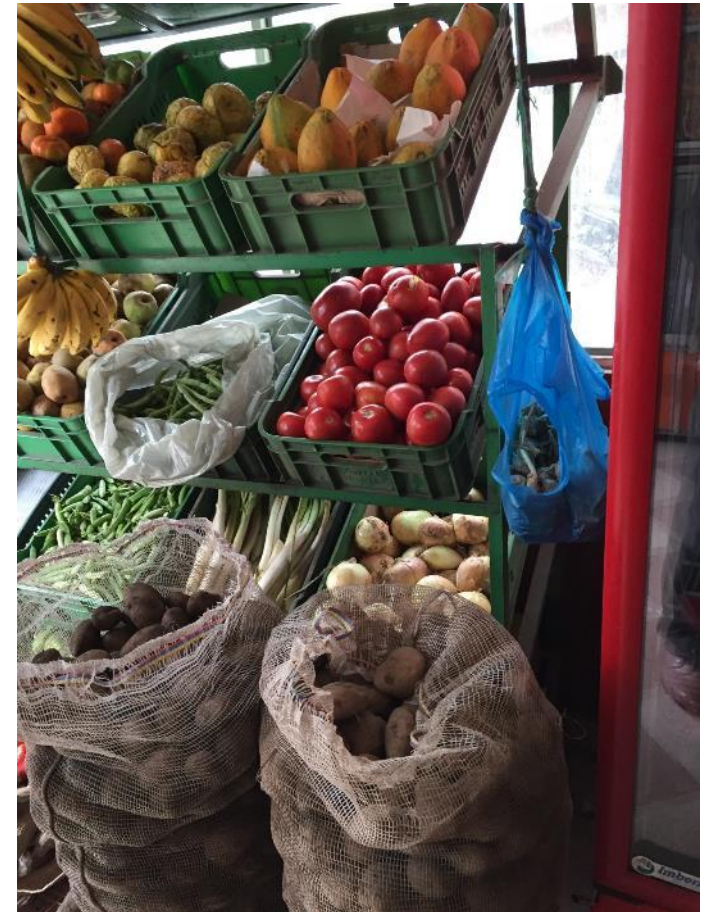


Shortening Supply Chains: Experimental Evidence from Fruit and Vegetable Vendors in Bogota's Slums

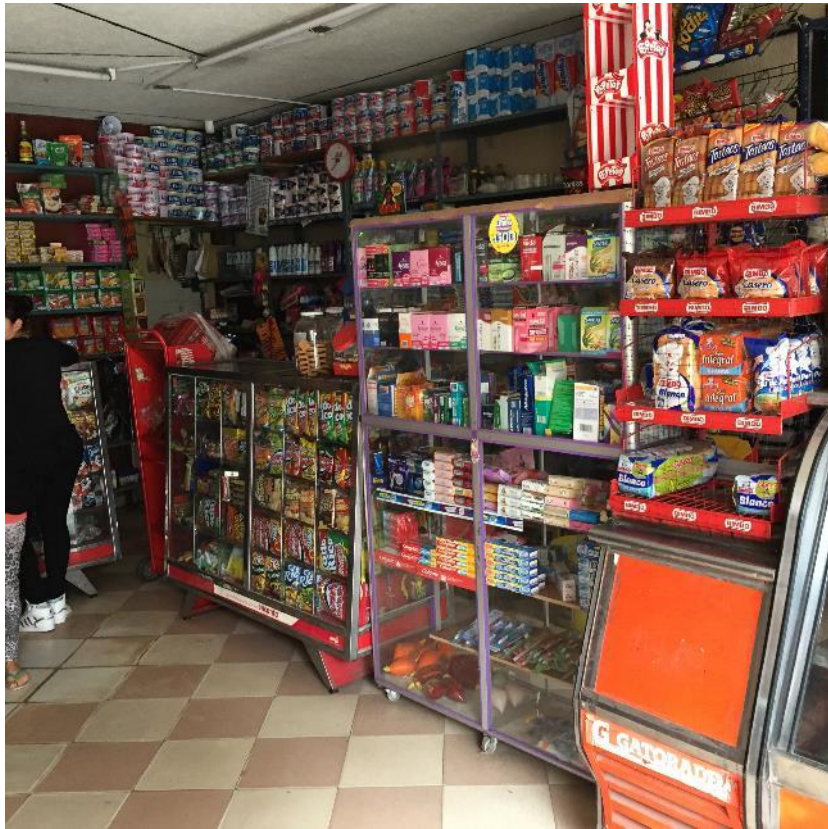
Leonardo Iacovone
David McKenzie



Two very different supply chains facing small retail stores in developing countries

- Non-perishable branded products

– store-door delivery to some of the most remote places on the planet



- Fresh fruit and vegetables

– less efficient supply chains that often end in centralized wholesale markets, requiring substantial travel and cost for firm owners to buy



