The Welfare Effects of Price Caps in Search Markets

Evidence from Uruguayan Retail Data during the Covid-19 Pandemic

Jose Manuel Paz y Miño (jpazm@fen.uchile.cl), Universidad de Chile
Stefan Weiergraeber (sweiergr@iu.edu), Indiana University

Motivation

- Price caps = potential protection policy against high consumer prices. Theoretically, its effects are ambiguous!
- Intuitively: price caps can reduce the maximum price in a market; however, in markets with consumer search costs expected prices can increase (Fershtman and Fishman 1994; Armstrong et al. 2009).
- In the latter case: Price caps deter consumer search efforts → lower pressure on firms → expected prices can increase!
- There is no comprehensive empirical study of the effects of price caps in search markets –except for Galenianos and Gavazza (2022) for credit card industry.
- To fill this gap, we study empirically the effects of price cap policies over different products in Uruguay during the Covid-19 pandemic.

Voluntary Price Cap Policy in Supermarket Retail Markets

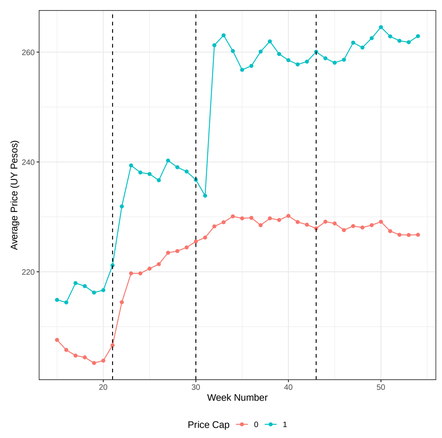
- First Covid-19 case in Uruguay on March 13 2020.
- Although the government did not impose a quarantine, it recommended low mobility and WFH policies across the country.
- On May 11 2020, several chain retailers agreed to impose voluntary price caps for selected UPCs for the next 3 months.

Data

- Price data at the store, UPC, and daily level from February 2020 to October 2020. It covers *Pre Covid-19* (February 1 - March 12), *initial Covid-19* (March 13 - May 10), *Price Cap* (May 11 - August 11) and *Post Price Cap* (August 12 - October 1) periods.
- Store information contains retailer type (specific chain or independent) and exact geographical location.
- Each store location is matched to zip code characteristics.
- For each chain retailer, list of UPCs subject to price caps and their magnitude.
- We use only information from the capital (Montevideo).

Descriptive and Reduced Form Evidence

Different trends (example: Meat UPCs)



Significant impact of price caps

	P	P	P	P
Covid	0.0455***	0.0459***	0.0474***	0.0472***
	(0.0094)	(0.0094)	(0.0099)	(0.0099)
Agree	0.0733***	0.0664***	0.0743***	0.0740***
	(0.0025)	(0.0035)	(0.0034)	(0.0033)
Post	0.0931***	0.0890***	0.0923***	0.0921***
	(0.0055)	(0.0049)	(0.0055)	(0.0054)
T	0.0146	0.0072	0.0172	0.0097
	(0.0098)	(0.0090)	(0.0118)	(0.0130)
Covid x T	0.0062***	0.0146***	0.0095**	0.0118***
	(0.0018)	(0.0022)	(0.0029)	(0.0025)
Agree x T	-0.0395***	-0.0310***	-0.0455***	-0.0416***
	(0.0048)	(0.0065)	(0.0057)	(0.0057)
Post x T	-0.0281**	-0.0356**	-0.0434***	-0.0406***
	(0.0089)	(0.0131)	(0.0128)	(0.0117)
Treatment (T) Type	U	S	U	S
Sample	All	All	PC UPC	PC UPC
Obs	4,706,468	4,706,468	3,049,932	3,049,932
R2	0.9742	0.9741	0.9739	0.9739

Regression:

$$log(p_{ist}) = \text{period}_t + \text{upc}_i + \text{store}_s + \text{T}_{is} + \beta_t \text{period}_t : \text{T}_{is} + \epsilon_{ist}$$

Notes: Treatment type refers to different types of treatment variable definitions: U = unrestricted, S = only markets full of PC signers. Sample refers to different samples used in the regression: All = over all UPCs, PC UPC = only uses UPCs that were affected by the price cap policy.

Model

- For each market m, follow Wildenbeest (2011)-model of consumer search allowing for vertical differentiation by transforming prices to the utility space u.
- After a consumer has observed her search cost c, she chooses the number of stores to search. Define by c_l the search cost of the consumer indifferent between searching l and $l+1$. Then,

$$\begin{aligned} c_l &= Eu_{max,1:l+1} - Eu_{max,1:l} \\ &= \int_0^1 u(y)\big((l+1)y - l\big)y^{l-1}dy, \text{ for } l = 1, \dots N-1 \end{aligned} \tag{1}$$

- The proportion of consumers who search l stores can then be written as: $q_l = G(c_{l-1}) - G(c_l)$, for $l = 2, \dots, N-1$ and $q_1 = 1 - G(c_1)$.
- Assuming that firms play a symmetric mixed-strategy equilibrium in utility space, the indifference condition can be expressed in terms of profit and is given by:

$$\Pi(u) = (x - \underline{u}) \cdot \frac{q_1}{N} = (x-u)\left[\sum_{l=1}^{N} q_l \cdot \frac{l}{N} F_u(u)^{l-1}\right] \tag{2}$$

Estimation Results

Price cap policy increased proportion of consumers that only searches once only temporarily.

	s_l^{min}	s_l^{max}	s_l^{mean}	s_l^{std}	obs	markets
Pre Covid-19						
1	0.4000	1.0000	0.8982	0.1434	65	65
2	0.0000	0.6000	0.0885	0.1351	65	31
6	0.0000	0.6000	0.0585	0.1339	3	3
Covid-19						
1	0.2000	1.0000	0.9036	0.1388	120	120
2	0.0000	0.8000	0.0828	0.1268	120	45
14	0.0000	0.8000	0.0528	0.1206	1	1
Price Cap						
1	0.4235	1.0000	0.9351	0.1087	91	91
2	0.0000	0.2807	0.0297	0.0565	91	33
13	0.0000	0.5535	0.0321	0.0861	1	1
Post						
1	0.2127	1.0000	0.9021	0.1399	73	73
2	0.0000	0.7873	0.0874	0.1319	73	27
6	0.0000	0.7873	0.0472	0.1249	2	2

Notes: Results using non-overlapping markets structural estimation. First four columns correspond to different statistics about consumer search. Obs column is the number of observation for each row. Markets column indicate the unique number of markets. Only for markets that can be identified.

Counterfactuals: No Price Caps

Lower CS and higher PS under no price caps regime.

	$\%\Delta CS$	$\%\Delta PS$	$\%\Delta TS$	N
Total	-31.9568	2.0819	-0.2040	91
Direct	-35.3088	3.8174	-0.0000	91
Indirect	3.3520	-1.7355	-0.2040	91

Notes: Direct captures the difference between base scenario and changing minimum utility keeping search behavior constant. Indirect captures the difference between the CF scenario and changing minimum utility keeping search behavior constant. N equal to number of observations. Only for markets that can be identified and in Price Cap period.

Conclusions

- Evidence of lower intensity of consumer search due to price cap policies.
- Counterfactuals indicate that the policy was beneficial for consumers, as without it, on average, they would have suffered from a reduction in utility of 31%. Firms would be better off without price caps → additional benefits not accounted for in the model.
- When we decompose this change, we find that indirect effects ameliorate the effects on consumers, but not enough to offset the direct effects.
- We find no evidence of consumers' search reduction being strong enough to make price caps reduce consumer surplus.