Can VAT Cuts Dampen the Effects of Food Price Inflation?

Youssef Benzarti
UCSB & NBER

Santiago Garriga
CEFIP-UNLP

Dario Tortarolo
World Bank DECRG

NBER Public Economics Program Meeting

October 19, 2023
Food inflation and temporary VAT cuts

Many countries are ↓ VAT rates on food on a scale not seen before to help the vulnerable cope with the soaring cost of living.

<table>
<thead>
<tr>
<th>0% on basic food</th>
<th>Partial VAT cuts</th>
<th>Considering cutting...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peru</td>
<td>Romania (9 to 5%)</td>
<td>Belgium</td>
</tr>
<tr>
<td>Poland</td>
<td>Bosnia (17 to 5%)</td>
<td>Italy</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>Croatia (13 to 5%)</td>
<td>Austria</td>
</tr>
<tr>
<td>Lithuania</td>
<td>Latvia (21 to 5%)</td>
<td>Slovakia</td>
</tr>
<tr>
<td>North Macedonia</td>
<td>Turkey (8 to 1%)</td>
<td>Estonia</td>
</tr>
<tr>
<td>Cyprus</td>
<td>Greece (24 to 13%)</td>
<td>Netherlands</td>
</tr>
<tr>
<td>Uruguay</td>
<td>DR Congo (16 to 8%)</td>
<td>Belgium</td>
</tr>
<tr>
<td>Spain</td>
<td>Costa Rica (13 to 1%)</td>
<td>Germany</td>
</tr>
<tr>
<td>Portugal</td>
<td></td>
<td>Angola</td>
</tr>
<tr>
<td>Fiji</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oman</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Togo</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: VATCalc www.vatcalc.com
Grocery tax cuts are on the rise in the US too...
Kansas, Alabama, Virginia, Illinois, Tennessee

Kansas phases out sales tax cut on food (6.5% to 0%)
These initiatives are at odds with IMF/OECD advice against using VAT cuts in response to rising inflation.

But no (relevant) evidence → inflation is rare since late 1980s.

And little is done to achieve (expensive!) policy goals.
These initiatives are at odds with IMF/OECD advice against using VAT cuts in response to rising inflation.

But no (relevant) evidence → inflation is rare since late 1980s.

And little is done to achieve (expensive!) policy goals.

Can VAT Cuts Dampen the Effects of Food Price Inflation?

We study whether temporarily reducing VAT rates on foodstuff can mitigate the effects of inflation using **Argentina** as our laboratory.
These initiatives are at odds with IMF/OECD advice against using VAT cuts in response to rising inflation.

But no (relevant) evidence → inflation is rare since late 1980s.

And little is done to achieve (expensive!) policy goals.

---

**Can VAT Cuts Dampen the Effects of Food Price Inflation?**

We study whether temporarily reducing VAT rates on foodstuffs can mitigate the effects of inflation using **Argentina** as our laboratory.

- Do supermarkets lower (VAT-inclusive) prices or pocket some of it?
- Can gov’ts mandate tax incidence? (e.g., anti-profiteering clauses)
- What are the distributional effects?
Setting: a 4.5-month long VAT holiday on basic food + a variety of gov’t “mandates”

- **Timeline/Goal**
  - Aug 16, 2019
  - Jan 1, 2020
  - 21%
  - 0%
  - Temporary 0% VAT on 13 categories of Basic Food Basket
  - Rest of goods taxed at 21%
  - VAT increase with ≠ caps

- **Enforcement**
  - Govt urged full pass-through to P (0.21/1.21=17.4%)
  - Govt imposed caps on how much P could increase (0%, 7%, or no cap)
  - Price monitoring system in chain supermarkets only!
Setting: a 4.5-month long VAT holiday on basic food + a variety of gov’t “mandates”

Timeline/Goal

- **VAT cut**: unanticipated, large, salient, and temporary
  → Govt urged full pass-through to P (0.21/1.21=17.4%) [link]

Enforcement

- Temporary 0% VAT on 13 categories of Basic Food Basket
- Rest of goods taxed at 21%
- VAT increase with ≠ caps
- Price monitoring system: only in chain supermarkets

4.5 months
**Setting:** a 4.5-month long VAT holiday on basic food + a variety of gov’t “mandates”

