutoffs by Allocation Period



(b) Manipulation Test



Note: Shaded regions are confidence intervals from bias-corrected continuous density manipulation test (Cattaneo et al., 2018).

Balance Tests | Robustness to Consultant Use and Allocation Round | Learning among Repeats

Application Review Process: Phase II (Discretionary)

- The **second phase** involves a more comprehensive evaluation of each application that makes the first-phase cutoff
  - Likelihood leave state or hire fewer employees absent incentive
  - Higher wage jobs in struggling areas
  - Strategic importance to innovation (could include size)
- Small fraction of businesses automatically advanced to second phase irrespective of score
  - Those whose CEOs/CFOs legally attest they will locate in another state or terminate employees in CA without the credit
  - Beginning in 2017, those that propose locating/expanding in disadvantaged parts of California also automatically advance (bound to set of geographies)

High-Poverty / High-Unemployment Areas

Tesla's 2015 Negotiated Tax Agreement with CCTC: 5-Year Milestones

Exhibit A Milestones

Taxpayer: Tesla Motors, Inc.

	2014 Tax Year (Base)	2015 Tax Year	2016 Tax Year	2017 Tax Year	2018 Tax Year	2019 Tax Year	Total
Total California Full-Time Employees[1]	6,463	8,058	9,126	10,011	10,548	10,889	
Net Increase of Full-Time Employees Compared to the Base Year		1,595	2,663	3,548	4,085	4,426	
Minimum Annual Salary of California Full-Time Employees Hired		$35,000	$35,000	$35,000	$35,000	$35,000	
Cumulative Average Annual Salary of California Full-Time Employees Hired		$55,000	$55,000	$55,000	$55,000	$55,000	
Investments		$693,280,000	$357,700,000	$430,750,000	$419,160,000	$488,590,000	$2,389,480,000
Tax Credit Allocation		$0	$500,000	$1,500,000	$2,500,000	$10,500,000	$15,000,000

[1] Determined on an annual full-time equivalent basis

- After 2 phases, agreements are negotiated to finalize milestones, and voted on in public CCTC committee
- If approved, 5 years to meet milestones and claim credits
- Applicants not bound to geographies, unless committed to investing in disadvantaged area
- CA Franchise Tax Board ensures compliance, can recapture credits
- e.g. Tesla proposed construction of new casting foundry in Stockton, CA, in exchange for $15 million in credits

Data

Data Sources and Sample

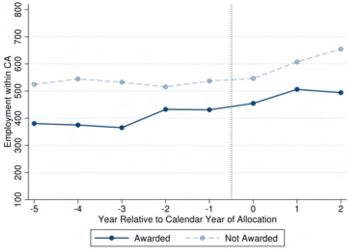
- CCTC applicants and awardees from GO-Biz
  - Complete application information, including ingredients to construct applicant scores
  - Also annual employment, payroll, and investment milestones
  - Approximately 3,800 total CCTC applicants in data; though 1,300 small firm ($<$ \$2m revenue) "set-asides" insufficient mass across cutoffs, so restrict attention to large
- Restricted-use establishment & firm data from Longitudinal Business Database (LBD)
  - Merge based on EIN, business name, business addresses, proposed location, and more
  - Allows us to measure firm's employment stock, annual payroll flow, and establishment locations across different geographies (sub-state, state, national)
- Focus on $\sim$1,700 large firms across 10 allocation periods, tracked from 2009 to 2019
  - FY2014-15 through FY2017-18, allowing 3 years of LBD "post" observations through 2019
  - LBD match rate for this sample is over 98%

Details on Data Timing

Top 20 Awards in Sample Period

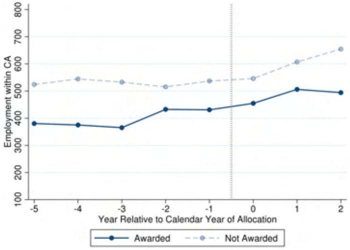
Applicant Name	Tax Credits Awarded	Proposed Investment Increase	Proposed Employment Increase	Industry	Year
Tesla Motors, Inc.	15,000,000	2,389,000,000	4,426	Automobile Manufacturing	2015
Faraday & Future, Inc.	12,725,000	311,100,000	1,990	Automobile Manufacturing	2016
Nordstrom, Inc.	11,000,000	171,000,000	367	Online Order Fulfillment Warehouse and Retail Distribution	2016
NextEV USA, Inc.	10,000,000	138,300,000	917	Automobile Manufacturing	2016
Northrop Grumman Systems Corp.	10,000,000	520,300,000	1,359	Aircraft Manufacturing	2015
Samsung Semiconductor, Inc.	9,000,000	194,700,000	327	Semiconductor R&D	2015
General Motors Company	8,000,000	14,000,000	1,163	Automobile Manufacturing	2017
Ulta, Inc.	8,000,000	48,300,500	542	Online Order Fulfillment Warehouse and Retail Distribution	2016
Boehringer Ingelheim Fremont, Inc.	7,500,000	122,000,000	258	R&D in Biotechnology	2017
Proterra, Inc.	7,500,000	85,967,500	432	Electric Automobile Manufacturing	2017
SF Motors, Inc.	7,500,000	10,884,910	357	Autonomous Vehicle R&D	2017
Kite Pharma, Inc.	7,000,000	114,800,000	621	Biopharmaceutical R&D and Manufacturing	2016
Centene Corporation	7,000,000	100,100,000	1,532	Healthcare Administration	2016
LuLaRoe LLC	6,400,000	120,000,000	1,362	Clothing Manufacturing and Wholesaler	2017
OWB Packers LLC	6,000,000	38,500,000	605	Beef Processing	2016
Samsung Semiconductor, Inc.	6,000,000	357,800,000	400	Semiconductor R&D	2014
Scopely, Inc.	5,500,000	53,468,069	309	Mobile Application Development	2016
Renovate America, Inc.	5,475,000	24,400,000	542	Energy Efficiency Consulting Services	2017
Snapchat, Inc.	5,000,000	32,000,000	1,194	Mobile Application Development	2016
Planet Labs, Inc.	4,340,000	60,000,000	216	Earth Imaging Satellite Design, Manufacturing and Operation	2015

(a) Awardees vs. Non-Awardees

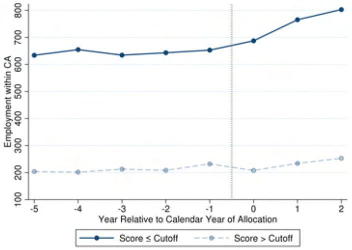


Descriptive Trends for Applicant Firm Employment in CA

(a) Awardees vs. Non-Awardees



(b) Below vs. Above Score Cutoff



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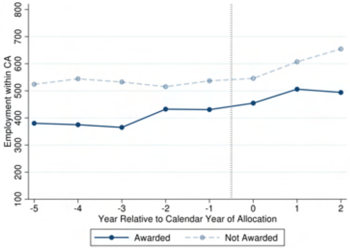

