

# The Unequal Gains from Entry at the Top: Estimating the Whole Foods effect

FAERE

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August 30th, 2019

# Outline

Introduction

Data and empirical strategy

Results

Scanner data results

Model

# Competition at the top

- ▶ In general, more competition is predicted to:
  - ▶ Decrease prices
  - ▶ Increase quality, quantity
  - ▶ Increase consumer welfare and decrease profits
- ▶ What about competition for high-end products?
  - ▶ Same inside the high-end submarket
  - ▶ Trickle-down hypothesis [Atkin, Faber and Gonzalez 2018](#)
  - ▶ Theoretically ambiguous result [Chen and Riordan 2009](#)
- ▶ In a context of rising inequality...
  - ▶ Increasing incentive to compete in high-end markets [Jaravel 2018](#)
  - ▶ Increasing concentration [De Loecker, Eeckhout and Unger 2018](#)
  - ▶ But not at a local level? [Rossi-Hansberg et al 2019](#)
  - ▶ Does that mechanically imply lower prices?

# Setting

- ▶ Food retail in the United States
- ▶ Market where growth is fundamentally limited ▶ GDP
- ▶ Traditional channels to increase profits: differentiation upwards (packaging, transformation) or discount “value”
- ▶ Widely studied for stark disparities between low-income and high-income households [Allcott, Diamond et al. 2019](#)

# The organic food retail market

- ▶ Recent trends: differentiation upwards, “better-for-you”: “health” and “natural”, high quality and expensive products.
- ▶ The USDA organic label: a marker of quality
  - ▶ Guarantees producer has followed precise processes avoiding most pesticides, etc.
  - ▶ Does not guarantee products are pesticide-free.
  - ▶ Much more expensive. ▶ premium
  - ▶ A perfect vertical dimension of quality?
- ▶ A segment that is growing twice as fast as the rest of sector  
▶ OTA

## Research question

- ▶ Does the entry of new stores in the better-for-you segment have a pro-competitive effect on the high-end segment of the food retail market? (Probably yes)
- ▶ Does it have a pro-competitive effect on the low-end segment (trickle down) or has it exacerbated inequalities?
- ▶ What mechanisms account for this?
  1. Cost story
  2. Price discrimination (if high-WTP customers leave the incumbent stores to shop at the new high-end stores)

## Research design

Use the rapid expansion of Whole Foods, a high-end grocery store specialized in "health" and organic products as entry shocks on various markets to study

1. ...on incumbent stores' prices and variety
2. ...on residents' consumption basket

Later: structural estimation on the demand structure for high-quality goods

# Literature review

- ▶ Differentiation models (IO)
  - ▶ Market share effect vs price sensitivity effect [Chen and Riordan 2008](#)
  - ▶ Horizontal: new entrants provide different, valued, characteristics
  - ▶ Both prices and consumer welfare may go up [Perloff, Suslow and Seguin 1995](#)
- ▶ Love for variety (Trade)
  - ▶ Wal-Mart in Mexico pushed incumbents' prices down while catering to rich customers [Atkin et al. 2018](#)
  - ▶ Innovation in high-end consumer goods resulted in relatively higher inflation for low-income consumers [Jaravel 2018](#)

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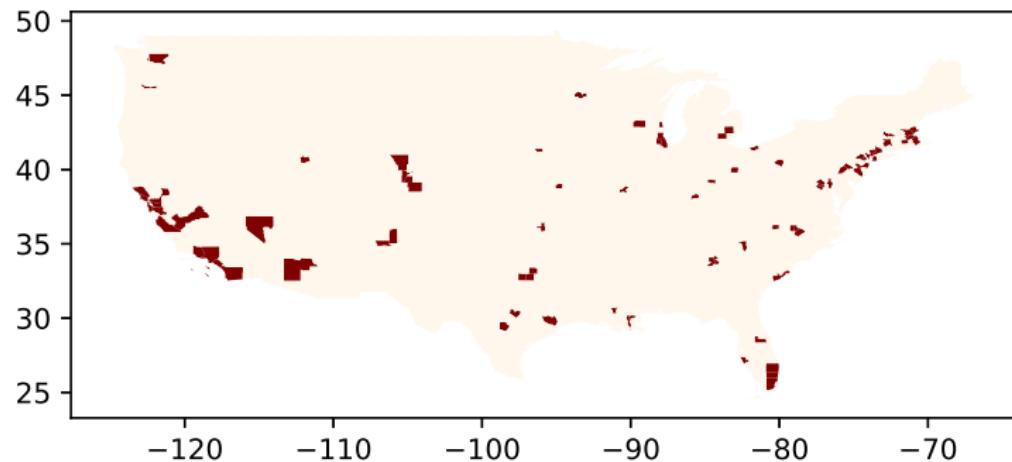
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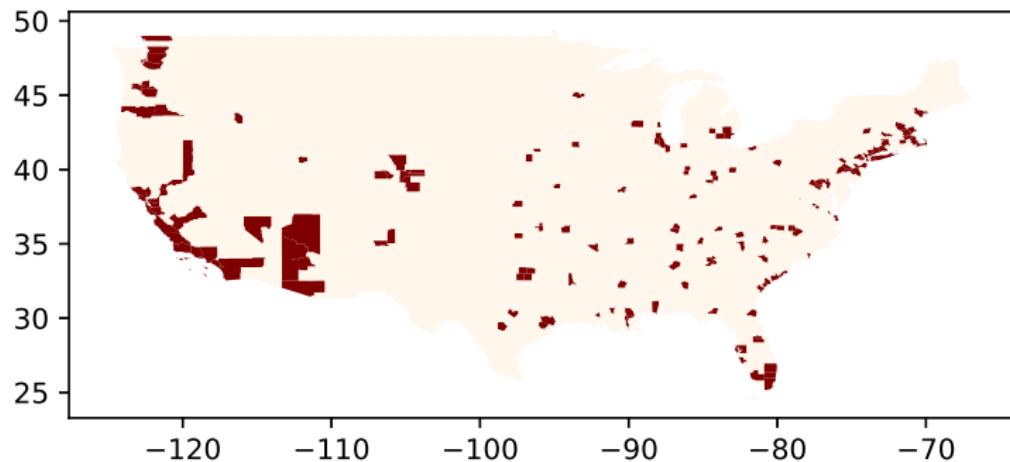
# Data