- **Timeline/Goal**
  - VAT cut: unanticipated, large, salient, and temporary
    - Govt urged *full* pass-through to P (0.21/1.21=17.4%) [link]
  - VAT increase: back to 21%
    - Govt imposed caps on how much P could increase (0%, 7%, or no cap)

- **Enforcement**
  - Temporary 0% VAT on 13 categories of Basic Food Basket
  - Rest of goods taxed at 21%
  - VAT increase with ≠ caps
  - Price monitoring system: In chain supermarkets only! [link]
**Setting:** a 4.5-month long VAT holiday on basic food + a variety of gov’t “mandates”

- **Timeline/Goal**
- **Enforcement**

- **VAT cut:** unanticipated, large, salient, and temporary
  → Govt urged *full* pass-through to P (0.21/1.21=17.4%) [link]

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

- **Price monitoring system:**
  → In chain supermarkets only! [link]
Data (Scentia scanner data) & Strategy (DiD)

\[ Y_{it} = \alpha_i + \gamma_t + \sum_{t\neq 2019m7} \beta_t D_{it} + \epsilon_{it} \]

\( i : \text{barcodes} \quad t : \text{months-years} \)

### Treatment (0% VAT)

<table>
<thead>
<tr>
<th>Categories</th>
<th>4.4k barcodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooking oils (sunflower, corn, mix)</td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td></td>
</tr>
<tr>
<td>Dried pasta</td>
<td></td>
</tr>
<tr>
<td>Tea, Yerba Mate, and Mate Cocido</td>
<td></td>
</tr>
<tr>
<td>Sugar</td>
<td></td>
</tr>
<tr>
<td>Canned vegetables and beans</td>
<td></td>
</tr>
<tr>
<td>Canned fruits</td>
<td></td>
</tr>
<tr>
<td>Corn flour (polenta)</td>
<td></td>
</tr>
<tr>
<td>Wheat flour</td>
<td></td>
</tr>
<tr>
<td>Fluid milk (whole/skim)</td>
<td></td>
</tr>
<tr>
<td>Yogurt (whole or skim)</td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td></td>
</tr>
<tr>
<td>Bread</td>
<td></td>
</tr>
<tr>
<td>Breadcrumbs and/or batter</td>
<td></td>
</tr>
</tbody>
</table>

### Control (21% VAT)

<table>
<thead>
<tr>
<th>Categories</th>
<th>3.7k barcodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other cooking oils (olive, soy, canola)</td>
<td></td>
</tr>
<tr>
<td>Rice-based meals</td>
<td></td>
</tr>
<tr>
<td>Breakfast cereal</td>
<td></td>
</tr>
<tr>
<td>Coffee</td>
<td></td>
</tr>
<tr>
<td>Salt</td>
<td></td>
</tr>
<tr>
<td>Herbs, Spices, &amp; Seasonings</td>
<td></td>
</tr>
<tr>
<td>Dulce de leche (caramel)</td>
<td></td>
</tr>
<tr>
<td>Jam and Jelly</td>
<td></td>
</tr>
<tr>
<td>Other flours</td>
<td></td>
</tr>
<tr>
<td>Crackers, Biscuits, Toasts, Puddings</td>
<td></td>
</tr>
<tr>
<td>Chocolate</td>
<td></td>
</tr>
<tr>
<td>Mayonnaise</td>
<td></td>
</tr>
<tr>
<td>Vinegar</td>
<td></td>
</tr>
<tr>
<td>Dried legumes and beans</td>
<td></td>
</tr>
</tbody>
</table>

Data provider: Scentia LLC. Barcode-level scanner data from supermarkets with P and Q.
Price responses pooling chains and indep stores
Price levels in Chains + Independent supermarkets

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

DiD with CPI data
Substantial pass-through of the VAT cut to prices (~60%)

- Full pass Δp: -17.4 p.p.
- Mean Δp: -10.5 p.p.

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

DiD with CPI data
Chain vs Independent stores
Average pass-through of the VAT cut is 35% for indep stores and 85% for supermarket chains.

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

Removal VAT from 21% to 0%

Re-introduction VAT from 0% to 21%

Indep stores

Mean $\Delta p$: -6.2 p.p.

