Job Growth from Opportunity Zones

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Research Question

- We study a recent economic policy intended to affect the spatial distribution of employment – Opportunity Zones
- Opportunity Zones created tax breaks for investments in specific Census tracts
- Research question: Did this policy affect job growth?

Summary of Results

Use DiD strategy to show that, over 2017-2019 the program

- 1. Increased employment and establishment growth in targeted tracts by 3.0 4.6 ppts,
- 2. Encouraged entry of new establishments,
- 3. Effects are largest in construction industries,
- 4. Growth occurred in skilled and unskilled industries,
- 5. Positive spillovers to nearby tracts.

Opportunity Zones (OZ) Program

- Established by the Tax Cuts and Jobs Act of 2017
- Tax advantages for investment in OZs
- Eligible Census tracts : low-income communities (LICs) or contiguous to LICs
- States designated ≤ 25% of eligible tracts as OZs
 This is what we use to identify impact of program

Tax Advantages for Investment in OZs

- 1. If reinvest realized capital gains on existing assets, can
 - Defer federal taxes on capital gains until sale
 - Reduce federal taxes on capital gains by 10% (15%) if held for \geq 5 (7) years
- 2. If make a new investment, can
 - ▶ Eliminate federal taxes on capital gains if held for ≥ 10 years

Eligible Census Tracts

Census tract is eligible for OZ program if

1. it is a low-income community (LIC)

Poverty rate > 20%

▶ Family income < 80% median family income

- 2. it is contiguous with a LIC (non-LIC)
 - The contiguous tracts must not have a median income exceeding 125% that of the low-income community with which the tract is contiguous
 - ▶ No more than 5% of designated tracts could be non-LIC

Eligible Tracts in New York City



1,448 eligible tracts, out of which 306 were Designated (292 LIC)

Eligible Tracts in Manhattan



133 eligible tracts, out of which 36 were Designated (all 36 LIC)

Opportunity Zones



Source: Economic Innovation Group, https://eig.org/opportunityzones.

Data

1. The Your-economy Time Series (YTS): establishment-level employment from 1997 to 2019 covering all U.S. public and private establishments.

Each year: sum all employment, establishments in a tract.

- 2. Urban Institute: eligible tracts with their designation status.
- 3. The American Community Survey (ACS): 2013-2017 5-year estimates: Census tract covariates.

Summary Stats: Eligible Tracts in 2017 by Designation

Variable	Mean			
	Eligible, but not OZs	Designated OZs		
Designated	0	1		
Your-economy Tin	ne Series data			
Employment	1912	3156		
2-Yr employment growth	0.044	0.019		
Number of establishments	186	269		
2-Yr establishment growth	0.046	0.038		
American Community	Survey controls			
% White	0.680	0.574		
% Higher ed	0.198	0.160		
% Renters	0.432	0.552		
% Share of native-born with health insurance	0.894	0.879		
% Poverty	0.177	0.246		
% Supplemental income	0.086	0.119		
% Employed	0.303	0.268		
Median earnings	28,087	24,386		
Median household income	46,435	36,538		
Median gross rent	915	826		
Population	4208	4022		
Total housing units	1550	1464		
Average commuting time (min)	36.8	14.7		

Discussion of Pre-Trends 2-Yr Employment Growth in Eligible Tracts Data Winsorized at 1%



Winsorized at 1%: Winsorizing replaces the outliers – lowest 1% and highest 99% values – by the next value inwards. \bigcirc Other

Discussion of Pre-Trends

- Designated and Other tracts are systematically different. How to check on pre-trends?
- Regress 2-year growth (Y), pooling 2013-15 and 2015-17, on
 - Growth from 2011-2013
 - ACS control variables
 - With and without Designated dummy variable
- Generate predicted growth in-sample and 2017-2019
- Graph error = actual less predicted

Actual Less Forecast, Establishment Growth



* Raw Data (no Winsorizing), metropolitan-area tracts only

Actual Less Forecast, Employment Growth



* Raw Data (no Winsorizing), metropolitan-area tracts only

Research Design: Difference-in-Differences

For Census tract i, in two-year period t

$$Y_{i,t} = \alpha_0 + \alpha_1 P_t + \alpha_2 D_i + \alpha_3 D_i P_t + \alpha_X X_i + \epsilon_{i,t},$$