- ▶ Nielsen's scanner data
  - ▶ Weekly prices and volume sold at the barcode level
  - ▶ 35,000 stores from 90 different chains, including half the sales volumes of US "grocery and drug stores", 2006-2016
- ▶ Nielsen's homescan panel data
  - ▶ For each shopping trip, prices and volume bought at the barcode level
  - ▶ 40,000-60,000 panelists per year, 2004-2016
- ▶ Specialized organic stores: I focus on Whole Foods (added 200 stores between 2008 and 2017, almost doubling stock). Retrieve exact location, entry and announcement dates from ProQuest

# Presence of Whole Foods in 2006



# Presence of Whole Foods in 2016



## Empirical strategy - temporal

- ▶ 250 stores opening over 10 years
- ▶ In 50 clean new *markets* (counties)
- ▶ **Problem** Not randomly selected
- ▶ *A priori* cannot use DiD
- ▶ Event-study? [Atkin, Faber and Gonzalez 2018](#)  
→ need flat pre-trend. Not necessarily the case here, as  
Whole Foods targets markets with growth and where residents  
are becoming richer. [▶ Trend](#)

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- ▶ Staggered rollout? [Meckel 2018](#)
  - need random timing

## Strategy: staggered rollout

- ▶ I collected the “announcement” dates of the new Whole Foods stores from media sources
- ▶ Identification strategy assumes conditional on announcement date, opening date is random
- ▶ From the 2008 Whole Foods annual report: “the length of time between a store’s tender date and opening date, varies depending on several factors, some of which are outside of our control.”
- ▶ 24 months **on average**, with S.D. of 14 months

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# Event-study Regressions

## 1. Store level

$$y_{smt} = \sum_{j=-12}^{36} \beta_j \mathbb{I}(\text{Months Since Entry}_{mt} = j) + \delta_{sm} + \eta_t + \epsilon_{smt}$$

## 2. Barcode-by-store level

$$\ln p_{bgsm} = \sum_{j=-12}^{36} \beta_j \mathbb{I}(\text{Months Since Entry}_{mt} = j) + \delta_{gsbm} + \eta_t + \epsilon_{gsbmt}$$

where  $\ln p_{bgsm}$  is the log price of a barcode-product b in product group g, individual store s, in market m and month t.

Cluster Standard Errors at the market level.

