

The Dark Side of Technological Progress? Impact of E-Commerce on Employees at Brick-and-Mortar Retailers

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- ▶ Technological advances have the potential to create enormous economic benefits to society
- ▶ Technological progress can also reshape and transform some labor markets
 - ▶ Changing the way some tasks are conducted
 - ▶ Augmenting some workers
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- ▶ Technological progress can also reshape and transform some labor markets
 - ▶ Changing the way some tasks are conducted
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 - ▶ Potentially replacing some workers
- ▶ One manifestation: E-commerce
- ▶ Question: **What's the impact of e-commerce on the employees of the traditional brick-and-mortar retail stores?**

Why Retail Sector?

- ▶ The retail sector employed approximately 16 million workers, or 13% of the private sector employment, at the end of 2016 (BLS)
- ▶ The rise of technology led by e-commerce caused the recent disruption
 - ▶ Retail sales by e-commerce: \$35.9 billion / 3.8% (2009Q4) \Rightarrow \$102.7 billion / 8.3% (2016Q4)
- ▶ In the earlier decades, the disruption in the retail sector was mainly driven by the expansion of retail chains
 - ▶ Jia (2008), Holmes (2011)

Motivation



- ▶ Rise in e-commerce retail sales
 - ▶ Convenience, pricing, etc
- ▶ Does it lead to decrease in sales of brick-and-mortar retail stores?
- ▶ Do retail stores cut wages or lay-off workers?

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- ▶ How workers are affected? Which types of workers are more vulnerable?
 - ▶ Use **comprehensive consumer data** from a major credit bureau

Main Findings

- ▶ The establishment of a FC in a county has a **negative effect on the income** of retail workers in that county and neighboring counties within 100 miles
 - ▶ The effect is driven by a cut in the number of hours worked
 - ▶ Wages of hourly workers, especially part-time workers, decrease significantly
 - ▶ The effect has a U-shaped pattern over worker's age

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 - ▶ The effect is driven by a cut in the number of hours worked
 - ▶ Wages of hourly workers, especially part-time workers, decrease significantly
 - ▶ The effect has a U-shaped pattern over worker's age
- ▶ Retail stores in counties around FCs experience a **reduction in sales**
 - ▶ There is a reduction in employment, a decrease in entry and an increase in exits of retail stores

- ▶ Effect of technological changes / competition on labor market
 - ▶ Technological changes: Krueger (1993), Autor, Katz, and Krueger (1998), Acemoglu (2002), Autor, Levy, and Murnane (2003), Autor (2015), Autor, Dorn, and Hanson (2015)
 - ▶ Competition: Basker (2005), Neumark, Zhang, and Ciccarella (2008), Autor, Dorn, and Hanson (2013), Autor, Dorn, Hanson, and Song (2014)
- ▶ Cause and consequence of disruptions in the retail sector
 - ▶ Holmes (2011), Jia (2008), Basker (2005), Neumark, Zhang, and Ciccarella (2008)
- ▶ Impact of e-commerce
 - ▶ Brynjolfsson and Smith (2000), Brynjolfsson, Hu, and Smith (2003), Ghose, Smith, and Teland (2006), Subramanian and Walden (2001), Pozzi (2013)

- ▶ Comprehensive consumer data from a major credit bureau

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- ▶ Identify workers employed in 2010Q1 and track these workers over the sample period
 - ▶ Quarterly worker data (2010 to 2016) for 2.6 million workers associated with 57 retail stores