- $Y_{i,t}$ two-year growth in employment, # establishments
- *P*_t post-2017 dummy
- D_i treatment dummy
- X_i vector of Census tract characteristics
- *α*₃ coefficient of interest

Notes:

- **Reminder**: Estimation sample includes only *eligible* tracts. Conditional on X_i , Designation is assumed to be random
- To mitigate influence of outliers, main specifications are: LAV and OLS Winsorized at 1%

All Eligible Tracts: Employment Growth

	(1)	(2)	(3)	(4)	(5)
	OLS	LAV	OLS	LAV	OLS
					Winsorized at 1%
ACS Controls	No	No	Yes	Yes	Yes
D_i	-0.027*	-0.015***	-0.018	-0.009***	-0.012***
	(0.015)	(0.003)	(0.015)	(0.003)	(0.005)
P_t	0.001	-0.072***	-0.003	-0.074***	-0.050***
	(0.009)	(0.002)	(0.009)	(0.002)	(0.003)
$D_i P_t$	0.025	0.021***	0.028	0.021***	0.036***
	(0.022)	(0.004)	(0.021)	(0.004)	(0.006)
$Emp.Growth_{2013-2015}$			0.098***	-0.003	0.009*
			(0.017)	(0.004)	(0.005)
Observations	52,060	52,060	52,053	52,053	52,053
R^2	0.000		0.002		0.010

***, **, and * indicate significance at the 1%, 5%, and 10% levels.

LAV: quantile regression to the median or Least Absolute Value (LAV).

OLS Winsorized at 1%: Winsorizing replaces the outliers – lowest 1% and highest 99% values – by the next value inwards.

All Eligible Tracts: Establishment Growth

	(1)	(2)	(3)	(4)	(5)
	OLS	LAV	OLS	LAV	OLS
					Winsorized at 1%
ACS Controls	No	No	Yes	Yes	Yes
D_i	-0.007	-0.005*	-0.007	-0.006**	-0.008***
	(0.007)	(0.003)	(0.007)	(0.003)	(0.003)
P_t	-0.097***	-0.091***	-0.098***	-0.093***	-0.109***
	(0.004)	(0.002)	(0.004)	(0.002)	(0.002)
$D_i P_t$	0.021**	0.020***	0.022**	0.018***	0.030***
	(0.010)	(0.004)	(0.010)	(0.004)	(0.004)
$Emp.Growth_{2013-2015}$			0.127***	0.016***	0.021***
			(0.008)	(0.003)	(0.003)
Observations	52,060	52,060	52,053	52,053	52,053
R^2	0.011		0.018		0.080

***, **, and * indicate significance at the 1%, 5%, and 10% levels.

We will use quantile regression (LAV) and OLS Winsorized at 1% with full set of ACS controls for remainder of presentation

Metropolitan vs. non-Metropolitan Areas: Employment Growth

	Metro	opolitan Area	Non-Metropolitan Area		
	(1)	(2)	(3)	(4)	
	LAV	OLS	LAV	OLS	
		Winsorized at 1%		Winsorized at 1%	
D_i	-0.014***	-0.019***	0.008	0.015	
	(0.003)	(0.005)	(0.007)	(0.012)	
P_t	-0.091***	-0.077***	-0.016***	0.044***	
	(0.002)	(0.003)	(0.004)	(0.007)	
$D_i P_t$	0.029***	0.046***	-0.012	-0.000	
	(0.005)	(0.007)	(0.010)	(0.015)	
$Emp.Growth_{2013-2015}$	-0.005	-0.005	0.021***	0.048***	
	(0.004)	(0.006)	(0.007)	(0.011)	
Observations	40,944	40,944	11,109	11,109	
R^2		0.020		0.017	

