Effects of Retailer SNAP Adoption on Households and Food Stores[1]

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Motivation

▶ Many anti-poverty transfers are in-kind (Currie and Gahvari, 2008)

  ▶ Government relies on private vendors to distribute transfers

  ▶ Our setting: nutrition assistance programs and food stores

▶ Vendor participation ("opt-in") can have welfare implications

  ▶ location (distance cost)

  ▶ other attributes (pricing, product offerings, etc.)

  ▶ responses may affect non-participants

    ⋆ Bitler and Figinski (2020), Goldin, Homonoff, and Meckel (2022), Handbury and Moshary (2021), Leung and Seo (2021), Meckel (2020), Meckel and Rossin-Slater (2022)

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Our Setting

- Supplemental Nutrition Assistance Program (SNAP)

  - Monthly vouchers for food at participating stores
  - $60 billion; 1 in 9 Americans (2019)
  - 14% of grocery sales (Wilde, 2010)

- Food store participation

  - apply to USDA, stocking requirements
  - upfront tech cost, low ongoing cost

- Increase in store participation during Great Recession

  - Media: "More retailers say yes to food stamps" *ABC News*, 7/2009
  - Total + Share of Food Stores + Total Benefits

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Question(s) of Interest

▶ What is the effect of increased retailer participation on participants, non-participants, and stores?

  ▶ Combine geocoded data on SNAP retailers, food stores, households in purchasing panel

  ▶ Exploit variation in date of retailer SNAP adoption

▶ Treatment

  ▶ Households: SNAP adoption by nearby store

    ⋆ Compare SNAP-eligible and ineligible

  ▶ Retailers: SNAP adoption

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  ▶ Retailers: SNAP adoption

Our Findings

▶ New stores are not grocers or superstores

  ▶ club and "limited selection"

  ▶ lower food sales, poorer/low-access areas

▶ Households

  ▶ 4% decrease in distance to nearest SNAP store, 7% in low-access areas

  ▶ small shift of expenditures among SNAP households (1pp), no shift for non-SNAP

  ▶ no evidence of changes on overall nutrition or prices paid

▶ New SNAP retailers

  ▶ sales of eligible food increases 10%

  ▶ no change in prices charged

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Our Results

▶ Current limitations

    ▶ short-term effects

    ▶ partial sample in consumer panel limits power

▶ Take-Aways

    ▶ Food Store participation is sensitive to program size (persists)

    ▶ Proposed restrictions on limited-inventory stores unlikely to have important impacts

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SNAP Retailer Authorization

▶ Stores authorized individually

- ▸ easier process for multi-store owners($\geq$10 stores)
- ▸ short application, documentation, 45 days

▶ To be eligible, stores need to carry:

- ▸ bread/cereals, meat, dairy, fruit/veg
  - ⋆ perishable goods in at least two categories

▶ Potential costs:

- ▸ EBT hardware/software
- ▸ train employees
- ▸ cold storage

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Identifying Store Adoption Events

▶ Food store starts accepting SNAP benefits
  ▸ precise timing
  ▸ differentiate from opening

▶ Administrative records on SNAP stores (STARS), 2008-12
  ▸ monthly panel w/ geocodes, redemptions
    ⋆ limit to $\geq$\$2k/month (41% of stores, 95% of benefits)
    ⋆ new stores from 6/2008-12/2011

▶ NielsenIQ's TDLinx
  ▸ comprehensive database of food stores w/ $\geq$ \$1 million in total sales
    ⋆ link to STARS by name and location
    ⋆ drop openings (50%)

▶ Means Comparison
  ▸ adopting stores vs. all SNAP stores in 2008
    ⋆ more limited (78% vs. 44%), low-access (43% vs. 37%), lower redemptions (\$31,013 vs. \$47,004)
  ▸ approx 58% of households w/ adoption in ZIP

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Data: IRI Consumer Network

▶ Household purchasing panel, 2008-2012

  ▸ about 203,000 households total

  ▸ demog. info from 2012: income, family size
    ★ impute SNAP elig. using gross income test (6%)