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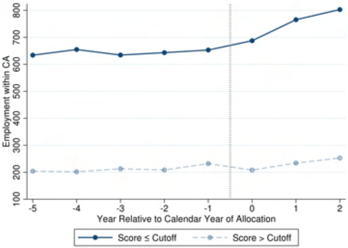
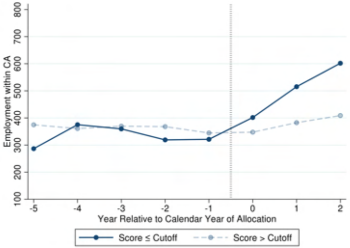


(c) Below vs. Above, RD Sample



- Demonstrates limitations to difference-in-differences, simple comparisons
- Instead, regression discontinuity design that takes advantage of variation in panel (c)

Trends in Proposed Zip Code of Expansion

Methods

Two Regression Discontinuity Approaches

1. "Pooled" RD approach pools allocation rounds and runs RD for each event year $\tau = t - t_{a(i)}$, from $\tau = -5$ to $+2$ (event years < 0 as "placebo")

$$y_{i\tau} = \alpha_\tau + \beta_\tau b_i + f_g(s_i) + \mu_a + \mathbf{X}_i \Omega_\tau + \varepsilon_{i\tau} \tag{2}$$

- applicant i, allocation period a, $s_i = score_i - cutoff_{a(i)}$, μ_a allocation period fixed effects
- $b_i = \mathbb{1}(s_i \leq 0)$ indicates i's score below relevant cutoff, f_g flexible polynomials of degree g

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   - $b_i = \mathbb{1}(s_i \leq 0)$ indicates i's score below relevant cutoff, f_g flexible polynomials of degree g

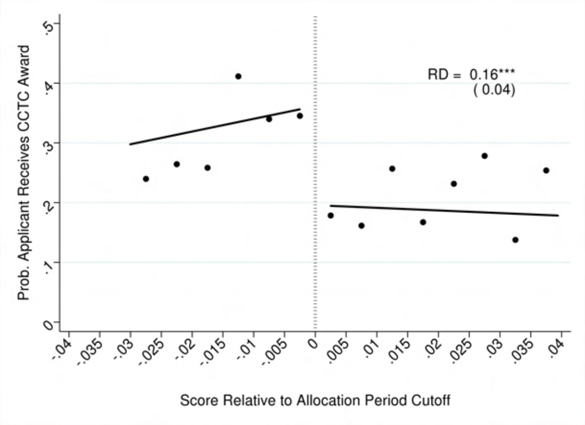
2. "Dynamic" RD approach (following Cellini et al. (2010)) based on panel of EIN-years
   - handles repeat applicants (34%) by dynamically controlling for prior application history. Includes applicants further from cutoff, but controls for distance to the cutoff and firm FEs

$$y_{it} = \sum_{k=-5}^{2} \left(\psi_k p_{i,t-k} + \pi_k b_{i,t-k} p_{i,t-k} + p_{i,t-k} f_g(s_{i,t-k})\right) + \theta_i + \eta_t + e_{it} \quad (3)$$

   - now i indexes EIN, and new term p denotes whether firm applied in year t

RD Details

First Stage Results (pooled RD)



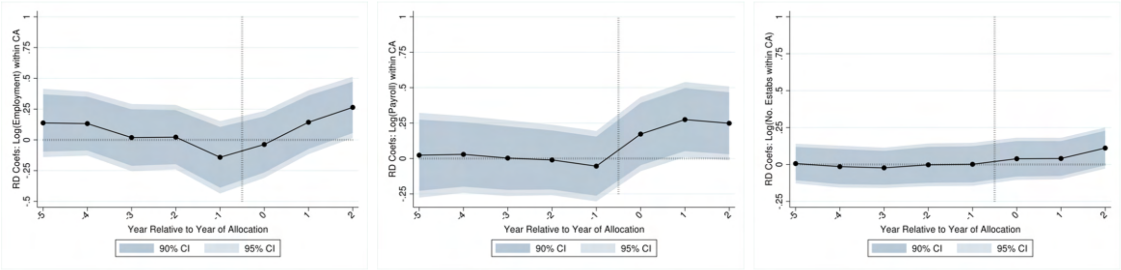
Distribution of Award Amounts

- Coming in below score cutoff results in 16pp ↑ award rate.
  - This is over a baseline of 20%—automatic advancers (AAs) who ultimately receive credit
- Context: mean (median) winning applicant in our sample is allocated ∼\$1 million (∼\$400,000) in tax credits
  - 20% receive more than \$1 million, with largest (Tesla) receiving \$15m
  - Lockhead Martin more recently: \$39.5m

Main Results

Employment, Payroll, and No. Establishments in CA (pooled RD)

(a) Employment (b) Payroll (c) Establishments

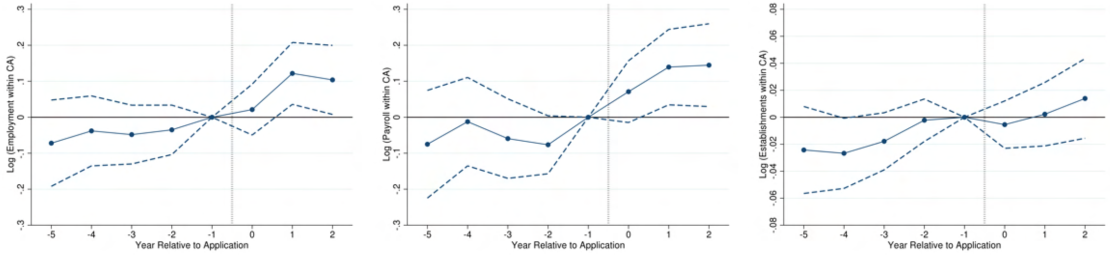


- 30% ↑ in CA employment over base of 455 employees (net of recaptures)
- 28% ↑ in CA payroll over base of $28.3 million
- Insignificant estabs estimate suggests most of growth is expansion at existing firms
- Patterns are similar for high-poverty areas High-Poverty Results

RD Figures

Employment, Payroll, and No. Establishments in CA (dynamic RD)

(a) Employment (b) Payroll (c) Establishments

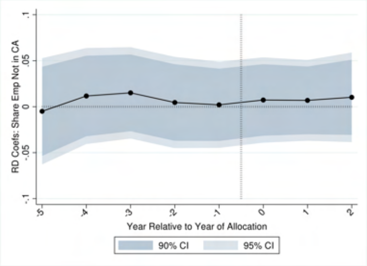


- Same pattern, but attenuation of results by around 50%
- *Limitation*. While uses more of the data, non-trivial weight further away from the cutoff. The truth probably lies within the bounds of these two estimates

