Understanding the Price Effects of the MillerCoors Joint Venture

Miller, Weinberg (2017)

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Overview

- Miller and Coors merged; why did the FTC let them?
- What does economic theory say about how Miller and Coors will behave post-merger?
- What does economic theory say about how *other* firms will behave post-merger?
- Authors have very detailed sales data.
- **Research Question:** Are the firms competing à la Nash-Bertrand post-merger?
  - Spoiler: No.
  - Harder question: *How* are firms colluding, and which firms?
  - More interesting question: Why did the FTC approve this merger?

Market Overview

TABLE I

REVENUE SHARES AND HHI [a]

Year	ABI	MillerCoors	Miller	Coors	Modelo	Heineken	Total	HHI
2001	0.37	–	0.20	0.12	0.08	0.04	0.81	2,043
2003	0.39	–	0.19	0.11	0.08	0.05	0.82	2,092
2005	0.36	–	0.19	0.11	0.09	0.05	0.79	1,907
2007	0.35	–	0.18	0.11	0.10	0.06	0.80	1,853
2009	0.37	0.29	–	–	0.09	0.05	0.80	2,350
2011	0.35	0.28	–	–	0.09	0.07	0.79	2,162

[a]This table provides revenue shares and the HHI over 2001–2011. Firm-specific revenue shares are provided for ABI, Miller, Coors, Modelo, and Heineken. The total across these firms is also provided. The HHI is scaled from 0 to 10,000. The revenue shares incorporate changes in brand ownership during the sample period, including the merger of Anheuser-Busch (AB) and InBev to form ABI, which closed in November 2008, and Heineken's acquisition of the FEMSA brands in April 2010. All statistics are based on supermarket sales recorded in IRI scanner data.

- Recall that merger guidelines say that HHI $\in$ (1500, 2500) is a gray area; needs further consideration