  ▸ geocoded: census block group (bg)
    ★ calculate distance from bg to nearest SNAP store

▶ Households scan all food products purchased, from any outlet

  ▸ price, quantity, chain name

▶ Outcome variables: household-year-month level

  ▸ total food expenditures

  ▸ chain expenditure share

  ▸ product type expenditure share

  ▸ prices paid per oz. for common soda brands (diet vs. not)

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► SNAP-elig. household *i* is treated if:

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  ► no other store starts accepting SNAP nearby w/in -6/+6 mos

► SNAP-elig. household *i* is a control (never-treated) if:

  ► no nearby adoptions from 2008-2012

► $\rightarrow$ 17% households are treated (4916 adoption events), 17% are control, 66% are excluded

  ► E: more rural, more low access

  ► purchasing filter: partial sample (x5)

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Identification Strategy

▶ Two-way fixed effects model with household and date FE

  ▶ staggered timing of nearby store adoptions

  ▶ dynamic effects, heterogeneous treatment effects

  ▶ 3 approaches: OLS (baseline), Sun & Abraham (2020), Borusyak et al. (2021)

▶ $Y_{it} = \alpha + \beta \text{After}_{it} * W_{it} + \gamma \text{PreW}_{it} + \delta \text{PostW}_{it} + \mu_i + \rho_t + \epsilon$

  ▶ i is household, t is date

  ▶ After_{it} indicates t is after nearby retailer adopts SNAP

  ▶ W_{it} is "window" of -6 to 6 months wrt adoption date

  ▶ ϵ clustered at household level

▶ Event-time:

  ▶ $\text{After}_{it} * W_{it} \rightarrow$ indicators for -6 to -2 and 0 to 6 months since adoption

▶ Identification assumption: no divergent, pre-existing trends

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Effect of Retailer SNAP Adoption on Log(Dist) to Nearest SNAP Store
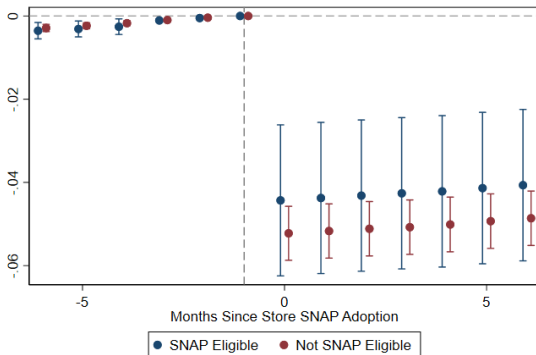
Regression includes 7441 (497 SNAP eligible) and 4527 (204 SNAP eligible) control households.
Includes 40 unique SNAP adoption waves and households in 5843 different zip codes.

▶ SNAP-eligible: -4.2% overall, -6.7% for low-access (Table , Modern DiD)

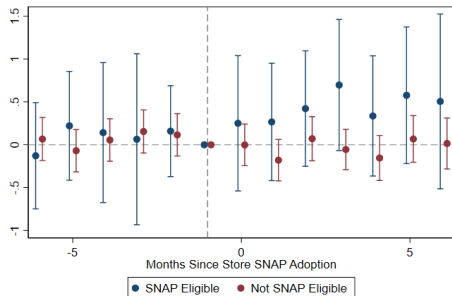 ▶ Lupi (2020) model: per-trip travel cost: -$0.07 to -$0.11 (4-7%)

Effect on Share of Food Spending at Adoption Store

Log Distance to Nearest SNAP Store
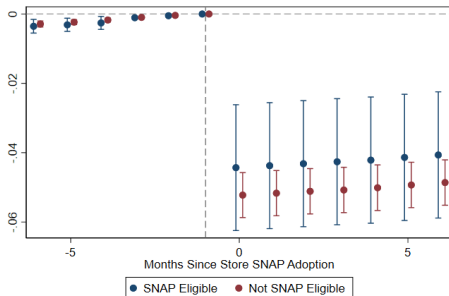
Regression includes 7441 (497 SNAP eligible) and 4527 (204 SNAP eligible) control households.
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Expenditure Share (p.p.)

