Online Appendix to "**Unveiling Bargaining Impacts of Mergers and Divestitures**"

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A Simple Approach for Policymakers to Quantify Bargaining Power

A by-product of the method presented in this article is a simple way for policymakers to quantify bargaining power, which I present in this appendix.

Starting from equation (13), one can use that costs $(mc^R_{mt} + mc^M_{mt}) \in [0, p_{mt} - \gamma_{mt}(p_{mt})]$ and re-write $(mc^R_{mt} + mc^M_{mt}) = \kappa(p_{mt} - \gamma_{mt})$ with $\kappa \in [0, 1]$. Solving for λ_{mt} in equation (13) and using $mc^R_{mt} + mc^M_{mt} = \kappa(p_{mt} - \gamma_{mt})$ one obtain the following equation for each retailer bargaining weight:

$$\lambda_{jmt} = \frac{A_{jmt}(p_{mt})}{A_{jmt}(p_{mt}) + (1-\kappa)(p_{jmt} - \gamma_{jmt}(p_{mt}))}. \tag{1}$$

Notice that except the parameter κ this equation depends only on elements that are often already computed in merger cases such as a demand function and Bertrand markups. The parameter κ can be set based on industry knowledge and allow to compute easily a value for the bargaining weights.

B Descriptive Statistics

Table 1. Deodorant Market - Market Shares Pre- and Post-Merger/Divestiture Period By Brand

		Pre		Post	
Manufacturer	Brand	Mean	S.D	Mean	S.D
Gillette	Gillette	4.05	0.78	3.81	0.73
	Soft & Dri	2.88	0.57		
	Dry Idea	2.68	0.35		
	Right Guard	11.69	1.65		
Procter & Gamble	Old Spice	11.27	2.21	12.46	1.81
	Secret	14.46	1.39	14.07	1.46
Henkel	Soft & Dri			2.84	1.41
	Dry Idea			2.45	0.32
	Right Guard			9.63	1.09
Unilever	Degree	6.62	0.79	8.34	0.95
	Dove	6.32	1.53	7.46	0.45
	Suave	2.69	0.37	2.64	0.31
	Axe	1.54	0.81	2.89	0.49
Colgate	Mennem Women	5.52	1.40	5.18	2.21
	Mennen Men	11.96	1.41	11.95	1.43
Church & Dwight	Arm & Hammer	3.02	0.94	2.82	0.58
	Arrid	5.22	1.10	4.71	0.86
Revlon	Mitchum Women	1.72	0.38	1.58	0.27
	Mitchum Men	3.33	0.67	3.01	0.56
	Ban	4.82	1.12	4.00	0.79
	Private Label	0.19	0.08	0.07	0.03

Note: The table reports the average (across regions and time periods) market shares before the merger and after the divestiture for the deodorant data.

Table 2. Summary Statistics - EU Merger Control Database

Variable	Obs	Mean	SD	Min	Max
ph2rem	37852	0.058	0.132	0	0.497
ph2clear	37852	0.009	0.032	0	0.155
remedies	37852	0.257	0.219	0	0.780
vertical	37852	0.247	0.139	0.007	0.592
distancehq	37852	1423.151	1906.314	0	6755

Notes: The table reports summary statistics for variables created from the EU Merger Control Database for the period 2004-2006. 'ph2rem' is the average number of mergers cleared in phase II conditional on remedies, 'ph2clear' the average number of mergers cleared unconditionally, 'remedies' the average number of time the parties proposed remedies to solve competition concerns, 'vertical' is the average number of merger for which the EU antitrust authority raised vertical concern. 'distancehq' is the distance from the headquarter in miles computed from the website `airmilescalculator`. Private labels excluded from sample.

C Event Studies: Estimates

Panel 1.1

Table 3. Estimates - Lead - δ_1

Lead	Lower Bound	Estimates	Upper Bound
1	0	0	0
2	-0.039	-0.013	0.011
3	-0.022	0.010	0.043
4	-0.051	-0.012	0.026
5	-0.001	0.039	0.081
6	-0.026	0.020	0.068
7	-0.044	0.008	0.060
8	-0.030	0.028	0.086
9	-0.065	0.000	0.067
10	-0.057	0.003	0.064
11	-0.062	-0.006	0.049
12	-0.061	0.001	0.064
13	-0.094	-0.021	0.050
14	-0.080	-0.008	0.064