The Status Quo: *Corabastos*



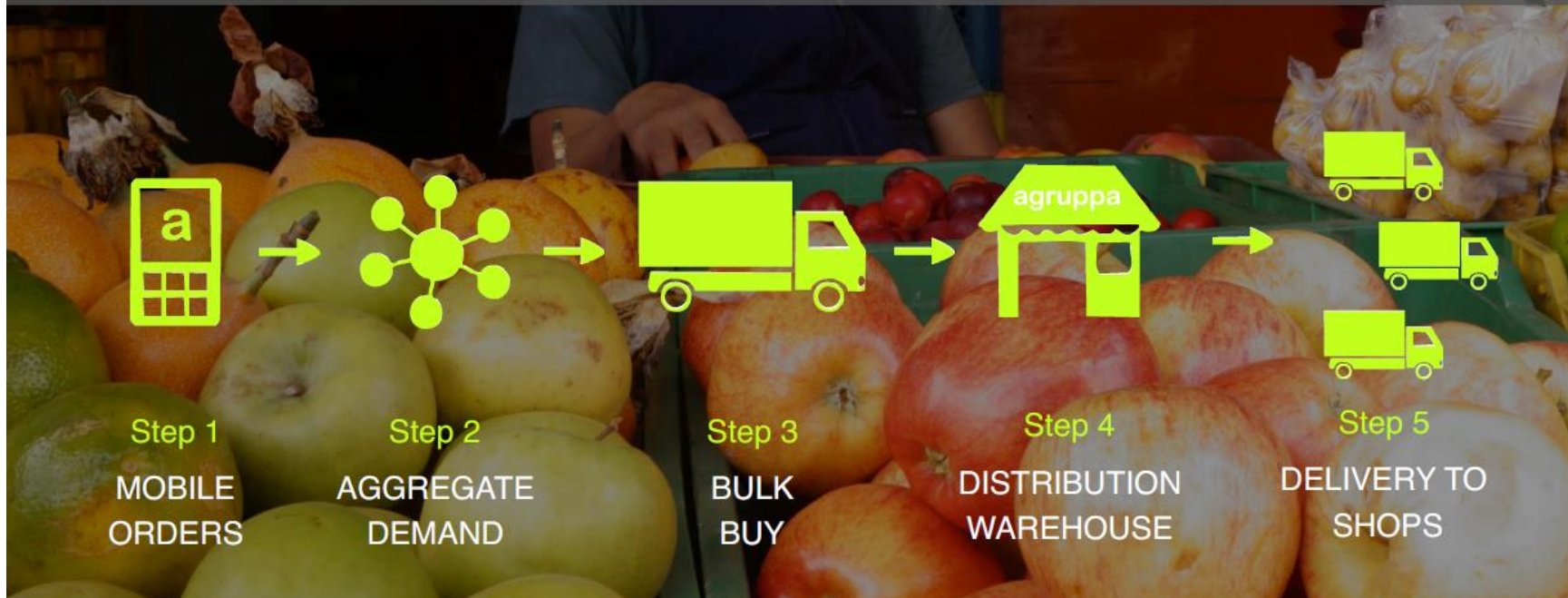
Status Quo for retail shop owners

- Firms open 7 days a week, typically 7am-9pm
- Before starting this 14 hour day, owners go to Corabastos (97% buy from here)
 - Median owner wakes up at 4:30am, spends 20 minutes travelling to Corabastos, spends 2 hours shopping there, then 25 minutes travelling back.
 - On average, firms spend more than 12 hours per week travelling to and shopping at market
 - Also monetary costs: spend about 25,000 pesos (~\$9) per day on transport costs, *cotero* and market exit fees.

Social Enterprise Solution: shorten supply chain from farmer to retail shop

2. ABOUT AGRUPPA

Agruppa uses **mobile phones** aims to **aggregate demand of small vendors** in low-income neighborhoods, creating daily **collective orders** at **wholesale prices**, with **discounts of up to 30%** transferable to vendors and their end consumers.



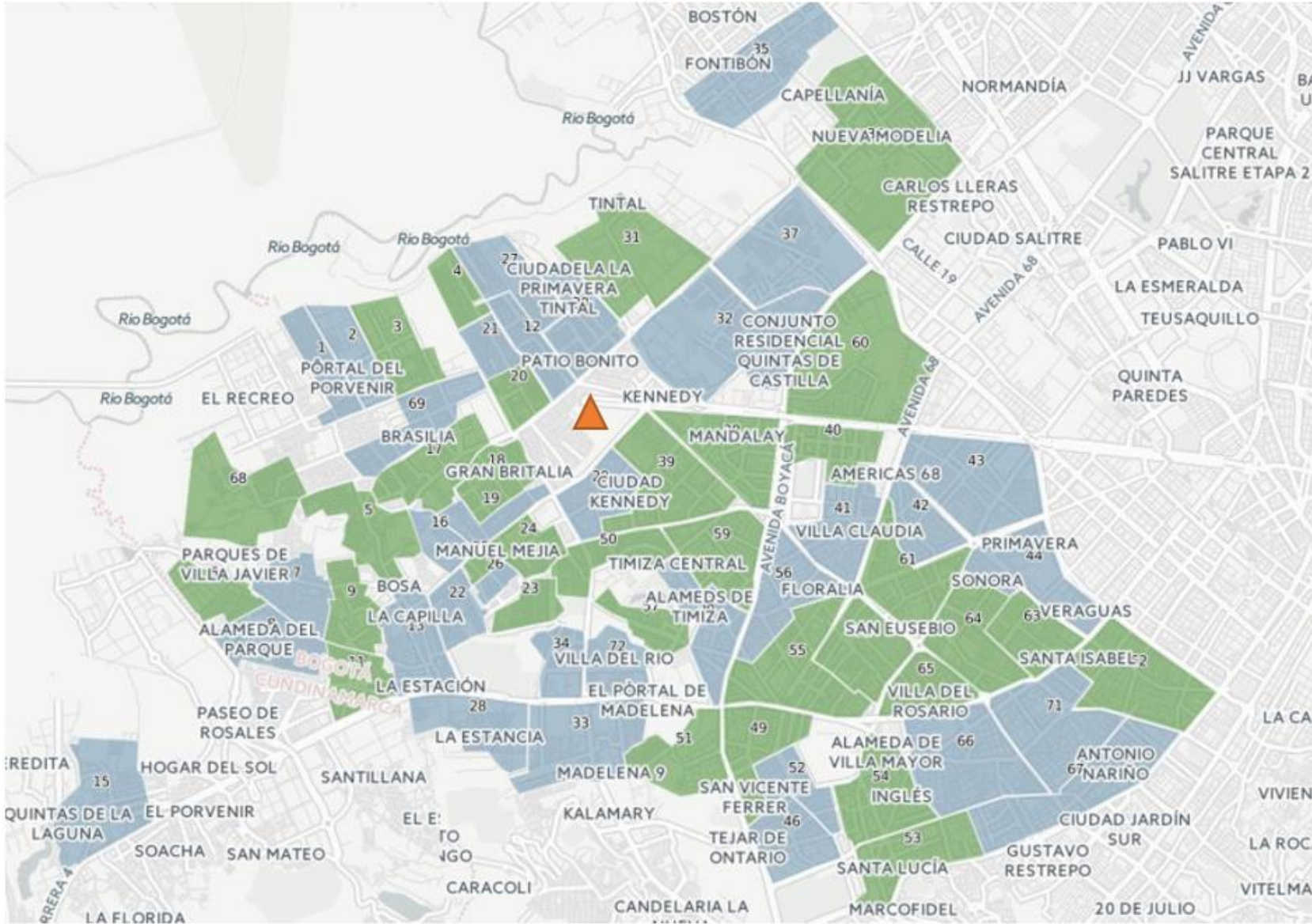
Social enterprise goals

- Reduce time and cost store owners spend travelling to central markets
- Improve work-life balance of store owners
- Lower the cost of fresh produce to store owners
- Lower the prices of fresh produce to consumers
- Develop a scalable and self-sustaining business model to do this

Our primary research questions

- Can the technological solution offered by Agruppa overcome coordination issues among firms to **reduce the amount of time and cost** they spend travelling to purchase inventories?
- Does the technology **lower the cost firms pay** for their inventories?
- Are lower costs **passed onto consumers in terms of lower prices**?
- Do the lower costs and incomplete pass-through or elastic demand result in **higher sales and higher profits** for firms?
- **Do non-participating firms lose sales** as a result of their competitors having lower prices or longer opening hours?

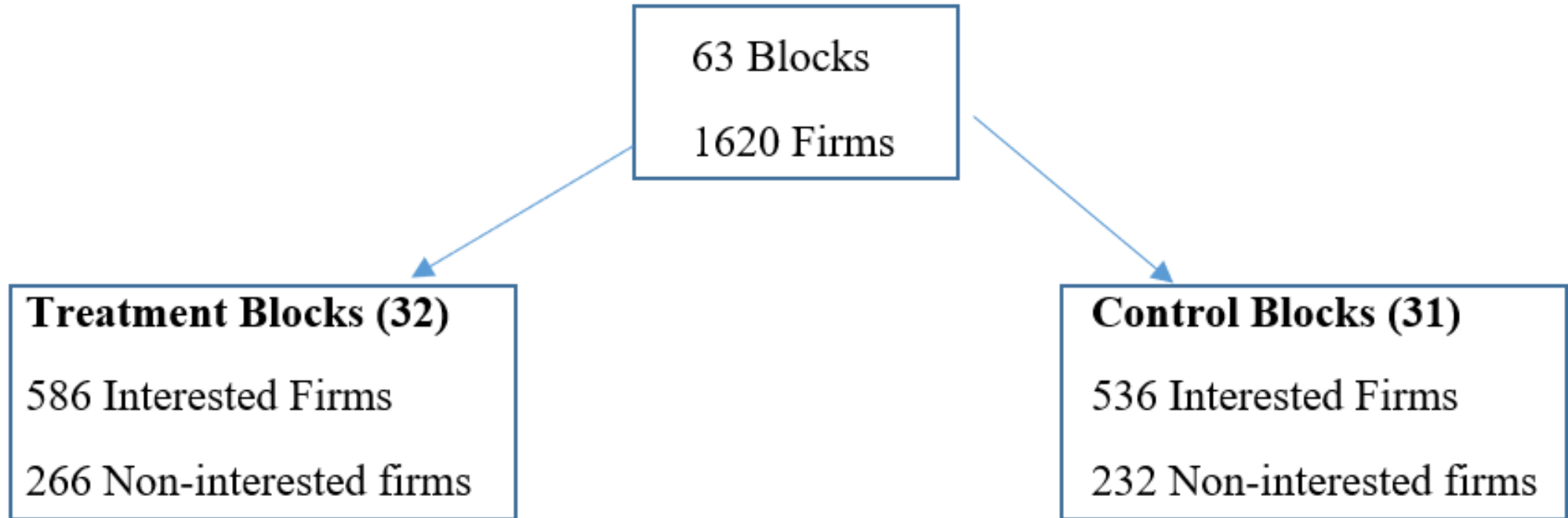
Block-level RCT: Treatment blue, Control green



Block has 25 vendors on average

Sample size

Study Sample



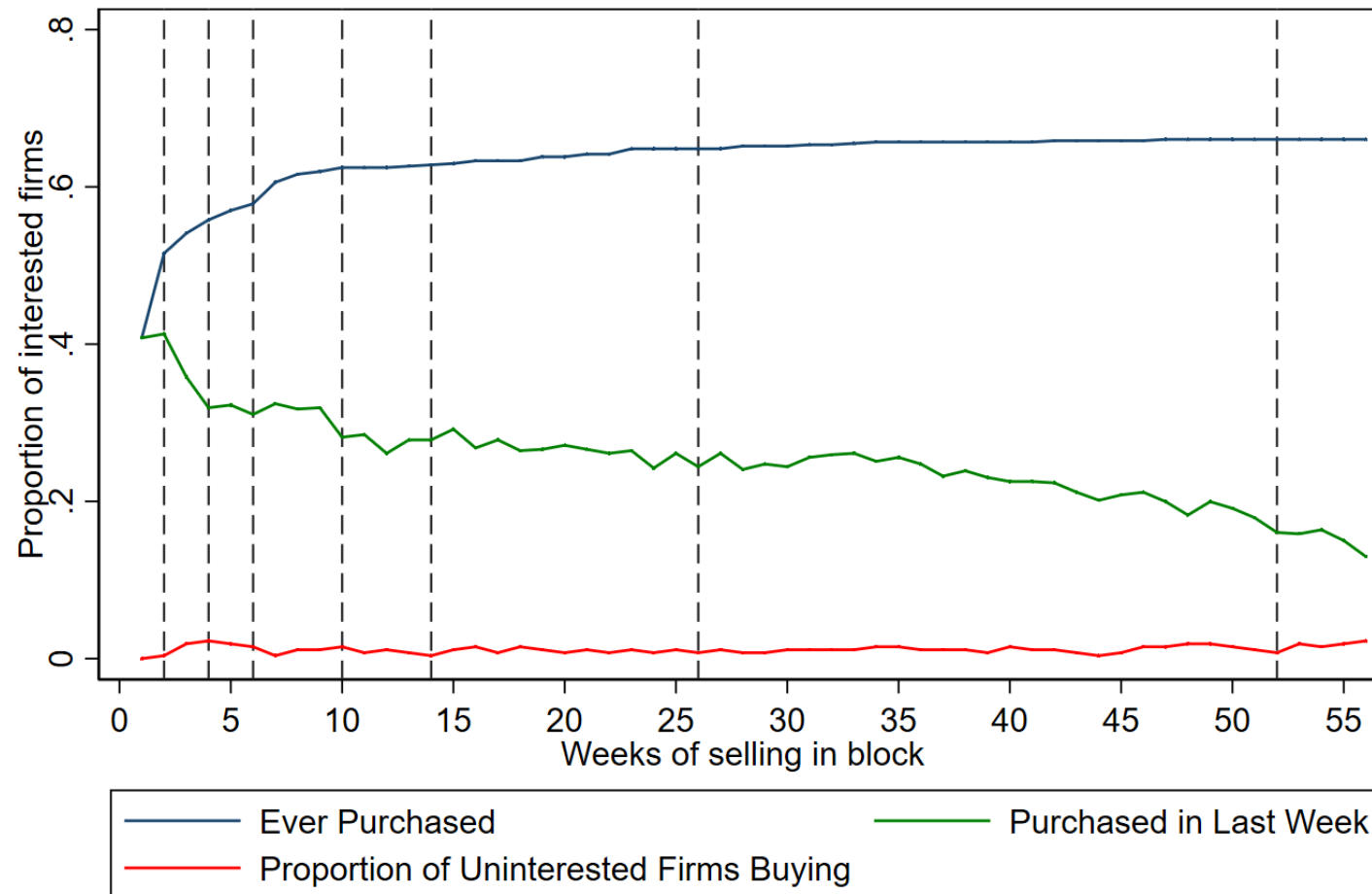
Baseline characteristics

- Owners
 - Average age 43, 32% female, 49% no more than primary education
 - Only 51% willing to say household income: median \$324/month, 39% below national poverty line
- Firms
 - Located an average of 4km from Corabastos, 50m from nearest competitor
 - Typically sell wide range of products: grains, eggs, bottled drinks, household and cleaning items
 - But Agruppa core 5 products account for 52% of sales
 - Change prices of fruit and vegetables very frequently – 76% daily
 - Median in business 8 years
 - Most businesses have only the owner working: only one-third have any paid employees, and only 21% any unpaid employees.
 - Most don't know prices or costs of other businesses

[illegible]

Take-up and retention

- 52% of interested customers purchase in first 2 weeks, 66% of interested firms made a purchase; but only 24% using it after 6 months

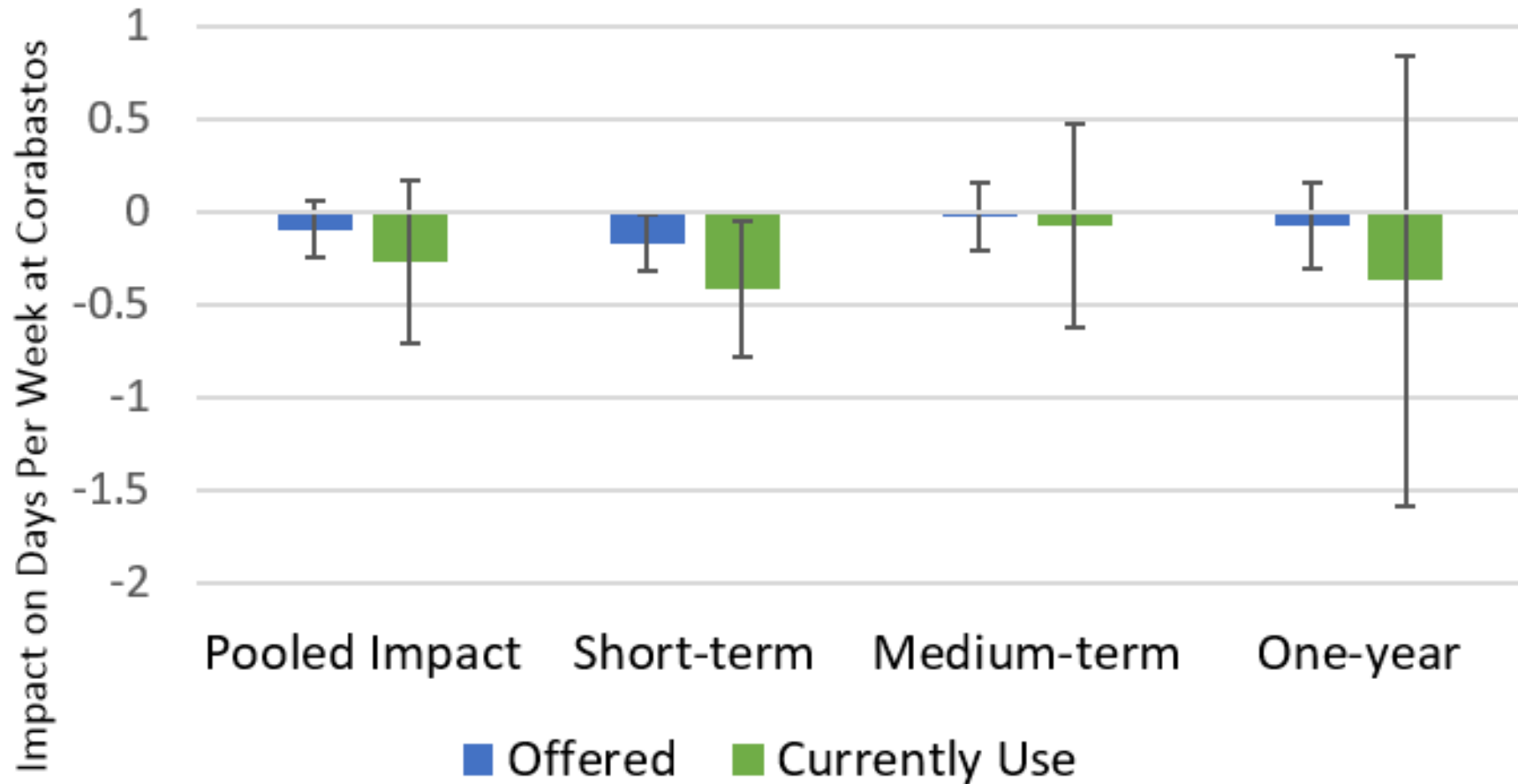


Follow-up data

- Admin data on Agruppa sales
 - High-frequency surveys: 5 surveys taken at 2, 4, 6, 10, and 14 weeks
 - 6 month follow-up
 - 12 month follow-up
-
- Response rate averages 79% interested firms, 69% uninterested firms, 1-2 p.p. difference by treatment status
 - High item non-response for profits and sales - crime/insecurity

Do they travel less?

Impact on Number of Days Going to Corabastos



Control mean is 4.7 days per week

So 0.4 day reduction is 8.7%

Pooled impact is over 12 months; short-term impact over first 6 weeks, medium-term is average over 10, 14, and 25 weeks.

	Average impact over all 7 rounds	Short-term impact weeks 2,4,6	Medium-term impact weeks 10,14,26	One-year impact week 52
PANEL C: IMPACT ON TOTAL WEEKLY CORABASTOS TRAVEL TIME				
ITT: Assigned to Treatment	-37*** (14)	-40** (16)	-23 (16)	-67* (34)
LATE: Used Agruppa in Last Week	-113*** (40)	-98*** (38)	-75 (51)	-425* (219)
Control Group Mean (minutes)	729	727	716	769
Sample Size	4923	2185	2002	736
PANEL D: IMPACT ON WORK-LIFE STRESS				
ITT: Assigned to Treatment			-0.037*** (0.009)	-0.014 (0.017)
LATE: Used Agruppa in Last Week			-0.130*** (0.033)	-0.082 (0.093)
Control Group Mean of Index			0.263	0.269
Sample Size			851	831

Did offering Agruppa change product availability, prices and mark-ups?

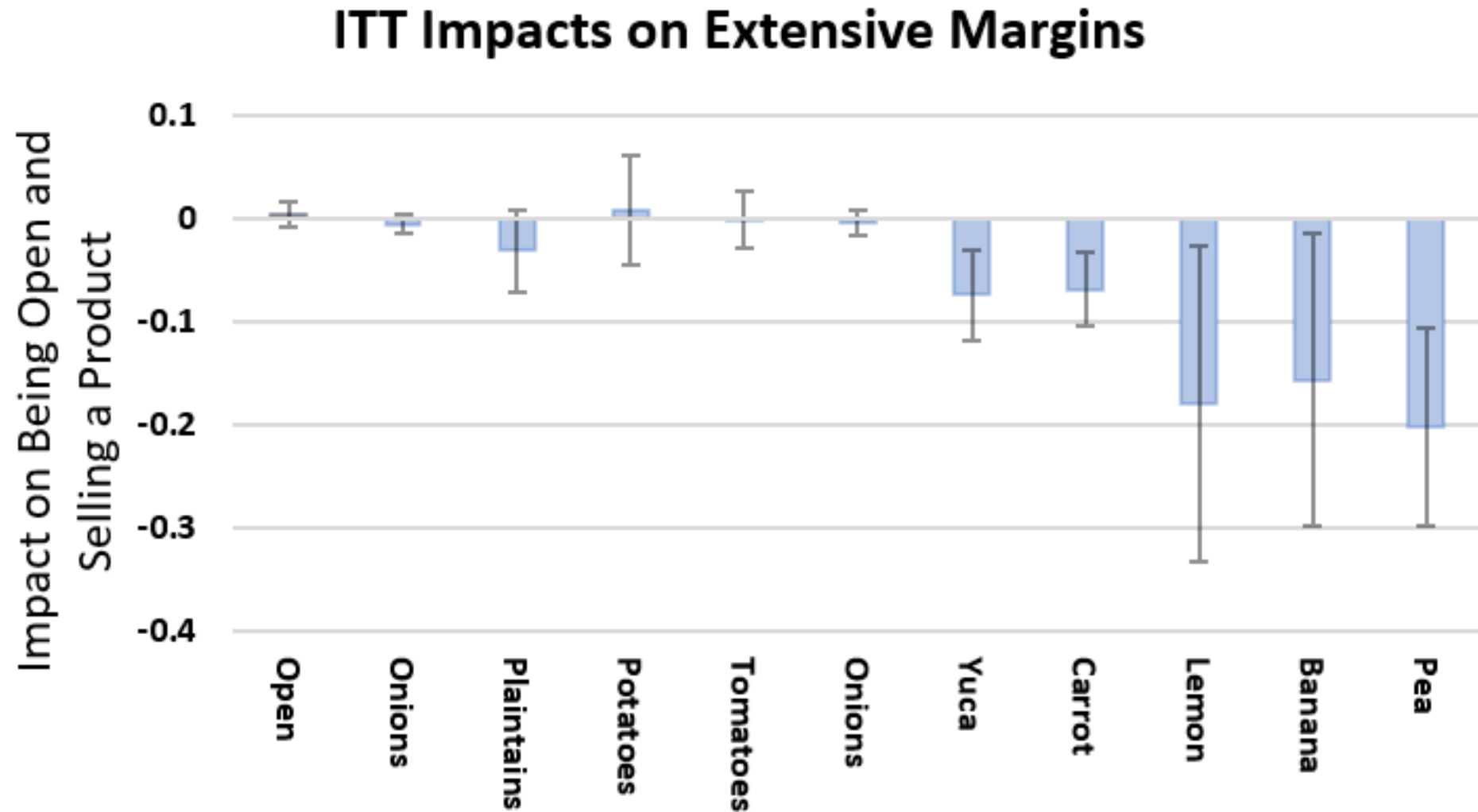
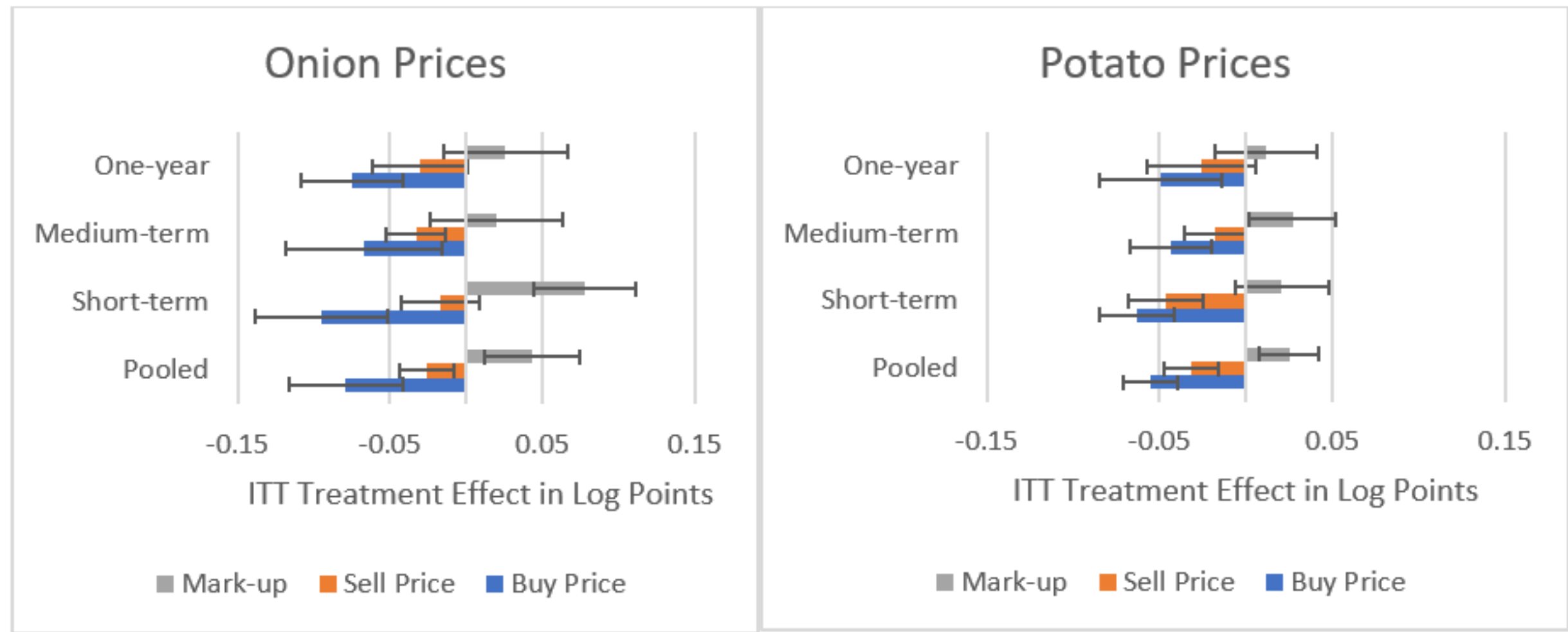


Figure 4: Estimated Intention-to-Treat Impacts on Purchase and Sale Prices, and Mark-ups of Core Agruppa Products



What was the impact on overall sales and profits?

Table 5: Impact on Sales and Profits

	Core Five Agruppa Products		From All Products	
	Log Sales in past day	Log mark-up profit in past day	Log Sales in past week	Log profits in past week
Panel A: Pooled over all Rounds				
Offered Agruppa	-0.001 (0.048)	-0.000 (0.045)	-0.092** (0.044)	-0.075 (0.050)
Mean	12.404	11.250	14.670	12.726
Sample Size	4593	4240	3132	2836
Panel B: Short-term (weeks 2, 4, 6)				
Offered Agruppa	-0.008 (0.075)	0.030 (0.074)	-0.090* (0.051)	-0.137** (0.063)
Mean	13.132	11.961	14.638	12.669
Sample Size	1959	1774	1229	1204

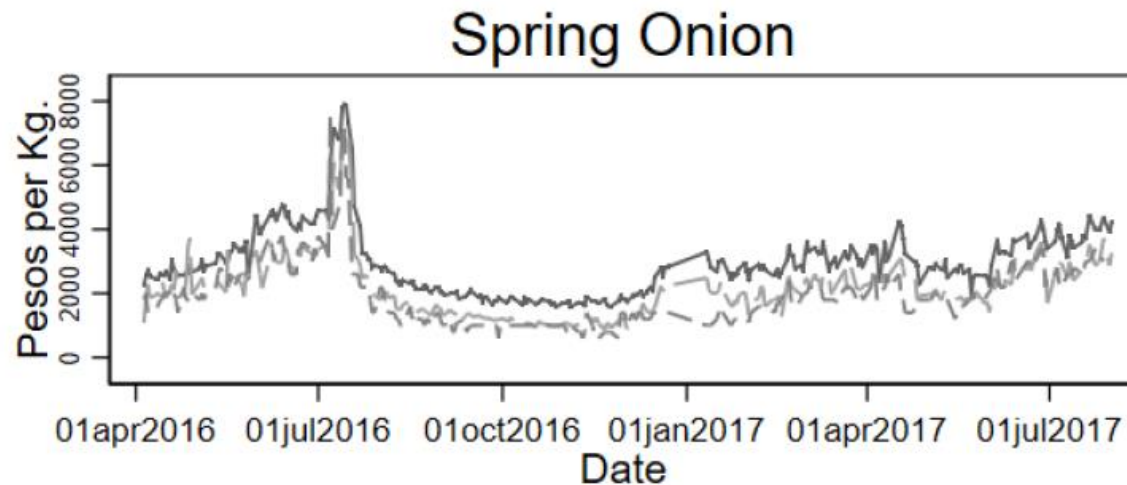
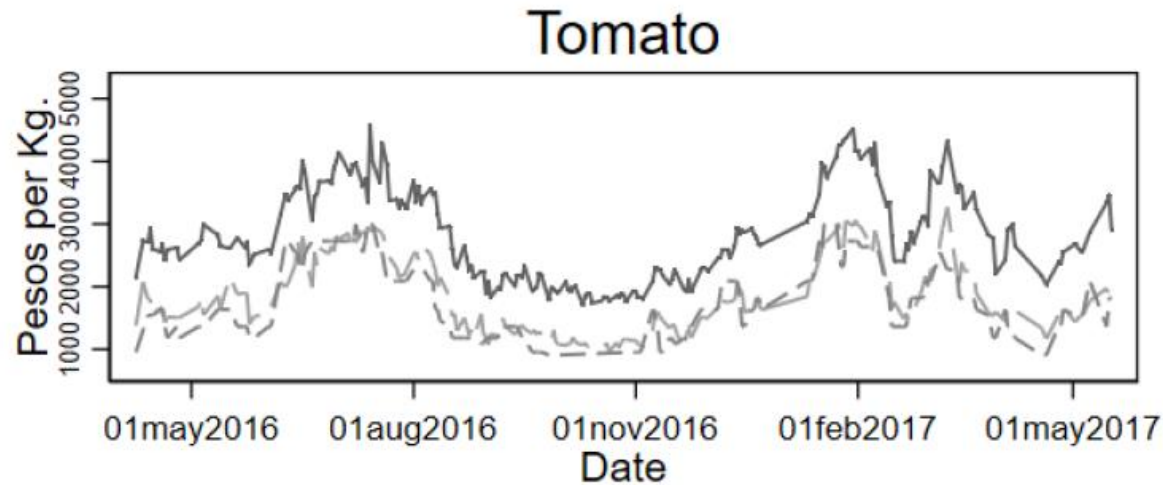
What was the competitive response among uninterested firms?

Table 6: Spillover impacts on Uninterested Firms

	Sale Prices of Agruppa Products					Log Sales	Log Weekly Sales	Log Weekly Profits
	Onions	Plantains	Potatoes	Tomatoes	Spring Onion	Agruppa products		
Panel A: Pooled over all Rounds								
In block assigned to Agruppa	-0.044*** (0.016)	-0.019 (0.014)	-0.022** (0.009)	-0.026** (0.012)	-0.040*** (0.013)	0.078 (0.064)	0.007 (0.084)	-0.055 (0.081)
Mean	7.648	7.860	7.192	5.329	7.833	12.341	14.505	12.569
Sample Size	2254	1790	1431	1589	2217	1522	959	862
Panel B: Short-term (weeks 2, 4, 6)								
In block assigned to Agruppa	-0.070*** (0.018)	0.003 (0.020)	-0.041*** (0.013)	-0.036 (0.025)	-0.053** (0.020)	0.106 (0.082)	-0.057 (0.118)	-0.104 (0.098)
Mean	7.693	7.974	7.356	7.839	7.874	13.205	14.573	12.510
Sample Size	988	778	659	530	960	642	383	371

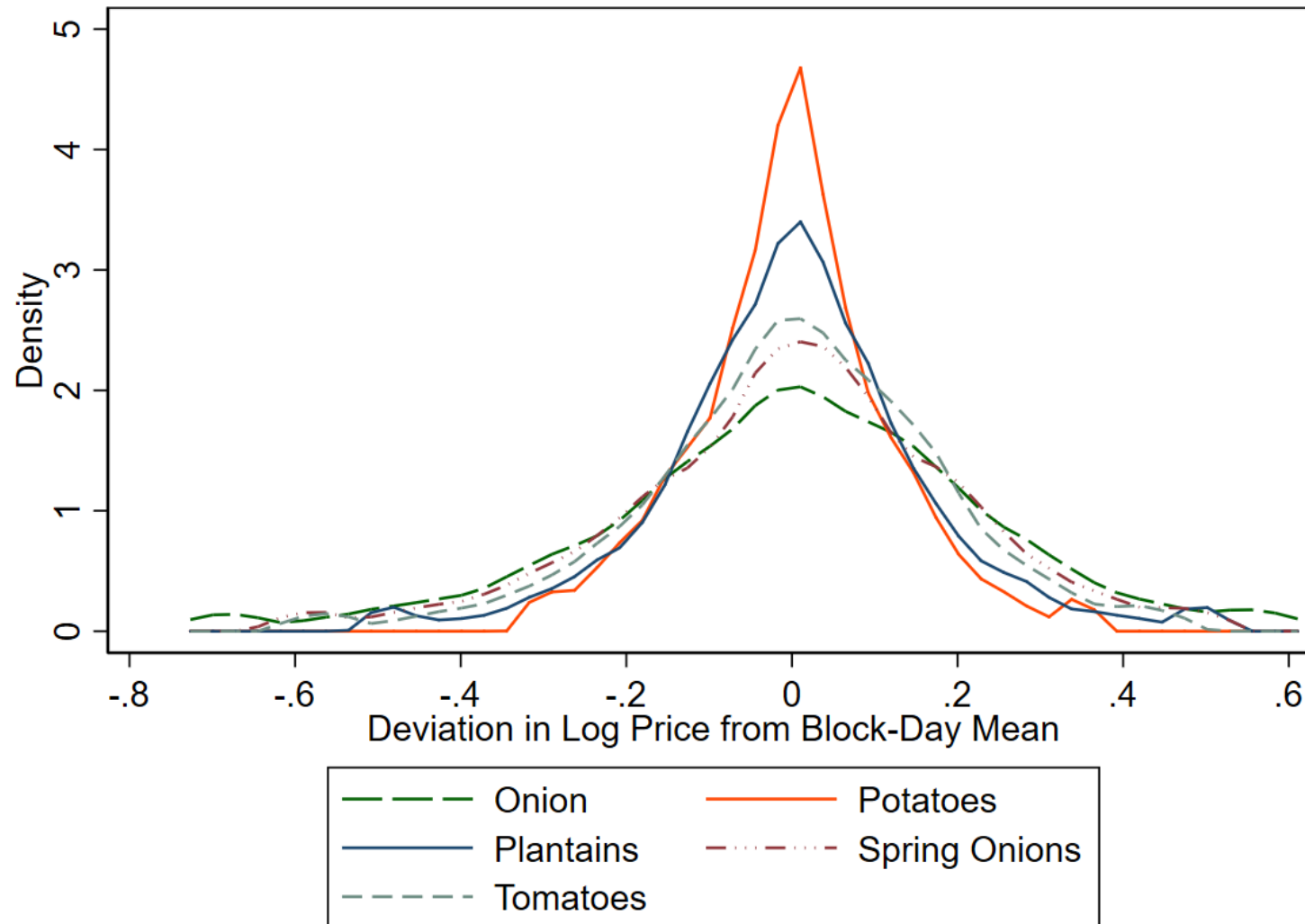
What can we learn from this about firm behavior?

Agruppa prices closely track Corabastos prices



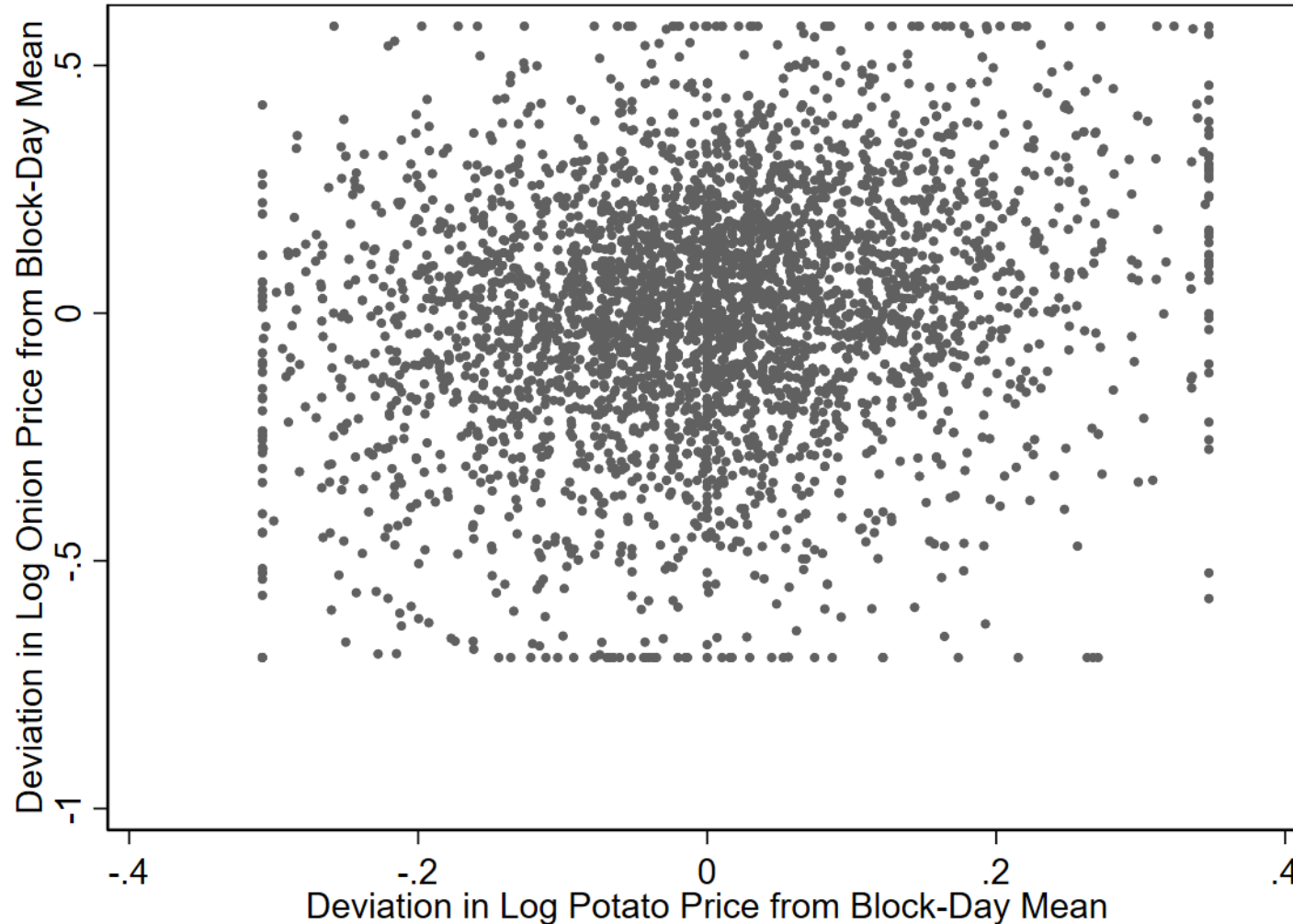
— Retail Sale Price
- - - Retail Purchase Price
- - - Corabastos Wholesale Price

Substantial cross-sectional price dispersion

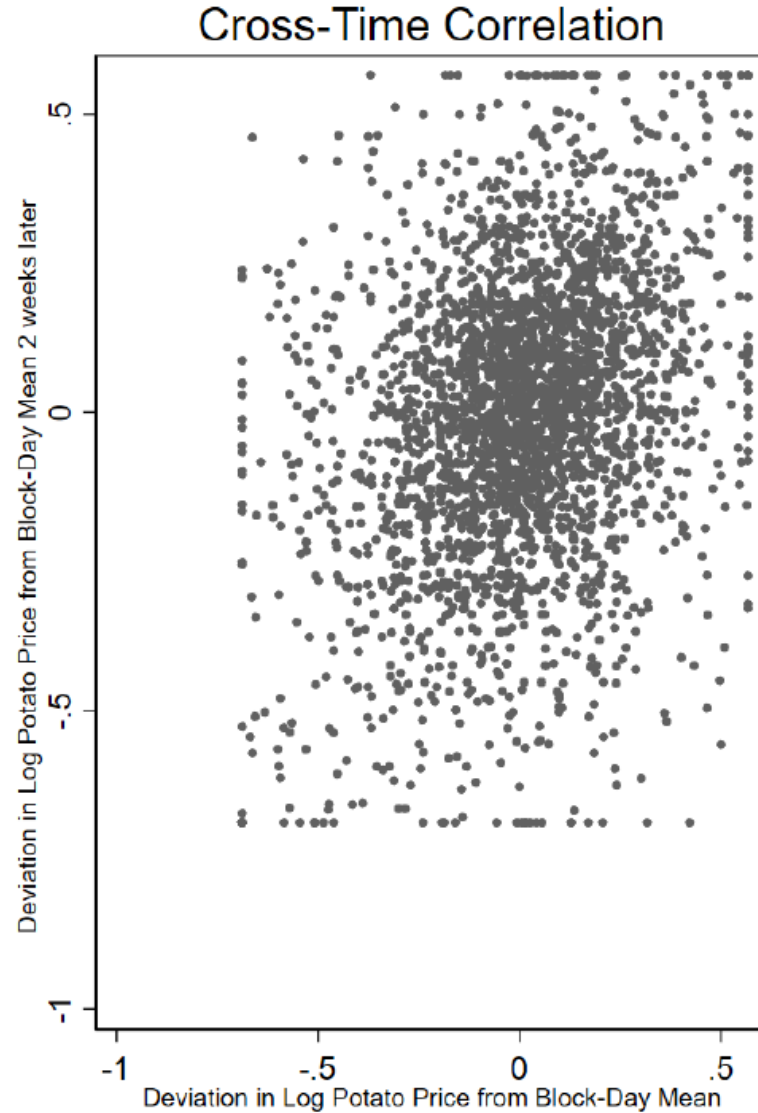


i.e. more than 50 percent
difference in prices stores in the
same block sell onions for on the
same day

But cheap for one good doesn't mean cheap for another at same point in time



And cheap today doesn't mean cheap
2 weeks from now



Implications

- Lots of price dispersion for these fruit and vegetable products – up to 50%
- But gains to customer from acquiring information on cheapest price limited since “cheap” varies by product and by day
- This reduces scope for stores to gain market share by small reduction in prices – helps explain why stores stay in business, and why cost savings from Agruppa doesn't allow big gain in sales

What happened to Agruppa?

- Closed down January 23, 2018
- Were very much a start-up when we started working with them
 - Had done proof-of-concept with 20 stores in 2014; won SME ideas competition in 2015 and attracted social venture funding
 - Lots of typical learning issues in launch and scale-up
 - App delayed in being developed – used Whatsapp, phone orders, driver orders
 - Didn't have a CRM – found it hard to track customer base; and so busy on operations that not having time to talk to customers lost
 - Big challenge was economies of scale issue:
 - Lose money to start with, can only drive down prices by achieving scale in volume
 - Have to start with small set of products, but this makes it hard to be attractive to multi-product firm
 - Harder forming contracts with farmers than anticipated – farmers wouldn't do forward contracts
 - Had forecast break-even of 1,500 stores – but ran out of money when operating at about 500

Conclusions: Where are we on our primary research questions?

- Can the technological solution offered by Agruppa overcome coordination issues among firms to reduce the amount of time they spend travelling to purchase inventories? **Yes, but not as much as we hoped, 93 min/week**
- Does the technology lower the cost firms pay for their inventories? **Yes, 6-8% ITT/13-20%LATE**
- Are lower costs passed onto consumers in terms of lower prices? **Only partial pass-through, prices fall 1-3%, but mark-ups rise 3-5%.**
- Do the lower costs and incomplete pass-through or elastic demand result in higher sales and higher profits for firms? **No, if anything sales fall due to loss of other products**
- Do non-participating firms lose sales as a result of their competitors having lower prices or longer opening hours? **Don't detect impact, but they responded by lowering their prices**

The underlying idea seems to be catching on...



Benefits for Farmers

- Guaranteed Market
- Transparent pricing as seen on price boards
- Farming advice
- Resources and access to credit from Twiga's partners

Benefits for Vendors

- Fair Prices
- Quality Produce
- Free Delivery
- Assured food safety through easy tracking
- Access to credit from Twiga's partners

Twiga has grown to work with over 13,000 farmers and 6,000 vendors in Kenya. The company initially started off matching vendors to banana farmers, but now works with other produce such as tomatoes, cabbage, mango, potato and onion.

FRUBANA RAISES US\$12M OVER TWO ROUNDS

June 20, 2019



Colombian agtech **Frubana** raised US\$12m over two rounds. monashees, Y Combinator, Kairos and GE32 Capital invested US\$2m pre-seed, and Kairos led a US\$10m seed round. Frubana was founded in 2018 by **Rappi** veteran Fabián Gomez.

(**Latam List**) **Frubana** is a Colombian agrotech platform that eliminates intermediaries in the food industry between producers and buyers, connecting restaurants directly with producers. The startup has raised a total of \$12M in two rounds. The \$2M Pre-Seed round was led

by **Y Combinator**, **Monashees**, **Kairos**, **GE32 Capital**, and the following \$10M Seed round was raised from Kairos earlier this year.

“Technology allows us to scale, and scaling brings efficiency. Specifically, we have built predictive technology that facilitates routing, operations, and purchasing,” said Fabián Gomez, former Expansion Leader at Rappi, and now CEO and founder at Frubana.

In less than one year of operations, Frubana created 100 jobs, has a monthly growth rate of 50%, and provides services to over 1000 active clients.