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On the Possibility of an Unsuccessful Merger: Implications from Stock Market and Retail Scanner Data*

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Abstract

Industrial economists and competition policymakers have traditionally assumed that a horizontal or vertical merger raises involved parties' joint profits, whereas whether consumers benefit or lose should be judged on a case-by-case basis. However, if a completed merger is not as successful as expected, its observed effects on the retail market may not necessarily be a result of the integrated firm's anti-competitive conduct. How can one assess whether a merger has achieved its initial objectives? This paper proposes to use two different data sources to empirically argue the possibility of such an *unsuccessful* merger. First, I use *stock market data* to provide an event study analysis, and compare PepsiCo's vertical integraton of two of the its chain bottlers (February 2010) and Coca-Cola's acquistion of its biggest bottler (October 2010). I argue that the stock market may not have perceived Coca-Cola's vertical merger as promising as PepsiCo's vertical merger. Furthermore, the former may have been perceived as helping Dr Pepper Snapple rather than Coca-Cola itself. Secondly, I use *retail scanner data* to present evidence, based on a difference-in-differences estimation, which shows that Coca-Cola's retail prices rose by 5% after its vertical merger, suggesting that internal conflicts may have been passed through to its final prices.

JEL Classification: L4; K21; G34.

Keywords: Mergers; Vertical Integration; Event Study Analysis; Difference-in-Differences Estimation.

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1 Introduction

One presumption under merger evaluation is that a merger must raise joint profits of both parties. Salop and Culley's (2016) recent proposal for a revision of the Vertical Merger Guidelines is, for example, no exception. However, at least *ex post*, the completed merger can turn out to be less successful than expected, or even harmful to the integrated entity. As recognized by Bresnahan and Levin (2012), the industrial organization literature tends to assume away the possibility of organizational conflicts when a horizontal or vertical merger is considered. However, obviously, any merger is associated with organizational change.

This paper empirically presents evidence for such an "unsuccessful" merger by using *two different data sources* in a constructive way. Specifically, I study the two biggest vertical mergers in the U.S. carbonated soft drink industry: PepsiCo's merger with two bottlers (February 2010) and Coka-Cola's merger with the biggest bottler in its supply chain (October 2010). First, from an event study analysis using *stock market data*, the contrast between PepsiCo's and Coca-Cola's vertical mergers is revealed and explored. Indeed, it suggests that Coca-Cola's vertical merger was not perceived to be as promising as PepsiCo's vertical merger. In addition, the stock market may have perceived that Coca-Cola's vertical merger would help Dr Pepper Snapple (hereafter, Dr Pepper) rather than Coca-Cola itself. Secondly, other evidence from *retail scanner data* suggests that Coca-Cola's vertical merger raised its own retail prices by about 5%, with statistical significance. It is thus inferred that Coca-Cola's vertical integration may have caused transactional conflicts between upstream and downstream firms which were passed through to its retail prices.

The rest of the paper is organized as follows. First, in Section 2, I further describe the two vertical mergers in the U.S. carbonated soft drink industry, which form the focus of this study. Then, Section 3 presents empirical results from an event study analysis. After a robustness analysis is conducted in Section 4, I provide a supporting analysis that shows Coca-Cola's vertical merger raised its own retail prices in Section 5. Lastly, Section 6 concludes the paper with remarks on implications for competition policy based on the foregoing empirical results.

2 The Two Vertical Mergers in the U.S. Carbonated Soft Drink Industry

PepsiCo's acquisition of its two biggest bottlers (Pepsi Bottling Group and PepsiAmericas) in 2010 and Coca-Cola's acquisition of Coca-Cola Enterprises (CCE) in the same year are considered as the two biggest vertical mergers in the industry's history. First, PepsiCo reached a deal to acquire Pepsi Bottling Group (PBG) and PepsiAmericas (PAS) on August 4, 2009. At the time of this announcement, PepsiCo owned about 40% and 43% of the shares of PBG and PAS, respectively (Federal Trade Commission's (FTC) press-release on February 26, 2010), and it completed the merger process on February 26, 2010. Chairwoman Indra Nooyi stated that the main reason for the vertical merger was to respond to changes in consumers' tastes in a faster way (PepsiCo's press release on August 4, 2009), although bottlers had been reluctant to adjust to these new trends (Zhou and Wan, 2017). It seemed that the news of this vertical merger was received favorably by the stock market. There was a 5.1% increase in the value of PepsiCo's shares on the same day of PepsiCo's announcement of the merger plan; and the numbers were even higher for the two bottlers: 8.5% for PBG and 9% for PAS (Kilibarda, 2010).