***, **, and * indicate significance at the 1%, 5%, and 10% levels. All regressions include a full set of ACS controls

These are our benchmark estimates for impact of the program

Metropolitan versus non-Metropolitan Areas: Establishment Growth

	Metro	opolitan Area	Non-Metropolitan Area	
	(1)	(2)	(3)	(4)
	LAV	OLS	LAV	OLS
		Winsorized at 1%		Winsorized at 1%
D_i	-0.014***	-0.016***	0.016***	0.024***
	(0.003)	(0.003)	(0.006)	(0.007)
P_t	-0.117***	-0.140***	-0.015***	0.003
	(0.002)	(0.002)	(0.003)	(0.004)
$D_i P_t$	0.032***	0.043***	-0.022***	-0.023**
	(0.004)	(0.005)	(0.007)	(0.009)
$Emp.Growth_{2013-2015}$	0.010***	0.015***	0.045***	0.039***
	(0.004)	(0.004)	(0.005)	(0.007)
Observations	40,944	40,944	11,109	11,109
R^2		0.125		0.011

***, **, and * indicate significance at the 1%, 5%, and 10% levels. All regressions include a full set of ACS controls

Going forward, our sample only includes tracts in metropolitan areas

Robustness: LIC vs non-LIC and Placebo Test

- Low-income (LIC) vs contiguous communities (non-LIC)
 - Estimates for LIC are close to the baseline
 - Estimates for non-LIC are higher, but so are standard errors
- **Placebo test**: Regress pre-designation outcomes on designation dummy, post dummy for 2015-2017, and their interaction:
 - Small, significantly negative (instead of positive) estimate for employment growth
 - Small, positive, either insignificant or marginally significant estimate for establishment growth

Robustness: Political Tract Selection

- Frank, Hoopes and Lester (2020):
 - The tract selection process was somewhat political
 - A tract is politically affiliated if a tract's lower house representative and the governor belong to the same party
- We construct a similar variable, %same party, a share of the tract's lower house representatives that belong to the same party as the governor
- Results:
 - The estimates of the impact of the program are similar controlling for political affiliation
 - Political affiliation either does not affect or reduce the employment and establishment growth

Political Tract Selection: Employment Growth

	(1)	(2)	(3)	(4)
	LAV	OLS	LAV	OLS
		Winsorized at 1%		Winsorized at 1%
D_i	-0.014***	-0.019***	-0.014***	-0.019***
	(0.004)	(0.005)	(0.004)	(0.005)
P_t	-0.093***	-0.077***	-0.093***	-0.077***
	(0.002)	(0.003)	(0.002)	(0.003)
$D_i P_t$	0.031***	0.046***	0.037***	0.058***
	(0.005)	(0.007)	(0.006)	(0.009)
$\% same_party$	0.001	0.004	0.002	0.006*
	(0.002)	(0.003)	(0.002)	(0.003)
$D_i P_t \% same_party$			-0.011	-0.024**
			(0.007)	(0.010)
$Emp.Growth_{2013-2015}$	-0.014***	-0.010*	-0.013***	-0.010*
	(0.004)	(0.006)	(0.004)	(0.006)
Observations	40,716	40,716	40,716	40,716
R^2		0.023		0.024

***, **, and * indicate significance at the 1%, 5%, and 10% levels All regressions include a full set of ACS controls

Political Tract Selection: Establishment Growth

	(1)	(2)	(3)	(4)
	LAV	OLS	LAV	OLS
		Winsorized at 1%		Winsorized at 1%
D_i	-0.011***	-0.016***	-0.011***	-0.016***
	(0.003)	(0.003)	(0.003)	(0.003)
P_t	-0.119***	-0.141***	-0.119***	-0.141***
	(0.002)	(0.002)	(0.002)	(0.002)
$D_i P_t$	0.032***	0.043***	0.031***	0.040***
	(0.004)	(0.005)	(0.006)	(0.006)
$\% same_party$	0.001	0.002	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
$D_i P_t \% same_party$			0.002	0.005
			(0.006)	(0.006)
$Emp.Growth_{2013-2015}$	0.000	0.007*	-0.000	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)
Observations	40,716	40,716	40,716	40,716
R^2		0.140		0.140

***, **, and * indicate significance at the 1%, 5%, and 10% levels All regressions include a full set of ACS controls

Robustness: Doubly Robust Difference-in-Differences

- Callaway, SanAnna (2021): Differences-in-Differences Estimator that is robust to misspecification of the propensity score or the main empirical model (but not both).
- Results: estimates are higher than the baseline:
 - 5.3-5.4 percentage points for employment growth,
 - 4.4-4.6 percentage points for establishment growth.