Table 4. Estimates - Lag - δ_1

Lag	Lower Bound	Estimates	Upper Bound
0	-0.064	-0.023	0.018
1	-0.099	-0.053	-0.006
2	-0.081	-0.030	0.019
3	-0.089	-0.044	-0.000
4	-0.077	-0.037	0.003
5	-0.060	-0.018	0.023
6	-0.088	-0.043	0.002
7	-0.107	-0.055	-0.003
8	-0.119	-0.063	-0.006
9	-0.117	-0.069	-0.0211
10	-0.125	-0.072	-0.019
11	-0.127	-0.075	-0.023
12	-0.138	-0.084	-0.030
13	-0.131	-0.075	-0.020
14	-0.125	-0.067	-0.009

Panel 1.2

Table 5. Estimates - Lead - δ_2

Lead	Lower Bound	Estimates	Upper Bound
1	0	0	0
2	-0.009	0.000	0.010
3	-0.013	0.010	0.034
4	-0.013	0.009	0.033
5	-0.015	0.009	0.034
6	-0.009	0.006	0.022
7	-0.003	0.014	0.031
8	-0.017	0.004	0.026
9	-0.013	0.005	0.023
10	-0.015	0.006	0.027
11	-0.024	-0.003	0.017
12	-0.028	-0.006	0.015
13	-0.029	-0.008	0.012
14	-0.038	-0.009	0.020

Table 6. Estimates - Lag - δ_2

Lag	Lower Bound	Estimates	Upper Bound
0	-0.005	0.004	0.014
1	-0.027	-0.010	0.005
2	-0.032	-0.014	0.004
3	-0.031	-0.012	0.006
4	-0.026	-0.004	0.016
5	-0.020	-0.000	0.019
6	-0.026	0.024	0.075
7	0.025	0.073	0.120
8	0.020	0.067	0.115
9	0.012	0.056	0.101
10	0.025	0.074	0.124
11	0.020	0.069	0.119
12	0.013	0.066	0.118
13	0.011	0.060	0.109
14	0.010	0.060	0.110

Panel 1.3

Table 7. Estimates - Lead - δ_3

Lead	Lower Bound	Estimates	Upper Bound
1	0	0	0
2	-0.019	-0.004	0.010
3	-0.008	0.006	0.021
4	-0.021	-0.004	0.012
5	-0.017	0.003	0.024
6	-0.020	0.004	0.028
7	-0.034	-0.006	0.021
8	-0.041	-0.013	0.014
9	-0.035	-0.006	0.022
10	-0.038	-0.010	0.017
11	-0.041	-0.012	0.015
12	-0.039	-0.012	0.014
13	-0.046	-0.018	0.008
14	-0.052	-0.021	0.009

Table 8. Estimates - Lag - δ_3

Lag	Lower Bound	Estimates	Upper Bound
0	-0.017	0.003	0.024
1	-0.025	-0.003	0.017
2	-0.019	0.000	0.021
3	-0.023	-0.001	0.019
4	-0.025	-0.003	0.018
5	-0.023	-0.002	0.018
6	-0.026	-0.001	0.023
7	-0.032	-0.005	0.021
8	-0.024	0.001	0.027
9	-0.040	-0.013	0.0139
10	-0.044	-0.008	0.027
11	-0.032	-0.001	0.029
12	-0.041	-0.012	0.016
13	-0.032	-0.007	0.017
14	-0.035	-0.006	0.022

Panel 1.4

Table 9. Estimates - Lead - δ_4

Lead	Lower Bound	Estimates	Upper Bound
1	0	0	0
2	0.000	0.010	0.020
3	-0.006	0.005	0.017
4	0.004	0.017	0.030
5	-0.002	0.010	0.023
6	-0.011	0.002	0.017
7	-0.002	0.0140	0.030
8	-0.011	0.006	0.024
9	-0.020	-0.002	0.015
10	-0.021	-0.002	0.017
11	-0.020	-0.002	0.015
12	-0.020	-0.001	0.016
13	-0.027	-0.008	0.011
14	-0.028	-0.005	0.016

Table 10. Estimates - Lag - δ_4

Lag	Lower Bound	Estimates	Upper Bound
0	-0.015	-0.002	0.010
1	-0.010	0.003	0.017
2	-0.019	-0.004	0.010
3	-0.020	-0.006	0.008
4	-0.020	-0.005	0.010
5	-0.033	-0.014	0.003
6	-0.029	-0.007	0.015
7	-0.056	-0.033	-0.010
8	-0.052	-0.029	-0.005
9	-0.039	-0.016	0.006
10	-0.040	-0.013	0.013
11	-0.044	-0.017	0.009
12	-0.043	-0.016	0.011
13	-0.037	-0.014	0.009
14	-0.045	-0.019	0.007