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

P Levels Weekly data Distrib of P-T Series for T and C Small cheaper
Average pass-through of the VAT cut is 35% for indep stores and 85% for supermarket chains
Mitigating subsequent price increases using pass-through caps
VAT rate reinstated at 21% but pass-through was capped in chain supermarkets at ∼7% for some goods

- Goods w/flexible prices exhibit an increase ∼2x that of capped goods
- The gap is remarkably persistent → hysteresis
Ultimately led to a permanent price gap in necessities btw independent and chain supermarkets.

**Price effect (p.p.)**

- **Removal VAT from 21% to 0%**
  - Indep stores:
    - Full pass Δp: -17.4 p.p.
  - Chains (capped):

- **Re-introduction VAT from 0% to 21%**
(Unintended) distributional consequences
Policy goal was to ensure that *low-income* households could still afford basic food in a context of inflation.

- Targeted goods (T) more heavily consumed by the lowest deciles.

![Bar chart showing the share of zero-rated goods in total food expenditure by deciles](chart.png)
But low-income people tend to shop at indep supermarkets where price pass-through was limited (!)

Food expenditure in zero-rated products by store type (%)

- Independent stores
- Supermarket chains

• Important policy implication when designing VAT cuts
Welfare implications

VAT cut benefits the poor (albeit w/ leakages)

- CES model provides simple expression based on observable expenditure shares and price changes:
  \[ d \ln V_h = - \sum_g \alpha_{gh} \cdot d \ln p_{gh} \]

![VAT cut graph]

Deciles of Household Per Capita Income

<table>
<thead>
<tr>
<th>Decile</th>
<th>Observed</th>
<th>Counterfactual (full pass-through)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.7</td>
<td>1.4</td>
</tr>
<tr>
<td>2</td>
<td>0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>3</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>4</td>
<td>0.9</td>
<td>0.8</td>
</tr>
<tr>
<td>5</td>
<td>0.8</td>
<td>0.7</td>
</tr>
<tr>
<td>6</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>7</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>8</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>9</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>10</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>0.2</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Observed: Red
Counterfactual (full pass-through): Blue
Welfare implications

VAT increase hurts the poor

- CES model provides simple expression based on observable expenditure shares and price changes:
  \[ d \ln V_h = - \sum_g \alpha_{gh} \cdot d \ln p_{gh} \]

VAT increase

Deciles of Household Per Capita Income

<table>
<thead>
<tr>
<th>Decile</th>
<th>Observed</th>
<th>Counterfactual (P back to baseline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.08</td>
<td>0.03</td>
</tr>
<tr>
<td>2</td>
<td>-0.04</td>
<td>0.03</td>
</tr>
<tr>
<td>3</td>
<td>-0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>4</td>
<td>-0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>5</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>6</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>7</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>8</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>9</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>10</td>
<td>0.03</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Possible mechanisms
Chains vs independent stores

- Enforcement (price monitoring in chains)
  [Bachas et al, 2020; Kopczuk et al, 2016]

- Evasion (independent stores)
  [Bachas et al, 2020; Kopczuk et al, 2016]

- Pricing strategies (rigidities and menu costs)
  [DellaVigna & Gentzkow, 2019; Harju et al, 2018]

- Competition
  [Genakos & Pagliero, 2022]
Robustness and additional results

- Very similar results with official CPI data
- Substitution across products in T and C
- VAT changes + nominal price freezes
- Pass-through rates by region
- Store-switching behavior
- Purchase responses (Q)
Concluding remarks

While VAT cuts + gov’t ‘mandates’ can be effective tools to

👍 lower prices in grocery stores,
👍 ensure continued access to basic food during high inflation,
👍 mitigate subsequent price increases

They can lead to

👎 asymmetric responses across chain and indep supermarkets,
👎 hysteresis effects in the medium-run,
👎 unintended distributional/incidence effects

⇒ In all, the Arg experience helps us advance knowledge on: (i) how tax incidence might operate in supermarkets, (ii) policy design.
THANK YOU!

Dario Tortarolo
dtortarolo@worldbank.org
Additional results
1. VAT as a tool to affect economic variables:

★ Blundell (2009); Crossley et al (2009); Bachmann et al (2021); Slemrod (2011); Benzarti & Tazhitdinova (2011); Pomeranz (2015); Naritomi (2019); D’Acunto et al (2022)

→ While VAT can be effective at lowering prices, the distributional effects can be unintended, in part because we don’t yet fully understand tax incidence.