► Tables: DRDiD estimates

Heterogeneity: Establishment Births and Deaths

Old or new establishments?

- Previous results: the dependent variable was the growth in the **net** number of establishments
- Here: the dependent variable is the percent of entered/exited establishments. Focus: establishment births and deaths
- Result: Designated tracts experienced
 - \blacktriangleright \uparrow the number of new establishments
 - \downarrow the number of failing establishments

Establishment Birth and Death Regressions

	Percent of E	Entered Establishment	Percent of Exiting Establishment		
	(1)	(2)	(3)	(4)	
	LAV	OLS	LAV	OLS	
		Winsorized at 1%		Winsorized at 1%	
D_i	-0.025***	-0.031***	-0.012***	-0.011***	
	(0.003)	(0.003)	(0.002)	(0.002)	
P_t	-0.056***	-0.089***	-0.014***	-0.008***	
	(0.002)	(0.002)	(0.001)	(0.001)	
$D_i P_t$	0.031***	0.040***	-0.005*	-0.009***	
	(0.004)	(0.004)	(0.003)	(0.002)	
$Emp.Growth_{2013-2015}$	0.083***	0.104***	0.150***	0.112***	
	(0.003)	(0.003)	(0.002)	(0.002)	
Observations	40,944	40,944	40,944	40,944	
R^2		0.177		0.211	

***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Heterogeneity: Intensive or Extensive Margin

Did policy encourage growth of existing establishments (intensive margin) or new establishments (extensive margin)?

- Three definitions of "existing" establishments:
 - 1. Establishments that existed in all years: 2013, 2015, 2017, 2019.
 - 2. Establishments that existed in 2015, 2017, 2019.
 - 3. Establishments that satisfy [2] + remained in the same tract in 2015, 2017, and 2019.
- Results: creation of new establishments the extensive margin is driving positive employment growth

Heterogeneity: Intensive or Extensive Margin



***, **, and * denote significance at the 1%, 5%, and 10% levels.

Benchmark: estimates for establishments in all industries in metro areas.

Heterogeneity: Industries

Investigate How Policy Affected Specific Industries and Workers

- 1. Which industries are affected?
- 2. Who gets hired?

Mian and Sufi (2014) Industry Classification



***, **, and * denote significance at the 1%, 5%, and 10% levels

Benchmark: estimates for establishments in all industries in metro areas.

Mian, Sufi's classification

Estimates by 1-digit NAICS Industry



***, **, and * denote significance at the 1%, 5%, and 10% levels.

▶ 1-digit NAICS sectors: (1) agriculture, (2) construction, (3) manufacturing, (4) trade, (5) information, FIRE and management, and (6) services.

Benchmark: estimates for establishments in all industries in metro areas.

Heterogeneity: Who Gets Hired?

Oldenski (2012)'s skill-intensity measure:

- The average educational level of labor used in an industry
- From 1 for "some high school" to 5 for "graduate school"
- Available for 4-digit NAICS industries
- Oldenski's Source: 2004 American Community Survey

We classify industries into education quantiles based on this skill-intensity measure

Heterogeneity: Who Gets Hired? Industries across all Skill-levels Experience Growth



***, **, and * denote significance at the 1%, 5%, and 10% levels Benchmark: estimates for establishments in all industries in metro areas

Heterogeneity: Tract Characteristics Larger effects in tracts with higher share of white



***, **, and * denote significance at the 1%, 5%, and 10% levels.

Benchmark: estimates for establishments in all industries in metro areas

What Happened to Nearby Tracts?

- Did the program simply shift employment from nearby tracts to Designated tracts?
- Or, did the presence of an OZ in an adjacent tract increase employment via agglomeration spillovers?
What Happened to Nearby Tracts?