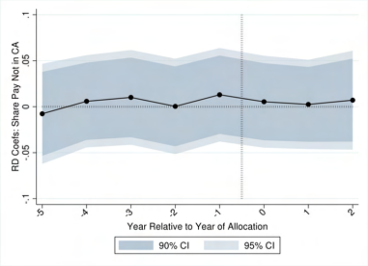
Dynamic RD Plots Ignoring Repeats

Reallocation Findings: Share of Activity Outside CA

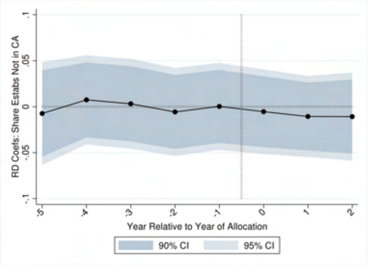
(a) Employment



(b) Payroll



(c) Establishments



- Surprisingly, no strong evidence of reallocation *within* firm, *across* tax jurisdictions. (Prior is 3pp ↓ in employment share, which we can rule out with 95% confidence)
- Also no evidence of revenue costs to reallocation Revenue Effects
- Consistent with Giroud & Mueller (2015); Howell (2017), firms with pre-existing expansion plans growth choose the highest NPV location (lower cost of capital, labor)

RD Figures for Outside CA

Discussion

Discussion: What about this program is working?

- We find
  - CCTC induces business growth in CA, including in relatively disadvantaged areas
  - Little evidence that expansions are at expense of operations in other states
  - High social return (not shown): workers receive \$5.66 in benefits for every \$1 invested, slightly higher than some estimates for investment credits (Gaggl & Wright, 2017) MVPF
  - Companion work also finds large local job multiplier of 3 (Freedman et al. (2023))
- Suggests targeted & audited subsidies can be effective in promoting local business expansions without significant cross-state displacement effects, if structured like CCTC
- What we think is working
  - CCTC discretion is effective at targeting and capturing **large** and **new** planned capital investments for which the tax advantage is material, and labor requirements are sizable
  - The tax advantage is salient for *new* projects, but not large enough to offset potential costs of reallocating *existing* activity from other states to CA

Thank you!

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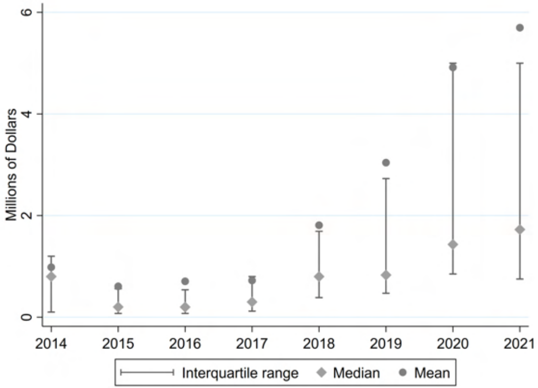
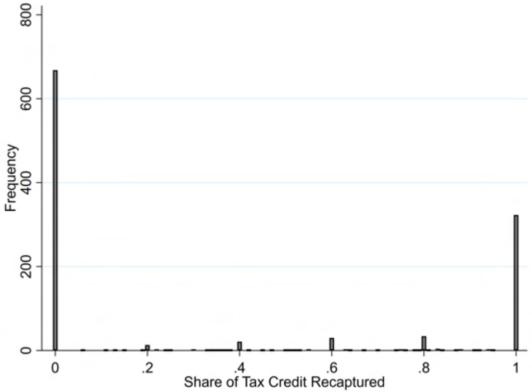
Apendices

CCTC Award Amounts

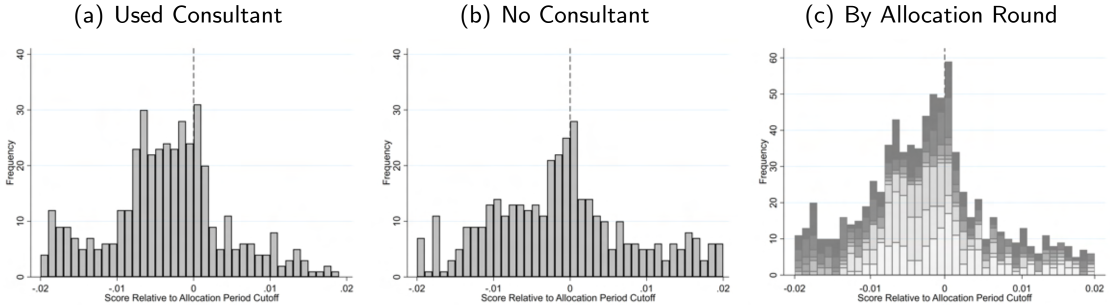




Back to Tax Credit Agreements

Back to First Stage

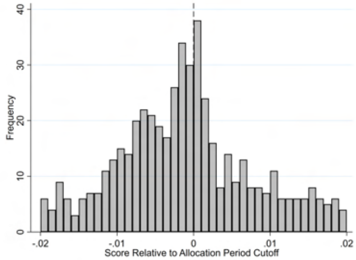
Histograms by Consultant Status and Allocation Round



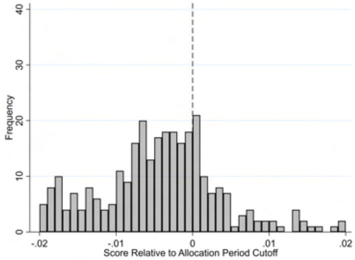
Back to Score Cutoffs

Learning Among Repeat Applicants

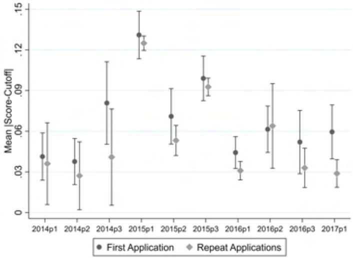
(a) First Time Applicants



(b) Repeat Applicants



(c) Learning



Back to Score Cutoffs

Sample

- Timeframe:
  - LBD data end in 2019; limit attention to CCTC allocations through calendar year 2017 so as to have at least 3 years of post-allocation data for each applicant.
  - Keep five years of pre-allocation data for each applicant.
- Other restrictions:
  - Exclude small firms (revenues $<$ \$2 million annually) due to earlier set aside (where cutoff was rarely binding).