D Demand Results

Table 11. First Stage Regression Nested-Logit

	$log(s_{jmt\|g})$
PG_{Post}	0.107 (0.033)
DIV_{Post}	-0.100 (0.050)
# Rivals' product female	0.002 (0.001)
# Rivals' product male	0.002 (0.002)
BLP	-0.009 (.001)
# products female by manufacturer	-0.000 (.001)
# products male by manufacturer	0.003 (.002)
size	0.469 (0.043)
Brand-form-size FE	✓
Retailer FE	✓
Geographic FE	✓
Period FE	✓
N	38150
F-Test of excluded instruments	17.36

Robust standard errors in parentheses

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 12. First Stage Regression Nested-Logit

	Price
PG_{Post}	-0.035 (.010)
DIV_{Post}	0.084 (.015)
# Rivals' product female	-0.001 (.000)
# Rivals' product male	-0.002 (.000)
BLP	-0.000 (.000)
# products female by manufacturer	-0.000 (.000)
# products male by manufacturer	-0.002 (.000)
Size	0.311 (.015)
Brand-form-size FE	✓
Retailer FE	✓
Geographic FE	✓
Period FE	✓
N	38150
F-Test of excluded instruments	10.50

Robust standard errors in parentheses

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 13. Brand-form-size dummies

Variable	Mean
Brand-form-size dummies	
Brand-form-size 1	-0.131 (0.007)
Brand-form-size 2	-0.169 (0.008)
Brand-form-size 3	-0.798 (0.043)
Brand-form-size 4	0.050 (0.002)
Brand-form-size 5	-0.212 (0.021)
Brand-form-size 6	-0.448 (0.013)
Brand-form-size 7	-1.509 (0.060)
Brand-form-size 8	0.108 (0.007)
Brand-form-size 9	0.071 (0.005)
Brand-form-size 10	-1.497 (0.040)
Brand-form-size 11	-0.173 (0.008)
Brand-form-size 12	-1.267 (0.060)
Brand-form-size 13	-0.797 (0.025)
Brand-form-size 14	-0.363 (0.021)
Brand-form-size 15	0.447 (0.025)
Brand-form-size 16	-1.102 (0.051)
Brand-form-size 17	-0.049 (0.015)
Brand-form-size 18	0.586 (0.020)
Brand-form-size 19	-0.473 (0.021)
Brand-form-size 20	-0.433 (0.038)
Brand-form-size 21	-0.382 (0.020)
Brand-form-size 22	0.325 (0.018)
Brand-form-size 23	0.052 (0.010)
Brand-form-size 24	0.758 (0.028)
Brand-form-size 25	-0.466 (0.033)
Brand-form-size 26	-0.286 (0.032)
Brand-form-size 27	-0.395 (0.037)
Brand-form-size 28	-0.382 (0.023)
Brand-form-size 29	0.009 (0.012)
Brand-form-size 30	0.570 (0.017)
Brand-form-size 31	-0.312 (0.034)
Brand-form-size 32	-0.621 (0.032)
Brand-form-size 33	0.289 (0.013)
Brand-form-size 34	0.115 (0.008)
Brand-form-size 35	0.519 (0.014)
Brand-form-size 36	-0.176 (0.064)
Brand-form-size 37	-0.665 (0.056)
Brand-form-size 38	-0.759 (0.054)
Brand-form-size 39	-0.280 (0.043)
Brand-form-size 40	-0.251 (0.031)
Brand-form-size 41	-0.145 (0.021)
Brand-form-size 42	-0.072 (0.037)
Brand-form-size 43	0.480 (0.060)
Brand-form-size 44	-0.045 (0.015)

Robust standard error in parentheses.

Variable	Mean
Brand-form-size dummies	
Brand-form-size 45	-0.686 (0.049)
Brand-form-size 46	-0.047 (0.017)
Brand-form-size 47	0.321 (0.006)
Brand-form-size 48	-0.411 (0.025)
Brand-form-size 49	0.025 (0.003)
Brand-form-size 50	-1.093 (0.054)
Brand-form-size 51	-1.047 (0.055)
Brand-form-size 52	-0.116 (0.009)
Brand-form-size 53	0.314 (0.019)
Brand-form-size 54	-1.079 (0.054)
Brand-form-size 55	-1.094 (0.041)
Brand-form-size 56	0.127 (0.006)
Brand-form-size 57	0.678 (0.039)
Brand-form-size 58	0.163 (0.006)
Brand-form-size 59	-0.437 (0.020)
Brand-form-size 60	0.102 (0.012)
Brand-form-size 61	0.069 (0.007)
Brand-form-size 62	-0.777 (0.057)
Brand-form-size 63	-0.375 (0.033)
Brand-form-size 64	-0.100 (0.020)
Brand-form-size 65	-0.193 (0.049)
Brand-form-size 66	0.2700 (0.001)
Brand-form-size 67	-0.033 (0.015)
Brand-form-size 68	-0.437 (0.050)
Brand-form-size 69	-0.216 (0.013)
Brand-form-size 70	0.148 (0.011)
Brand-form-size 71	-0.615 (0.041)
Brand-form-size 72	0.278 (0.003)
Brand-form-size 73	0.443 (0.013)
Brand-form-size 74	-0.611 (0.037)
Brand-form-size 75	0.271 (0.013)
Brand-form-size 76	0.272 (0.012)
Brand-form-size 77	0.137 (0.015)
Brand-form-size 78	0.327 (0.021)
Brand-form-size 79	-0.759 (0.035)
Brand-form-size 80	0.210 (0.016)
Brand-form-size 81	0.154 (0.053)
Brand-form-size 82	0.210 (0.014)
Brand-form-size 83	0.050 (0.044)
Brand-form-size 84	-2.149 (0.125)
Brand-form-size 85	-0.510 (0.035)
Brand-form-size 86	0.016 (0.011)
Brand-form-size 87	0.224 (0.003)
Brand-form-size 88	0.572 (0.064)
Brand-form-size 89	0.082 (0.008)