• Sample includes 5 groups of tracts:

group k	description of contiguity group	treatment k
0	all eligible tracts (including OZs)	D_i
1	tracts, contiguous to group 0 tracts	$D_i G_{i1}$
2	tracts, contiguous to group 1 tracts	$D_i G_{i2}$
3	tracts, contiguous to group 2 tracts	D_iG_{i3}
4	tracts, contiguous to group 3 tracts	D_iG_{i4}

- $G_{i,k} = 1$ if tract i is in group k = 1, 2, 3, 4 and 0 otherwise
- Run extended specification:

$$Y_{i,t} = \alpha_0 + \alpha_{0,k}G_{i,k} + (\alpha_1 + \alpha_{1,k}G_{i,k})P_t + (\alpha_2 + \alpha_{2,k}G_{i,k})D_i + (\alpha_3 + \alpha_{3,k}G_{i,k})D_iP_t + \mathbf{X}_i\alpha_X + \epsilon_{i,t}$$

• Results: positive spillovers to contiguous tracts up to second degree of contiguity and net zero effect further out

Employment Growth: Spillovers on Nearby Tracts

	(1)	(2)
	OLS	Test of net effect
	Winsorized at 1%	
D_i	-0.018***	
	(0.005)	
P_t	-0.080***	
	(0.003)	
$D_i P_t$	0.045***	
	(0.007)	
$D_iG_{i1}P_t$	-0.026***	0.019***
	(0.009)	p=0.0006
$D_i G_{i2} P_t$	-0.027**	0.018**
	(0.010)	p=0.0134
$D_i G_{i3} P_t$	-0.030**	0.015
	(0.015)	p=0.2493
$D_iG_{i4}P_t$	-0.041	0.004
	(0.027)	p=0.8512
$Emp.Growth_{2013-2015}$	0.003*	
	(0.002)	
Observations	127,718	
R^2	0.025	

***, **, and * denote significance at the 1%, 5%, and 10% levels

Conclusion

- Opportunity Zone legislation increased employment and establishment growth by 3.0 4.6 ppts in Census tracts located in metropolitan areas
- The policy encouraged entries of new establishments
- The effect of the policy was largest for construction
- This effect was similar across skilled and unskilled industries
- Positive spillovers to nearby tracts

Future research:

- 1. Our estimate of the cost per job is 14,087. Is the program cost-effective relative to other employment creation programs?
- 2. Is the effect of the policy temporary or permanent?

Appendix

Why do we Care?

- Regional income convergence has declined in the U.S., e.g., Ganong and Shoag (2017)
- Mobility costs remain high, especially for low-income households who tend to live in low-income communities
- Renewed interest in policies to promote employment in low-income places, including place-based policies, e.g., Austin, Glaeser, and Summers (2018)
- Place-based policies are policies tied to a specific geography
- But could have negative consequences
 - Opportunity Zones create tax benefits for capital investment which could *decrease* labor demand
 - Inframarginal subsidy costs taxpayers without creating jobs?

Eligible Census tracts

A Census tract is a Low Income Community (LIC) if

- 1. The tract has a poverty rate of at least 20%, OR
- 2. The tract is not in a metro area and median family income \leq 80% of statewide median family income, OR
- 3. The tract is in a metropolitan area and median family income \leq 80% of the greater of metropolitan area or statewide family income, OR
- 4. The tract has a population of less than 2,000 people, it is within an empowerment zone, and it is contiguous to one or more LICs.

Opportunity Zones in Wisconsin



Source: Wisconsin Housing and Economic Development Authority.

Opportunity Zones in Madison, WI



Source: City of Madison website.

Existing Work on Opportunity Zones

- House prices: Chen, Glaeser, and Wessel (2020), Casey (2019), CEA (2020)
- CRE prices: Sage, Langen, and Van de Minne (2019)
- Selection: Frank, Hoopes, and Lester (2020)
- Job postings and minimum posted wages: Atkins, Hernandez-Lagos, Jara-Figueroa, Seamans (2020)

Non-OZ literature

Existing work

Opportunity Zones

- Casey (2019), Chen, Glaeser, and Wessel (2019), CIA (2020) home prices
- Sage, Langen, and Van de Minne (2019) CRE prices
- Frank, Hoopes, and Lester (2020) selection
- Atkins, Hernandez-Lagos, Jara-Figueroa, Seamans (2020) job postings, minimum posted wages