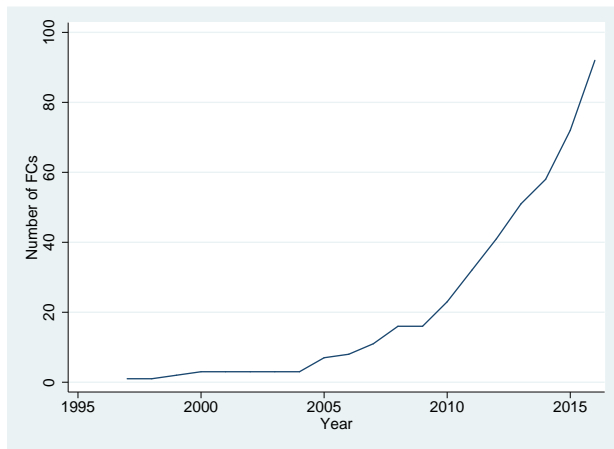
Worker Data

| | N | Mean | Median | Std Dev |
|-------------------------------|------------|--------|--------|---------|
| <i>Hourly Workers</i> | | | | |
| Total Income (\$ per quarter) | 34,806,676 | 7,326 | 6,889 | 4,197 |
| Wage Income (\$ per quarter) | 34,689,666 | 6,362 | 6,007 | 3,553 |
| Bonuses (\$ per quarter) | 32,510,284 | 1,030 | 738 | 1,105 |
| Hours Worked (per week) | 34,489,187 | 30.9 | 33.7 | 10.1 |
| Wage Rate (\$ per hour) | 34,489,187 | 14.9 | 13.9 | 4.54 |
| <i>Salary Workers</i> | | | | |
| Total Income (\$ per quarter) | 5,438,083 | 21,504 | 16,357 | 18,271 |

- ▶ Annual establishment data (2010 to 2014) from the National Establishment Time-Series (NETS) Database
 - ▶ Sales and employment data
- ▶ Quarterly county-industry employment data (2010 to 2016) from Quarterly Census of Employment & Wage (QCEW)
- ▶ Fulfillment centers data from MWPVL International
 - ▶ Exclude establishment of FCs if a FC has been built in the same county or within 20 miles (Houde, Newberry, and Seim (2017))
- ▶ County distance table from NBER
- ▶ Analysis is conducted on 6-digit NAICS industries selected based on the major e-commerce retailer's product catalog

▶ List of Retail Industries

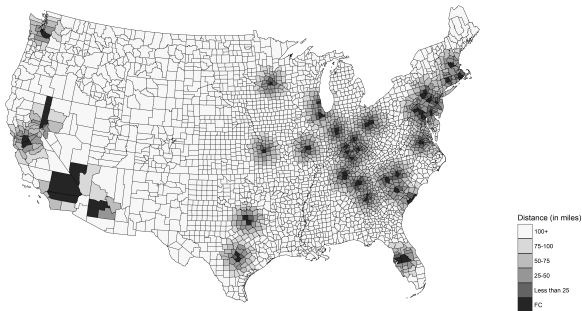
Fulfillment Centers



- ▶ The staggered rollout of FCs

Fulfillment Centers

Fulfillment Center Network, 2016



- ▶ The establishment of FCs allows optimized inventory placement, which in turn allows the e-commerce retailer to cut the shipping costs and shipping times

Determinant of FCs Locations

- ▶ Strong local demand: Higher retail sales and population density
- ▶ Weak local economic condition: Lower wages

| | FC | | | | |
|--------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Δ Log(Retail Sales) | 0.012*** (0.004) | 0.005 (0.003) | 0.005 (0.003) | 0.005 (0.003) | 0.005 (0.003) |
| Δ Log(Population Density) | | 0.114*** (0.025) | 0.115*** (0.025) | 0.115*** (0.025) | 0.116*** (0.025) |
| Δ Unemployment rate | | | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) |
| Δ Log Median household income | | | | -0.008 (0.019) | -0.008 (0.019) |
| Δ Perc. age b/w 18 and 65 | | | | | 0.000 (0.001) |
| Observations | 3128 | 3109 | 3109 | 3109 | 3109 |
| R ² | 0.04 | 0.05 | 0.05 | 0.05 | 0.05 |

- ▶ Objective: Evaluate the local effect of the establishment of a new FC
 - ▶ Counties with FCs
 - ▶ Counties within 50/100 miles of the FC (excluding counties with FCs)
- ▶ Treat each county as treated in the first quarter that a FC opens within county or within 50/100 miles
 - ▶ Match worker to a county based on the zip code of residence