Descriptive Smoking Gun

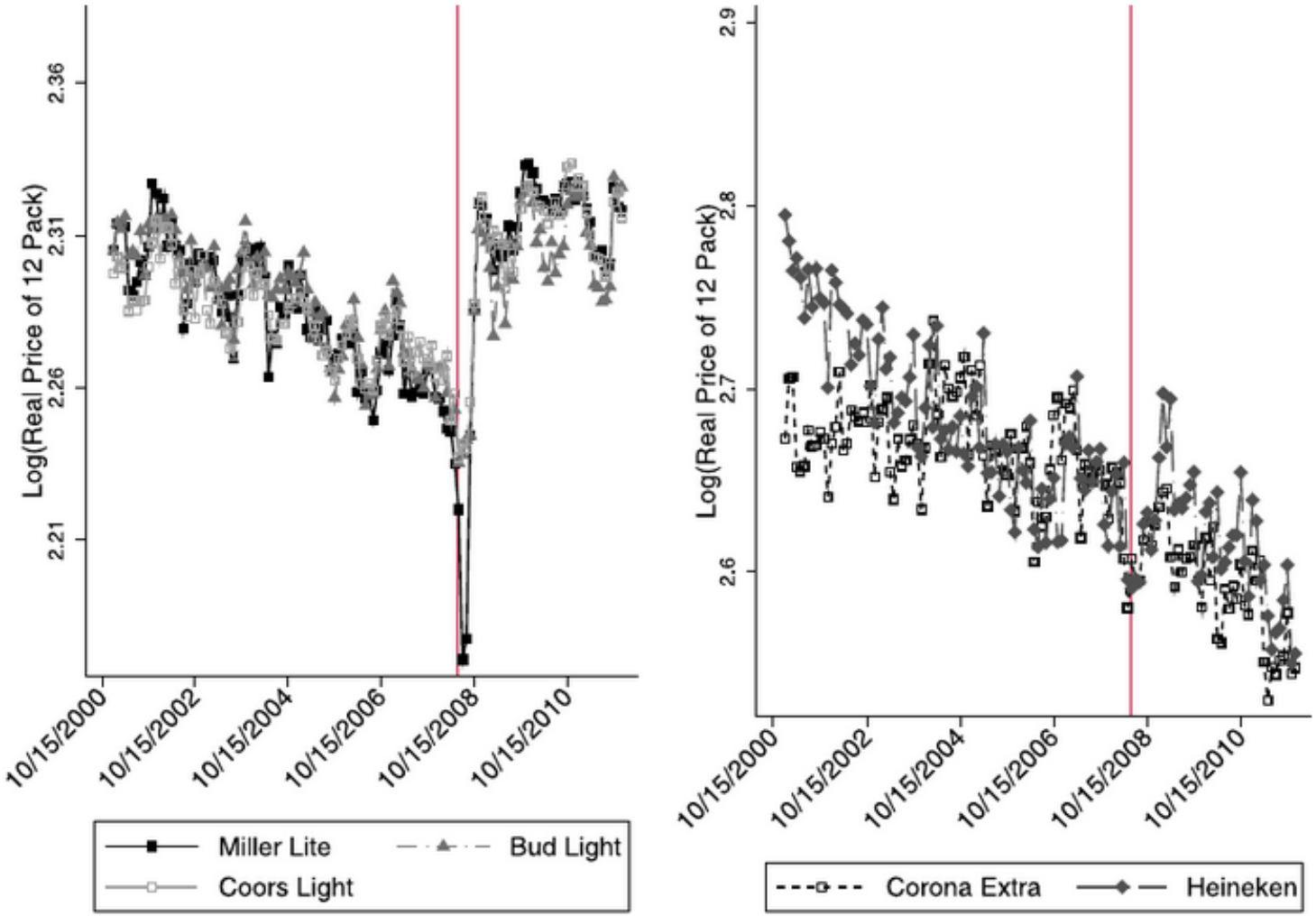

FIGURE 1.—Average retail prices of flagship brand 12 packs. *Notes*: This figure plots the average prices of a 12 pack over 2001–2011, separately for Bud Light, Miller Lite, Coors Light, Corona Extra, and Heineken. The vertical axis is the natural log of the price in real 2010 dollars. The vertical bar drawn at June 2008 signifies the consummation of the Miller–Coors merger.

Demand

- Model consumer demand using Random Coefficient Nested Logit (RCNL)

$$s_{jrt} = \frac{1}{N_{rt}} \sum_{i=1}^{N_{rt}} \frac{\exp\left((\delta_{jrt} + \mu_{ijrt})/(1-\rho)\right)}{\exp\left(I_{igrt}/(1-\rho)\right)} \frac{\exp I_{igrt}}{\exp I_{irt}}$$

$$\begin{aligned} \rho &\equiv \text{nesting parameter} \\ \delta &\equiv \text{mean utility} \\ \mu &\equiv \text{consumer-specific deviations} \end{aligned}$$

- This relaxes some restrictions on substitution patterns and allows for "natural" economic impacts, e.g. from the recession

- This approach is pretty common in empirical IO (Asker 2016)

Estimation and Instruments

- Estimation via GMM

$$\hat{\theta}^D = \arg\min_{\theta} \omega(\theta)' Z A^{-1} Z' \omega(\theta)$$

- Identification requires one instrument for price, and an instrument for each non-linear parameter

- **Price Instruments (supply side)**
  1. Distance between the brewery and region
  2. Indicator for ABI and MillerCoors products post-merger

- **Instruments for the nesting parameter**
  - — Need exogenous variation in the conditional shares of the inside goods
  1. Number of products in the market
  2. Distance summed across products in the marke

TABLE IV

BASELINE DEMAND ESTIMATES[a]

Demand Model:		NL-1	RCNL-1	RCNL-2	RCNL-3	RCNL-4
Data Frequency:		Monthly	Monthly	Quarterly	Monthly	Quarterly
Variable	Parameter	(i)	(ii)	(iii)	(iv)	(v)
Price	α	−0.1312	−0.0887	−0.1087	−0.0798	−0.0944
		(0.0884)	(0.0141)	(0.0163)	(0.0147)	(0.0146)
Nesting Parameter	ρ	0.6299	0.8299	0.7779	0.8079	0.8344
		(0.0941)	(0.0402)	(0.0479)	(0.0602)	(0.0519)
Demographic Interactions						
Income × Price	Π_1		0.0007	0.0009		
			(0.0002)	(0.0003)		
Income × Constant	Π_2		0.0143	0.0125	0.0228	0.0241
			(0.0051)	(0.0055)	(0.0042)	(0.0042)
Income × Calories	Π_3		0.0043	0.0045	0.0038	0.0031
			(0.0016)	(0.0017)	(0.0018)	(0.0015)
Income × Import	Π_4				0.0039	0.0031
					(0.0019)	(0.0016)
Income × Package Size	Π_5				−0.0013	−0.0017
					(0.0007)	(0.006)
Other Statistics						
Median Own Price Elasticity		−3.81	−4.74	−4.33	−4.45	−6.10
Median Market Price Elasticity		−1.10	−0.60	−0.72	−0.60	−0.69
Median Outside Diversion		29.80%	12.96%	16.98%	13.91%	11.82%
J-Statistic			13.94	13.75	13.91	14.15