2. Economic incidence of consumption taxes and empirical anomalies:

★ Fullerton & Metcalf (2002); Benzarti et al (2020); Benzarti & Carloni (2019); Kosonen (2015); Kopczuk et al (2016); Benedek et al (2019); Carbonnier (2007); Fuest et al (2021); Buettner & Madzharova (2020); Harju et al (2018); Gaarder (2018); Bachas et al (2020); Genakos & Pagliero (2022)

→ Govts can influence how much of a statutory tax change is passed on to consumers prices beyond relative magnitudes of S and D elasticities.
→ Pass-through can vary widely by type of supermarket consumers shop at.
Elections, currency devaluation, and VAT cut/hike

Context: high inflation (∼55%), elections, peso 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 temporary VAT holiday on basic food set to expire on Dec 31, 2019 [Goal: to contain the impact of 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)
"It’s unreasonable to reduce the VAT indiscriminately as has been done. This will not result in a decrease in prices. It will surely be pocketed by companies. It would have been better to rebate the VAT to the most neglected sectors."
Normative debate: VAT cuts or targeted tax rebates

• Commonly argued that policy should target the most needy
  ★ E.g., VAT rebates through debit cards

• **Tarjeta Alimentar**
  ★ Debit card to purchase basic food
  ★ For AUH recipients with children up to 14yo
  ★ 2.5m cardholders (95% are women) covering about 4m children

• A tool with potential for targeted VAT rebates [Press]
  ★ But subject to pitfalls when poorly designed (e.g., see Cruces et al, 2020)
Enforcement tools at hand

Media article (August 16, 2019)

"What will be the effect of the VAT cut on basic food: there will controls and sanctions from the govt"

VAT cut enforced by the Consumer Protection Agency:

1) *Precios Claros*: Online price monitoring system since Feb’16 → in chains only!

2) *Ley de Lealtad Comercial*: Fair Retail Law passed in Apr’19
The Head of the Consumer Protection Agency stated: [link]

▶ “Daily, between 6 and 8am, all supermarket chains in the country submit their prices through the App ‘Precios Claros’. This provides us with updated info that can be compared with historical data.”

▶ “We will control stores to ensure that the tax cut is passed on to lower prices and not higher profits.”

▶ “The Consumer Protection Agency will act through the regime of fines supported by the Fair Retail Trade Law.”
VAT cut/increase was highly publicized in the media & (chain) supermarkets (mandatory banners/tags)
Repeal, pass-through caps, and *online* monitoring

- **Chain supermarkets:** govt said they would track prices daily: [link]

  “Supermarkets report their prices online to the Ministry of Commerce. The database is updated as soon as they upload the price lists, and we can see it. The sector already showed goodwill by working with us until December 31 and committed to absorb two-thirds of the impact. But obviously we’ll be monitoring them”

- **Small stores:** FASA association not part of the agreement [link]
Translation: “The government assures that it will control ‘online’ that the new food price agreement is fulfilled” [Jan 1st, 2020]
Collusion? Unlikely
Collusion? Unlikely

<table>
<thead>
<tr>
<th>Coca Cola sin Azúcar 1.5 Lt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Precio de lista</strong></td>
</tr>
<tr>
<td>$225.50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fideos Tallarines Matarazzo 500 Gr</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Precio de lista</strong></td>
</tr>
<tr>
<td>$210.00</td>
</tr>
</tbody>
</table>
Price levels in **small independent stores**

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

Price index (2019 July = 100)

- **Control**
- **Treated**
Price levels in supermarket chains (prices are monitored)

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

Control

Treated

Price index (2019July=100)

2019m1 2019m3 2019m5 2019m7 2019m9 2019m11 2020m1 2020m3

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

Control

Treated
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 (2019 July = 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)

-20 -10 0 10 20 30 40 50

Small stores
Large chains

Removal VAT from 21% to 0%
Re-introduction VAT from 0% to 21%
Price levels in **supermarket chains** (weekly data)

![Graph showing price index trends over time with notes]

**Note:** $Obs=2,541,535$ (4645 EANs: 2,032 treated + 2,613 control)
Average price pass-through of $\sim 85\%$ in large chains

- Full pass $\Delta p$: -17.4 p.p.
- Removal VAT from 21% to 0%
- Re-introduction VAT from 0% to 21%
- + caps