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 - ▶ Match worker to a county based on the zip code of residence
- ▶ Include counties ever treated by the opening of an FC in the analysis ▶ Demographics
 - ▶ Exploit the variation in the timing of the establishment of FCs
 - ▶ Focus on FCs established after 2009

$$Y_{i,c,t} = \alpha + \beta \text{PostFC}_{c,t} + \eta_i + \theta_t + \epsilon_{i,c,t},$$

- ▶ i : worker, c : county, t : time
- ▶ PostFC is an indicator that equals 1 in the quarter that a FC is established in county c or within 50/100 miles of county c and remains 1 for all subsequent quarters
- ▶ η_i : worker FEs, θ_t : year-quarter FEs
- ▶ Standard errors are clustered at the county level

Effect of FCs on Income of Retail Workers

| | Log(Total Income) | | |
|---|----------------------|----------------------|-------------------|
| | All Workers | Hourly Workers | Salary Workers |
| | (1) | (2) | (3) |
| Panel A: Counties with FCs | | | |
| PostFC | -0.024*** (0.005) | -0.025*** (0.005) | -0.010 (0.008) |
| Observations | 2,175,144 | 1,881,184 | 293,960 |
| Adjusted R ² | 0.845 | 0.809 | 0.849 |
| Panel B: Counties within 50 Miles of FCs | | | |
| PostFC | -0.020*** (0.004) | -0.022*** (0.004) | -0.001 (0.008) |
| Observations | 5,643,934 | 4,744,111 | 899,823 |
| Adjusted R ² | 0.865 | 0.828 | 0.856 |
| Worker FE | ✓ | ✓ | ✓ |
| YearQtr FE | ✓ | ✓ | ✓ |

Dynamic Effect

$$\begin{aligned} \text{Log}(\text{Total Income}_{i,c,t}) = & \alpha + \sum_{j=2}^4 \beta_j \text{PreFC}_{c,t}(-j) + \sum_{j=0}^4 \gamma_j \text{PostFC}_{c,t}(j) \\ & + \eta_i + \theta_t + \epsilon_{i,c,t} \end{aligned}$$

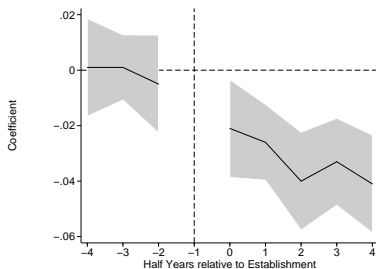


Figure: Counties with FCs

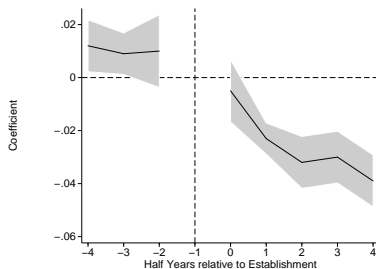


Figure: Counties within 50 Miles

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- ▶ The timing of negative shocks to firms with concentrated operations coincide with the timing of FC \Rightarrow Include firm-year-quarter fixed effects

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- ▶ Differences in state-level economic and regulatory environments \Rightarrow Include state-year-quarter fixed effects

Can Omitted, Unobservable Firm-Specific Variables or Local Economic Conditions Be Driving the Results?

- ▶ The timing of negative shocks to firms with concentrated operations coincide with the timing of FC \Rightarrow Include firm-year-quarter fixed effects
- ▶ Differences in state-level economic and regulatory environments \Rightarrow Include state-year-quarter fixed effects
- ▶ County-level time-varying unobservables \Rightarrow Use workers in other industries as a control group & include county-year-quarter fixed effects