[a]This table shows the baseline demand results. We use 2SLS for estimation in column (i) and GMM in columns (ii) to (v). There are 94,656 observations at the brand–size–region–month–year level in columns (i), (ii), and (iv) and 31,784 observations at the brand–size–region–year–quarter level in columns (iii) and (v). The samples exclude the months/quarters between June 2008 and May 2009. All regressions include product (brand × size) and period (month or quarter) fixed effects. The elasticity and diversion numbers represent medians among all the brand–size–region–month/quarter–year observations. Standard errors are clustered by region and shown in parentheses.

Supply Model

- Differentiated-products price competition
- Post-merger, ABI and/or MillerCoors partially internalize their pricing externalities

$$\underbrace{\Omega_{t_1^*} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}}_{\text{Nash-Bertrand}} \qquad \underbrace{\Omega_{t_2^*} = \begin{bmatrix} 1 & \kappa & \kappa & 0 \\ \kappa & 1 & 1 & 0 \\ \kappa & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}}_{\text{post-merger}}$$

- Green terms capture full internalization by MillerCoors
- κ captures partial internalization due to collusion between ABI and MillerCoors
- We still have 0's in some places because Modelo doesn't get to collude

Supply Estimates

Brand/Category		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
						Product-Specific Own and Cross-Elasti			
(1)	Bud Light	−4.389	0.160	0.019	0.182	0.235	0.101	0.146	0.047
(2)	Budweiser	0.323	−4.272	0.019	0.166	0.258	0.103	0.166	0.047
(3)	Coors	0.316	0.154	−4.371	0.163	0.259	0.102	0.167	0.046
(4)	Coors Light	0.351	0.160	0.019	−4.628	0.230	0.100	0.142	0.047
(5)	Corona Extra	0.279	0.147	0.018	0.137	−5.178	0.108	0.203	0.047
(6)	Corona Light	0.302	0.151	0.018	0.153	0.279	−5.795	0.183	0.048
(7)	Heineken	0.269	0.145	0.018	0.131	0.311	0.108	−5.147	0.047
(8)	Heineken Light	0.240	0.112	0.014	0.124	0.210	0.086	0.138	−5.900
(9)	Michelob	0.301	0.140	0.015	0.146	0.208	0.089	0.135	0.042
(10)	Michelob Light	0.345	0.159	0.019	0.181	0.235	0.101	0.146	0.047
(11)	Miller Gen. Draft	0.346	0.159	0.019	0.182	0.235	0.101	0.146	0.047
(12)	Miller High Life	0.338	0.159	0.019	0.177	0.242	0.102	0.153	0.047
(13)	Miller Lite	0.344	0.159	0.019	0.180	0.237	0.101	0.148	0.047
(14)	Outside Good	0.016	0.007	0.001	0.009	0.011	0.005	0.006	0.002
							Cross-Elasticities by Category		
	6 Packs	0.307	0.152	0.018	0.155	0.275	0.104	0.180	0.047
	12 Packs	0.320	0.154	0.019	0.163	0.250	0.102	0.161	0.047
	24 Packs	0.356	0.160	0.019	0.189	0.222	0.099	0.136	0.047
	Domestic	0.349	0.160	0.019	0.184	0.229	0.100	0.142	0.047
	Imported	0.279	0.147	0.018	0.138	0.301	0.108	0.200	0.047

ABI/MillerCoors $\neq$ Modelo

TABLE VII

BREWER MARKUPS FROM RCNL-1[a]

	6 Packs		12 Packs		24 Packs	
Brand	Pre	Post	Pre	Post	Pre	Post
Bud Light	3.63	4.34	3.52	4.24	3.43	4.13
Budweiser	3.79	4.49	3.66	4.38	3.55	4.25
Coors	2.70	4.39	2.56	4.31	2.44	4.18
Coors Light	2.47	4.21	2.36	4.14	2.28	4.04
Corona Extra	3.30	3.18	3.04	2.91	3.04	3.03
Corona Light	3.02	2.91	2.75	2.65	2.87	2.80
Heineken	3.20	3.14	2.98	2.92	3.22	3.33
Heineken Light	2.87	2.81	2.61	2.50	2.75	2.69
Michelob	3.69	4.47	3.62	4.38	3.34	4.28
Michelob Light	3.61	4.34	3.53	4.23	3.46	4.06
Miller Gen. Draft	2.89	4.26	2.77	4.16	2.68	4.09
Miller High Life	2.91	4.28	2.80	4.20	2.74	4.13
Miller Lite	2.89	4.25	2.78	4.18	2.69	4.07

[a]This table provides the average markups for each brand–size combination separately for the pre-merger and post-merger periods, based on the RCNL-1 specification shown in column (ii) of Tables IV and VI.

But. . . what if they weren't colluding?

TABLE VIII

CHANGES IN ABI LOG COSTS WITH BERTRAND AND COORDINATION[a]

	Budweiser	Bud Light	Michelob Light	Michelob Ultra
$\mathbb{1}${Post-Merger and Bertrand}	0.122	0.120	0.089	0.102
	(0.006)	(0.006)	(0.004)	(0.007)
$\mathbb{1}${Post-Merger}	0.016	−0.002	0.124	0.050
	(0.014)	(0.011)	(0.016)	(0.013)

[a]The dependent variable is log marginal costs from (i) the baseline model and (ii) an alternative with Nash–Bertrand pricing in all periods. The RCNL-1 specification is used to obtain the implied marginal costs. Observations are thus at the brand–size–region–month–scenario level. The estimation sample excludes observations from June 2008 through May 2009. All regressions include product (brand × size) fixed effects interacted with region fixed effects. Standard errors are clustered at the region level and shown in parentheses.

- Seems unlikely that ABI had costs skyrocket for no apparent reason
- However, much harder to say that the merger between Miller and Coors *caused* the switch in competition/firm conduct

So, why did the FTC approve the merger?

TABLE X

RESULTS FROM COUNTERFACTUAL ANALYSIS [a]

Coordinated Effects:	yes	yes	no	no	no
Unilateral Effects:	yes	yes	yes	yes	no
Efficiencies:	yes	no	yes	no	no
	(i)	(ii)	(iii)	(iv)	(v)
			Retail Prices		
ABI	10.03	10.14	9.38	9.55	9.43
Miller	8.94	9.37	8.28	8.72	8.19
Coors	10.18	10.85	9.56	10.22	9.26
			Brewer Markups		
ABI	4.45	4.56	3.81	3.97	3.84
Miller	4.52	4.32	3.83	3.63	3.05
Coors	4.25	4.06	3.61	3.41	2.68
			Welfare Statistics		
Producer Surplus	22.1%	19.1%	10.3%	8.2%	–
ABI	10.3%	19.8%	−0.08%	9.3%	–
Miller	37.8%	20.2%	24.6%	9.1%	–
Coors	47.8%	12.9%	34.7%	3.5%	–
Consumer Surplus	−3.7%	−5.3%	−0.2%	−2.1%	–
Total Surplus	1.3%	−0.6%	1.8%	−0.1%	–

[a]This table provides volume-weighted mean prices and markups, separately, for 12-pack flagship brands of ABI, Miller, and Coors, under five different economic scenarios. Also shown are the percentage changes in producer surplus, consumer surplus, and total surplus relative to the "No Merger" scenario. The welfare statistics are calculated using the complete data set (i.e., all products). Column (i) is based on the raw data and supply-side parameter estimates. Columns (ii) to (v) show the results from counterfactual scenarios. The numbers in column (ii) are computed assuming the merger occurs with coordinated and unilateral effects but without efficiencies. The numbers in column (iii) are computed assuming the merger occurs with unilateral effects and efficiencies but no coordinated effects. The numbers in column (iv) are computed assuming the merger occurs with unilateral effects but without efficiencies or coordinated effects. Lastly, the numbers in column (v) are computed assuming that the Miller/Coors merger does not occur. All statistics are for 2011.