Other Place-based Policies: Mixed Evidence

- Neumark and Simpson (2015)
- Neumark and Kolko (2010)
- Ham, Swenson, İmrohoroğlu, and Song (2011)
- Busso, Gregory, and Kline (2013)
- Freedman (2012)
- Harger and Ross (2016)



2-Yr Employment Growth in Eligible Tracts



(a) Raw Data

(b) Winsorized at 1%

2-Yr Establishment Growth in Eligible Tracts



(a) Raw Data

(b) Winsorized at 1%

Return

Opportunity Zones in North Carolina



Opportunity Zones in Chapel Hill and Durham, NC



Source: https://public.nccommerce.com/oz

Eligible tracts in Chapel Hill and Durham, NC



Opportunity Zones in Chapel Hill, NC



Source: https://public.nccommerce.com/oz

Eligible tracts in Chapel Hill, NC



Eligible tracts in California



4,343 eligible tracts, out of which 879 were Designated (870 LIC)

Eligible tracts in Santa Cruz, CA County



27 eligible tracts, out of which 4 were Designated (all LIC)

Eligible tracts in the City of Santa Cruz



12 eligible tracts, out of which 2 were Designated (all LIC)

Eligible Tracts in Wisconsin



732 eligible tracts, out of which 120 were Designated (all LIC)

Opportunity Zones in Madison, WI



Source: CDFI fund: https://www.cims.cdfifund.gov/ preparation/?config=config_nmtc.xml.

Eligible tracts in Dane County and Madison, WI



41 eligible tracts, out of which 11 were Designated (all LIC)

Employment growth: LIC vs non-LIC

	(1)	(2)	(3)	(4)
		LIC	Non-LIC	
	LAV	OLS	LAV	OLS
		Winsorized fraction .01		Winsorized fraction .01
ACS Controls	Yes	Yes	Yes	Yes
D_i	-0.015***	-0.023***	-0.005	0.004
	(0.004)	(0.005)	(0.022)	(0.029)
P_t	-0.094***	-0.084***	-0.077***	-0.058***
	(0.002)	(0.003)	(0.004)	(0.006)
$D_i P_t$	0.033***	0.050***	0.133***	0.124***
	(0.005)	(0.007)	(0.032)	(0.041)
$Emp.Growth_{2013-2015}$	-0.006	-0.008	-0.003	0.001
	(0.005)	(0.007)	(0.010)	(0.012)
Observations	31,434	31,434	9,510	9,510
R^2		0.021		0.016

***, **, and * indicate significance at the 1%, 5%, and 10% levels.

 $P_t = \mathbb{1}\{t \ge 2017\}$ - post dummy.

 $D_i = \mathbbm{1}\{i \text{ is designated as OZ}\}$ - treatment dummy.



Eligible Tracts in Pennsylvania



1,640 eligible tracts, out of which 300 were Designated (289 LIC)

Eligible Tracts in Centre County, PA



19 eligible tracts, out of which 4 were Designated (3 LIC)

Eligible Tracts in State College, PA



7 eligible tracts, out of which 1 Designated (LIC)

Opportunity Zone in State College, PA



Establishment growth: LIC vs non-LIC

	(1)	(2)	(3)	(4)
	LIC		Non-LIC	
	LAV	OLS	LAV	OLS
		Winsorized at 1%		Winsorized at 1%
ACS Controls	Yes	Yes	Yes	Yes
D_i	-0.014***	-0.017***	-0.010	-0.016
	(0.003)	(0.003)	(0.020)	(0.019)
P_t	-0.119***	-0.143***	-0.110***	-0.133***
	(0.002)	(0.002)	(0.004)	(0.004)
$D_i P_t$	0.033***	0.045***	0.082***	0.088***
	(0.005)	(0.005)	(0.028)	(0.027)
$Emp.Growth_{2013-2015}$	0.009**	0.014***	0.029***	0.018**
	(0.004)	(0.005)	(0.008)	(800.0)
Observations	31,434	31,434	9,510	9,510
R^2		0.125		0.127

***, **, and * indicate significance at the 1%, 5%, and 10% levels.

 $P_t = \mathbb{1}\{t \ge 2017\}$ - post dummy.

 $D_i = \mathbbm{1}\{i \text{ is designated as } \mathsf{OZ}\}$ - treatment dummy.