Regression includes 5293 (341 SNAP eligible) and 0 (0 SNAP eligible) control households.
Includes 39 unique SNAP adoption waves and households in 2467 different zip codes.

- Effects: 1pp (33%) overall and for low-access (Table , Modern DiD)
  - add'l sample restrictions:
    - top 20 chains, drops 25%
    - no control group, drops 50%

Other Margins of Adjustment

▶ SNAP take-up: no evidence of changes

  ▸ total food expenditure Here

  ▸ supplementary analysis using ZIP-month participation

▶ Composition of purchases Here

  ▸ Imprecise estimate of an increase in snack/dessert expenditure shares
    if entering store has limited inventory (as in James, 2022)

▶ Prices (preliminary, no evidence of change)

Overview

IRI Infoscan

▶ Retailer panel, 2008 to 2012

  ▶ weekly, product-level transactions of food

  ▶ about 44,000 stores, 51% of food sales

  ▶ store name and address (geocoded)

    ★ link to SNAP retailer data (84% of sales)

  ▶ Treatment: SNAP adopters (17,582)

  ▶ Control: stores without any adopters nearby (1,826)

▶ Outcomes:

  ▶ monthly: sales, Beraja et al. (ECMA 2019) price index

  ▶ quarterly:

    ★ proxy indicators for inventory

   ★ product-level prices and sales of top 100 products for SNAP eligible

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Retailer Regression

- $Y_{st} = \alpha + \beta \text{After}_{st} * W_{st} + \gamma \text{PreW}_{st} + \delta \text{PostW}_{st} + \mu_s + \rho_t + \epsilon$

    - s is store or store-product, t is date
    - **After**$_{st}$ indicates t is after s's adoption date
    - W_{st} is -6 to 6 months around adoption date
    - ϵ clustered at store level

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- Identification assumption: no divergent, pre-existing trends

Effect of Retailer SNAP Adoption on Food Sales

Months since SNAP Adoption
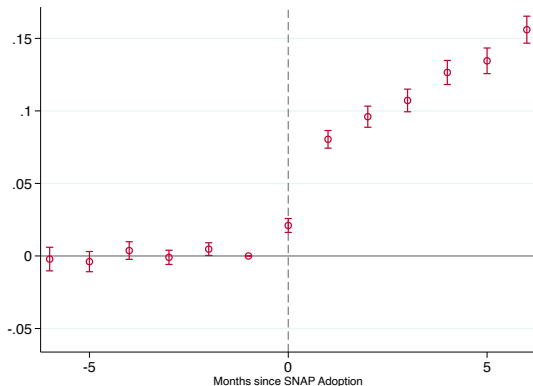
▶ 10.2% increase in sales, consistent across measures (Table), (Modern DiD))

   ▸ Aligns with expenditure effect

Effect of Retailer SNAP Adoption on Food Prices

Months since SNAP Adoption
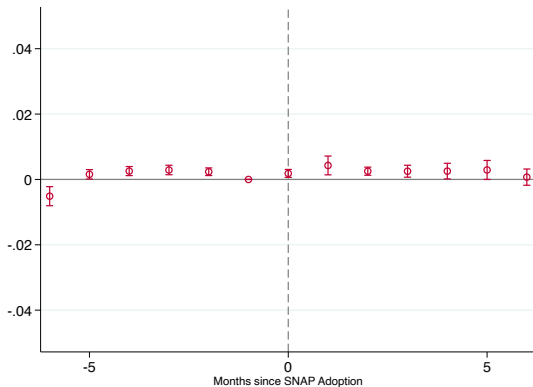
▶ 0.1% or -0.4%, imprecise

▶ Table , Modern DiD

Additional Margins

▶ No evidence of SNAP store exit among nearby stores

▶ No evidence of price changes among competitor stores

▶ Inventory proxies - increase staples in frozen/chilled section Chilled , Frozen