Table 15. Retailer, Geographic market and period dummies

Variable	Mean
Retailer dummies	
Retailer 1	-
Retailer 2	-0.043 (0.015)
Retailer 3	0.011 (0.007)
Retailer 4	0.136 (0.019)
Retailer 5	-0.366 (0.018)
Retailer 6	-0.176 (0.008)
Retailer 7	-0.316 (0.010)
Retailer 8	-0.333 (0.014)
Retailer 9	-0.191 (0.009)
Retailer 10	0.048 (0.007)
Retailer 11	-0.334 (0.014)
Retailer 12	0.180 (0.020)
Retailer 13	-0.197 (0.126)
Geographic market dummies	
Geographic market 1	-
Geographic market 2	-0.342 (0.075)
Geographic market 3	-0.243 (0.078)

Robust standard error in parentheses.

Variable	Mean
Period dummies	
Period 1	-
Period 2	-0.017 (0.009)
Period 3	0.012 (0.034)
Period 4	-0.019 (0.004)
Period 5	-0.076 (0.011)
Period 6	-0.028 (0.020)
Period 7	-0.013 (0.006)
Period 8	-0.028 (0.044)
Period 9	-0.023 (0.004)
Period 10	-0.035 (0.024)
Period 11	-0.010 (0.035)
Period 12	-0.045 (0.018)
Period 13	0.002 (0.062)
Period 14	-0.046 (0.031)
Period 15	-0.043 (0.021)
Period 16	-0.020 (0.043)
Period 17	-0.011 (0.060)
Period 18	-0.031 (0.028)
Period 19	-0.006 (0.055)
Period 20	-0.062 (0.019)
Period 21	-0.033 (0.059)
Period 22	-0.036 (0.062)
Period 23	-0.045 (0.057)
Period 24	-0.040 (0.032)
Period 25	-0.051 (0.024)
Period 26	-0.071 (0.009)
Period 27	-0.055 (0.035)
Period 28	-0.065 (0.060)
Period 29	-0.084 (0.030)
Period 30	-0.061 (0.036)
Period 31	-0.054 (0.011)
Period 32	-0.071 (0.021)
Period 33	-0.027 (0.070)
Period 34	-0.031 (0.059)
Period 35	-0.036 (0.041)
Period 36	-0.051 (0.052)

The formulas to compute the own and cross-price elasticity of the random coefficient nested logit, omitting the subscripts m and t, are as follows. The own-price elasticity is given by:

$$\frac{\partial S_j}{\partial p_j}\frac{p_j}{s_j} = -\frac{p_j}{s_j}\int \alpha_i(\frac{1}{1-\rho} - \frac{\rho}{1-\rho}s_{ij|g} - s_{ij})s_{ij}f(v)dv. \tag{2}$$

The cross-price elasticity of products in the same nest is:

$$\frac{\partial S_j}{\partial p_j}\frac{p_j}{s_k} = -\frac{p_j}{s_k}\int \alpha_i(\frac{\rho}{1-\rho}s_{ij|g} + s_{ij})s_{ik}f(v)dv. \tag{3}$$

The cross-price elasticity of products in different nest is:

$$\frac{\partial S_j}{\partial p_j}\frac{p_j}{s_k} = -\frac{p_j}{s_k}\int \alpha_i s_{ij}s_{ik}f(v)dv. \tag{4}$$

Table 17. Comparison Own-Price Elasticity with other studies

	Range Average Own-Price Elasticity
NL	-4.122
RCNL	-4.917
Sara Lee/Unilever (Case COMP/M.5658, 2010)	
Belgium	[-2.9; -2.2]
Netherlands	[-4.8; -2.1]
Spain	[-9.1; -3.4]
UK	[-3.5; -1.2]

E Lower Bounds for Costs

In the U.S. deodorant market from 2004 to 2006, there is a limited number of private labels. In particular, I do not observe private labels in the forms Gel and Stick. Therefore, I need to impute these costs. To do this, I assume that the width of the cost interval in forms in which private labels are unobserved is equal to the weighted average width of the cost intervals in which costs are observed.