# Event study on variety of all food items

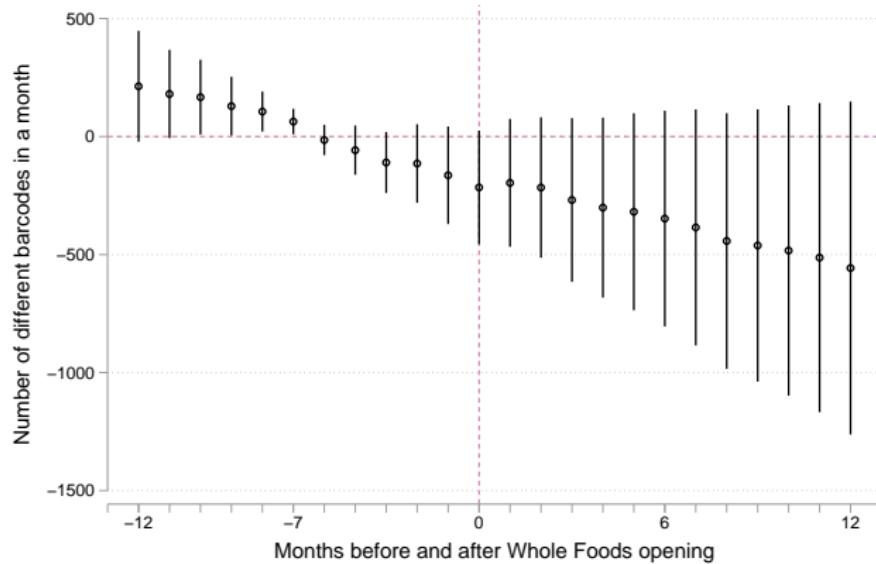


Figure: Unconditional on the year announcement

# Event study on variety of organic food items

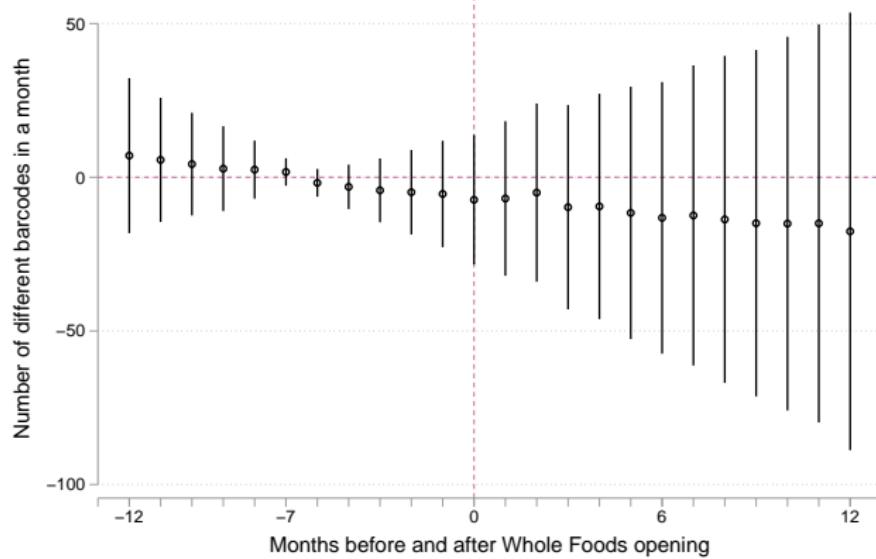


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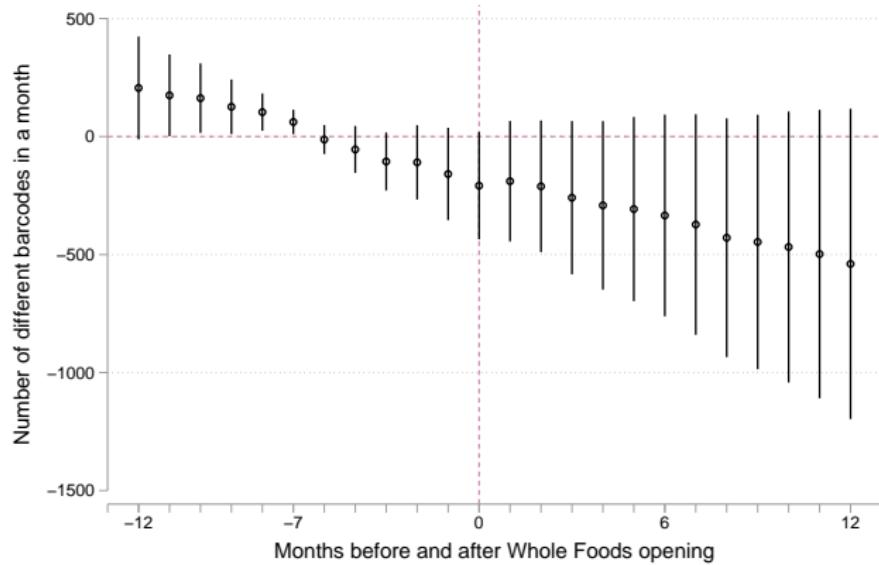


Figure: Unconditional on the year announcement

# Event study on log barcode price of all food items

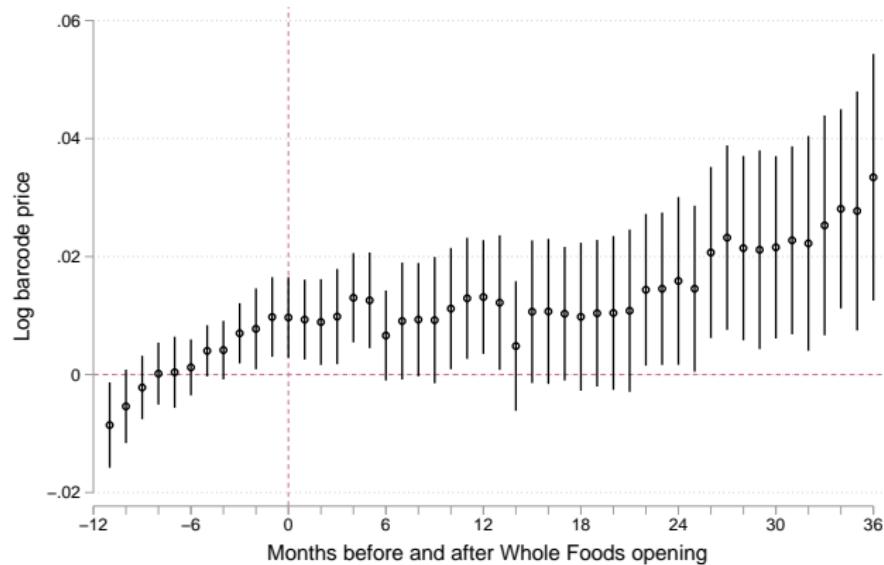


Figure: Unconditional on the year announcement

# Event study on log barcode price, scanner data

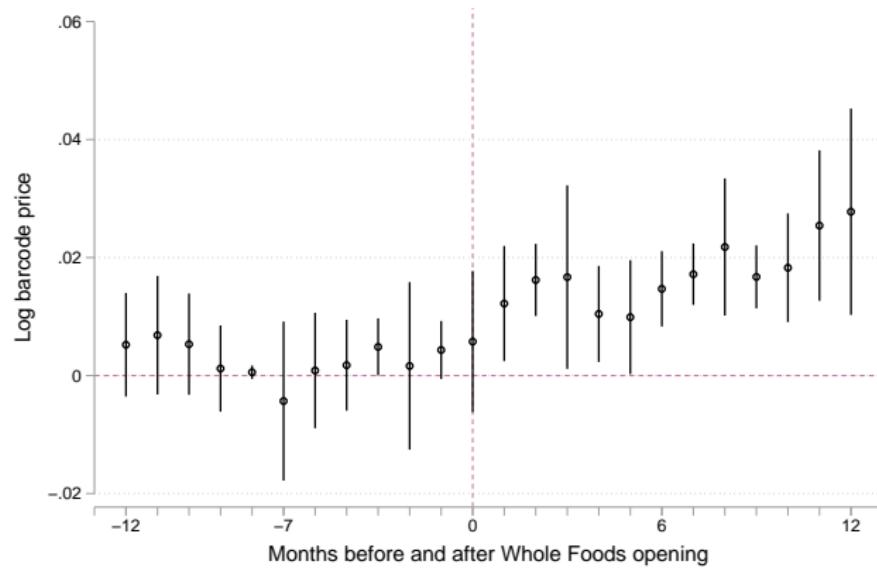


Figure: Conditional on being announced in 2011

# Event study on log barcode price of all food items, panel data

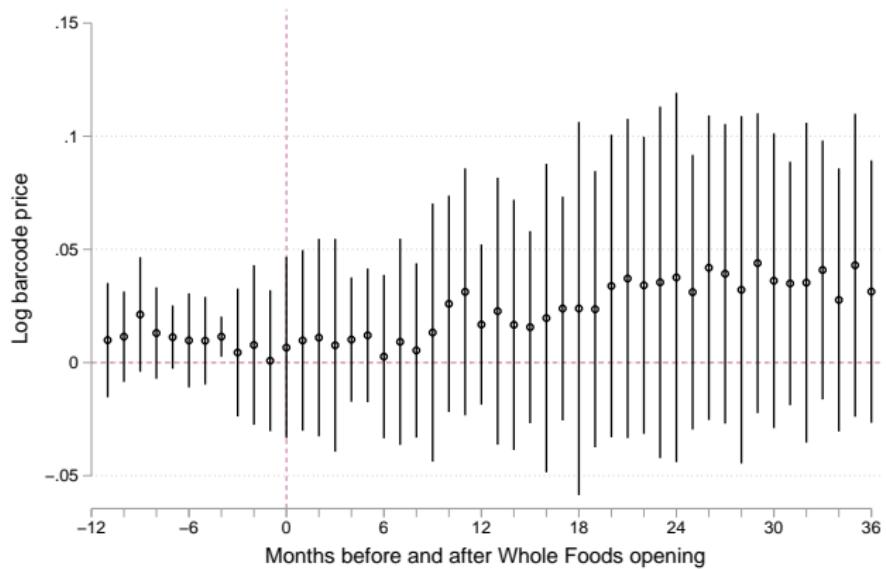


Figure: Conditional on being announced in 2011

# Event study on log barcode price, scanner data

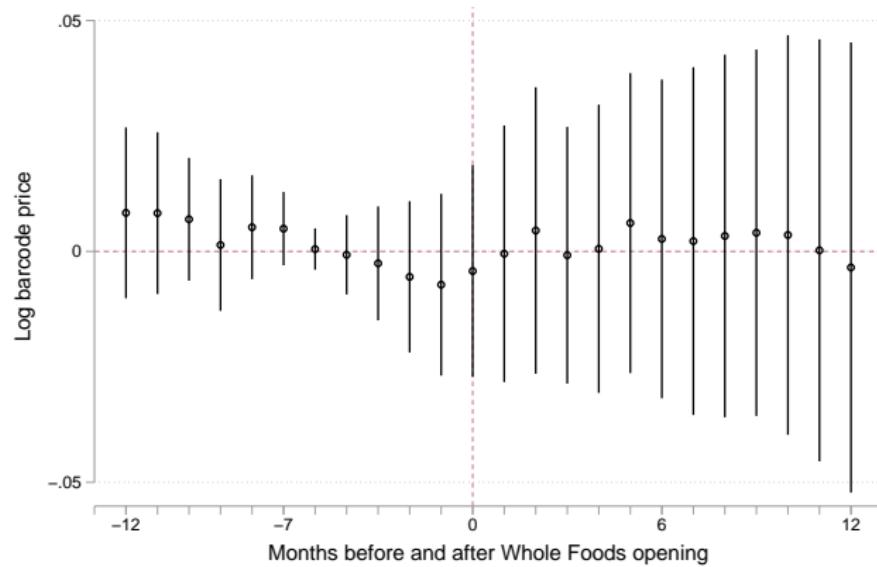


Figure: Conditional on being announced in 2012

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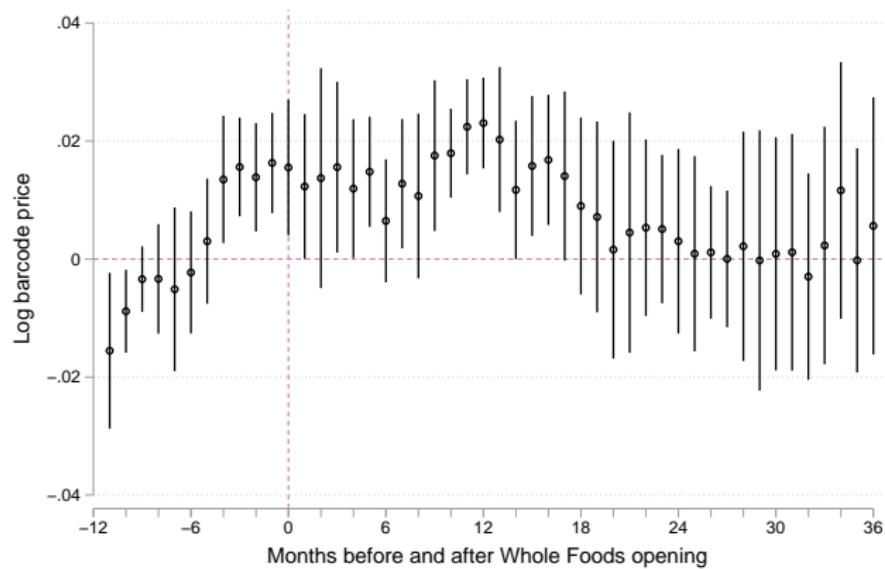


Figure: Conditional on being announced in 2012

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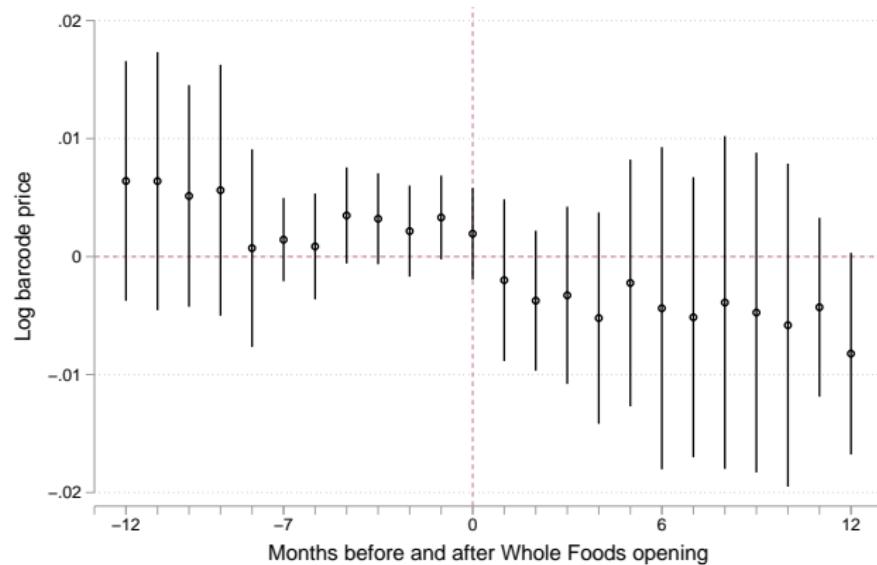


Figure: Conditional on being announced in 2013

# Event study on log barcode price of all food items, panel data

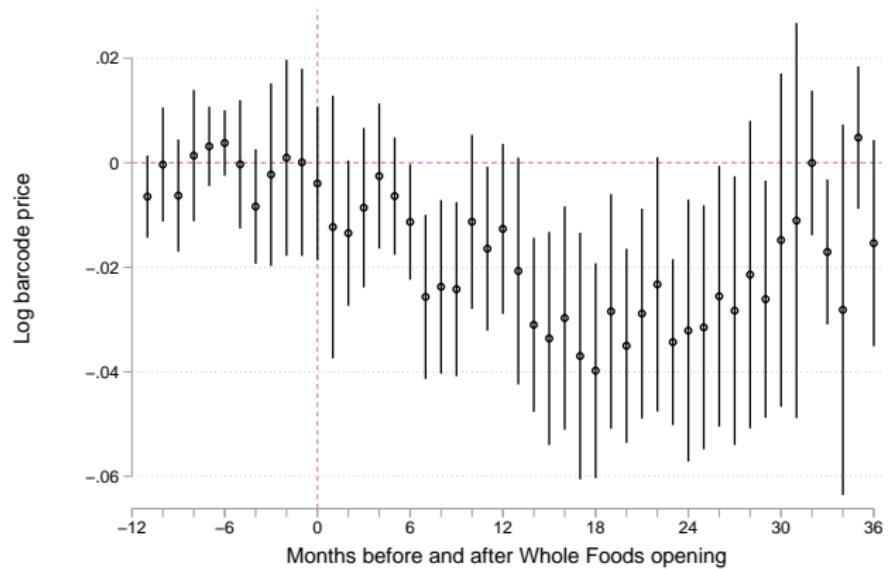


Figure: Conditional on being announced in 2013

## Event study on log barcode price, scanner data

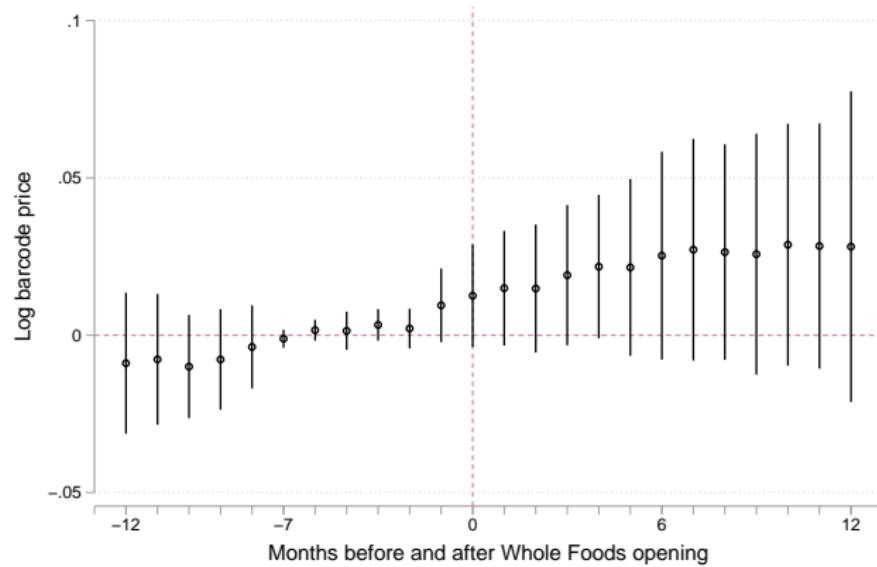


Figure: Conditional on being announced in 2014

# Event study on log barcode price of all food items, panel data

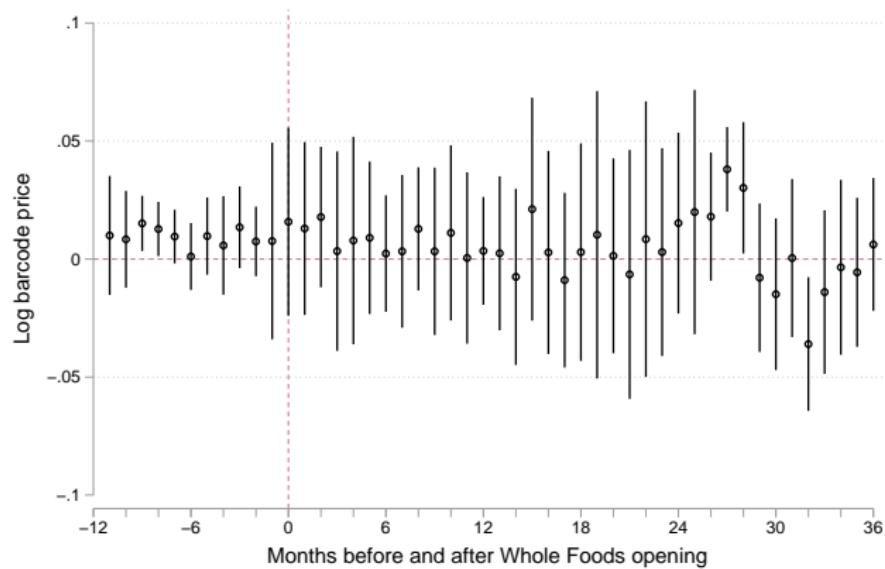


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## Model sketch

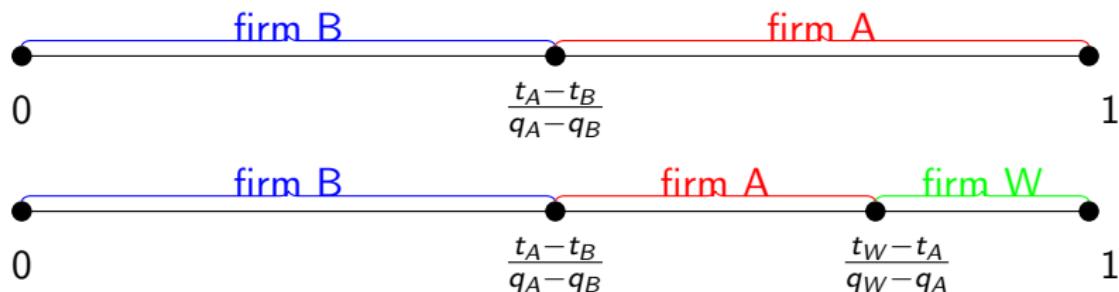
- ▶ Oligopolistic competition with vertical differentiation.
- ▶ Firms: sequential game
  1. They decide whether to enter or not
  2. If they enter they choose a quality level  $q \in [0, \bar{q}]$
  3. They compete in prices.
- ▶ Consumers: they are characterized by a taste for quality  $\theta$ .

$$U(d, t) = v + \theta q - t$$

- ▶ With 2 firms, maximum differentiation, higher price at the top.

## Preview of results

- ▶ Going from two firms  $(q_A, q_B)$  to three  $(q_A, q_B, q_W)$  with  $q_W > q_Q > q_B$



- ▶ High-income consumers always benefit from entry by switching
- ▶ For the rest, ambiguous. May end up with a quality-price bundle that they enjoy less.
- ▶ Overall welfare change depends on distribution of valuations for the goods.