Overview

Conclusion

- Large increase in food store participation in SNAP during historic expansion in the program in Great Recession

- Many adopters have smaller food sales, limited inventory

- Small impacts on expenditure patterns among nearby SNAP eligible households despite decrease in distance

- Proposed restrictions on eligible stores unlikely to have an important impact on SNAP households

Overview

Table: Means Comparison, SNAP Store Samples

Sample:	(1) All, 2008	(2) New	(3) in TDLinx	(4) Adopter	(5) Treatment
SNAP Stores	83,954	39,387	16,975	9,052	4,916
Monthly $	$47,004	$23,824	$36,358	$31,013	$30,838
Limited Food	0.44	0.61	0.72	0.78	0.75
Poverty	0.15	0.16	0.14	0.14	0.13
Low Access	0.37	0.36	0.42	0.43	0.47
Rural	0.23	0.18	0.22	0.19	0.23

The sample is drawn from the Store Tracking and Redemption System (STARS) Dataset from USDA-FNS. "New" indicates stores that joined SNAP from 6/2008 to 12/2011. "...in TDLinx" indicates the subset of new stores that we matched to stores in NielsenIQ's TDLinx Data. "...Adopter" indicates the subset of matched stores such that that the store's SNAP adoption date is at least 6 months after its opening date. "Treatment" indicates the subset of adopters with no other new SNAP stores nearby, as defined below. "Monthly $" refers to average monthly redemptions. "Limited Food" indicates the store is from the convenience or combination channels. "Poverty" is defined at the ZIP level, refers to the share of households in a store's ZIP that live below the poverty line, and is from 2006-2011 ACS. "Low Access" and "Rural" are defined at the tract level and come from USDA's Food Access Research Atlas

Table: Retailer SNAP Adoption and Log(Dist) to Nearest SNAP Store

	(1)	(2)
SNAP Adopt	-0.042***	-0.018*
	(0.010)	(0.009)
SNAP Adopt x Low Access		-0.049***
		(0.018)
Dep. Var. Mean (percentage points)	-.11	-.11
Household FE	Yes	Yes
Year-month FE	Yes	Yes
Observations	37,910	37,910

Note: Data are drawn from the IRI Consumer Network Panel and FNS' Store Tracking and Redemption System (STARS). Our sample of SNAP stores is restricted to those with greater than $2,000/month in EBT redemptions. For each U.S. Census block group centroid, we identified the nearest SNAP store in each month from 1/2008-12/2012. These data are combined with households in the Consumer Network Panel based on their block group of residence. The sample includes SNAP-eligible households only. "SNAP Adopt" indicates the nearby SNAP adoption of a food retailer. "Low Access" is a measure indicating limited availability of fresh food stores in the Census tract.
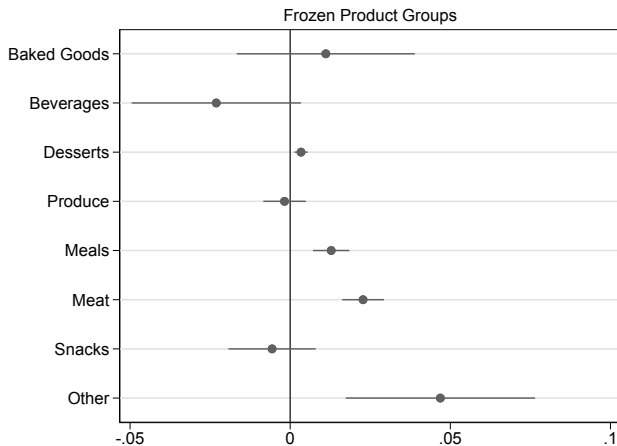
Distance to Nearest SNAP retailer Modern DID for SNAP Eligible Households
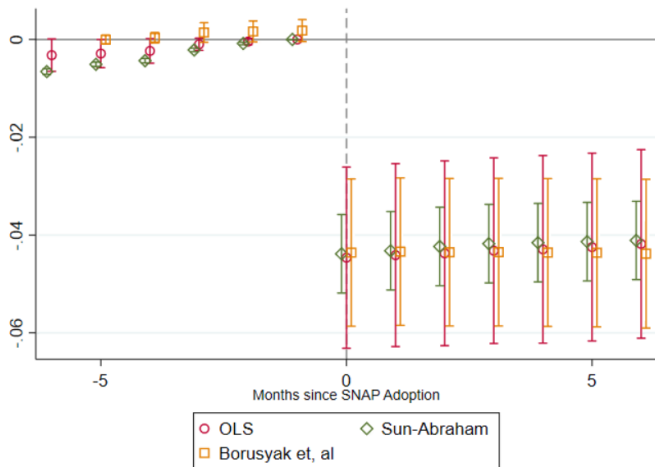
Effects of Adoption on Refrig. Inventory