F Costs: Comparison with Alternative Approach

An alternative approach is to estimate some bargaining weights using equation (13) to creates moment conditions. Assume that total marginal costs are as follows:

$$mc^R_{jmt} + mc^M_{jmt} = X_{jmt}\kappa + \eta_{jmt} \tag{5}$$

where η_{jmt} is an unobservable costs shock, X_{jmt} is the row jmt of a matrix X containing a constant, a dummy for each manufacturer-form-size-t combinations.
Recall that the retailer first order condition is given by:

$$p_{jmt} - \gamma_{jmt} = \Gamma_{jmt}(\lambda_{jmt}, p_{jmt}) + mc^R_{jmt} + mc^M_{jmt} \tag{6}$$

Plugging (3) in equation (40), one obtain:

$$p_{jmt} - \gamma_{jmt} = \Gamma_{jmt}(\lambda_{jmt}, p_{jmt}) + X_{jmt}\kappa + \eta_{jmt}. \tag{7}$$

It is likely that manufacturers and retailers observe the realisation of η_{jmt} when they set prices such that $\Gamma_{jmt}(\lambda_{jmt})$ is correlated with η_{jmt}. Therefore, one needs instruments satisfying $E[z'\eta(\theta^s)] = 0$ to disentangle the price variation caused by variation in cost from the one due to variation in markup. The number of instruments available limits the number of bargaining weight that one can estimate. I use three instruments. I use an indicator variable equal to 1 for (i) the divested products and (ii) products of the merged firms in the post-merger period. I use the number of products owned by rivals manufacturer (BLP-type) instruments. These instruments are relevant as they influence upstream markups. They are assumed to be orthogonal to the unobserved cost shocks. Constrained by these number of instruments, I estimate three upstream bargaining weights: one for the merged firms, one for the buyer of the divested brands and rivals. Next, one can define a structural error term as follows:

$$\eta_{jmt} = p_{jmt} - \gamma_{jmt} - \Gamma_{jmt}(\lambda_{jmt}, p_{jmt}) - X_{jmt}\kappa. \tag{8}$$

Denote $\theta^s = (\lambda, \kappa)$ such that θ^s is the vector of parameters minimizing the following Generalized Method of Moments objective function:

$$\underset{\theta^s}{argmin} \quad \eta(\theta^s)' Z W Z' \eta(\theta^s). \tag{9}$$

In total, I estimate 1724 parameters corresponding to the manufacturer-form-size-t combinations; a constant and 3 bargaining weights. The estimates are shown in Table 18.

Table 18. Supply Parameter Estimates

	Estimates
Bargaining weights (λ)	
Merger	0.345
Buyer Divested brand	0.313
Rivals	0.484
Cost Parameters	
Constant	✓
manufacturer-form-size-t dummies	✓
Observations	38150

Discussion

The estimation approach imposes some form of symmetry on the bargaining weights. The alternative approach I introduce in this article assumes some form of symmetry on the costs guided by the institutional setting. In the former, the estimated bargaining weights are not varying across time and geographic market. In the latter, the costs are symmetric for each firm-form-size combinations but may vary over time.

G Bargaining Ability Parameters with Brand Specific Effects

Table 19. Bargaining Ability Parameter Estimates with Brand-Specific Effects

Upstream Bargaining Power	LB	UB	LB	UB	LB	UB
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
$\mathbb{1}_{\text{Merger}}{}^{M}_{jmt}$	-0.10***	-0.089***	-0.24***	-0.14***		
	(0.021)	(0.012)	(0.023)	(0.012)		
$\mathbb{1}_{\text{Dry idea}}{}^{M}_{jmt}$	0.16*	0.13***	0.12+	0.11***		
	(0.068)	(0.035)	(0.062)	(0.032)		
$\mathbb{1}_{\text{Soft}}{}^{M}_{jmt}$	-0.098***	-0.059**	-0.10**	-0.057**		
	(0.029)	(0.018)	(0.033)	(0.020)		
$\mathbb{1}_{\text{Right}}{}^{M}_{jmt}$	0.22***	0.16***	0.20***	0.16***		
	(0.022)	(0.0091)	(0.023)	(0.0087)		
Controls	✓	✓	✓	✓		
Product FE	✓	✓	✓	✓	✓	✓
Period FE	✓	✓	✓	✓		
Region FE	✓	✓	✓	✓		
adj. R^2	0.76	0.84	0.76	0.84	0.75	0.83
N	37852	37852	37852	37852	37852	37852