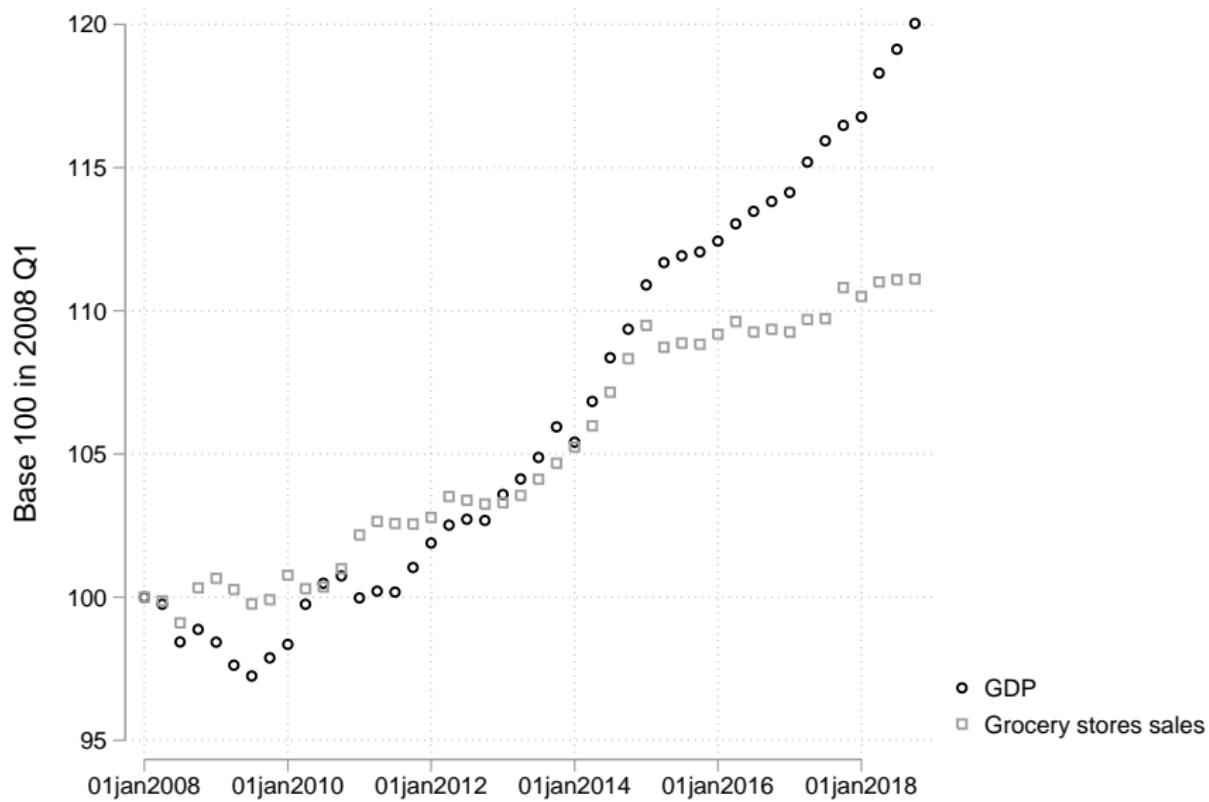
# Conclusion

- ▶ Work in progress
- ▶ Initial evidence that the increase in competition at the top might not benefit the lower-income households
  1. Small barcode-price increase on top of inflation 2 years after
  2. Small variety decrease

Next steps:

- ▶ Extend the reduced-form analysis beyond produce and frozen departments, for more Whole Foods store (more organic stores)
- ▶ Elaborate on model.

## GDP vs grocery store sales in real terms, 2008-2018



Source: FRED St Louis Fed

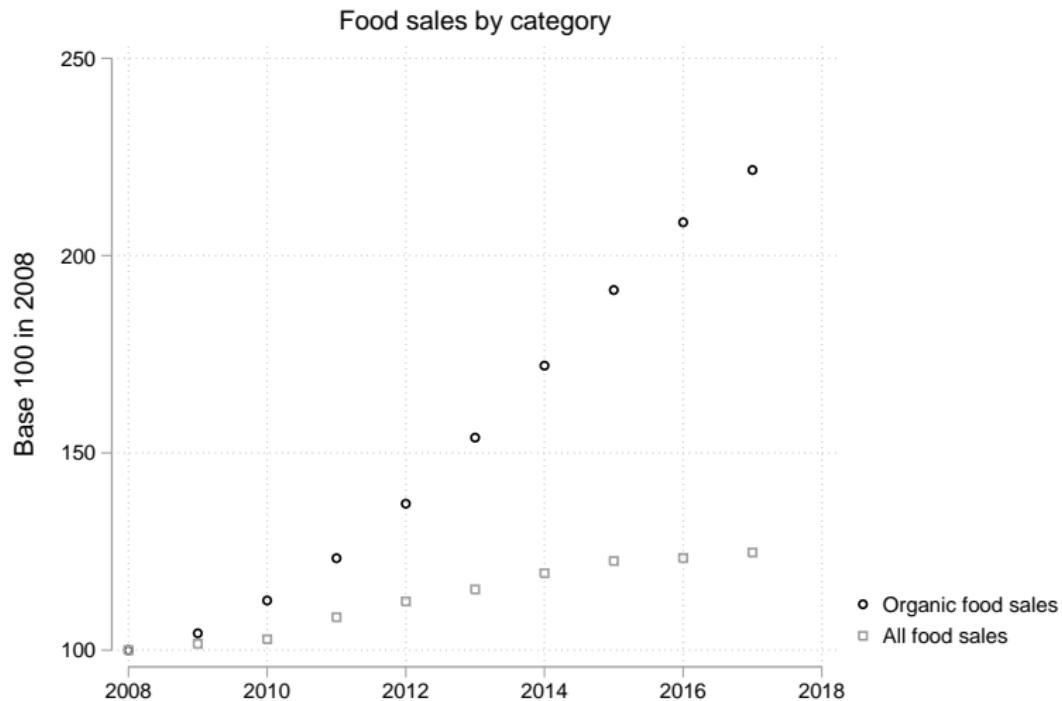
# The organic price premium

	(1)	(2)	(3) Log price	(4)	(5)	(6)	(7)
organic	0.204*** (89.28)	0.278*** (131.29)	0.292*** (147.40)	0.294*** (160.12)	0.293*** (160.32)	0.287*** (157.35)	0.269*** (149.04)
Group FEs	No	Yes	No	No	No	No	No
Module FEs	No	No	Yes	No	No	No	No
Product FEs	No	No	No	Yes	Yes	Yes	Yes
Date FEs	No	No	No	No	Yes	Yes	Yes
County FEs	No	No	No	No	No	Yes	No
Store FEs	No	No	No	No	No	No	Yes
N	7926459	7918604	7918604	7918604	7918604	7918604	7918604
r <sup>2</sup>	0.00100	0.143	0.260	0.409	0.412	0.415	0.430

t statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

# All vs organic food sales in real terms, 2008-2018



Source: Organic Trade Association

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