Chilled Product Groups
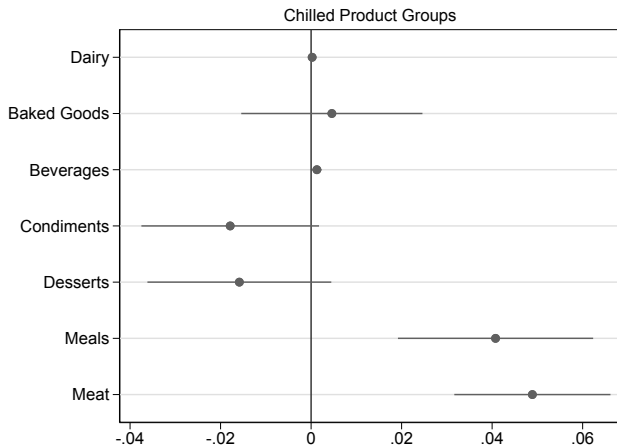
Effects of Adoption on Frozen Inventory

Frozen Product Groups

# Adopting Chain Expenditure Share Modern DID for SNAP Eligible Households
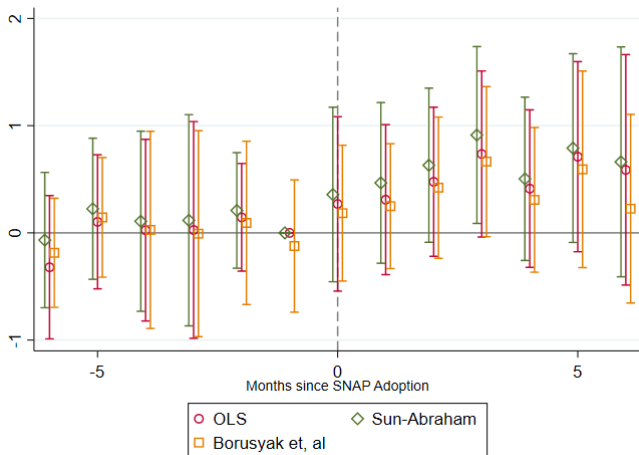
Table: Effect of Retailer SNAP Adoption on SNAP Household Exp. Share

	(1)	(2)
SNAP Adopt	0.488*	0.412
	(0.282)	(0.327)
SNAP Adopt x Low Access		0.153
		(0.465)
Dep. Var. Mean (percentage points)	2.89	2.89
Household FE	Yes	Yes
Year-month FE	Yes	Yes
Observations	17,194	17,194

Note: Data are drawn from the IRI Consumer Network Panel and FNS' Store Tracking and Redemption System (STARS). Our sample of SNAP stores is restricted to those with greater than $2,000/month in EBT redemptions. The sample of households from the Consumer Network Data includes SNAP-eligible households only. "SNAP Adopt" indicates the nearby SNAP adoption of a food retailer. "Low Access" is a measure indicating limited availability of fresh food stores in the Census tract.