Notes: The table reports the estimated bargaining ability parameters in equation (16) for the lower bound (LB) and upper bound (UB) of the upstream bargaining weight. There are 37852 observations for the period 2004 to 2006. Private labels are excluded from the sample. Specifications in column (i), (ii), (iii) and (iv) include products, region, period dummies (month) as well as dummies controlling for the announcement and the transitory periods. Columns (i) and (ii) are based on OLS. Columns (iii) and (iv) are based on GMM with excluded instruments. Standard errors clustered at the product level in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

H Estimated Changes in Costs

In this appendix, I provide details on how I estimated the changes in costs in Table 7 and show standard errors.

I estimate a specification similar in spirit as previous approaches used to study changes in costs in merger analysis in horizontal market such as Bjornerstedt and Verboven (2016).[1] The difference is that I recover bounds on costs and estimate two equations. Precisely, I estimate the following specification for the upper and lower bounds on costs:

$$log(mc^R_{j,mt} + mc^M_{j,mt}) = K + \alpha_j + \mathbb{1}_{\text{Dry Idea}} \times \mathbb{1}_{\text{Post}} + \mathbb{1}_{\text{Soft \& Dry}} \times \mathbb{1}_{\text{Post}} + \mathbb{1}_{\text{Right Guard}} \times \mathbb{1}_{\text{Post}} + \mathbb{1}_{\text{Merger}} \times \mathbb{1}_{\text{Post}} + \epsilon_{jmt}, \quad (10)$$

where $mc^R_{j,mt} + mc^M_{j,mt}$ are either the lower or upper bounds on total costs from propositon 1. $\mathbb{1}_{\text{Dry Idea}} \times \mathbb{1}_{\text{Post}}$ is an indicator variable equal to 1 for the products of the brand Dry Idea in the post merger and divestiture period. $\mathbb{1}_{\text{Soft \& Dry}} \times \mathbb{1}_{\text{Post}}$ is an indicator variable equal to 1 for the products of the brand Soft & Dry in the post merger and divestiture period. $\mathbb{1}_{\text{Right Guard}} \times \mathbb{1}_{\text{Post}}$ is an indicator variable equal to 1 for the products of the brand Right Guard in the post merger and divestiture period. $\mathbb{1}_{\text{Merger}} \times \mathbb{1}_{\text{Post}}$ is an indicator variable equal to 1 for the products of the merged firms in the post merger and divestiture period.

[1] See. equation (12), page 154.

Table 20. Changes in Costs Estimates

Costs	Lower bound	Upper bound
	(i)	(ii)
$\mathbb{1}_{\text{Dry Idea}} \times \mathbb{1}_{\text{Post}}$	-0.025***	-0.012*
	(0.0062)	(0.0060)
$\mathbb{1}_{\text{Soft \& Dry}} \times \mathbb{1}_{\text{Post}}$	-0.048***	-0.035***
	(0.011)	(0.0073)
$\mathbb{1}_{\text{Right Guard}} \times \mathbb{1}_{\text{Post}}$	-0.083***	-0.066***
	(0.015)	(0.011)
$\mathbb{1}_{\text{Merger}} \times \mathbb{1}_{\text{Post}}$	-0.080***	-0.054***
	(0.017)	(0.012)
Product FE	✓	✓
N	37976	37976

Notes: The table reports the estimated changes in costs shown in Table (7). I use data for the full period 2004 to 2006. Private labels are included in the sample. Specifications include products dummies. Standard errors clustered at the product level in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

I Simulation Algorithm

In this appendix, I provide details on the simulation algorithm used in Section 6 to simulate the price effects of a merger and divestiture based on pre-merger data.

Combining equations 13 and 17, in a given market m, I obtain:

$$p_{mt} - \gamma_{mt}(p_{mt}) = \frac{1 - \lambda_{mt}(\mathbb{1}_{\text{Divestiture}^M_{mt}}, \mathbb{1}_{\text{Merger}^M_{mt}})}{\lambda_{mt}(\mathbb{1}_{\text{Divestiture}^M_{mt}}, \mathbb{1}_{\text{Merger}^M_{mt}})} A_{mt}(p_{mt}, I^M_{mt}) + mc^R_{mt} + mc^M_{mt}. \tag{11}$$

Denote $p_{m,pre}$ the vector of prices in the pre-merger period, $\lambda_{m,pre}$ the vector of bargaining weights in the pre-merger period, $\mathbb{1}_{\text{Divestiture}^M_{mt}}$ a vector containing indicator variables equal to 1 for divested products in the post-merger period and 0 otherwise, $\mathbb{1}_{\text{Merger}^M_{mt}}$ a vector containing indicator variables equal to 1 for products of the merged firms in the post-merger period and 0 otherwise, $I^M_{m,pre}$ (resp. $I^M_{m,post}$) the upstream ownership matrix in the pre-merger period (resp. post-merger and divestiture period) and $mc^R_{m,pre} + mc^M_{m,pre}$ the costs in the pre-merger period.