Back to Data

Policy Timing

Table: CCTC Application Rounds in the Sample

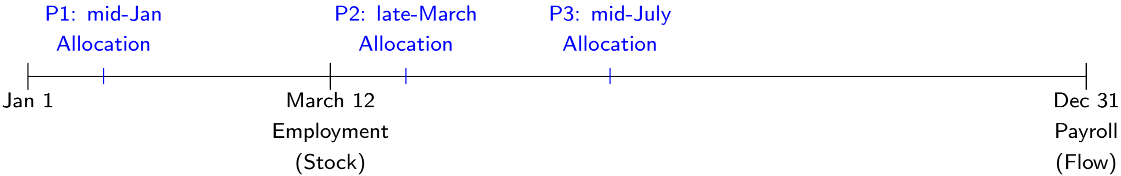
	FY 2014-15 ($150 mil.)	FY 2015-16 ($200 mil.)	FY 2016-17 ($200 mil.)	FY 2017-18 ($200 mil.)
P1	Sep 29, '14 - Oct 27, '14	Jul 20, '15 - Aug 17, '15	Jul 25, '16 - Aug 22, '16	Jul 24, '17 - Aug 21, '17
P2	Jan 5, '15 - Feb 2 '15	Jan 4, '16 - Jan 25, '16	Jan 2, '17 - Jan 23, '17	
P3	Mar 9, '15 - Apr 6 '15	Mar 7, 2016 - Mar 28, '16	Mar 6, '17 - Mar 27, '17	

- Define τ as the event year, measured relative to the calendar year of the allocation period for an applicant.
- Our main estimates focus on the cross-section of $\tau = +2$, long enough for the LBD to capture any effects.
- Also show full dynamic path of estimates over event time.

Back to Data

Data Timing

Figure: LBD Data Timing

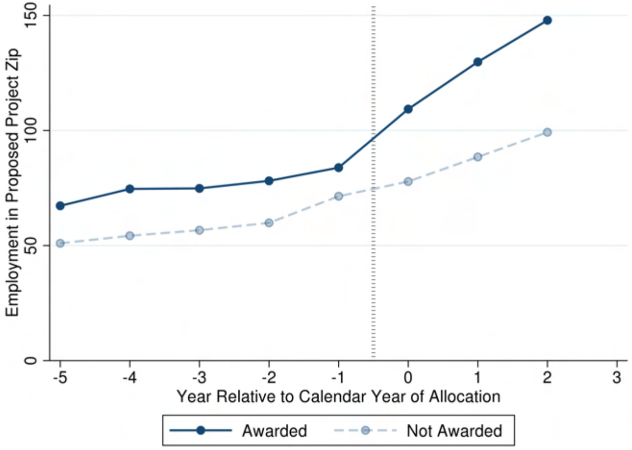


Event Year (τ) = Calendar Year of LBD Data – Calendar Year of CCTC Allocation

Period	Employment Exposure	Payroll Exposure
P1	None in $\tau = 0$, full in $\tau = +1$	Partial in $\tau = 0$, full by $\tau = +1$
P2	Partial in $\tau = 0$, full in $\tau = +1$	Near-Full in $\tau = 0$, full by $\tau = +1$
P3	None in $\tau = 0$, full in $\tau = +1$	Near-Full in $\tau = 0$, full by $\tau = +1$

Back to Data

Trends for Applicant Firm in Proposed Zip Code of Expansion



Back to Descriptive Trends

Pooled RD Details

- Follow Calonico et al. (2014), who use an IMSE-optimal bandwidth that trades off "smoothing bias" and variance
  - Narrower window produces less smoothing bias, but greater variance (and vice versa)
  - Estimator allows for an asymmetric bandwidth on each side of the cutoff (optimizes choosing both the left- and right-side bandwidth boundaries)
- Use a linear polynomial based on appearance of the data and following Gelman and Imbens (2019)
- Use a triangular kernel, with linear weights from 0 to 1 from the bandwidth boundary to the cutoff
  - Choice of kernel weight is rarely consequential when using IMSE-optimal bandwidths (Calonico et al. 2014).

Back to Methods

First Stage Table (pooled RD)

Dep. Variable	(1)	(2)	(3)	(4)	(5)
Pr(Applicant Receives Award)	0.19***	0.20***	0.17***	0.18***	0.16***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Applicant No. of Awards	0.14***	0.14***	0.11**	0.12***	0.10**
	(0.05)	(0.04)	(0.05)	(0.04)	(0.04)
Industry FEs		X		X	X
Allocation Period FEs			X	X	X
Baseline Controls					X
Control Mean (Pr(Award))	0.16	0.15	0.19	0.19	0.19
Control Mean (No. of Awards)	0.33	0.31	0.35	0.33	0.34
N	1,600	1,600	1,600	1,600	1,600

- Baseline controls: incorporation type, $\mathbb{1}$(public firm), single- vs. multi-unit firm

Back to Score Cutoffs

Continuity Tests (pooled RD)

Panel A. Pre-Determined Application Covariates

Back to Score Cutoffs

Dep. Variable	Discontinuity ($\hat{\beta}$)	Standard Error	Control Mean ($\hat{\alpha}$)	N
Tax Credits Requested	-157,600	164,900	795,500	1,600
AA Relocate	-0.01	0.02	0.03	1,600
AA Terminate or Leave	0.03	0.04	0.33	1,600
AA Occur Other State	-0.02	0.03	0.07	1,600
Log Baseline Employees	-0.07	0.13	4.16	1,600
Log Projected Compensation Next 5 Years	0.30**	0.12	15.48	1,600
Log Projected Investment Next 5 Years	0.38**	0.16	14.51	1,600
Industry FEs	X	X	X	
Allocation Period FEs	X	X	X	
Baseline Controls	X	X	X	

Continuity Tests (pooled RD)

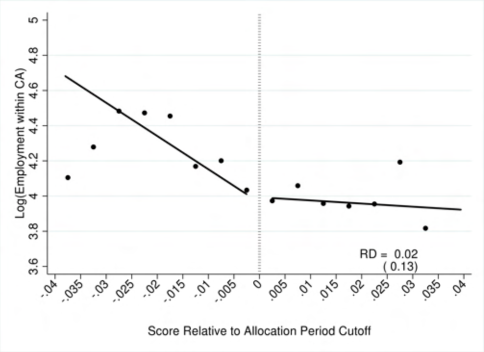
Panel B. Outcome Measures in Placebo Period ($\tau = -2$)

Back to Score Cutoffs

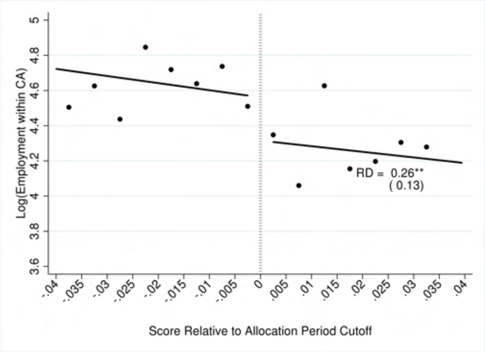
Dep. Variable	Discontinuity ($\hat{\beta}$)	Standard Error	Control Mean ($\hat{\alpha}$)	N
Activity in California				
Employment within CA	64	195	455	1,600
Payroll within CA (Ths. $)	4,999	12,870	28,350	1,600
Establishments within CA	-0.18	1.67	4.40	1,600
Log Employment within CA	0.02	0.13	3.99	1,600
Log Payroll within CA	-0.01	0.13	8.03	1,600
Log Establishments within CA	0.00	0.07	0.34	1,600
Activity in High-Poverty/High-Unemployment California ZIPs				
Employment in High Pov-Unemp CA ZIPs	75	82	109	1,600
Payroll in High Pov-Unemp CA ZIPs (Ths. $)	3,777	4,057	5,698	1,600
Establishments in High Pov-Unemp CA ZIPs	-0.04	0.67	1.58	1,600
Log Emp. in High Pov-Unemp CA ZIPs	0.17	0.24	4.2	1,600
Log Payroll in High Pov-Unemp CA ZIPs	0.04	0.25	8.23	1,600
Log Establishments in High Pov-Unemp CA ZIPs	0.12	0.14	0.49	1,600
Activity outside California				
Employment outside CA	611	1,216	1,973	1,600
Payroll outside CA (Ths. $)	36,480	72,710	115,000	1,600
Establishments outside CA	-3.98	12.26	20.32	1,600
Log Employment outside CA	-0.71	0.48	6.36	1,600
Log Payroll outside CA	-0.73	0.51	10.50	1,600
Log Establishments outside CA	-0.69**	0.34	2.20	1,600
Share Employment outside CA	0.00	0.03	0.15	1,600
Share Payroll outside CA	0.00	0.03	0.15	1,600
Share Establishments outside CA	-0.01	0.02	0.16	1,600
Industry FEs	X	X	X	
Allocation Period FEs	X	X	X	
Baseline Controls	X	X	X	

Applicant Employment in CA (pooled RD)

(a) Two Years Before Credit



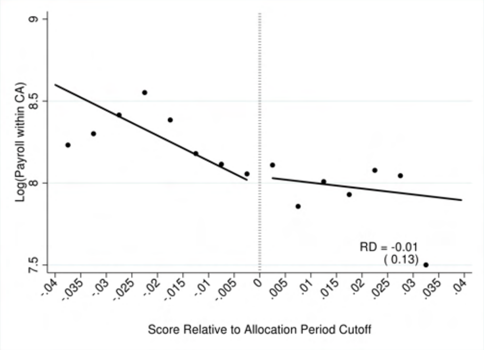
(b) Two Years After Credit



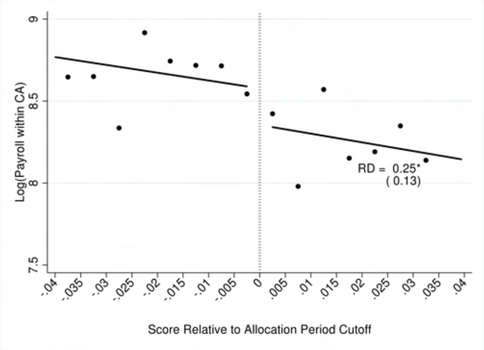
Back to Main Results RD Tables

Applicant Payroll in CA (pooled RD)

(a) Two Years Before Credit



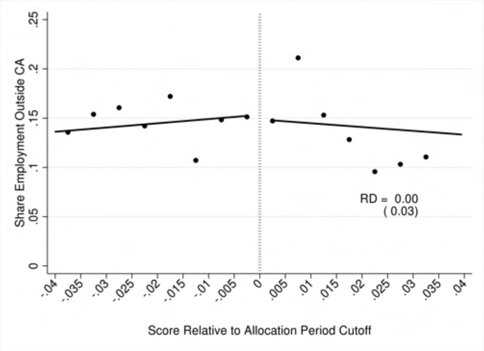
(b) Two Years After Credit



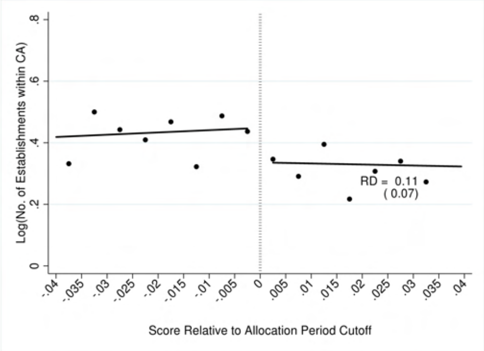
Back to Main Results RD Tables

Applicant No. Establishments in CA (pooled RD)

(a) Two Years Before Credit



(b) Two Years After Credit



Back to Main Results RD Tables

Pooled RD results for activity in California, $\tau = -2$ (placebo estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dep. Variable	Levels					Logs				
Employment within CA	623**	368*	494*	246	64	0.49***	0.27*	0.37**	0.19	0.02
	(264)	(207)	(263)	(206)	(195)	(0.17)	(0.15)	(0.17)	(0.15)	(0.13)
Employment in High Pov-Unemp ZIP	223**	161*	180*	118	75	0.63**	0.42	0.39	0.25	0.17
	(99)	(87)	(98)	(87)	(82)	(0.31)	(0.26)	(0.30)	(0.26)	(0.24)
Employment outside CA	4,457**	2,584**	3,532**	1,717	611	0.31	0.13	0.08	-0.17	-0.71
	(1,791)	(1,269)	(1,790)	(1,266)	(1,216)	(0.59)	(0.49)	(0.57)	(0.48)	(0.48)
Payroll within CA	40,900**	25,060*	32,340**	17,730	4,999	0.54***	0.27*	0.43**	0.20	-0.01
	(16,170)	(13,840)	(16,080)	(13,770)	(36,480)	(0.17)	(0.15)	(0.17)	(0.15)	(0.13)
Payroll in High Pov-Unemp ZIP	11,230**	8,059*	8,868*	5,824	3,777	0.56*	0.30	0.34	0.16	0.04
	(4,864)	(4,310)	(4,842)	(4,288)	(4,057)	(0.31)	(0.27)	(0.31)	(0.27)	(0.25)
Payroll outside CA	251,500**	147,300*	200,300**	101,600	36,480	0.3	0.1	0.09	-0.18	-0.73
	(99360)	(77130)	(99160)	(76920)	(72710)	(0.61)	(0.53)	(0.59)	(0.51)	(0.51)
No. Establishments within CA	3.73*	1.55	3.01	1.06	-0.18	0.22**	0.06	0.20*	0.06	0.00
	(1.98)	(1.75)	(1.97)	(1.74)	(1.67)	(0.11)	(0.08)	(0.11)	(0.08)	(0.07)
No. Establishments in High Pov-Unemp ZIP	1.38*	0.59	0.98	0.28	-0.04	0.42**	0.22	0.33	0.15	0.12
	(0.83)	(0.72)	(0.82)	(0.71)	(0.21)	(0.67)	(0.15)	(0.21)	(0.15)	(0.14)
No. Establishments outside CA	26.98*	11.5	20.59	6.47	-30.98	-0.19	-0.32	-0.34	-0.43	-0.69**
	(15.49)	(12.81)	(15.48)	(12.79)	(12.26)	(0.43)	(0.35)	(0.42)	(0.34)	(0.34)
Industry FEs		X		X	X		X		X	X
Allocation Period FEs			X	X	X			X	X	X
Baseline Controls					X					X
Control Mean (Emp within CA)	260	403	264	382	455	3.89	3.99	3.80	3.90	3.99
Control Mean (Emp High Pov-Unemp)	77	100	67	93	109	4.23	4.27	4.14	4.21	4.20
Control Mean (Emp outside CA)	677	1,704	771	1,550	1,973	6.23	6.27	6.08	6.16	6.36
Control Mean (Payroll within CA)	16,110	24,350	16,530	23,410	28,350	7.89	7.99	7.81	7.92	8.03
Control Mean (Payroll High Pov-Unemp)	3,849	5,047	3,631	4,903	5,698	8.21	8.28	8.13	8.23	8.23
Control Mean (Payroll outside CA)	45,330	100,900	48,760	91,090	115,000	10.38	10.41	10.23	10.29	10.50
Control Mean (Estabs within CA)	3.4	4.13	3.17	3.91	4.4	0.3	0.34	0.26	0.31	0.34
Control Mean (Estabs High Pov-Unemp)	1.38	1.56	1.19	1.45	1.58	0.52	0.5	0.48	0.5	0.49
Control Mean (Estabs outside CA)	11.81	17.99	10.93	16.28	20.32	2.30	2.25	2.15	2.14	2.20
N	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600

Main RD Figures

Pooled RD results for activity in California, $\tau = +2$ (main estimates)

Dep. Variable	(1)	(2)	(3)	(4)	(5)
Log(Employment within CA)	0.76***	0.60***	0.64***	0.51**	0.26**
	(0.16)	(0.14)	(0.16)	(0.14)	(0.13)
Log(Payroll within CA)	0.85***	0.64***	0.73***	0.56**	0.25*
	(0.17)	(0.15)	(0.17)	(0.15)	(0.13)
Log(No. Establishments within CA)	0.40***	0.27**	0.33***	0.22***	0.11
	(0.10)	(0.08)	(0.10)	(0.08)	(0.07)
Industry FEs		X		X	X
Allocation Period FEs			X	X	X
Baseline Controls					X
Control Mean (Emp. within CA)	4.18	4.22	4.12	4.17	4.31
Control Mean (Payroll within CA)	8.14	8.20	8.11	8.18	8.34
Control Mean (Estabs within CA)	0.28	0.31	0.24	0.28	0.34
N	1,700	1,700	1,700	1,700	1,700

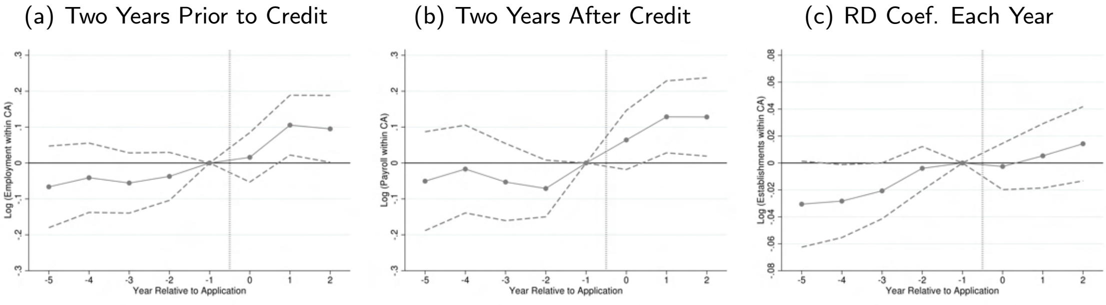
Main RD Figures

Pooled RD results for activity in California, $\tau = +2$ (complete estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dep. Variable			Levels					Logs		
Employment within CA	942***	832***	733**	598**	220	0.76***	0.6***	0.64***	0.51***	0.26**
	(305)	(259)	(304)	(257)	(241)	(0.16)	(0.14)	(0.16)	(0.14)	(0.13)
Employment in High Pov-Unemp ZIP	323***	302***	247**	222**	135	0.94***	0.75***	0.71**	0.59**	0.41*
	(103)	(92)	(102)	(91)	(85)	(0.28)	(0.25)	(0.28)	(0.24)	(0.22)
Employment outside CA	5,047***	4,301***	4,022**	3,078**	1,103	0.97	0.65	0.58	0.21	-0.33
	(1,696)	(1,331)	(1,695)	(1,327)	(1,264)	(0.63)	(0.54)	(0.59)	(0.52)	(0.51)
Payroll within CA	52,520***	42,150***	41,890**	31,310**	8,926	0.85***	0.64***	0.73***	0.56***	0.25*
	(16,910)	(14,800)	(16,820)	(14,700)	(13720)	(0.17)	(0.15)	(0.17)	(0.15)	(0.13)
Payroll in High Pov-Unemp ZIP	13,370**	11,310**	10,150*	7,891	3,592	0.92***	0.66**	0.75**	0.58**	0.34
	(5,449)	(4,965)	(5,426)	(4,938)	(4,663)	(0.3)	(0.26)	(0.29)	(0.26)	(0.24)
Payroll outside CA	304,100***	242,000***	242,300**	169,800*	45,470	0.91	0.61	0.65	0.3	-0.33
	(109,400)	(90,170)	(109,300)	(89,830)	(84,700)	(0.65)	(0.57)	(0.62)	(0.55)	(0.54)
No. Establishments within CA	7.61***	6.47***	6***	4.84***	2.49	0.4***	0.27***	0.33***	0.22***	0.11
	(2.14)	(1.87)	(2.14)	(1.86)	(1.76)	(0.1)	(0.08)	(0.1)	(0.08)	(0.07)
No. Establishments in High Pov-Unemp ZIP	3.11***	2.75***	2.24**	1.9**	1.06	0.82***	0.68***	0.63***	0.52***	0.38***
	(0.96)	(0.84)	(0.95)	(0.83)	(0.76)	(0.21)	(0.16)	(0.21)	(0.16)	(0.14)
No. Establishments outside CA	53.66***	48.21***	41.13**	34.57**	15.51	0.49	0.27	0.22	-0.06	-0.21
	(16.59)	(13.84)	(16.55)	(13.76)	(13.03)	(0.48)	(0.42)	(0.46)	(0.4)	(0.39)
Industry FEs		X		X	X		X		X	X
Allocation Period FEs			X	X	X			X	X	X
Baseline Controls					X					X
Control Mean (Emp. within CA)	321	447	303	377	555	4.18	4.22	4.12	4.17	4.31
Control Mean (Emp. High Pov-Unemp)	73	89	58	67	102	4.36	4.35	4.27	4.28	4.31
Control Mean (Emp. outside CA)	597	1348	644	1062	1949	6.11	6.16	5.88	6.09	6.33
Control Mean (Payroll within CA)	19,300	26,300	20,140	24,890	35,340	8.14	8.2	8.11	8.18	8.34
Control Mean (Payroll High Pov-Unemp)	4,788	5,872	4,223	5,150	6,814	8.26	8.28	8.2	8.24	8.29
Control Mean (Payroll outside CA)	43,430	95,650	49,450	81,510	136,700	10.29	10.34	10.1	10.26	10.57
Control Mean (Estabs within CA)	2.66	3.34	2.39	2.8	3.91	0.28	0.31	0.24	0.28	0.34
Control Mean (Estabs outside CA)	6.11	11.94	6.6	9.26	17.8	2.17	2.26	1.96	2.12	2.19
Control Mean (Estabs in High Pov-Unemp)	1.02	1.2	0.87	0.98	1.32	0.4	0.36	0.36	0.35	0.39
N	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700