Modern DID for SNAP Eligible
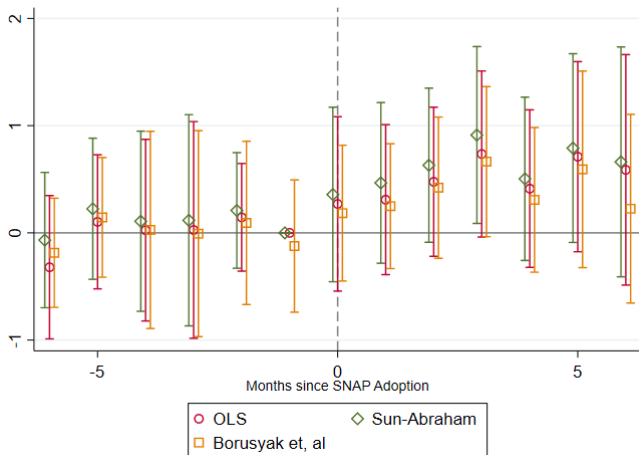
Table: Effect of Retailer SNAP Adoption on Composition of Food Purchases

	Produce		Snacks/Dessert/Soda	
	(1) All	(2) Limited Stores	(3) All	(4) Limited Stores
SNAP Adopt	0.148	-0.137	-0.124	0.607
	(0.194)	(0.253)	(0.345)	(0.460)
Dep. Var. Mean (p.p.)	8.38	8.42	30.44	30.61
Household FE	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes
Observations	37,394	25,487	37,394	25,487

Note: Data are drawn from the IRI Consumer Network Panel and FNS' Store Tracking and Redemption System (STARS). Our sample of SNAP stores is restricted to those with greater than $2,000/month in EBT redemptions. These data are combined with households in the Consumer Network Panel. The sample includes SNAP-eligible households only. "SNAP Adopt" indicates the nearby SNAP adoption of a food retailer. "Limited Stores" indicates that the adopting store has limited healthy food offerings.

# Effect of Retailer SNAP Adoption on Total Food Expenditure

OLS ($)
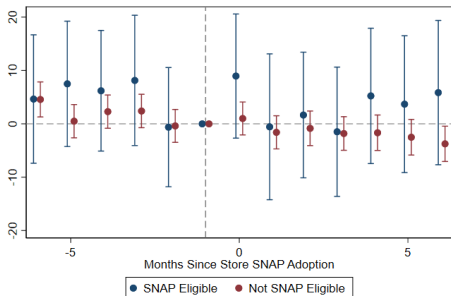
PPML (%)

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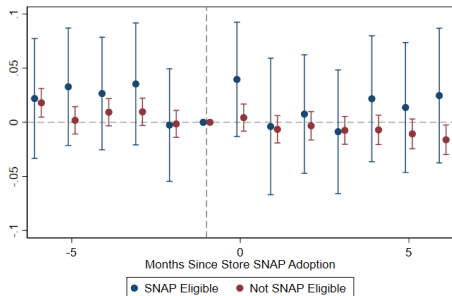
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Includes 40 unique SNAP adoption waves and households in 5843 different zip codes.