In Section 6.1, I study the price effects of a merger and divestiture with no changes in costs and bargaining weights. I change the upstream ownership matrix $I^M_{m,pre}$ to the new ownership matrix corresponding to either a merger with or without divestiture $I^M_{m,post}$ and solve the new vector of price $p_{m,post}$ from the following system of nonlinear equations in the month prior to the date of the merger:

$$p_{m,post} - \gamma_{mt}(p_{m,post}) = \frac{1-\lambda_{m,pre}}{\lambda_{m,pre}} A_{m,pre}(p_{m,post}, I^M_{m,post}) + mc^R_{m,pre} + mc^M_{m,pre}. \quad (12)$$

In Section 6.1, I study the price effects of a merger and divestiture with changes in costs and bargaining weights. I change the upstream ownership matrix $I^M_{m,pre}$ to the new ownership matrix corresponding to a merger with divestiture $I^M_{m,post}$; update the vector $\mathbb{1}_{\text{Merger}^M_{m,pre}}$ and $\mathbb{1}_{\text{Divestiture}^M_{m,pre}}$ to $\mathbb{1}_{\text{Merger}^M_{m,post}}$ and $\mathbb{1}_{\text{Divestiture}^M_{m,post}}$. Next, I solve for the new vector of bargaining weights in the month prior to the date of the merger using equation 17:

$$\lambda_{m,post} = \lambda_{m,pre}(\mathbb{1}_{\text{Divestiture}^M_{m,post}}, \mathbb{1}_{\text{Merger}^M_{m,post}}) \quad (13)$$

Last, I solve for the new vector of prices $p_{m,post}$ from the following system of nonlinear equations in the month prior to the date of the merger:

$$p_{m,post} - \gamma_{m,pre}(p_{m,post}) = \frac{1-\lambda_{m,post}}{\lambda_{m,post}} A_{m,pre}(p_{m,post}, I^M_{m,post}) + mc^R_{m,post} + mc^M_{m,post},$$

Where $mc^R_{m,post} + mc^M_{m,post}$ are computed as $mc^R_{m,post} + mc^M_{m,post} = (mc^R_{m,pre} + mc^M_{m,pre}) \times (1 + x_m)$ with x_m the change in costs shown in Table 7.

J Merger Without Divestiture

Table 21. Comparison Price Effects: Merger Without Divestiture

	Merger without divestiture	
	Lower Bound	Upper Bound
	(i)	(ii)
Change in Prices (%)		
Divested Brands		
Dry Idea	3.80 (1.23)	11.8 (4.41)
Soft & Dri	6.41 (3.60)	9.97 (6.13)
Right Guard	5.52 (3.96)	8.16 (4.51)
Merged Firms	-2.48 (2.90)	-0.268 (4.28)
Rivals	-0.239 (0.36)	0.0163 (0.56)
ΔCS (%)	0.0635	-0.7815

Notes: The table reports the average percentage changes in prices and consumer surplus for a merger without divestiture. The simulations are based on the RCNL demand estimates presented in Table 2 and supply estimates presented in Table 3 and 4. Pre-merger data for September 2005 are used. Standard deviations in parenthesis relate to variation across geographic markets and products. 'Lower bound' (resp. 'Upper bound') refers to bound on upstream bargaining weights.

K Consumer Surplus

The individual consumer surplus in a given market mt is computed based on the 'log-sum' formula provided by Anderson et al. (1992):

$$CS_i = \frac{1}{\alpha_i} log(1 + \sum_{g=1}^{G} (\sum_{j \in g} exp(\frac{\delta_j(p_j) + \mu_{ij}(p_j)}{1-\sigma}))^{1-\sigma}), \tag{14}$$

The consumer surplus is thus the individual consumer surplus integrated over the idiosyncratic shocks:

$$CS = \int \frac{1}{\alpha_i} log(1 + \sum_{g=1}^{G} (\sum_{j \in g} exp(\frac{\delta_j(p_j) + \mu_{ij}(p_j)}{1-\sigma}))^{1-\sigma}) f(v) dv. \tag{15}$$

Denote p_j^{pre} (resp. $p_j^\star$) the price of product j in the no merger scenario (resp. in a counterfactual scenario) such as:

$$CS^\star = \int \frac{1}{\alpha_i} log(1 + \sum_{g=1}^{G} (\sum_{j \in g} exp(\frac{\delta_j(p_j^\star) + \mu_{ij}(p_j^\star)}{1-\sigma}))^{1-\sigma}) f(v) dv. \quad (16)$$

$$CS^{pre} = \int \frac{1}{\alpha_i} log(1 + \sum_{g=1}^{G} (\sum_{j \in g} exp(\frac{\delta_j(p_j^{pre}) + \mu_{ij}(p_j^{pre})}{1-\sigma}))^{1-\sigma}) f(v) dv. \quad (17)$$

In all tables I report the average (across markets) of the percentage change in consumer surplus where the change in consumer surplus is $CS^\star - CS^{pre}$.

L Counterfactual Choices of the Brands: Alternative Buyer

Table 22. Comparison Price Effects: Divestiture to Colgate

	Actual package		**Without Dry Idea**	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
	(i)	(ii)	(iii)	(iv)
Change in Prices (%)				
Divested Brands				
Dry Idea	3.51 (0.62)	7.09 (1.67)	-8.27 (0.46)	-10.0 (0.57)
Soft & Dri	-2.30 (0.42)	-1.29 (2.44)	-3.08 (0.27)	-2.38 (2.12)
Right Guard	1.60 (2.33)	2.64 (2.76)	1.54 (2.30)	2.56 (2.73)
Buyer: Colgate	1.48 (1.54)	3.76 (2.02)	1.10 (1.67)	3.16 (2.19)
Merged Firms	-8.01 (2.52)	-7.80 (3.89)	-8.12 (2.41)	-8.10 (3.65)
Rivals	-0.489 (0.45)	-0.499 (0.43)	-0.621 (0.58)	-0.831 (0.624)
ΔCS (%)	1.2404	0.5304	1.6889	1.2278

Notes: The table reports the average percentage changes in prices and consumer surplus for different scenarios. Column (i) and (ii) shows the price effects caused by the actual divestiture package sold to Colgate. Column (iii) and (iv) show the price effects caused by the actual divestiture package without Dry idea sold to Colgate. The simulations are based on the RCNL demand estimates presented in Table 2 and supply estimates presented in Table 3 and 4. Pre-merger data for September 2005 are used. Standard deviations in parenthesis relate to variation across geographic markets and products. 'Lower bound' (resp. 'Upper bound') refers to bound on upstream bargaining weights.

M New Measure: Computation

In this appendix I provide details on how to compute the change in downstream bargaining power such that prices are unaffected by the merger as in Section 6.6.
First, note that the downstream bargaining weight associated with a product j in m at t

is given by:

$$\lambda_{jmt} = \frac{A_{jmt}(p_{mt}, I^M_{mt})}{A_{jmt}(p_{mt}, I^M_{mt}) + p_{jmt} - \gamma_{jmt}(p_{mt}) - mc^R_{jmt} - mc^M_{jmt}}, \tag{18}$$

where $A_{jmt}(p_{mt}, I^M_{mt}) = (I^M_{mt} \odot \mathcal{S}_{mt})^{-1}(I^R_{mt} \odot \mathcal{S}_{mt})\gamma_{mt}(p_{mt})$.

Denote $p_{m,pre}$ the vector of prices and $I^M_{m,pre}$ (resp. $I^M_{m,post}$) the upstream ownership matrix in the pre-merger (resp. post-merger and divestiture) period defined as September 2005 (one month before the merger).

The bargaining weight such that an arbitrary product j (owned by the merged firms) leave all prices unchanged is given by:

$$\bar{\lambda}_{jm,pre} = \frac{A_{jmt}(p_{m,pre}, I^M_{m,post})}{A_{jmt}(p_{m,pre}, I^M_{m,post}) + p_{jm,pre} - \gamma_{jmt}(p_{m,pre}) - mc^R_{jm,pre} - mc^M_{jm,pre}}, \tag{19}$$

where $I^M_{m,post}$ is the new upstream ownership matrix implied by the merger.

In the pre-merger period, for j we have:

$$\lambda_{jm,pre} = \frac{A_{jm,pre}(p_{m,pre}, I^M_{m,pre})}{A_{jm,pre}(p_{m,pre}, I^M_{m,pre}) + p_{jm,pre} - \gamma_{jm,pre}(p_{m,pre}) - mc^R_{jm,pre} - mc^M_{jm,pre}}, \tag{20}$$

Combining (19) and (20), one can compute the percentage change in downstream bargaining weight such as prices are unaffected by the merger, for all products owned by the merged firms, as follows:

$$\frac{\bar{\lambda}_{jm,pre} - \lambda_{jm,pre}}{\lambda_{jm,pre}} \tag{21}$$

References

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