Firm-Specific Unobservables and Local Economic Conditions

| | Log(Total Income) Hourly Workers | | | |
|---|-------------------------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) |
| Panel A: Counties with FCs | | | | |
| PostFC | -0.021*** (0.004) | -0.008*** (0.002) | -0.011*** (0.002) | |
| PostFC*Retail | | | | -0.044*** (0.006) |
| Observations | 1,881,184 | 1,881,184 | 1,881,184 | 5,596,632 |
| Adjusted R ² | 0.841 | 0.811 | 0.842 | 0.850 |
| Panel B: Counties within 50 Miles of FCs | | | | |
| PostFC | -0.017*** (0.003) | -0.020*** (0.003) | -0.018*** (0.002) | |
| PostFC*Retail | | | | -0.029*** (0.007) |
| Observations | 4,744,111 | 4,744,111 | 4,744,111 | 14,247,756 |
| Adjusted R ² | 0.862 | 0.830 | 0.863 | 0.852 |
| Worker FE | ✓ | ✓ | ✓ | ✓ |
| Firm-YearQtr FE | ✓ | | ✓ | |
| State-YearQtr FE | | ✓ | ✓ | |
| County-YearQtr FE | | | | ✓ |

How Does the Impact of FCs Vary with Distance from the Focal County?

The negative effect exhibits an inverse U-shape with distance

| | Log(Total Income) | | | | | | |
|-------------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------------------|
| | <i>Hourly Workers</i> | | | | | | |
| | FC | 50 miles | 100 miles | 150 miles | 200 miles | 250 miles | 500miles |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| PostFC | -0.019** (0.008) | -0.039*** (0.007) | -0.023*** (0.005) | -0.020*** (0.004) | -0.018*** (0.003) | -0.014*** (0.003) | -0.002 (0.003) |
| Observations | 1,075,790 | 1,503,517 | 3,675,332 | 4,902,589 | 6,241,358 | 7,524,622 | 11,185,880 |
| Adjusted R ² | 0.846 | 0.856 | 0.839 | 0.839 | 0.842 | 0.849 | 0.864 |
| Worker FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| YearQtr FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Decomposing the Impact of FC Establishment on Wages

Reduction in hours worked and bonuses and no change in wage rate

| | Log(Wage Income) (1) | Log(Bonus) (2) | Log(Hours Worked) (3) | Log(Wage Rate) (4) |
|---|-------------------------|----------------------|--------------------------|-----------------------|
| Panel A: Counties with FCs | | | | |
| PostFC | -0.007*** (0.002) | -0.012 (0.008) | -0.007*** (0.002) | 0.001*** (0.000) |
| Observations | 1,875,176 | 1,764,173 | 1,866,683 | 1,866,683 |
| Adjusted R ² | 0.842 | 0.740 | 0.731 | 0.970 |
| Panel B: Counties within 50 Miles of FCs | | | | |
| PostFC | -0.014*** (0.002) | -0.026*** (0.009) | -0.014*** (0.002) | -0.000 (0.001) |
| Observations | 4,730,532 | 4,414,584 | 4,711,647 | 4,711,647 |
| Adjusted R ² | 0.856 | 0.744 | 0.761 | 0.968 |
| Worker FE | ✓ | ✓ | ✓ | ✓ |
| Firm-YearQtr FE | ✓ | ✓ | ✓ | ✓ |
| State-YearQtr FE | ✓ | ✓ | ✓ | ✓ |

Are All Retail Workers Affected?

- ▶ U-shaped pattern based on worker's age

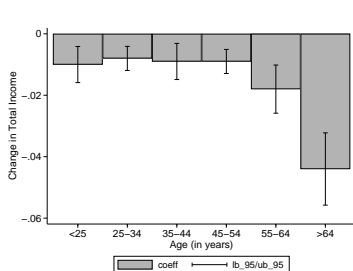


Figure: Counties with FCs

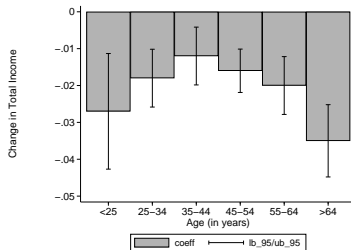


Figure: Counties within 50 Miles

- ▶ Part-time workers are affected more
- ▶ No difference between male and female workers

▶ Figure

Credit Outcomes

- ▶ If labor markets are frictionless, the short-run displacement of some traditional retail store workers may not matter
- ▶ However, labor markets have frictions and the scope of work differs between traditional retail stores and warehouses \Rightarrow Some workers can be worse off

- ▶ If labor markets are frictionless, the short-run displacement of some traditional retail store workers may not matter
- ▶ However, labor markets have frictions and the scope of work differs between traditional retail stores and warehouses \Rightarrow Some workers can be worse off
- ▶ Hard to identify any other source of income
- ▶ Instead, look at the credit outcomes of the workers
 - ▶ The declines in income may lead to worse credit outcomes
 - ▶ Especially for the workers who are living on the margin (e.g. high bank card utilization)

Credit Outcomes

| | Counties with FCs (1) | Counties within 50 Miles of FCs (2) |
|--|-----------------------------|---|
| Panel A: Credit Scores | | |
| PostFC*Low (1) | 0.593 (0.786) | 0.004 (0.433) |
| PostFC*High (2) | -2.500*** (0.220) | -0.835* (0.506) |
| Difference ((2)-(1)) | -3.089*** (0.735) | -0.849 (0.609) |
| Observations | 1,210,611 | 3,191,674 |
| Adjusted R ² | 0.812 | 0.826 |
| Panel B: Bank Card 90+ Day Delinquency | | |
| PostFC*Low (3) | -0.001* (0.001) | -0.000 (0.001) |
| PostFC*High (4) | 0.006*** (0.001) | 0.002** (0.001) |
| Difference ((4)-(3)) | 0.007*** (0.001) | 0.003*** (0.001) |
| Observations | 1,081,133 | 2,879,747 |
| Adjusted R ² | 0.108 | 0.111 |
| Worker FE | ✓ | ✓ |
| Low-Firm-YearQtr FE | ✓ | ✓ |
| Low-State-YearQtr FE | ✓ | ✓ |

How Do FCs Affect Local Brick-and-Mortar Stores Retail Stores?

- ▶ Do FCs affect retail stores in other dimensions?
 - ▶ Retail sales
 - ▶ Employment
 - ▶ Store closure
 - ▶ Store opening
- ▶ The analysis can potentially highlight the channel

Effect of FCs on Sales of Retail Stores

Retail stores in counties around FCs experience a reduction in sales

| | Log(1+Sales) | | | |
|---|-----------------------------|---------------------|----------------------|-----------------------------|
| | All (1) | Small (2) | Medium (3) | Large (4) |
| Panel A: Counties with FCs | | | | |
| PostFC | -0.028*** (0.009) | -0.029** (0.012) | -0.020*** (0.005) | -0.034*** (0.012) |
| Observations | 184,829 | 63,636 | 58,799 | 62,394 |
| Adjusted R ² | 0.959 | 0.808 | 0.728 | 0.918 |
| Panel B: Counties within 50 Miles of FCs | | | | |
| PostFC | -0.009 (0.008) | 0.010 (0.008) | -0.024*** (0.008) | -0.017 (0.018) |
| Observations | 509,182 | 172,954 | 164,848 | 171,362 |
| Adjusted R ² | 0.956 | 0.801 | 0.744 | 0.914 |
| Establishment FE | ✓ | ✓ | ✓ | ✓ |
| Ind-Year FE | ✓ | ✓ | ✓ | ✓ |
| State-Year FE | ✓ | ✓ | ✓ | ✓ |

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Other Results

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- ▶ Increase in store-exit, especially for small and young stores ▶ Exit (Size) ▶ Exit (Age)
- ▶ Lower entry rate ▶ Entry
- ▶ No change in restaurants sales ▶ Restaurant

Other Results

- ▶ Reduction in employment ▶ Employment
- ▶ Increase in store-exit, especially for small and young stores ▶ Exit (Size) ▶ Exit (Age)
- ▶ Lower entry rate ▶ Entry
- ▶ No change in restaurants sales ▶ Restaurant
- ▶ Consistent results with aggregate county-industry data from QCEW ▶ County-Industry

- ▶ Limited to the short-run impact of the technological innovation on the retail sector
- ▶ Cannot quantify the benefits to consumers
 - ▶ Lower prices
 - ▶ More choices
 - ▶ Additional leisure time
- ▶ There are potential positive spillovers in the local community and other sectors
- ▶ Quantifying the aggregate effect of e-commerce is beyond the scope of this paper

Conclusion

- ▶ Wages of hourly retail workers in counties with FCs decrease by 2.5%, equivalent to \$825, after the establishment of FCs
- ▶ Annual retail sales decrease by 2.8%, about \$64,000 per store. Retail sales for large stores decrease by \$200,000

THANK YOU

List of Retail Industries

| NAICS | Industry Name |
|--------|--|
| 441310 | Automotive parts and accessories stores |
| 441320 | Tire dealers |
| 442110 | Furniture stores |
| 442210 | Floor covering stores |
| 442291 | Window treatment stores |
| 442299 | All other home furnishings stores |
| 443141 | Household appliance stores |
| 443142 | Electronics stores |
| 444110 | Home centers |
| 444120 | Paint and wallpaper stores |
| 444130 | Hardware stores |
| 444190 | Other building material dealers |
| 444210 | Outdoor power equipment stores |
| 444220 | Nursery, garden, and farm supply stores |
| 446120 | Cosmetic and beauty supply stores |
| 446191 | Food, health, supplement stores |
| 446199 | All other health and personal care stores |
| 448110 | Men's clothing stores |
| 448120 | Women's clothing stores |
| 448130 | Children's and infants' clothing stores |
| 448140 | Family clothing stores |
| 448150 | Clothing accessories stores |
| 448190 | Other clothing stores |
| 448210 | Shoe stores |
| 448310 | Jewelry stores |
| 448320 | Luggage and leather goods stores |
| 451110 | Sporting goods stores |
| 451120 | Hobby, toy, and game stores |
| 451130 | Sewing, needlework, and piece goods stores |
| 451140 | Musical instrument and supplies stores |
| 451211 | Book stores |
| 451212 | News dealers and newsstands |
| 451220 | Precorded tape, cd, and record stores |
| 452111 | Department stores, except discount |
| 452112 | Discount department stores |
| 452910 | Warehouse clubs and supercenters |
| 452990 | All other general merchandise stores |
| 453110 | Florists |
| 453210 | Office supplies and stationery stores |
| 453220 | Gift, novelty, and souvenir stores |
| 453310 | Used merchandise stores |
| 453910 | Pet and pet supplies stores |
| 453920 | Art dealers |
| 453930 | Manufactured, mobile, home dealers |
| 453991 | Tobacco stores |
| 453998 | Store retailers not specified elsewhere |

County Demographics

| | Full Sample | Counties with FCs | Counties within 50 Miles of FCs | Counties within 100 Miles of FCs |
|--|-------------|-------------------|---------------------------------|----------------------------------|
| N | 3,135 | 50 | 445 | 1,141 |
| Total Population | 308,674,608 | 30,774,770 | 86,724,715 | 163,939,679 |
| Population | 98,460.80 | 615,495.40 | 194,887.00 | 143,680.70 |
| Population Density | 259.49 | 672.84 | 698.24 | 531.76 |
| Retail Sales (in millions) | 431.71 | 2,827.55 | 821.65 | 615.01 |
| Retail Sales per Capita | 3,552.72 | 4,623.48 | 3,692.95 | 3,679.81 |
| Median Household Income | 43,419.43 | 56,220.34 | 51,179.56 | 47,123.08 |
| Unemployment Rate | 9.36 | 9.64 | 10.17 | 10.27 |
| Percent Age under 18 | 23.49 | 24.80 | 23.77 | 23.22 |
| Percent Age over 65 | 15.93 | 12.16 | 14.08 | 15.31 |
| Percent High School Graduate or Higher | 82.51 | 85.84 | 83.04 | 82.31 |
| Percent Bachelor's Degree or Higher | 18.73 | 27.52 | 21.74 | 19.73 |

▶ Back

Are All Retail Workers Affected?