Note: $\text{Obs}=2,541,535$ (4645 EANs: 2,032 treated + 2,613 control)
Indep stores cheaper (pre-reform) than chain supermarkets

\[
\log P_{irst} = \alpha_{irt} + \sum_{t \neq 2019m7}^{2020m3} \beta_t \text{IndepStore}_{irst} + \epsilon_{irst}
\]

\(i: \text{barcodes}, \ r: 5 \text{ regions}, \ t: \text{month-year}, \ s: \text{store type}\)
Indep stores cheaper (pre-reform) than chain supermarkets

\[
\log P_{irst} = \alpha_{irt} + \sum_{t \neq 2019m7}^{2020m3} \beta_t \text{IndepStore}_{irt} + \epsilon_{irst}
\]

\(i : barcodes, r : 5 \text{ regions, } t : \text{ month-year, } s : \text{ store type}\)
Indep stores cheaper (pre-reform) than chain supermarkets

\[
\log P_{irst} = \alpha_{irt} + \sum_{t \neq 2019m7}^{2020m3} \beta_t \text{IndepStore}_{irt} + \epsilon_{irst}
\]

- \( i \): barcodes, \( r \): 5 regions, \( t \): month-year, \( s \): store type
But largely heterogeneous across the 5 regions

\[ \log P_{irst} = \alpha_{irt} + \sum_{t \neq 2019m7}^{2020m3} \beta_t \text{SmallStore}_{irt} + \epsilon_{irst} \]

- \( i \) : barcodes, \( r \) : 5 regions, \( t \) : month-year, \( s \) : store type
But largely heterogeneous across the 5 regions

\[ \log P_{irst} = \alpha_{irt} + \sum_{t \neq 2019m7}^{2020m3} \beta_t S_{mallStore_{irst}} + \epsilon_{irst} \]

\( i : barcodes, r : 5 \) regions, \( t : \) month-year, \( s : \) store type
But largely heterogeneous across the 5 regions

\[
\log P_{irst} = \alpha_{irt} + \sum_{t \neq 2019m7}^{2020m3} \beta_t \text{Small Store}_{irt} + \epsilon_{irst}
\]

\(i\): barcodes, \(r\): 5 regions, \(t\): month-year, \(s\): store type
But largely heterogeneous across the 5 regions

\[
\log P_{irst} = \alpha_{irt} + \sum_{t \neq 2019m7}^{2020m3} \beta_t \text{Small Store}_{irts} + \epsilon_{irst}
\]

\(i: barcodes, r: 5 \text{ regions}, t: \text{month-year}, s: \text{store type}\)
But largely heterogeneous across the 5 regions

\[
\log P_{irst} = \alpha_{irt} + \sum_{t\neq 2019 m7}^{2020 m3} \beta_t \text{SmallStore}_{i rt} + \epsilon_{irst}
\]

\[
i: \text{barcodes, } r: 5 \text{ regions, } t: \text{month-year, } s: \text{store type}
\]
Price density for overlapped and non-overlapped barcodes

**Overlapped EANs**

- **Small stores**
- **Chain supermarkets**

**Non-overlapped EANs**

- **Small stores**
- **Chain supermarkets**
Price density for overlapped barcodes

Var: $\frac{P_{ir,t_0}^{Small}}{P_{ir,t_0}^{Large}} \times 100$

Overlapped EANs

Price normalized to barcodes in large stores
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)


ΔPrice (p.p.): Week 1 vs Week -1

Treated
Control

Density
Distrib of price changes right after VAT reinstated

Large chains (prices are monitored)

Delta price cap: 7%

Density

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

Treated
Control
Distrib of price changes right after VAT removal

Large chains (treated goods)

Full pass $\Delta p$: -17.4 p.p.
Distrib of price changes: VAT reinstated

Large chains

Δp cap: 7%

ΔPrice (p.p.): Week 1 vs Week -1

Density
Distrib of price changes: VAT removal

Small stores vs Large chains

ΔPrice (p.p.): Sept'19 vs July'19

Control: Large
Control: Small

Density
Distrib of price changes: VAT removal

Small stores vs Large chains

ΔPrice (p.p.): Sept'19 vs July'19

Treated: Large
Treated: Small
Pass-through of the 2018 peso depreciation

**Exchange Rate (pesos per dollar)**

- 24% increase Aug 30, 2018
- 24% increase Aug 12, 2019
- VAT cut

**Source:** BCRA, Tipo de Cambio de Referencia - Comunicación “A” 3500 (Mayorista).
Are goods in T and C similarly affected by the 2018 peso depreciation?
Do large and small stores respond differently to a large economic shock with no govt mandate?
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)
Distrib of price changes after VAT re-intro
Small stores vs Large chains

ΔPrice (p.p.): Jan'20 vs Dec'19
Treated: Large
Treated: Small

Density
Distrib of price changes after VAT re-intro

Small stores vs Large chains

ΔPrice (p.p.): Jan'20 vs Dec'19

Control: Large

Control: Small

Density

0.15

0.10

0.05

0.00

-20 -15 -10 -5 0 5 10 15 20 25 30

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.
Does substitution across T and C bias our price effects? The results barely change when:

- Including and excluding close substitutes in the control group
- Using food and non-food products in the control group
Does substitution across T and C bias our price effects? The results barely change when:

- Including and excluding close substitutes in the control group
- Using food and non-food products in the control group
DiD of close substitutes in C vs rest of C

Price effect (p.p.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline T and C</th>
<th>Close substitutes from C vs rest of C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019w14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019w22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019w30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019w38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019w46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020w2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020w10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Removal VAT from 21% to 0%

Re-introduction VAT from 0% to 21% + caps
T vs Close substitutes in C (case studies)

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

Price effect (p.p.)

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

Instant Coffee
Tea
Barcodes sold in either indep or chain stores (no overlap) vs sold in both types of stores (overlap)

Pass-through is greater for varieties sold in both types of stores.
VAT rate reinstated at 21% but pass-through was capped

- VAT rate $\uparrow$ back to pre-holiday level of 21%
- But new govt limited the price increase with $\neq$ caps
- **No caps:** Prices could $\uparrow$ up to 21%
- **Caps:** Force incidence sharing
- NOT in independent stores

⇒ We show that gov’ts can successfully limit VAT pass-through

<table>
<thead>
<tr>
<th>Categories</th>
<th>$\Delta p$</th>
<th>cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil (sunflower &amp; mix)</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Oil (corn)</td>
<td></td>
<td>No cap</td>
</tr>
<tr>
<td>Rice (regular: long grain white)</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Rice (other: basmati, brown, organic)</td>
<td></td>
<td>No cap</td>
</tr>
<tr>
<td>Dried pasta</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Tea, Yerba Mate, and Mate Cocido</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Sugar</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Canned vegetables and beans</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Canned fruits</td>
<td></td>
<td>No cap</td>
</tr>
<tr>
<td>Corn flour</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Wheat flour</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Fluid milk (whole/skim)</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Yogurt (regular)</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Yogurt (other: w/cereal, fruit chunks)</td>
<td></td>
<td>No cap</td>
</tr>
<tr>
<td>Eggs</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Sliced Bread (white)</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Sliced Bread (rest)</td>
<td></td>
<td>No cap</td>
</tr>
<tr>
<td>Breadcrumbs and/or batter</td>
<td></td>
<td>10.5%</td>
</tr>
</tbody>
</table>

Treated: VAT back to 21%
Regular Rice (7% cap) vs Other Rice (no cap)
Capped VAT increase: Rice

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

Price effect (p.p.)

Removal VAT from 21% to 0%

Re-introduction VAT from 0% to 21% + caps
Capped VAT increase: Canned food

Canned vegetables (7% cap) vs Canned fruit (no cap)

Price effect (p.p.)

Removal VAT from 21% to 0%

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

Canned vegetables
Canned vegetables (7% cap) vs Canned fruit (no cap)
Capped VAT increase: Sliced bread

Slide bread (white) (7% cap) vs Sliced bread (rest) (no cap)
Capped VAT increase: Sliced bread

Slide bread (white) (7% cap) vs Sliced bread (rest) (no cap)
Milk (0% cap): Full incidence on the supply

Removal VAT from 21% to 0%

Re-introduction VAT from 0% to 21% + caps
**Milk (0% cap): Full incidence on the supply**

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

### Price effect (p.p.)

- **Milk**
- **Regular Yogurt**

### Timeline:
- 2019w19
- 2019w27
- 2019w35
- 2019w43
- 2019w51
- 2020w7
Regular Yogurt (7% cap) vs Other Yogurt (no cap)
Capped VAT increase