Robustness: nearby tracts as the control group

- Restrict the control group to non-designated eligible tracts within a 3-mile ring of designated tracts to control for unobserved local economic forces
- **Result:** estimates are higher at 4.0 6.4 ppts for employment growth and 4.0 6.2 ppts for establishment growth



Employment growth: nearby tracts

	(1)	(2)	(3)	(4)
	3-mile Ring		LIC + 3-mile Ring	
	LAV	OLS	LAV	OLS
		Winsorized at 1%		Winsorized at 1%
ACS Controls	Yes	Yes	Yes	Yes
D_i	-0.015***	-0.023***	-0.016***	-0.020***
	(0.004)	(0.005)	(0.004)	(0.004)
P_t	-0.102***	-0.098***	-0.129***	-0.155***
	(0.003)	(0.004)	(0.003)	(0.003)
$D_i P_t$	0.040***	0.064***	0.041***	0.055***
	(0.005)	(0.007)	(0.005)	(0.005)
$Emp.Growth_{2013-2015}$	-0.014***	-0.022***	0.003	0.003
	(0.005)	(0.007)	(0.005)	(0.005)
Observations	27,543	27,543	27,543	27,543
R^2		0.027		0.141

***, **, and * indicate significance at the 1%, 5%, and 10% levels.

 $P_t = \mathbb{1}\{t \ge 2017\}$ - post dummy.

 $D_i = \mathbbm{1}\{i \text{ is designated as } \mathsf{OZ}\}$ - treatment dummy.



Establishment growth: nearby tracts

	(1)	(2)	(3)	(4)
	3-mile Ring		LIC + 3-mile Ring	
	LAV	OLS	LAV	OLS
		Winsorized at 1%		Winsorized at 1%
ACS Controls	Yes	Yes	Yes	Yes
D_i	-0.015***	-0.023***	-0.015***	-0.019***
	(0.004)	(0.005)	(0.004)	(0.004)
P_t	-0.103***	-0.098***	-0.128***	-0.153***
	(0.003)	(0.004)	(0.003)	(0.003)
$D_i P_t$	0.040***	0.062***	0.040***	0.053***
	(0.005)	(0.008)	(0.005)	(0.005)
$Emp.Growth_{2013-2015}$	-0.008	-0.021***	0.003	0.004
	(0.005)	(0.008)	(0.005)	(0.005)
Observations	23,580	23,580	23,580	23,580
R^2		0.026		0.136

***, **, and * indicate significance at the 1%, 5%, and 10% levels.

 $P_t = \mathbb{1}\{t \ge 2017\}$ - post dummy.

 $D_i = \mathbbm{1}\{i \text{ is designated as } \mathsf{OZ}\}$ - treatment dummy.



Employment growth: placebo test

	(1)	(2)	(3)	(4)
				3-mile
	LAV	OLS	LAV	OLS
		Winsorized at 1%		Winsorized at 1%
ACS Controls	Yes	Yes	Yes	Yes
D_i	-0.008***	-0.012***	-0.007***	-0.010***
	(0.002)	(0.003)	(0.002)	(0.004)
P_t	0.007***	0.007***	0.007***	0.009***
	(0.001)	(0.002)	(0.002)	(0.003)
$D_i P_t$	-0.006**	-0.007	-0.005	-0.007
	(0.003)	(0.004)	(0.003)	(0.005)
$Emp.Growth_{2013-2015}$	-0.013***	-0.024***	-0.015***	-0.031***
	(0.002)	(0.003)	(0.002)	(0.004)
Observations	41,926	41,926	27,576	27,576
R^2		0.029		0.025

***, **, and * indicate significance at the 1%, 5%, and 10% levels.

 $P_t = 1 \{ t \ge 2017 \}$ - post dummy.

 $D_i = \mathbb{1}\{i \text{ is designated as OZ}\}$ - treatment dummy.

