

## ONLINE APPENDIX

Figure A1. The evolution of various percentiles of prices normalized per 500mg over time for regulated and unregulated dosages of acetaminophen tablets

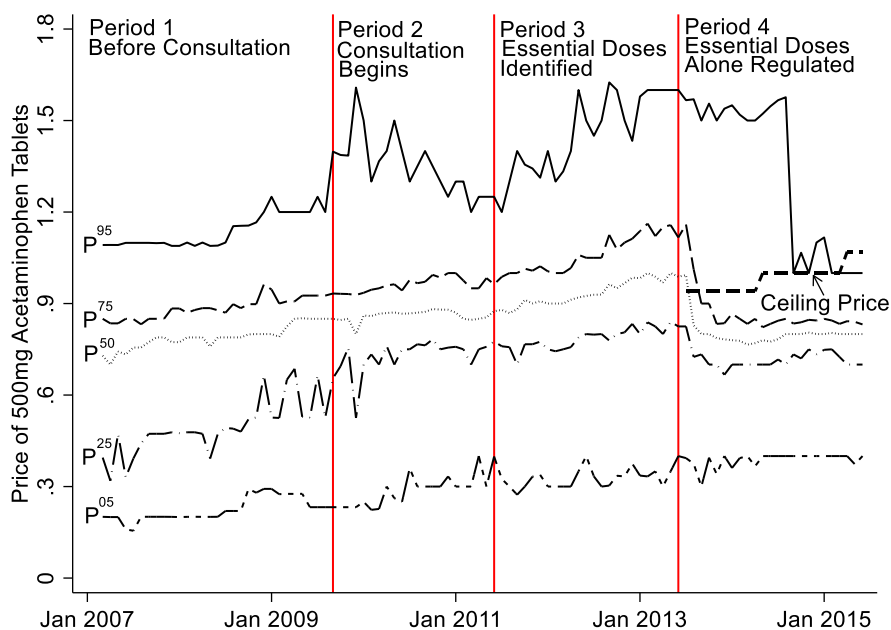


Figure A2. Total number of prescriptions, in millions of tablets, over time for acetaminophen tablets for unregulated 500mg and regulated 650mg dosage formulations

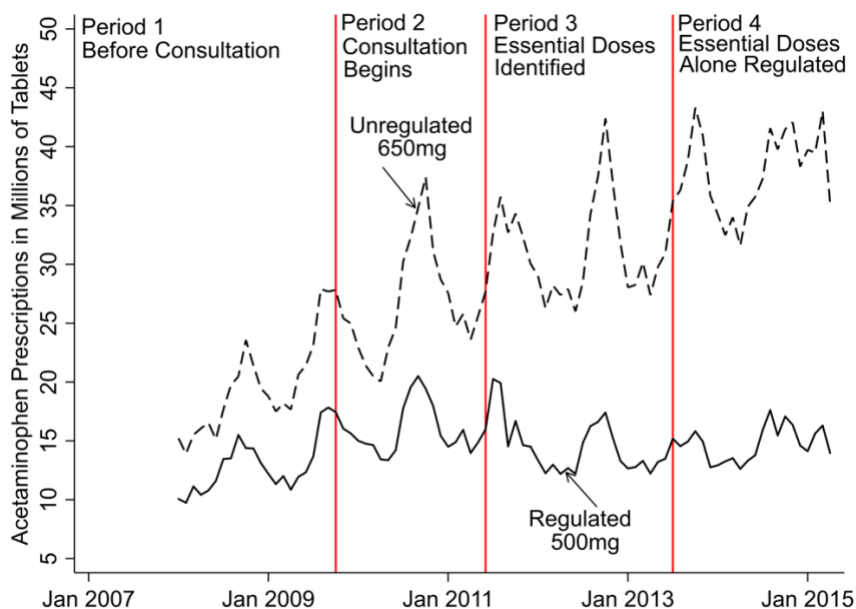


Figure A2 Notes. The total number of prescriptions in millions of tablets for both regulated and unregulated dosage formulations of acetaminophen tablets are plotted. The number of prescriptions for the regulated 500mg acetaminophen tablets was lower, relative to that for the 650mg acetaminophen tablets, in period 3 and period 4. The source of prescription data is IMS Health Medical Audit.

Table A1. Robustness check for the subsamples of firms with below and above median marketing intensity

Columns	(1)	(2)	(3)	(4)	(3)	(4)
Sample	CMIE Sample			CMIE Diversified Firms		
Subsample	< Median Marketing Intensity	> Median Marketing Intensity	Both Combined	< Median Marketing Intensity	> Median Marketing Intensity	Both Combined
D.V.	Fraction of 500mg Sales by Volume					
Period 2	-0.04*** [0.01]	-0.05*** [0.02]	-0.04*** [0.01]	-0.06*** [0.02]	-0.05*** [0.01]	-0.06*** [0.02]
Period 3	-0.09*** [0.02]	-0.14*** [0.02]	-0.08*** [0.01]	-0.08*** [0.02]	-0.11*** [0.02]	-0.08*** [0.02]
Period 4	-0.06*** [0.01]	-0.17*** [0.03]	-0.07*** [0.01]	-0.08*** [0.02]	-0.13*** [0.02]	-0.09*** [0.02]
Period 2 x Above Median Marketing Intensity Dummy			-0.03 [0.02]			-0.01 [0.02]
Period 3 x Above Median Marketing Intensity Dummy			-0.04* [0.02]			-0.03 [0.03]
Period 4 x Above Median Marketing Intensity Dummy			-0.10*** [0.03]			-0.05* [0.03]
Above Median Marketing Intensity Dummy			0.05** [0.02]			0.02 [0.02]
HHI	-0.05 [0.05]	-0.01 [0.06]	-0.03 [0.04]	-0.05 [0.07]	0.06 [0.05]	0.02 [0.04]
Constant	0.37*** [0.03]	0.54*** [0.05]	0.43*** [0.04]	0.37*** [0.02]	0.62*** [0.03]	0.50*** [0.03]
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,112	11,958	21,718	5,232	6,784	11,413
R-squared	0.820	0.661	0.750	0.775	0.679	0.745

Table A1 Notes: As the interaction terms can capture both within and between effects (Shaver, 2019), while hypothesis 3 relates to between effects, we have run a segmented regression in this table. Here, we split the marketing intensity variable based on the median value. The results show that the period dummies are lower for the sample of firms with above median marketing intensity, confirming that cross-sectional variation explains a significant part of the marketing intensity effect. Standard errors clustered at the firm-region level are reported in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A2. Robustness check: OLS Estimates for the price per 500mg of acetaminophen tablets before and after regulation

Columns	(1)	(2)	(3)	(4)
Sample	Full Sample		Diversified Firms Only	
D.V.	Price per 500mg			
Period 2	0.08*** [0.01]	0.08*** [0.01]	0.07*** [0.01]	0.08*** [0.01]
Period 3	0.13*** [0.01]	0.13*** [0.01]	0.13*** [0.01]	0.13*** [0.01]
Period 4	0.01 [0.01]	0.01 [0.01]	-0.01 [0.01]	-0.00 [0.01]
Period 2 x Unregulated	-0.02 [0.01]	-0.03* [0.01]	0.01 [0.01]	-0.00 [0.01]
Period 3 x Unregulated	0.01 [0.02]	0.02 [0.02]	0.03* [0.02]	0.04* [0.02]
Period 4 x Unregulated	0.22*** [0.02]	0.21*** [0.02]	0.25*** [0.02]	0.24*** [0.02]
Period 2 x Slow Release	-0.09*** [0.02]	-0.16*** [0.03]	-0.06*** [0.02]	-0.13*** [0.02]
Period 3 x Slow Release	-0.10*** [0.02]	-0.62*** [0.04]	-0.02 [0.03]	-0.56*** [0.04]
Period 4 x Slow Release	-0.11*** [0.03]	-0.56*** [0.04]	0.04 [0.03]	-0.49*** [0.04]
Period 2 x Pack=15	-0.00 [0.01]	-0.03** [0.01]	0.01 [0.01]	-0.01 [0.01]
Period 3 x Pack=15	0.11*** [0.02]	0.12*** [0.02]	0.11*** [0.02]	0.12*** [0.02]
Period 4 x Pack=15	0.07*** [0.02]	0.06*** [0.02]	0.08*** [0.02]	0.07*** [0.02]
Period 2 x Unregulated x Slow Release		0.08** [0.04]		0.08** [0.03]
Period 3 x Unregulated x Slow Release		0.52*** [0.04]		0.55*** [0.04]
Period 4 x Unregulated x Slow Release		0.45*** [0.04]		0.53*** [0.05]
Period 2 x Unregulated x Pack=15		0.14*** [0.02]		0.13*** [0.02]
Period 3 x Unregulated x Pack=15		-0.04 [0.03]		-0.04 [0.03]
Period 4 x Unregulated x Pack=15		0.03 [0.03]		0.02 [0.03]
Unregulated	0.06*** [0.01]	0.06*** [0.01]	0.05*** [0.01]	0.05*** [0.01]
Slow Release	0.33*** [0.02]	0.33*** [0.02]	0.26*** [0.01]	0.26*** [0.01]
Pack=15	0.06** [0.02]	0.06** [0.02]	0.05** [0.03]	0.05** [0.02]
HHI	-0.08*** [0.03]	-0.08*** [0.03]	-0.07** [0.03]	-0.07** [0.03]
Constant	0.87*** [0.04]	0.87*** [0.04]	0.80*** [0.02]	0.80*** [0.02]
Firm Fixed Effects	Yes	Yes	Yes	Yes

Region Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Observations	93,436	93,436	75,473	75,473
R-squared	0.493	0.494	0.302	0.303

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Table A2 Notes: Standard errors clustered at the firm-region level are reported in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A3. Repositioning by specialist firms in subsamples of 650mg and 500mg submarkets