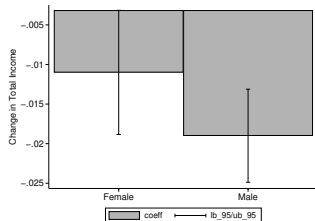
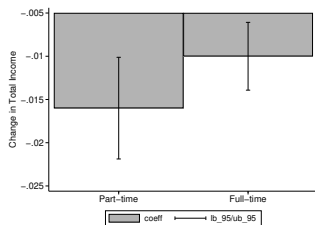


Figure: Counties with FCs

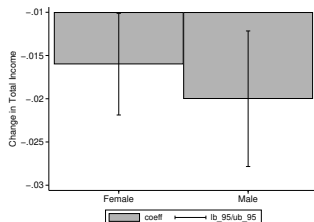
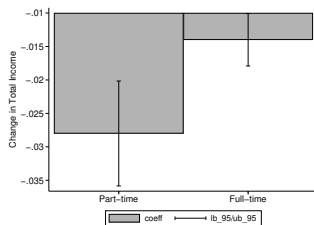


Figure: Counties within 50 Miles

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Retail stores in counties around FCs experience a reduction in employment

| | Log(1+Employment) | | | |
|---|----------------------|----------------------|----------------------|----------------------|
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| Observations | 184,829 | 63,636 | 58,799 | 62,394 |
| Adjusted R ² | 0.973 | 0.871 | 0.907 | 0.955 |
| Panel B: Counties within 50 Miles of FCs | | | | |
| PostFC | -0.007 (0.004) | -0.003 (0.003) | -0.015*** (0.005) | -0.005 (0.007) |
| Observations | 509,182 | 172,954 | 164,848 | 171,362 |
| Adjusted R ² | 0.973 | 0.875 | 0.912 | 0.956 |
| Establishment FE | ✓ | ✓ | ✓ | ✓ |
| Ind-Year FE | ✓ | ✓ | ✓ | ✓ |
| State-Year FE | ✓ | ✓ | ✓ | ✓ |

Retail Store Closures: Size Effect

| | Exit | | | |
|---|---------------------|---------------------|---------------------|---------------------|
| | All (1) | Small (2) | Medium (3) | Large (4) |
| Panel A: Counties with FCs | | | | |
| PostFC | 0.029*** (0.010) | 0.038** (0.014) | 0.027*** (0.009) | 0.023*** (0.007) |
| Observations | 161,520 | 53,753 | 53,470 | 54,297 |
| Adjusted R ² | 0.214 | 0.222 | 0.213 | 0.207 |
| Panel B: Counties within 50 Miles of FCs | | | | |
| PostFC | 0.023*** (0.007) | 0.035*** (0.009) | 0.022*** (0.007) | 0.012** (0.005) |
| Observations | 446,770 | 148,440 | 148,708 | 149,604 |
| Adjusted R ² | 0.202 | 0.207 | 0.201 | 0.200 |
| Establishment FE | ✓ | ✓ | ✓ | ✓ |
| Ind-Year FE | ✓ | ✓ | ✓ | ✓ |
| State-Year FE | ✓ | ✓ | ✓ | ✓ |

Retail Store Closures: Age Effect

| | Exit | | | |
|---|---------------------|---------------------|---------------------|---------------------|
| | All (1) | Young (2) | Medium (3) | Old (4) |
| Panel A: Counties with FCs | | | | |
| PostFC | 0.032** (0.012) | 0.041** (0.016) | 0.043*** (0.013) | 0.007 (0.010) |
| Observations | 75,162 | 26,080 | 25,093 | 23,984 |
| Adjusted R ² | 0.204 | 0.217 | 0.199 | 0.185 |
| Panel B: Counties within 50 Miles of FCs | | | | |
| PostFC | 0.032*** (0.008) | 0.040*** (0.011) | 0.030*** (0.009) | 0.025*** (0.007) |
| Observations | 226,182 | 79,011 | 72,694 | 74,465 |
| Adjusted R ² | 0.198 | 0.212 | 0.190 | 0.182 |
| Establishment FE | ✓ | ✓ | ✓ | ✓ |
| Ind-Year FE | ✓ | ✓ | ✓ | ✓ |
| State-Year FE | ✓ | ✓ | ✓ | ✓ |

Opening of Retail Stores

| | Log(1+Entrants) | | | |
|---|---------------------|---------------------|-------------------|---------------------|
| | All (1) | Small (2) | Medium (3) | Large (4) |
| Panel A: Counties with FCs | | | | |
| PostFC | -0.015 (0.040) | -0.118** (0.052) | 0.095 (0.083) | 0.019 (0.078) |
| Observations | 180 | 180 | 180 | 180 |
| Adjusted R ² | 0.989 | 0.974 | 0.981 | 0.968 |
| Panel B: Counties within 50 Miles of FCs | | | | |
| PostFC | -0.088** (0.039) | -0.054 (0.053) | -0.043 (0.073) | -0.133** (0.055) |
| Observations | 2,205 | 2,205 | 2,205 | 2,205 |
| Adjusted R ² | 0.966 | 0.937 | 0.933 | 0.934 |
| Establishment FE | ✓ | ✓ | ✓ | ✓ |
| Ind-Year FE | ✓ | ✓ | ✓ | ✓ |
| State-Year FE | ✓ | ✓ | ✓ | ✓ |

Placebo Tests: Sales of Full-Service Restaurants

No change in restaurants sales

| | Log(1+Sales) | | | |
|---|------------------|---------------------|-------------------|-------------------|
| | All (1) | Small (2) | Medium (3) | Large (4) |
| Panel A: Counties with FCs | | | | |
| PostFC | 0.002 (0.002) | 0.012*** (0.004) | -0.002 (0.002) | -0.002 (0.004) |
| Observations | 110,043 | 36,097 | 40,546 | 33,400 |
| Adjusted R ² | 0.979 | 0.895 | 0.856 | 0.944 |
| Panel B: Counties within 50 Miles of FCs | | | | |
| PostFC | 0.003 (0.003) | 0.010 (0.008) | -0.003 (0.004) | 0.000 (0.008) |
| Observations | 311,132 | 100,077 | 115,726 | 95,329 |
| Adjusted R ² | 0.980 | 0.892 | 0.806 | 0.956 |
| Establishment FE | ✓ | ✓ | ✓ | ✓ |
| State-Year FE | ✓ | ✓ | ✓ | ✓ |

County-Industry Evidence

| | Log(1+Total Wage) (1) | Log(1+Employment) (2) | Log(1+Average Wage) (3) | Log(1+Establishment) (4) |
|---|--------------------------|--------------------------|----------------------------|-----------------------------|
| Panel A: Counties with FCs | | | | |
| PostFC | -0.054 (0.103) | -0.017 (0.038) | -0.040 (0.065) | 0.002 (0.011) |
| Counties | 47 | 47 | 47 | 47 |
| Observations | 35,146 | 35,146 | 35,146 | 35,146 |
| Adjusted R ² | 0.346 | 0.615 | 0.180 | 0.861 |
| Panel B: Counties within 50 Miles of FCs | | | | |
| PostFC | -0.185* (0.097) | -0.062** (0.031) | -0.132** (0.066) | -0.019*** (0.007) |
| Counties | 340 | 340 | 340 | 340 |
| Observations | 136,336 | 136,336 | 136,336 | 136,336 |
| Adjusted R ² | 0.376 | 0.628 | 0.210 | 0.873 |
| County FE | ✓ | ✓ | ✓ | ✓ |
| Ind-YearQtr FE | ✓ | ✓ | ✓ | ✓ |
| State-YearQtr FE | ✓ | ✓ | ✓ | ✓ |

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