Establishment growth: placebo test

	(1)	(2)	(3)	(4)
				3-mile
	LAV	OLS	LAV	OLS
		Winsorized at 1%		Winsorized at 1%
ACS Controls	Yes	Yes	Yes	Yes
D_i	-0.011***	-0.016***	-0.011***	-0.013***
	(0.002)	(0.003)	(0.003)	(0.003)
P_t	0.003*	0.004**	0.008***	0.009***
	(0.001)	(0.002)	(0.002)	(0.002)
$D_i P_t$	0.006*	0.007*	0.003	0.004
	(0.003)	(0.004)	(0.004)	(0.004)
$Emp.Growth_{2013-2015}$	0.005**	0.015***	0.002	0.013***
	(0.002)	(0.002)	(0.003)	(0.003)
Observations	41,926	41,926	27,576	27,576
R^2		0.072		0.0545

***, **, and * indicate significance at the 1%, 5%, and 10% levels.

 $P_t = \mathbb{1}\{t \ge 2017\}$ - post dummy.

 $D_i = \mathbb{1}\{i \text{ is designated as OZ}\}$ - treatment dummy.



Doubly Robust Difference-in-Difference Callaway, SanAnna (2021)

	All	Metropolitan Area				
(1)	(2)	(3)	(4)			
Raw	Winsorized at 1%	Raw	Winsorized at 1%			
	Panel A: Employm	ent Growth				
0.033**	0.042***	0.053***	0.054***			
(0.016)	(0.007)	(0.007)	(0.020)			
2.028	6.037	7.529	2.672			
Panel B: Establishment Growth						
0.023**	0.032***	0.046***	0.044***			
(0.009)	(0.004)	(0.005)	(0.007)			
2.544	8.050	9.681	6.397			
	(1) Raw 0.033** (0.016) 2.028 0.023** (0.009) 2.544	All (1) (2) Raw Winsorized at 1% Panel A: Employme 0.033** 0.042*** (0.016) (0.007) 2.028 6.037 Panel B: Establishm 0.023** 0.032*** (0.009) (0.004) 2.544 8.050	AllMetr (1) (2) (3) RawWinsorized at 1%RawPanel A: Employment Growth 0.033^{**} 0.042^{***} 0.053^{***} (0.016) (0.007) (0.007) 2.028 6.037 7.529 Panel B: Establishert Growth 0.023^{**} 0.032^{***} 0.046^{***} (0.009) (0.004) (0.005) 2.544 8.050 9.681			

 $\hat{\tau}$ is the average treatment effect on the treated (ATT).

***, **, and * denote significance at the 1%, 5%, and 10% levels.


Heterogeneity: Industries

1. Use two classifications of industries:

- Mian, Sufi (2014)'s classification of industries into Construction, Tradable, Non-tradable, and Other
- Broad 1-digit NAICS industries
- 2. Results:
 - Robust rise in Construction and information, FIRE (Finance, insurance, real estate) and management industries
 - Growth in Other industries (not Tradable, Non-tradable, or Construction)
 - Growth in trade and services

Mian and Sufi (2014) industry classification

- based on 4-digit NAICS industries
- classify industries into 4 types:
 - 1. Construction: industries related to construction, real estate, and land development
 - 2. Non-tradable: retail and restaurants
 - 3. Tradable: imports plus exports equal to at least \$10,000 per worker, or total exports plus imports exceeds \$500M.
 - 4. Others: all other



1-digit NAICS industries

0 4::+		1 1 1
2-digit		1-digit
NAICS	Description	NAICS
Sectors		Sectors
11	Agriculture, Forestry, Fishing and Hunting (not covered in the economic	1
	census)	1
21	Mining, Quarrying, and Oil and Gas Extraction	
22	Utilities	2
23	Construction	
31-33	Manufacturing	3
42	Wholesale Trade	
44-45	Retail Trade	4
48-49	Transportation and Warehousing	
51	Information	
52	Finance and Insurance	
53	Real Estate and Rental and Leasing	
54	Professional, Scientific, and Technical Services	5
55	Management of Companies and Enterprises	
56	Administrative and Support and Waste Management and Remediation Ser-	
	vices	
61	Educational Services	
62	Health Care and Social Assistance	
71	Arts, Entertainment, and Recreation	6
72	Accommodation and Food Services	
81	Other Services (except Public Administration)	
92	Public Administration (not covered in the economic census)	

Source: https://www.census.gov/programs-surveys/economic-census/guidance/ understanding-naics.html.

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