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

Sunflower Oil (9% cap) vs Corn Oil (no cap)
Capped VAT increase

Sunflower Oil (9% cap) vs Corn Oil (no cap)
Small stores (not subject to caps): No differential effects btw capped and uncapped goods

7% cap vs No cap

![Graph showing price effect (p.p.) over time from 2019Q1 to 2020Q3. The graph compares the removal of VAT from 21% to 0% and the re-introduction of VAT from 0% to 21% with and without price caps. The graph indicates that the removal of VAT leads to a decrease in price effect, while the re-introduction of VAT with price caps leads to an increase in price effect. The price effect is measured in percentage points (p.p.).]
Pass-through under nominal 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 $\Rightarrow$ 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)
[1] Productos Esenciales (in T) vs Rest (T and C)

- 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
[1] Productos Esenciales (in T) vs Rest (T and C)
[1] Productos Esenciales (in T) vs Rest (T and C)
Productos Esenciales: in T and C

Price index (July'19=100)
Quantity effects in the longer run

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

Quantity effect (p.p.)
Quantity effects in the longer run

Removal VAT from 21% to 0%
Re-introduction VAT from 0% to 21%
Quantity effect (Dynamic DiD): Large chains

Yerba Mate vs Control

VAT Removed

VAT Restored

Quantity effect (p.p.)

2019w14 2019w22 2019w30 2019w38 2019w46 2020w2 2020w10
Canned fruit/veg vs Control

Quantity effect (p.p.): VAT Removed vs VAT Restored

<table>
<thead>
<tr>
<th>Week</th>
<th>Quantity effect (p.p.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019w14</td>
<td></td>
</tr>
<tr>
<td>2019w22</td>
<td></td>
</tr>
<tr>
<td>2019w30</td>
<td></td>
</tr>
<tr>
<td>2019w38</td>
<td></td>
</tr>
<tr>
<td>2019w46</td>
<td></td>
</tr>
<tr>
<td>2020w2</td>
<td></td>
</tr>
<tr>
<td>2020w10</td>
<td></td>
</tr>
</tbody>
</table>
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

AUSTRAL

Price effect (p.p.)

Full pass Δp: -17.4 p.p.
Heterogeneities by region

BS. AS. RESTO

Full pass \( \Delta p: -17.4 \) p.p.
Heterogeneities by region

CAPITAL FEDERAL

Full pass $\Delta p$: -17.4 p.p.
Heterogeneities by region

CORDOBA

Price effect (p.p.)

Full pass Δp: -17.4 p.p.
Heterogeneities by region

CUYO

Price effect (p.p.)

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

Price effect (p.p.)

Full pass Δp: -17.4 p.p.
Heterogeneities by region

LITORAL SUR

Full pass Δp: -17.4 p.p.
Heterogeneities by region

NOA

Price effect (p.p.)

Full pass Δp: -17.4 p.p.
Heterogeneities by region

PERIFERIA

Price effect (p.p.)

Full pass Δp: -17.4 p.p.
Heterogeneities by region

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

SUR

Price effect (p.p.)
Low-income people do not seem to switch to chain supermarkets
Low-income people do not seem to switch to chain supermarkets
Heterogeneities by products

Aceites

Arroz

Azucar

Conservas de frutas, veg enlatados y legum

Harinas

Leches fluidas

Pastas secas

Te y yerbas

Yogures
Robustness (aggregate price data)

- Result is also present in aggregate price data!
- National Institute of Statistics (INDEC) publishes average monthly prices of some products (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:

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

\[D_{it}\] 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]
Partial pass-through $\text{[DiD]}$  

- **Robustness**

$0\%$ VAT on some pantry staples

$b = -0.0747$

\[
\log P_{it} = \alpha_i + \gamma_t + \sum_{t \neq 2019m7}^{2020m5} \beta_t D_{it} + \epsilon_{it}
\]
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
The policy was successful at sustaining the demand for basic necessities.

But the govt may have overshot it, leading to some hoarding of commodities.
Q effect is more muted in independent stores

- The policy was successful at sustaining the demand for basic necessities
- Muted response in small stores where pass-through was limited

The graph shows the effect of removing VAT from 21% to 0% and re-introducing VAT from 0% to 21% on quantity effect (p.p.) from 2019m1 to 2020m3.