Main RD Figures

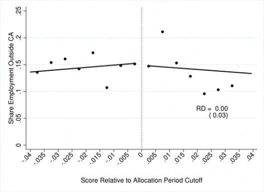
CCTC applicant outcomes in CA (dynamic RD), ignoring repeats



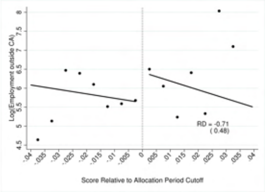
Dynamic RD Plots

RD results for activity outside CA

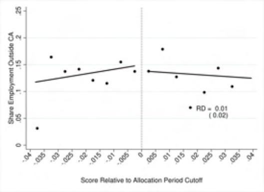
(a) Share Emp., $\tau = -2$



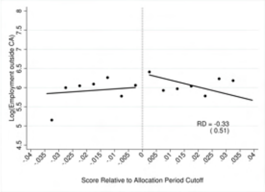
(b) Log Emp., $\tau = -2$



(c) Share Emp., $\tau = +2$



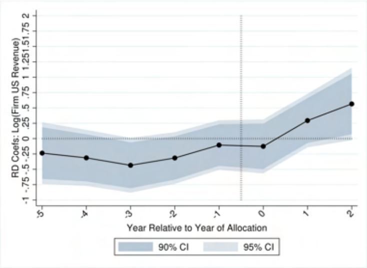
(d) Log Emp., $\tau = +2$



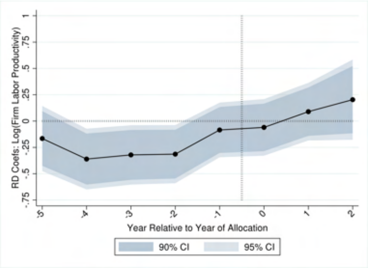
Pooled Plots for outside CA

Additional Reallocation Findings: Effects on Firm-Wide Revenue

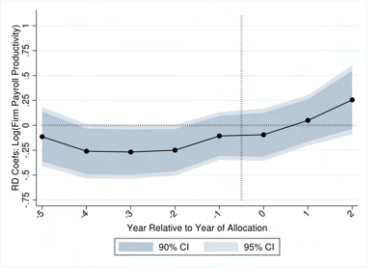
(a) Revenue



(b) Revenue per Worker



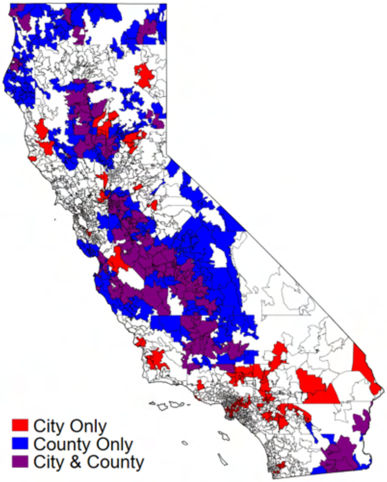
(c) Revenue per Payroll Dollar



- No evidence of costs associated with reallocating to California. If anything, positive spillovers, which could be driven by investments and product space expansions

Back to Reallocation Results

High Poverty / High Unemployment areas



GOVERNOR'S OFFICE OF BUSINESS AND ECONOMIC DEVELOPMENT
STATE OF CALIFORNIA • OFFICE OF GOVERNOR GAVIN NEWSOM

California Competes Tax Credit
List of High Poverty and High Unemployment Areas

Applicable to applications submitted January 3, 2022 – January 24, 2022

"High poverty area" means a city and/or county within California with a poverty rate of at least 150% of the California statewide poverty rate per the most recently updated data available from the U.S. Census Bureau's American Community Survey 5-Year Estimates thirty days prior to the first day of the applicable application period.

"High unemployment area" means a city and/or county within California with an unemployment rate of at least 150% of the California statewide unemployment rate per the most recently updated data available from the California Employment Development Department on http://www.labormarketinfo.edd.ca.gov/ or the equivalent website thirty days prior to the first day of the applicable application period.

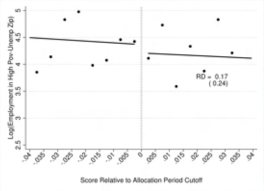
Cities with High Poverty

Adelanto	Desert Hot Springs	Oroville
Arcata	Dinuba	Parlier
Arvin	Dorris	Point Arena
Atwater	El Centro	Porterville
Avenal	Exeter	Red Bluff
Banning	Farmersville	Reedley
Barstow	Firebaugh	San Bernardino
Bell	Fort Jones	San Joaquin
Bell Gardens	Fresno	San Luis Obispo
Biggs	Grass Valley	Sanger
Blythe	Hawaiian Gardens	Santa Cruz
Brawley	Hemet	Selma
Calexico	Holtville	Shafter
California City	Huntington Park	Sonora
Calipatria	Huron	Taft
Cathedral City	Lancaster	Tehama
Chico	Lindsay	Tulare
Chowchilla	Madera	Tulelake
Clearlake	Maricopa	Twentynine Palms
Coachella	Maywood	Victorville
Coalinga	McFarland	Wasco
Compton	Mendota	Weed
Corcoran	Merced	Westmorland
Corning	Mount Shasta	Willits
Crescent City	Needles	Woodlake
Cudahy	Nevada City	Yreka
Davis	Orange Cove	
Delano	Orland	