Modern DiD for SNAP-Eligible Sales
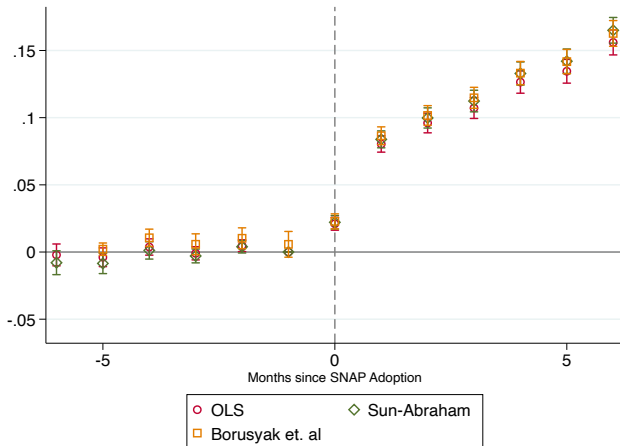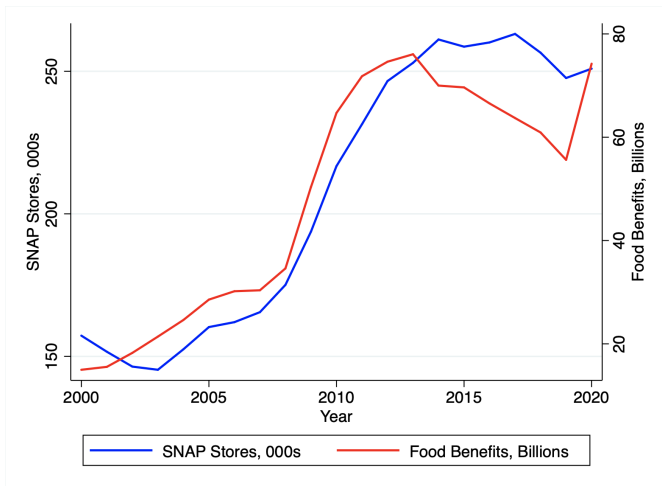
Total SNAP Stores `Back`
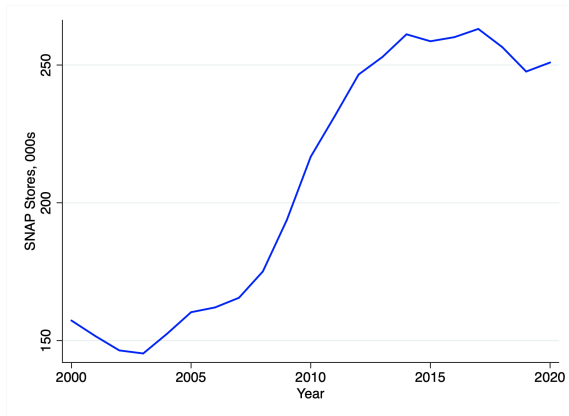
Notes: Data is drawn from FNS Annual Reports by the Benefit Redemption Division. Retailer counts represent total retailers authorized on September 1. Wayback Machine was used to recover early reports.
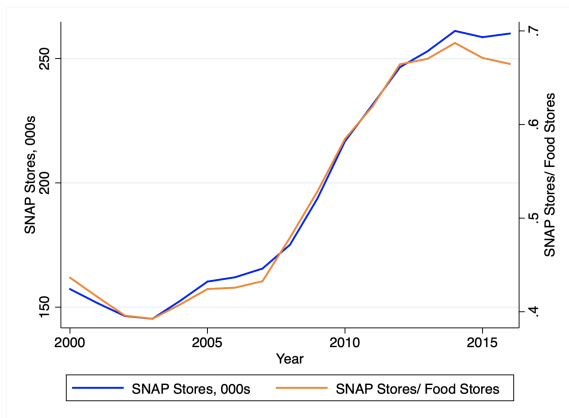
Notes: Data on SNAP retailers from FNS Annual Reports by the Benefit Redemption Division. Wayback Machine was used to recover early reports. Total food store counts are from the Statistics of U.S. Businesses, and equal the sum of establishments across the following NAICS codes: 445110 (Supermarkets and Other Grocery except Convenience); 445120 (Convenience stores); 445130 (Beer, Wine, and Liquor Stores); 446110 (Pharmacies and Drug Stores); 447110 (Gasoline Stations with Convenience Stores); 452910 (Warehouse Clubs and Supercenters; 452990 All Other General Merchandise Stores; 4452 (Specialty Food Stores)

Total SNAP Stores and SNAP Benefits

Notes: Data is drawn from FNS Annual Reports by the Benefit Redemption Division. Retailer counts represent total retailers authorized on September 1. Wayback Machine was used to recover early reports.