Columns	(1)	(2)	(3)	(4)	(5)	(6)
Sample	All	CMIE	All	All	CMIE	All
Subsample	Specialist 500mg Firms			Specialist 650mg Firms		
D.V.	Sales Volume					
Period 2	0.05 [0.05]	0.28* [0.16]	0.13*** [0.05]	0.11** [0.04]	0.18 [0.12]	0.06** [0.03]
Period 3	0.10** [0.05]	0.35* [0.19]	0.17*** [0.05]	0.23** [0.09]	0.36* [0.22]	0.14** [0.06]
Period 4	0.06 [0.06]	0.36** [0.16]	0.14** [0.06]	0.34** [0.15]	0.65* [0.35]	0.21** [0.09]
Period 2 x Marketing Intensity		-5.66* [3.33]			-0.14 [1.55]	
Period 3 x Marketing Intensity		-5.94** [3.01]			-0.88 [2.26]	
Period 4 x Marketing Intensity		-7.05*** [2.62]			-2.47 [3.03]	
Period 2 x Marketing Proxy			-0.36** [0.14]			0.49** [0.24]
Period 3 x Marketing Proxy			-0.28** [0.11]			0.71** [0.33]
Period 4 x Marketing Proxy			-0.35*** [0.13]			0.84** [0.40]
Marketing Intensity		3.36 [2.60]			-1.82 [1.37]	
Marketing Proxy			0.38** [0.17]			-1.25** [0.56]
HHI	-0.18 [0.19]	-0.19 [0.23]	-0.18 [0.18]	0.11 [0.19]	0.08 [0.34]	0.07 [0.18]
Constant	1.98*** [0.22]	0.08 [0.14]	1.86*** [0.21]	-0.20 [0.18]	0.20 [0.18]	-0.02 [0.15]
Observations	12,569	3,941	12,569	12,380	6,116	12,380
R-squared	0.199	0.293	0.205	0.457	0.479	0.468
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table A3 Notes. Columns 1 to 3 use subsamples of specialist 500mg firms and 4 to 6 use subsamples of specialist 650mg firms. The results using both marketing intensity and J1 prescriptions-based marketing proxy are reported. Standard errors clustered at the firm-region level are reported in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A4. Results for GSK subsample

Column	(1)	(2)
D.V.	Fraction of 500mg Sales by Revenue	Price per 500mg
Period 2	-0.03* [0.02]	0.12*** [0.01]
Period 3	-0.07*** [0.02]	0.36*** [0.02]
Period 4	-0.13*** [0.02]	0.23*** [0.02]
Period 2 x Unregulated		-0.06*** [0.01]
Period 3 x Unregulated		-0.24*** [0.02]
Period 4 x Unregulated		-0.03 [0.02]
Unregulated		0.17*** [0.01]
HHI	0.33*** [0.10]	-0.05 [0.06]
Constant	0.76*** [0.03]	0.77*** [0.02]
Firm Fixed Effects	Yes	Yes
Region Fixed Effects	Yes	Yes
Month Fixed Effects	Yes	Yes
Observations	2,300	9,335
R-squared	0.557	0.221

Table A4 Notes: Standard errors clustered at the firm-region level are reported in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A5. Results for subsample excluding GSK

Columns	(1)	(2)	(3)	(4)
Sample	All Firms	CMIE Sample	All Firms	CMIE Sample
D.V.	Fraction of 500mg Sales by Revenue		Price per 500mg	
Period 2	0.00 [0.01]	-0.05*** [0.02]	0.08*** [0.01]	0.18*** [0.03]
Period 3	-0.04*** [0.01]	-0.05** [0.02]	0.12*** [0.01]	0.17*** [0.04]
Period 4	-0.07*** [0.01]	0.01 [0.02]	0.00 [0.01]	0.07* [0.04]
Period 2 x Unregulated			-0.02 [0.02]	-0.12*** [0.03]
Period 3 x Unregulated			0.03 [0.02]	-0.03 [0.03]
Period 4 x Unregulated			0.23*** [0.02]	0.12*** [0.03]
Period 2 x Marketing Intensity		-0.12 [0.35]		-2.09*** [0.70]
Period 3 x Marketing Intensity		-1.58*** [0.53]		-1.52* [0.92]
Period 4 x Marketing Intensity		-3.35*** [0.53]		-2.59*** [0.88]
Period 2 x Unregulated x Marketing Intensity				3.05*** [0.48]
Period 2 x Unregulated x Marketing Intensity				3.11*** [0.80]
Period 2 x Unregulated x Marketing Intensity				3.86*** [0.58]
Unregulated x Marketing Intensity				-3.03*** [0.46]
Marketing Intensity		0.93** [0.44]		2.42*** [0.85]
Unregulated			0.04*** [0.02]	0.16*** [0.02]
Slow Release			0.25*** [0.02]	0.31*** [0.03]
Pack=15			-0.06*** [0.01]	-0.02 [0.03]
HHI	-0.02 [0.03]	-0.05 [0.05]	-0.08** [0.03]	-0.19*** [0.06]
Constant	0.67*** [0.03]	0.38*** [0.04]	0.96*** [0.04]	0.67*** [0.05]
Firm Fixed Effects	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Observations	50,087	19,694	84,101	34,378
R-squared	0.733	0.739	0.502	0.245

Table A5 Notes: Standard errors clustered at the firm-region level are reported in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1