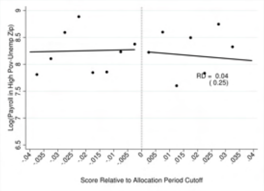
Back to Phase II

RD results for activity in high-poverty/unemployment areas

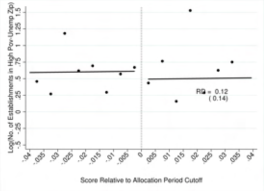
(a) Employment, $\tau = -2$



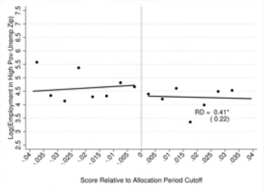
(b) Payroll, $\tau = -2$



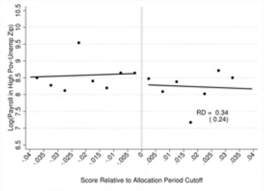
(c) Estabs., $\tau = -2$



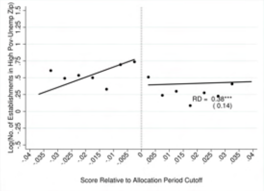
(d) Employment, $\tau = +2$



(e) Payroll, $\tau = +2$



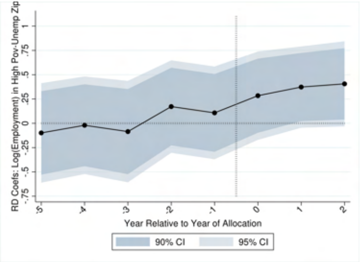
(f) Estabs., $\tau = +2$



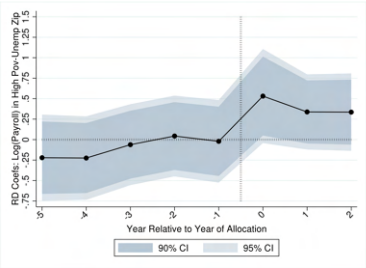
Pooled Plots for High-Poverty Areas

Results for High-Poverty/Unemployment Areas (pooled RD)

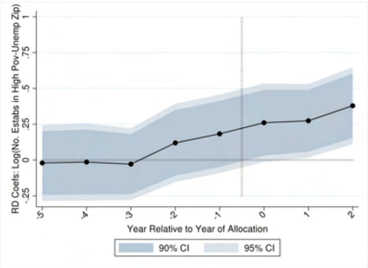
(a) Employment



(b) Payroll



(c) Establishments

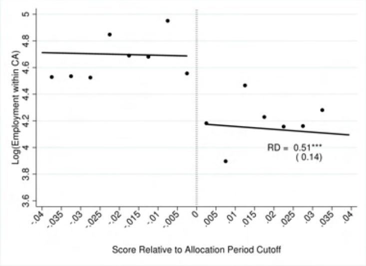


- Larger employment/payroll estimates (0.41 log points, 0.34 log points), with some evidence of extensive margin effects (but noisier)
- Implied increase is ∼60% of mean CA employment increase, but only 30% of population in these areas $\implies$ disproportionate employment-per-pop in disadvantaged areas

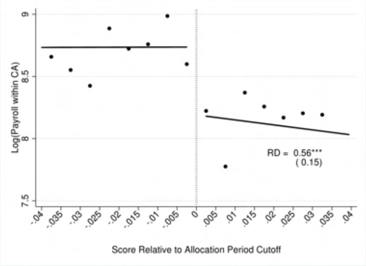
Back to Main Results RD Tables RD Figures for High-Poverty Areas

Alt. Specification: Relaxing Baseline Controls (pooled RD)

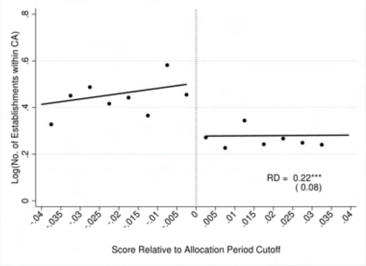
(a) Emp Two Years After Credit



(b) Pay Two Years After Credit



(c) Estabs Two Years After Credit



- *Limitation.* Pooled estimator with small sample is sensitive to controls; choice of controls is guided by achieving full balance in pre-treatment outcomes and baseline covariates
- Combined with need to account for repeat applicants, warrants dynamic RD specification

Back to Main Results

Implied Local Tax Elasticities

- Use RD coefficients together with tax credit data (and implied reduction in applicants' state tax liabilities) to calculate several local tax elasticity estimates.
  - First estimate change in annual tax liability (i.e., the effective net-of-tax rate). We apply CA's 8.84% corporate tax rate to estimated baseline profits (apportioned using revenue, labor, and investment costs from LBD and tax credit application information) $\Rightarrow$ Mean applicant receives a **4% decrease in tax liability** when below the cutoff
  - Given this reduction, we can calculate elasticities of labor, payroll, and establishments with respect to changes in tax liabilities
  - Can also calculate "firm mobility" elasticities using estimates for changes in firm activity in other states

Implied Local Tax Elasticities

Table: Tax Elasticity Calculation Results

Log(Employment within CA)	0.26**	Local Labor Demand	$\frac{exp(0.26)-1}{exp(-0.04)-1} = -7.57$
	(0.13)		
Log(Payroll within CA)	0.25*	Local Payroll Demand	$\frac{exp(0.25)-1}{exp(-0.04)-1} = -7.24$
	(0.13)		
Log(Establishments within CA)	0.11	Local Firm Expansion	$\frac{exp(0.11)-1}{exp(-0.04)-1} = -2.96$
	(0.07)		
Sh(Employment outside CA)	0.01	Firm Mobility (Semi-Elas.)	$\frac{0.01}{exp(-0.04)-1} = -0.26$
	(0.02)		

Marginal Value of Public Funds

Use framework developed by Hendren (2016) to calculate MVPF; i.e., the dollar benefits per dollar cost of the program.

- Numerator reflects estimated increase in payroll/worker that would not have otherwise happened, substracted by measure of reservation wage (use 1 year of UI payments in CA)
- Denominator reflects net fiscal costs/worker of the program, net of estimated state income taxes received from new jobs (assume a 3.06% effective income tax rate)

$$\text{MVPF} = \frac{\text{Worker WTP for CCTC}}{\text{Net Fiscal Costs}} = \frac{\overbrace{\$60,908}^{Est.\uparrow \text{ in payroll / worker}} - \overbrace{\$23,400}^{\text{Reservation wage}}}{\underbrace{\$8,493}_{\text{Cost per job}} - \underbrace{0.0306 \times \$60,908}_{\text{Fiscal externality}}} = 5.66$$

- i.e., workers received \$5.66 in benefits for every \$1 the policy cost the state government; slightly higher than some estimates for investment credits (Gaggl & Wright, 2017)

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