Adoption and SNAP-Eligible Sales Back
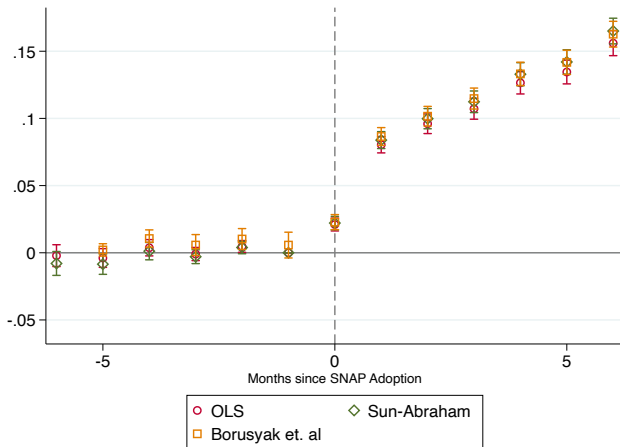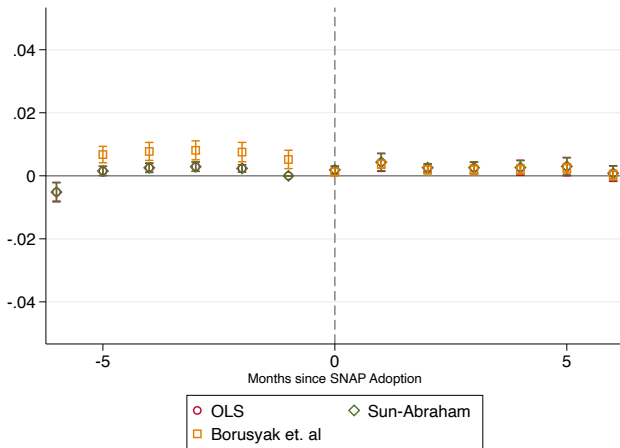
Adoption and Log Price Index Back

Table: Effect of SNAP Adoption on Retailer Sales (Back)

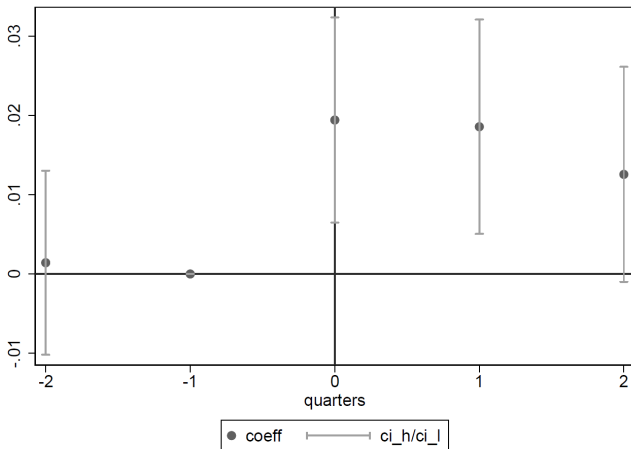|	(1) Food Sales	(2) Top 100 Sales	(3) Top 100 Unit Sales
SNAP Adopt	0.1021*** (0.0033)	0.0771*** (0.0048)	0.0690*** (0.0050)
Dep. Var. Mean (\$ or units)	\$364,595	\$834	448
Store FE	Yes	Yes	Yes
Product FE	No	Yes	Yes
Year-Month FE	Yes	Yes	Yes
Observations	184,259	2,266,580	2,266,580

Table: SNAP Adoption on Retailer Price (Back)

	(1) Price Index	(2) Price, top 100
SNAP Adopt	0.0018*	-0.0044*
	(0.0010)	(0.0024)
N	110,688	2,266,580
Dep. Var. Mean ($)		$2.12
Store FE	Yes	Yes
Product FE	No	Yes
Year-Month FE	Yes	Yes
Observations	184,259	2,266,580

Table: SNAP Adoption on Inventory Measures, Control Group 1

	(1)	(2)
(3)		
	Any Frozen Staple	Any Frozen Accessory
Any Frozen Product		
1-6 Months after Adopt	0.0002**	0.003***
0.003***		
	(0.0000)	(0.001)
(0.001)		
N	318,733	318,733
318,733		

Any Frozen Staple Product Sales, CG1 Back

Notes: