Can Governments Affect Tax Incidence? Evidence from a Large VAT Cut in Argentina

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9th Annual Mannheim Taxation Conference

September 9, 2022
German consumer groups demand VAT cut on fresh food

The Federation of German Consumer Organizations has called for the abolition of VAT on fruits, vegetables and legumes to cushion the impact of rising food prices.

Published: 21 April 2022 12:16 CEST

With inflation at a forty-year high and the price of groceries continuing to go up, consumer and social associations are now calling for value-added tax (VAT) on certain foods to be completely abolished.
Motivation

1. VAT has become a common policy tool used to affect the economy
   - In the aftermath of the Great Recession (e.g., UK in 2009)
   - Especially after COVID (e.g., the UK, Germany, Norway, Austria, Belgium, Bulgaria, Greece, Colombia, Peru, etc)

2. Governments often state specific goals when cutting VAT rates:
   - (i) ↓ $P$ and ↑ demand, (ii) ↑ cash flow/profits, (iii) ↑ wages

3. Implicitly assume that govts can affect tax incidence. Yet little is done to achieve these policy goals
VAT incidence is complicated

**Standard model:** pass-through of VAT changes to prices
- No role for the government!
- Determined by the relative magnitude of demand/supply elast
VAT incidence is complicated

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- No role for the government!
- Determined by the relative magnitude of demand/supply elast

In practice, it’s much more complicated:

- **Limited vs full pass-through** (Benzarti & Carloni, 2019; Kosonen, 2015; Gaarder, 2018; Buettner & Madzharova, 2021; Fuest et al, 2021)
- **Asymmetry and price hysteresis** (Benzarti et al, 2020)
- **Heterogeneity** (by type of firm) (Harju et al, 2018)
VAT incidence is complicated

Standard model: pass-through of VAT changes to prices

- No role for the government!
- Determined by the relative magnitude of demand/supply elast

In practice, it’s much more complicated:

- Limited vs full pass-through (Benzarti & Carloni, 2019; Kosonen, 2015; Gaarder, 2018; Buettner & Madzharova, 2021; Fuest et al, 2021)
- Asymmetry and price hysteresis (Benzarti et al, 2020)
- Heterogeneity (by type of firm) (Harju et al, 2018)

⇒ These issues substantially complicate using temporary VAT cuts as a policy tool. Can governments do something about it?
Can governments affect tax incidence? Yes.

This paper

- We empirically show that tax incidence can be affected by govs in spite of the relative magnitude of tax elasticities

- We exploit a **large and temporary VAT cut** on basic food in Argentine supermarkets along with a variety of govt “mandates”

- **Goal:** contain the impact of a $\sim24\%$ currency devaluation on prices following a surprising presidential primary election

  ⇒ Ensuring that the VAT cut was passed on to prices was essential
Reform: a 4.5-month long VAT holiday on basic food

- **VAT cut**: unanticipated, large, salient, and temporary
  → Govt urged *full* pass-through to P

- **VAT increase**: back to 21%
  → Govt imposed caps on how much P could increase (0%, 7%, or no cap)

- **Price monitoring system**:  
  → In large chain supermarkets only

![Timeline chart showing VAT rate changes from Aug 16, 2019 to Jan 1, 2020.]

- Temporary 0% VAT on 13 categories of Basic Food Basket
- Rest of goods taxed at 21%
- Δ VAT
- 4.5 months
Barcode-level **scanner data** with P and Q

### Treatment
Temporary 0% VAT

<table>
<thead>
<tr>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooking oils (sunflower, corn, mix)</td>
</tr>
<tr>
<td>Rice</td>
</tr>
<tr>
<td>Dried pasta</td>
</tr>
<tr>
<td>Tea, Yerba Mate, and Mate Cocido</td>
</tr>
<tr>
<td>Sugar</td>
</tr>
<tr>
<td>Canned vegetables and beans</td>
</tr>
<tr>
<td>Canned fruits</td>
</tr>
<tr>
<td>Corn flour <em>(polenta)</em></td>
</tr>
<tr>
<td>Wheat flour</td>
</tr>
<tr>
<td>Fluid milk <em>(whole/skim)</em></td>
</tr>
<tr>
<td>Yogurt <em>(whole or skim)</em></td>
</tr>
<tr>
<td>Eggs</td>
</tr>
<tr>
<td>Bread</td>
</tr>
<tr>
<td>Breadcrumbs and/or batter</td>
</tr>
</tbody>
</table>

### Control
Standard 21% VAT

<table>
<thead>
<tr>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other cooking oils (olive, soy, canola)</td>
</tr>
<tr>
<td>Rice-based meals</td>
</tr>
<tr>
<td>Breakfast cereal</td>
</tr>
<tr>
<td>Coffee</td>
</tr>
<tr>
<td>Salt</td>
</tr>
<tr>
<td>Herbs, Spices, &amp; Seasonings</td>
</tr>
<tr>
<td>Dulce de leche <em>(caramel)</em></td>
</tr>
<tr>
<td>Jam and Jelly</td>
</tr>
<tr>
<td>Other flours</td>
</tr>
<tr>
<td>Crackers, Biscuits, Toasts, Puddings</td>
</tr>
<tr>
<td>Chocolate</td>
</tr>
<tr>
<td>Mayonnaise</td>
</tr>
<tr>
<td>Vinegar</td>
</tr>
<tr>
<td>Dried legumes and beans</td>
</tr>
</tbody>
</table>

Notes: Wheat flour and bread are taxed at the reduced rate of 10.5%.
Data: Grocery Stores

[1] **Retail scanner data** *(Scentia)*
  - **High-frequency barcode-level data**
    - Large chains (e.g., Walmart): *weekly freq* (2,317 stores)
    - Small independent stores: *monthly freq* (800 stores)
    - Period: January 2018 - June 2021 (182 weeks, 42 months)
    - Vars: barcode, description, price, quantity, total sales, 10 regions
      E.g., *Twinings English Breakfast Tea – 25 Bags*

[2] **Panel of shoppers**
  - To analyze distributional effects (8 income groups)
    - Period: January 2018 - June 2021 - monthly frequency

  - We built a database with all barcodes and regulated prices from *'Precios Cuidados'* and *'Productos Esenciales'*
Empirical strategy: Diff-in-Diffs

Run a dynamic DiD comparing T (0% VAT) and C (21% VAT):

\[ Y_{it} = \alpha_i + \gamma_t + \sum_{t \neq 2019w32} \beta_t D_{it} + \epsilon_{it} \]

- \( Y_{it} \): **PRICE** (weighted average across stores) or **QUANTITY** (total sold)
- \( Y_{it}^* = 100 \) (outcomes normalized to 100 for each barcode \( i \) on 2019w32)
- \( D_{it} \): indicator for whether barcode \( i \) is treated in week \( t \)
- \( \beta_t \): estimate the difference btw T and C relative to \( t^* = 2019w32 \)
- We use a balanced panel of \( \approx 5,000 \) barcodes
The VAT cut was very salient

August 16, 2019
(1 day post announcement)
...and so was the VAT increase

January 2, 2020
(2 days after VAT was reintroduced)
It was also highly publicized in stores (mandatory banners and tags)
Price responses pooling large and small stores
Price levels in Large + Small supermarkets

- **Removal VAT from 21% to 0%**
- **Re-introduction VAT from 0% to 21% + caps**

### Price index
(2019 July = 100)

<table>
<thead>
<tr>
<th>Year</th>
<th>Control</th>
<th>Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019m1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019m3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019m5</td>
<td></td>
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<tr>
<td>2019m7</td>
<td></td>
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<tr>
<td>2019m9</td>
<td></td>
<td></td>
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<tr>
<td>2019m11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020m1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020m3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Substantial pass-through of the VAT cut to prices (~60%)

Full pass $\Delta p$: -17.4 p.p.
Mean $\Delta p$: -10.5 p.p.

Removal VAT from 21% to 0%
Re-introduction VAT from 0% to 21% + caps

Mean $\Delta p$: -10.5 p.p.
Full pass $\Delta p$: -17.4 p.p.
Large vs small stores separately
Average pass-through of the VAT cut is 85% for supermarket chains and 35% for independent stores.
Average pass-through of the VAT cut is 85% for supermarket chains and 35% for independent stores.
Monitoring App (in large stores only!)
(Unintended) distributional consequences
Policy goal was to ensure that low-income households could still afford basic food

- Targeted goods more heavily consumed by the lowest deciles
But low-income people tend to shop at small supermarkets where price pass-through was limited!

Food expenditure by type of store (%)

<table>
<thead>
<tr>
<th></th>
<th>Small + specialized stores</th>
<th>Large supermarkets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>82</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>75</td>
<td>25</td>
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<tr>
<td>4</td>
<td>73</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>72</td>
<td>28</td>
</tr>
<tr>
<td>6</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>8</td>
<td>62</td>
<td>38</td>
</tr>
<tr>
<td>9</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>10</td>
<td>54</td>
<td>46</td>
</tr>
</tbody>
</table>
But low-income people tend to shop at small supermarkets where price pass-through was limited!

Food expenditure by type of store (%)

- VAT cut likely benefited richer households more
- Important policy implication when designing VAT cuts
VAT increase with govt-imposed caps
Capped VAT increase

- VAT rate effectively back to pre-holiday level of 21%
- But new govt limited the price increase with ≠ caps
  - **No caps**: Prices could ↑ up to 21%
  - **Caps**: Force incidence sharing

We show that govts can successfully limit VAT pass-through

### Treated: VAT back to 21%

<table>
<thead>
<tr>
<th>Categories</th>
<th>Δp cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil (sunflower &amp; mix)</td>
<td>9%</td>
</tr>
<tr>
<td>Oil (corn)</td>
<td>No cap</td>
</tr>
<tr>
<td>Rice (regular: long grain white)</td>
<td>7%</td>
</tr>
<tr>
<td>Rice (other: basmati, brown, organic)</td>
<td>No cap</td>
</tr>
<tr>
<td>Dried pasta</td>
<td>7%</td>
</tr>
<tr>
<td>Tea, Yerba Mate, and Mate Cocido</td>
<td>7%</td>
</tr>
<tr>
<td>Sugar</td>
<td>7%</td>
</tr>
<tr>
<td>Canned vegetables and beans</td>
<td>7%</td>
</tr>
<tr>
<td>Canned fruits</td>
<td>No cap</td>
</tr>
<tr>
<td>Corn flour</td>
<td>7%</td>
</tr>
<tr>
<td>Wheat flour</td>
<td>7%</td>
</tr>
<tr>
<td>Fluid milk (whole/skim)</td>
<td>0%</td>
</tr>
<tr>
<td>Yogurt (regular)</td>
<td>7%</td>
</tr>
<tr>
<td>Yogurt (other: w/cereal, fruit chunks)</td>
<td>No cap</td>
</tr>
<tr>
<td>Eggs</td>
<td>7%</td>
</tr>
<tr>
<td>Sliced Bread (white)</td>
<td>7%</td>
</tr>
<tr>
<td>Sliced Bread (rest)</td>
<td>No cap</td>
</tr>
<tr>
<td>Breadcrumbs and/or batter</td>
<td>10.5%</td>
</tr>
</tbody>
</table>
Goods with flexible prices exhibit an increase that is \( \sim \) twice that of goods subject to the 7% cap.

**Diagram:** 7% cap vs No cap

Price effect (p.p.)

- VAT Restored
- 7% cap

Timeline:
- 2019w19
- 2019w27
- 2019w35
- 2019w43
- 2019w51
- 2020w7
Goods with flexible prices exhibit an increase that is ~twice that of goods subject to the 7% cap.

Recall density

7% cap vs No cap

Price effect (p.p.)

2019w19 2019w27 2019w35 2019w43 2019w51 2020w7
Capped VAT increase: rice

Regular Rice (7% cap) vs Other Rice (no cap)
Capped VAT increase: rice

Regular Rice (7% cap) vs Other Rice (no cap)

<table>
<thead>
<tr>
<th>Year</th>
<th>Price effect (p.p.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019w19</td>
<td>-20</td>
</tr>
<tr>
<td>2019w27</td>
<td>-15</td>
</tr>
<tr>
<td>2019w35</td>
<td>-10</td>
</tr>
<tr>
<td>2019w43</td>
<td>-5</td>
</tr>
<tr>
<td>2019w51</td>
<td>0</td>
</tr>
<tr>
<td>2020w7</td>
<td>5</td>
</tr>
</tbody>
</table>
Capped VAT increase: canned food

Canned vegetables (7% cap) vs Canned fruit (no cap)
Capped VAT increase: canned food

Canned vegetables (7% cap) vs Canned fruit (no cap)
Purchase responses
Quantity effects

Policy goal of the temporary VAT cut was to ensure that households would still be able to purchase necessities

- **Income effect**: increased purchasing power
- **Intertemporal substitution effect**: cheaper to consume today
A sharp increase in units sold at large supermarkets

- The policy was successful at sustaining the demand for basic necessities
- But the govt may have overshot it, leading to some hoarding of commodities
A sharp increase in units sold at large supermarkets

- The policy was successful at sustaining the demand for basic necessities
- But the govt may have overshot it, leading to some hoarding of commodities
Conclusion: **govts can affect tax incidence using political pressure and/or legislative mandates**

- A substantial portion of the VAT cut was passed on to prices
  - Likely due to the political pressure imposed by the government on supermarkets

- Govt-imposed caps are effective at mitigating the price increases following the VAT reintroduction

- Pass through rates are more than twice bigger in chain supermarkets (85%) compared to independent stores (35%)

- This turns out to have important distributional effects
  1. Poorer households tend to shop more at small supermarkets
  2. Further confirmed by the effect on quantities purchased
Lessons and tools

👍 Overall, we show that VAT cuts can be an effective tool to ensure continued access to basic necessities during times of high inflation.

👎 But may miss the targeted population due to unexpected incidence effects.

👍 Our paper offers lessons/tools for Govts to fine tune VAT cuts and ultimately achieve their policy goals.
THANKS!
Additional results
Elections, currency devaluation, and VAT cut/hike

Timeline 2019

- August 11: Primary Elections
- August 12: Argentine peso drops 30%
- August 15: 0% VAT announced
- December 31: End of VAT holiday

0% VAT on 13 categories of basic food basket
21% VAT on remaining categories

Context: high inflation (∼55%), elections, currency devaluation

1) President Macri defeated in primary presidential elections by a 15.5 p.p. margin (much wider than expected)
2) Day after: Argentina’s currency collapsed (45 → 62 pesos-dollar)
3) Govt implements a targeted and temporary VAT cut with due date Dec 31, 2019 [Goal: to contain the impact of currency devaluation on prices]
4) New president Fernandez didn’t extend the VAT holiday
   Regulated repeal: limit price increase to 7% (0% for milk, no cap for some)
Price levels

Large chains (prices are monitored)

Price index (2019w32=100)

Removal VAT from 21% to 0%

Re-introduction VAT from 0% to 21% + caps

Note: Obs=2,541,535 (4,645 EANs: 2,032 treated + 2,613 control)
Average price pass-through of $\sim 85\%$ in large chains

Large chains (prices are monitored)

Note: $Obs=2,541,535$ ($4645$ EANs: $2,032$ treated $+ 2,613$ control)
Distrib of price changes two weeks before VAT removal
Large chains (prices are monitored)
Distrib of price changes right after VAT removal

Large chains (prices are monitored)

Full pass $\Delta p$: -17.4 p.p.

$\Delta$ Price (p.p.): Week 1 vs Week -1

Treated vs Control Density
Distrib of *price changes* right after VAT re-introduction

Large chains (prices are monitored)

Δp cap: 7%

ΔPrice (p.p.): Week 1 vs Week -1

Density

- Treated
- Control
Control goods: Large chains vs Small stores

- Removal VAT from 21% to 0%
- Re-introduction VAT from 0% to 21%

Small stores

Large chains

Price index (2019July=100)
Treated goods: Large chains vs Small stores

Removal VAT from 21% to 0%
Re-introduction VAT from 0% to 21%

Price index (2019 July = 100)

Small stores
Large chains

Distrib of price changes right after VAT removal

Large chains (treated goods)

Full pass Δp: -17.4 p.p.
Distrib of price changes: VAT re-introduction

Large chains

Δp cap: 7%

ΔPrice (p.p.): Week 1 vs Week -1
Distrib of price changes after VAT removal

Small stores vs Large chains

**Small stores**

*placebo*

<table>
<thead>
<tr>
<th>Density</th>
<th>ΔPrice (p.p.): July’19 vs May’19</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>-20</td>
</tr>
<tr>
<td>0.05</td>
<td>-15</td>
</tr>
<tr>
<td>0.10</td>
<td>-10</td>
</tr>
<tr>
<td>0.15</td>
<td>-5</td>
</tr>
<tr>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>0.02</td>
<td>5</td>
</tr>
<tr>
<td>0.04</td>
<td>10</td>
</tr>
<tr>
<td>0.06</td>
<td>15</td>
</tr>
<tr>
<td>0.00</td>
<td>20</td>
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<tr>
<td>0.00</td>
<td>25</td>
</tr>
<tr>
<td>0.00</td>
<td>30</td>
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</tbody>
</table>

**Large chains**

*placebo*

<table>
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<tbody>
<tr>
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<td>0.10</td>
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<td>0.15</td>
<td>-5</td>
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<tr>
<td>0.00</td>
<td>0</td>
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<tr>
<td>0.02</td>
<td>5</td>
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<tr>
<td>0.04</td>
<td>10</td>
</tr>
<tr>
<td>0.06</td>
<td>15</td>
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<tr>
<td>0.00</td>
<td>20</td>
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<tr>
<td>0.00</td>
<td>25</td>
</tr>
<tr>
<td>0.00</td>
<td>30</td>
</tr>
</tbody>
</table>
Distrib of price changes: VAT removal
Small stores vs Large chains

Density

- Control: Large
- Control: Small

ΔPrice (p.p.): Sept'19 vs July'19
Distrib of price changes: VAT removal

Small stores vs Large chains

ΔPrice (p.p.): Sept'19 vs July'19

Treated: Large
Treated: Small

Density

ΔPrice (p.p.): Sept'19 vs July'19
Do large and small stores respond differently to a large economic shock with no govt mandate?

Exchange Rate (pesos per dollar)

Source: BCRA, Tipo de Cambio de Referencia - Comunicación “A” 3500 (Mayorista).
Pass-through of a 24% currency devaluation (no mandate) is similar in small and large supermarkets.
Pass-through of a 24% currency devaluation (no mandate) is similar in small and large supermarkets.
Pass-through of currency devaluation: short run

Large chains

Density

ΔPrice (p.p.)

Control (one week before)

Control (one week after)

Density

ΔPrice (p.p.)

-25 -20 -15 -10 -5 0 5 10 15 20 25
Pass-through of 2018 peso devaluation

Price effect (p.p.)

Exchange Rate (right axis)

Price change

T - C

2018w1 2018w9 2018w17 2018w25 2018w33 2018w41 2018w49 2019w5 2019w13 2019w21 2019w29
Pass-through of 2018 peso devaluation

Exchange Rate (right axis)

Price effect (p.p.)

-1 0 1 2 3 4 5 6
2018m1 2018m4 2018m7 2018m10 2019m1 2019m4 2019m7

Large stores
Small stores
Pass-through of 2018 peso devaluation

Price effect (p.p.)

Exchange Rate (right axis)

Small stores

Large stores

2018m1 2018m4 2018m7 2018m10 2019m1 2019m4 2019m7
Distrib of price changes after VAT re-intro

Small stores vs Large chains

ΔPrice (p.p.): Jan'20 vs Dec'19

Density

- Treated: Large
- Treated: Small
Distrib of price changes after VAT re-intro
Small stores vs Large chains

Density

Control: Large
Control: Small

ΔPrice (p.p.): Jan'20 vs Dec'19
Close substitutes in C (e.g., coffee) do not seem to adjust prices after the VAT cut.
Close substitutes in C (e.g., coffee) do not seem to adjust prices after the VAT cut.

- Full pass Δp: -17.4 p.p.

Removal VAT from 21% to 0%
Re-introduction VAT from 0% to 21%

Price effect (p.p.):
- Original C group
- Excluding substitutes from C

-20 -15 -10 -5 0 5 10 15 20

- 2019w14 2019w22 2019w30 2019w38 2019w46 2020w2 2020w10
DiD of close substitutes in C vs rest of C

- Removal VAT from 21% to 0%
- Re-introduction VAT from 0% to 21% + caps

Price effect (p.p.)

-20 -15 -10 -5 0 5 10 15 20

2019w14 2019w22 2019w30 2019w38 2019w46 2020w2 2020w10
T vs Close substitutes in C (case studies)

![Graph showing price effect (p.p.) for Coffee and Tea over weeks 2019w11 to 2020w7 with VAT restored at 2019w35.]
T vs Close substitutes in C (case studies)

-20 -15 -10 -5 0 5 10

Price effect (p.p.)

2019w11 2019w19 2019w27 2019w35 2019w43 2019w51 2020w7

Ground/beans

Coffee

VAT

Restored

Instant

Coffee

Tea
T vs Close substitutes in C (case studies)

Price effect (p.p.)

VAT
Restored
Rice
Rice Meals

-20
-15
-10
-5
0
5
10

2019w19 2019w27 2019w35 2019w43 2019w51 2020w7
Capped VAT increase

Regular Yogurt (7% cap) vs Other Yogurt (no cap)
Regular Yogurt (7% cap) vs Other Yogurt (no cap)
Capped VAT increase

**Sunflower Oil** (9% cap) vs **Corn Oil** (no cap)

[Graph showing price effect (p.p.) for Sunflower Oil and Corn Oil with VAT restored and price effect for Sunflower Oil.]
Capped VAT increase

Sunflower Oil (9% cap) vs Corn Oil (no cap)
VAT change + Cap on price increases

1. Caps are able to mitigate price increases due to VAT increase but...
2. the prices of goods subject to the cap still exceed the cap
3. However, when the government mandates a 0% percent increase, there seems to be full compliance (milk)
4. This suggests that caps on percentage increase are less effective (harder to enforce) than on price levels
5. Let’s look at goods with frozen prices
Pass-through under nominal price controls
VAT changes + price controls

We show that price freezes are more effective at keeping controlling prices than capping the percent increase in prices.

**Productos Esenciales**: 64 barcodes of the Basic Food Basket with price frozen for 6 months (Apr 29–Oct 31, 2019)

▶ **Logic**: Price caps limit the incidence of VAT cuts:
Stores keep regulated price → pocket entire VAT reduction

We flag these 64 barcodes in our data and run the DiD

- Treated: 38 EANs (N=34,795)
- Control: 10 EANs (N=11,863); 16 missing (no data)

(1) Compare Essential barcodes in T vs Rest of goods in T and C
(2) Compare Essential barcodes in T vs C
Price Controls: mandatory tags, banners, and App
[1] Productos Esenciales (in T) vs Rest (T and C)
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- Price index (2019w32=100)
- Start Productos Esenciales
- VAT Removed
- End Productos Esenciales
- VAT Restored

Control (price control)
Treat (price control)
Two complementary policy tools

Monitoring App:
- **Precios Claros**: an Electronic Price Advertising System (SEPA) launched in 2016. Goal: ↑ price visibility
  - Large grocery stores must report daily price data (Art 4: except SMEs)
  - Consumers can search prices/location from web-page or app
  - Administered/enforced by the Consumer Protection Office

Price Controls:
- **Precios Cuidados**: A list of mass consumption goods with controlled prices (≈500 barcodes, e.g., Coke 1.5L). Since 2014
  - Updated every 4 months; Mandatory tags; Audits; High penalties
- **Productos Esenciales**: Govt froze the price of 64 barcodes in the Basic Food Basket for 6 months (Apr 29–Oct 31, 2019)
  - High compliance: Daily audits in 2,500 points of sale in the country to detect non-compliance and missing products
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Productos Esenciales (in T) vs Rest (T and C)

- Price index (July '19 = 100)
- Start Productos Esenciales
- VAT Removed
- End Productos Esenciales
- VAT Restored

Treat (price control)
Productos Esenciales: in T and C

Price index (July'19=100)

- Start Productos Esenciales
- VAT Removed
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- VAT Restored

Control (price control)
Treat (price control)
Productos Esenciales: Dynamic DiD

-25 -20 -15 -10 -5 0 5


Price Effect (p.p.)
Quantity effect (Dynamic DiD): Large chains

Yerba Mate vs Control

Quantity effect (p.p.)

VAT Removed

VAT Restored

2019w14 2019w22 2019w30 2019w38 2019w46 2020w2 2020w10
Quantity effect (Dynamic DiD): Large chains

Canned fruit/veg vs Control

- VAT Removed
- VAT Restored
Quantity effect (Dynamic DiD): Large chains

Cooking oil vs Control

Quantity effect (p.p.)

VAT Removed

VAT Restored

2019w14 2019w22 2019w30 2019w38 2019w46 2020w2 2020w10
Heterogeneities by region
Heterogeneities by products

Aceites

VAT Removal from 21% to 0%
Re-introduction VAT from 0% to 21%

Arroz

VAT Removal from 21% to 0%
Re-introduction VAT from 0% to 21%

Azucar

VAT Removal from 21% to 0%
Re-introduction VAT from 0% to 21%

Conservas de frutas, veg enlatados y legu

VAT Removal from 21% to 0%
Re-introduction VAT from 0% to 21%

Harinas

VAT Removal from 21% to 0%
Re-introduction VAT from 0% to 21%

Leches fluidas

VAT Removal from 21% to 0%
Re-introduction VAT from 0% to 21%

Pastas secas

VAT Removal from 21% to 0%
Re-introduction VAT from 0% to 21%

Te y yerbas

VAT Removal from 21% to 0%
Re-introduction VAT from 0% to 21%

Yogures

VAT Removal from 21% to 0%
Re-introduction VAT from 0% to 21%
Robustness (aggregate price data)

- Result is also present in aggregate price data!
- National Institute of Statistics (INDEC) publishes average monthly \textit{prices} of some products \textit{(link)} used in the CPI index (59 products in GBA; 14 products across 6 regions)
- We break the list into T (0\% VAT) and C (21\% VAT) and run:

$$\log P_{it} = \alpha_i + \gamma_t + \sum_{t\neq 2019m7}^{2020m5} \beta_t D_{it} + \epsilon_{it}$$

$D_{it}$ is an indicator that denotes whether product $i$ is treated in month $t$
Coefficients $\beta_t$ test the effect relative to 2019m7
Pass-through to consumer prices [levels]

T: 0% VAT
C: 21% VAT

Price index (2019m7=100)

Partial pass-through \([\text{DiD}]\)

-0% VAT on some pantry staples

\[ b = -0.0747 \]

\[ 0 \leq \% \text{ change relative to } 2019m7 \]


\[ \text{Observed, Simulated (full pass-through)} \]

\[ \text{log} \, P_{it} = \alpha_i + \gamma_t + \sum_{t \neq 2019m7}^{2020m5} \beta_t D_{it} + \epsilon_{it} \]