At the time of *The Wall Street Journal*'s article about PepsiCo's attempt to acquire the two bottlers (on April 20, 2009), The Coca-Cola Company and CCE established a new organization to for coordination and cost reduction in their distribution system (*The Wall Street Journal*, April 21, 2009). Chairman Muhtar Kent said (to *The Wall Street Journal*, April 22, 2009) that the organization would simplify "the payment system for concentrate and syrup." As Isdell and Beasley (2011, p.195) reveal, Coca-Cola had a plan to acquire CCE in the spring of 2006 "in order to lower costs and increase profits." Then, on February 25, 2010, Coca-Cola finally abandoned its own franchise system of bottling and distribution. At the time, CCE was the largest Coca-Coca bottler in North America, operating in 46 states and Washington, D.C., accounting for about 80% of Coca-Cola's sales volume in the U.S. According to FTC's press-release document issued on September 27, 2010, Coca-Cola, at the time of the announcement of the agreement, "owned about 34 percent of Coca-Cola Enterprises." Interestingly, on the day of the announcement, The Coca-Cola Company's shares dropped by 3.7%, although CCE's shares rose sharply by 31% (Kilibarda, 2010). Coca-Cola completed its acquisition process on

October 1, 2010.

However, two years after the Coca-Cola's acquisition of CCE, The Coca-Coca Company was reportedly (on December 12. 2013 according to *The Wall Street Journal,* "Coca-Cola Shakes Up Americas Management") initiating an "organizational shakeup" to "*refranchise* much of its U.S. distribution" (emphasis added) over the next several years. More recently, *The Wall Street Journal*, March 22, 2016, also reported, Coca-Cola was "refranchising nearly half of its distribution territory." These movements suggest that Coca-Cola's vertical integration was not successful in achieving its obejectives. In contrast, PepsiCo does not appear to have changed its distribution system following its own merger activities.

3 Event Study Analysis

To study the differences in how Coca-Cola's and PepsiCo's vertical mergers were conceived in the financial market, I conduct an event study analysis. In an event study analysis, one is interested in knowing whether and how much the value of a public company is affected by a particular event. To study how the stock market evaluated the acquiring firm and rival firms when a merger proposal was announced. I follow Hosken and Simpson (2001); Simpson (2001); Duso, Gugler, and Yurtoglu (2010); Kwoka and Gu (2015); and Günster and van Dijk (2016), among others, to consider the standard market model: $R_{jt} = \alpha_j + \beta_j R_{mt} + \gamma_j D_t + \epsilon_{jt}$, where R_{it} is the rate of return to firm j on day t, R_{mt} is the rate of return on the value-weighted market index at the New York Stock Exchange, D_t is a dummy variable which takes one if day t belongs to the event window (see below), and zero otherwise, and ϵ_{jt} is a serially uncorrelated random shock that is independent of R_{mt} and D_t.[1]

Herein, an event is an announcement of a soft drink seller's acquisition of a bottler. Let $t = 1, 2, ..., t_0, ..., T$ be the time index for the entire data period. The time period is daily, and

[1] One could also, as Filson, Olfati, and Radoniqi (2015) do, consider a more sophisticated version of the market model such as Fama and French's (1993) three-factor model:

$$R_{jt} - r_t = \alpha_j + \beta_j(R_{mt} - r_t) + \delta_j D_t + \delta_{j1} SMB_t + \delta_{j2} HML_t + \epsilon_{jt},$$

where r_t is the risk-free return rate on day t, and SMB_t and HML_t measure the excess returns of small and low-growth company stocks, respectively ("the Fama-French factors"). For the purpose here, however, it would suffice to consider the standard model, although the estimation is readily conducted because historical data on r_t, SMB_t, and HML_t are available via Kenneth French's webpage (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

date t_0 is the day when the event occurs. For Coca-Cola's vertical merger, it is February 24, 2010, and for PepsiCo's vertical merger, it is August 4, 2009. Then, the coefficient γ_j captures firm j's *abnormal return* due to the event. For each merger, the data period starts at 200 trading days before the event date, and ends 10 trading days after the event, which means that there are 211 days included in each of the two data sets. For each merger, the equation above is estimated using the entire period.

Data on R_{jt} and R_{mt} are taken from the Center for Research in Security Prices's (CRSP) US Stock Database.[2] I obtain information on daily returns for The Coca-Cola Company, PepsiCo, and Dr Pepper Snapple, Inc. I am also able to include Jones Soda Co, which is listed on NYSE, as a rival firm.[3] Information on daily returns for CCE and PBG is also available.[4] Admittedly, an announcement of a merger may not be a real shock not least because some information about the proposed merger may have been leaked prior to the announcement. In addition, the market may not quickly respond to the announcement. To mitigate these issues, I follow Kwoka and Gu (2015) and consider the following five cases for the estimation window: [0], [-1,1], [-3,3], [-10,5], and [-20,10], where, for example, [-3,3] is the event window that includes, the event day, 3 trading days before the event, and 3 trading days after the event.

Table 1 shows the estimation results for abnormal returns to the acquiring firm (The Coca-Cola Company), its rival firms, and the target (CCE). The cumulative abnormal return (CAR) to each firm is obtained by multiplying the estimated $\widehat{\gamma}_j$ by the total number of days in the event window (for example, it is 7 for the [-3,3] window). Table 2, on the other hand, shows the estimation results for abnormal returns due to the announcement of PepsiCo's vertical merger. As explained above, I focus on event windows [-1,1] and [-3,3] more than on [0].

First, *Coca-Coca's own abnormal return is negative* for either specification [-1,1] or [-3,3] *in the announcement of its merger plan* (albeit not statistically significant). On the other hand,

[2] Two pieces of information are available for R_{mt}; value-weighted market return that includes distributions, and an alternative that excludes dividends. I use the former and have verified that there are no significant changes if the latter is used.

[3] The listing of Jones Soda Co ended on September 19, 2012. The fourth largest company in terms of unit sales in the IRI Academic Data Set is National Beverage Corporation, which cannot be included because its listing on NYSE ended on June 11, 2007. It is now listed on NASDAQ.

[4] The other bottler, PepsiAmericas Inc ended its listing on June 9, 2004. While PBG's listing ended on February 26, 2010, which I take as the day when PepsiCo consummated its vertical merger, CCE did not wholly terminate listing on NYSE: its listing as CCE ended on October 3, 2010, but "Coca-Cola Enterprises New" was listed starting from October 4, 2010.

Table 1: Estimates for Abnormal Returns due to the Announcement of Coca-Cola's Vertical Merger

Event Window	[-1,1]			[-3,3]			[0]		
	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)
Coca-Cola	-1.378 (0.994)	0.167	-4.133	-0.838 (0.083)	**0.088**	-5.865	0.162 (0.083)	**0.052**	0.162
PepsiCo	-0.066 (0.211)	0.754	-0.199	0.061 (0.185)	0.743	0.425	0.025 (0.081)	0.759	0.025
Dr Pepper	3.668 (3.023)	0.226	11.003	0.823 (1.613)	0.610	5.763	0.179 (0.136)	0.191	0.179
Jones Soda	2.836 (2.520)	0.262	8.509	2.276 (3.163)	0.473	15.929	2.258 (0.502)	**0.000**	2.258
CCE	10.381 (9.265)	0.264	31.142	4.160 (4.468)	0.353	29.121	-1.180 (0.165)	**0.000**	-1.180

Event Window	[-10,5]			[-20,10]		
	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)
Coca-Cola	-0.105 (0.307)	0.732	-1.688	-0.177 (0.185)	0.341	-5.479
PepsiCo	0.309 (0.154)	0.047	4.943	0.092 (0.131)	0.482	2.863
Dr Pepper	0.726 (0.758)	0.339	11.616	0.491 (0.426)	0.250	15.208
Jones Soda	2.197 (1.740)	0.208	35.160	0.533 (1.505)	0.724	16.516
CCE	1.742 (2.075)	0.402	27.866	0.718 (1.088)	0.510	22.258

Notes: For each pair of Event Window and Company, the number of observations (trading days) is 211. Robust standard errors are shown in parentheses, and p-values less than 0.1 are emboldend.

Table 2: Estimates for Abnormal Returns due to the Announcement of PepsiCo's Vertical Merger

Event Window	[-1,1]			[-3,3]			[0]		
	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)
PepsiCo	0.653 (1.780)	0.714	1.958	0.044 (0.801)	0.957	0.306	4.956 (0.099)	**0.000**	4.956
Coca-Cola	-0.822 (0.306)	**0.008**	-2.465	-0.331 (0.291)	0.257	-2.319	-0.365 (0.110)	**0.001**	-0.365
Dr Pepper	-1.127 (0.244)	**0.000**	-3.381	-1.044 (0.277)	**0.000**	-7.306	-0.870 (0.197)	**0.000**	-0.870
Jones Soda	0.439 (1.866)	0.814	1.316	-1.497 (2.676)	0.576	-10.482	0.758 (0.523)	0.225	0.758
PBG	1.602 (2.730)	0.558	4.806	0.379 (1.258)	0.763	2.653	8.207 (0.172)	**0.000**	8.207

Event Window	[-10,5]			[-20,10]		
	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)	Est $(\widehat{\gamma}_j \times 10^2)$	p	CAR (%)
PepsiCo	-0.084 (0.377)	0.823	-1.351	-0.293 (0.244)	0.231	-9.097
Coca-Cola	-0.466 (0.242)	**0.056**	-7.459	-0.276 (0.209)	0.189	-8.544
Dr Pepper	-0.268 (0.331)	0.419	-4.287	0.202 (0.371)	0.587	6.257
Jones Soda	-0.834 (1.670)	0.618	-13.352	-1.920 (1.253)	0.127	-59.506
PBG	0.027 (0.605)	0.964	0.437	-0.336 (0.375)	0.371	-10.428

Notes: For each pair of Event Window and Company, the number of observations (trading days) is 211. Robust standard errors are shown in parentheses, and p-values less than 0.1 are emboldened.

PepsiCo's own abnormal return is positive; it is nearly 5% (and the p-value shows statistical significance) if the event window is [0]. Thus, Coca-Cola's vertical merger was less favorably perceived around the announcement date. Second, this is also apparent in the abnormal returns to the rival firms. Table 2 indicates moderate values for PepsiCo's abnormal returns, and relatively high abnormal returns to Dr Pepper and Jones Soda, which implies that *the financial market might have perceived that Coca-Cola's vertical merger would not strengthen its position* in the U.S. carbonated soft drink industry. This reasoning also applies if the event window is [-10,5] or [-20,10]. In contrast, an opposite finding is observed with regard to the announcement of PepsiCo's merger plan: in Table 2, Coca-Cola's and Dr Pepper's abnormal returns are both negative in the specifications [-1,1], [-3.3], and [0]. In particular, the corresponding p-values are low, showing statistical significance. In sum, while the financial market might have favored PepsiCo's vertical merger, it might not have perceived Coca-Cola's vertical merger in a similar way.

4 Robustness

Now, I consider two robustness checks. First, instead of including a dummy for the event window, I estimate $R_{jt} = \alpha_j + \beta_j R_{mt} + \epsilon_{jt}$, for $t = 1, 2, .., t_s < t_0$ (this period is called the *estimation window*). Then, the predicted (or the counterfactual) values, $\widehat{R}_{jt} = \widehat{\alpha}_j + \widehat{\beta}_j R_{mt}$ for $t = t_u, ..., t_v$, are computed, where $t_u = t_s + 1$ and $t_v \geq t_0$ (now, the period $t = t_u, ..., t_v$ is the event window). I set $t_s = t_0 - 1$. Below, I consider two possibilities for the event window: [-1,1] ($t_v = 1$) and [-3,3] ($t_v = 3$). Then, for each specification, I construct the following t statistic:

$$\frac{\sum_{t=t_u,...,t_v}(R_t - \widehat{R}_t)}{\widehat{\sigma}_\epsilon / \sqrt{t_v - t_u + 1}},$$

where ϵ_{jt} is assumed to be distributed according to *iid* $N(0, \sigma_\epsilon^2)$, and $\widehat{\sigma}_\epsilon$ is the estimate of σ_ϵ,[5] and CAR is now defined by $\sum_{t=t_u,...,t_v}(R_t - \widehat{R}_t)$. Table 3 shows that *PepsiCo and Dr Pepper had positive abnormal returns due to Coca-Cola's announcement.* However, Dr Pepper now also has positive abnormal returns as a result of PepsiCo's announcement.

[5] If there are J firms, then one can compute the variance for the abnormal by

$$\frac{\sum_{j=1,...,J}\sum_{t=t_u,...,t_v}[R_{jt} - \widehat{R}_{jt} - (\overline{R_{jt} - \widehat{R}_{jt}})]^2}{J}.$$

Table 3: Cumulative Abnormal Returns from the Announcements of Coca-Cola's and PepsiCo's Vertical Mergers

	Event Window	[-1,1]		[-3,3]	
		CAR (%)	t	CAR (%)	t
Coca-Cola's merger	Coca-Cola	-0.740	-1.342	-0.289	-0.796
	PepsiCo	1.402	2.218	0.342	0.819
	Dr Pepper	2.140	1.438	5.100	5.201
	Jones Soda	-26.589	-1.417	-13.010	-1.099
	CCE	-0.377	-0.489	0.038	0.074
PepsiCo's merger	PepsiCo	-3.139	-2.702	-1.660	-2.161
	Coca-Cola	-0.614	-0.427	-0.554	-0.582
	Dr Pepper	7.700	1.761	10.140	3.510
	Jones Soda	-32.455	-0.686	-19.160	-0.613
	PBG	-2.472	-0.603	-1.088	-0.401

Note: The number of observations (trading days) for each company in Event Windows [-1,1] and [-3,3] is 199 and 197, respectively. Reported t-statistics are based on robust standard errors.

Table 4: Sample Quantile Tests for Cumulative Abnormal Returns from the Announcements of Coca-Cola's and PepsiCo's Vertical Mergers

	Event Window	[-1,1]			[-3,3]		
		Est	$\widehat{R}_{jt}$		Est	$\widehat{R}_{jt}$	
		$(\widehat{\gamma}_j \times 10^2)$	5%	95%	$(\widehat{\gamma}_j \times 10^2)$	5%	95%
Coca-Cola's merger	Coca-Cola	-1.381	-1.454	1.525	-0.839	-1.462	1.529
	PepsiCo	-0.060	-1.466	1.599	0.062	-1.463	1.597
	Dr Pepper	3.680	-2.123	2.842	0.849	-1.914	2.796
	Jones Soda	2.716	-8.949	9.364	2.213	-8.825	9.447
	CCE	10.381	-1.942	1.892	4.161	-2.087	1.917
PepsiCo's merger	PepsiCo	0.636	-2.130	2.463	0.034	-2.055	2.462
	Coca-Cola	-0.829	-2.448	2.595	-0.338	-2.451	2.599
	Dr Pepper	-1.094	-3.355	3.844	-0.998	-3.361	3.838
	Jones Soda	0.274	-15.202	17.966	-1.591	-15.206	17.979
	PBG	1.587	-3.588	3.233	0.371	-3.578	3.228

Note: The number of observations (trading days) for each company in Event Windows [-1,1] and [-3,3] is 202 and 204, respectively. Reported t-statistics are based on robust standard errors.

Second, I use Gelbach, Helland, and Klick's (2013) sample quantile–"SQ"–test, which is a single-firm, single-event method, based on Conley and Taber (2011). By involking the *s*ample *q*uantile of the estimated abnormal returns, this test rejects the null hypothesis $H_0 : \gamma_j = 0$ against $H_0 : \gamma_j < 0$ if and only if the α-th percentile of $\widehat{R}_{jt} = \widehat{\alpha}_j + \widehat{\beta}_j R_{mt} + \widehat{\gamma}_j D_t$ is no less than $\widehat{\gamma}_j$, where the estimates are obtained for $t = 1, 2, .., t_0, ..., t_v$, and α, which the researcher can freely choose, corresponds to the Type I error probability. Table 4 compares the estimated $\widehat{\gamma}_j$ and the 5th and 95th percentiles of $\widehat{R}_{jt}$ for each firm j in both mergers. The only statistically significant result is *Dr Pepper's abnormally high returns* (with event window [-1,1]) *associated with the announcement of Coca-Cola's vertical merger*. This also implies that the financial market might have perceived that Coca-Cola's vertical merger would not strengthen its own position; it would rather benefit Dr Pepper.

5 Difference-in-Differences Evidence from Retail Scanner Data

The argument so far is also supported by the following evidence that uses another data sets (in particular, SymphonyIRI's Academic Data Set (Bronnenberg, Kruger, and Mela (2008)) and Kantar Media's Ad$pender); see Adachi (2017) for details about sample construction. Here, the reader should note that an observation unit is a product in each "market" (a pair of county and month). The constructed sample covers six products (Coca-Cola, Diet Coke, Pepsi, Diet Pepsi, Dr Pepper, and Diet Dr Pepper), encompassing the period of January, 2008, through December, 2012. October 2010, when The Coca-Cola Company completed its merger procedure, lies in the middle of this data period.

Table 5 shows the difference-in-differences (DID) estimates for an average treatment effect in the price equation in Adachi (2017) for the case of Coca-Cola's vertical merger. As a robustness check, estimates using the re-weighting method are also presented. It is observed that Coca-Cola's vertical merger *raised* its own retail prices by 5% (and the corresponding p-values are less than 0.1 (10% significance level) under both methods). This result is in contrast to Adachi's (2017) analysis of PepsiCo's case where its own retail price decreased by 4%. Both PepsiCo's and Dr Pepper's retail prices also rose a result of Coca-Cola's vertical merger. However, the estimates are smaller and are not statistically significant, *lending less*

Table 5: Average Treatment Effects (ATE) of Coca-Cola's Vertical Merger on the Retail Prices

	Standard DID		Re-Weighting	
	Est	p	Est	p
Dep Var: $\log p_{\text{coke}}$				
ATE	0.0488	**0.075**	0.0539	**0.028**
	(0.0273)		(0.0243)	
R^2	0.6023		0.6708	
Dep Var: $\log p_{\text{pepsi}}$				
ATE	0.0354	0.216	0.0044	0.889
	(0.0286)		(0.0314)	
R^2	0.5844		0.6048	
Dep Var: $\log p_{\text{dr\_p}}$				
ATE	0.0161	0.461	0.0218	0.204
	(0.0218)		(0.0171)	
R^2	0.6456		0.7417	

Notes: The number of observations is 18,292 for each of the six regressions. A "diet drink" dummy variable is included (results not presented). In addition, County fixed effects, time fixed effects, dummies for couties that experience PepsiCo's vertical merger (February 2010), interacted with monthly dummies for its occurence, market covariates, and cost covariates are also included. Standard errors, clustered by county, are shown in parentheses, and p-values less than 0.1 are emboldened.

support to the claim that Coca-Cola's vertical merger induced collusive behavior in the industry.[6]

To discuss the validity of the parallel trend assumption, I draw Figure 1 to check whether it reasonably holds before Coca-Cola's vertical merger (see Adachi (2017)). The plots should be all zero prior to the merger if the parallel trend assumption strictly holds. Panel (a) shows for most of the pre-merger period, the 95% confidence interval includes zero. However, it is observed from Panel (b) that the treatment group had a *negative* trend on Coca-Cola's market shares before the merger. This would be because the treatment group of Coca-Cola's vertical merger consists of populated and urbanized counties: consumers in these counties may have been more conscious about their health, being against the traditional icon of soda: Coca-Cola's products. While the pre-merger market share trend became nearly zero as the time for the finalization of Coca-Cola's merger approached, this movement seems to bounce back. The estimated positive effects of Coca-Coca's vertical merger on its own market share may be influenced by the negative values of the trend in the earlier months of the pre-merger period. In contrast, Panel (a) shows a more moderate trend, suggesting validity for the difference-in-differences estimation of the price effects of Coca-Cola's vertical merger.

6 Concluding Remarks

This paper has demonstrated how one can use both stock market and retail scanner data to argue the possibility of an unsuccessful merger. Both data sources from the U.S. carbonated soft drink industry suggest that the 2010 Coca-Cola vertical merger might not have achieved its initial objectives: (i) the stock market might have correctly anticipated its outcome, and (ii) Coca-Cola's retail price increase after its vertical merger may be a result from the pass-through of organizational conflicts, not a result from collusive behavior in the industry induced by the vertical merger. Although the newspaper articles cited in Section 2 assist the empirical results above, more direct evidence suggesting such internal issues would be further helpful.

I conclude this paper by suggesting that the empirical analysis herein has the following implications for competition policy. In most cases, competition policy authorities form policy recommendations by implicitly assuming that firms' activities are mutually beneficial to the

[6] See, e.g., Nocke and White (2007) and Normann (2009) for theoretical studies of the relationship between vertical integration and upstream collusion.

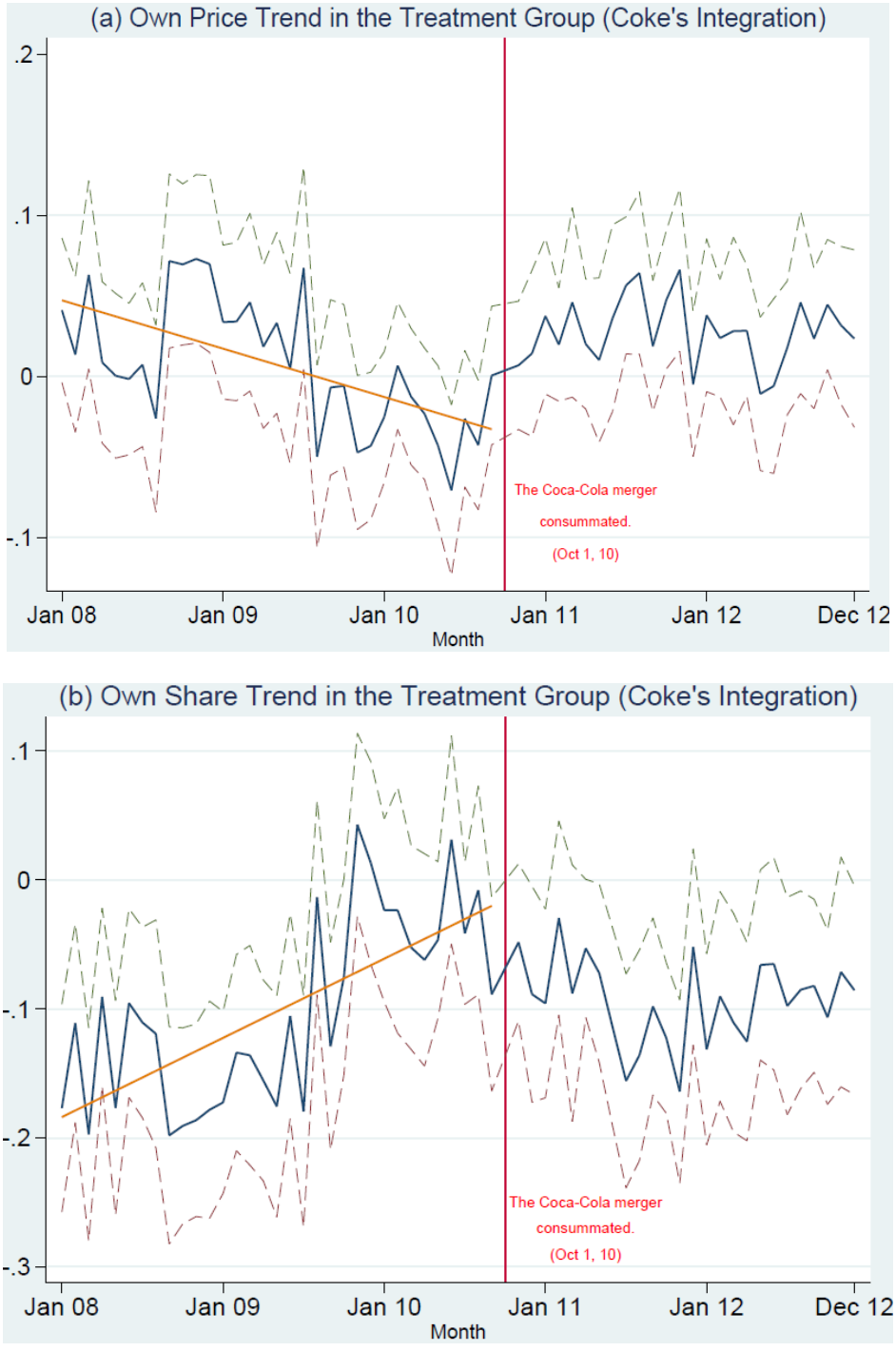

Figure 1: Price and Share Trends in the Treatment Group of Coca-Cola's Integration

Notes: The coefficient estimates for β_τ in Equation (1) in Adachi (2017) are plotted for each month τ. The dependent variable is log of Coca-Cola's own retail prices for Panel (a) and log of Coca-Cola's own market shares for Panel (b). The dashed lines show 95% confidence intervals, calculated by robust standard errors clustered by county.

involved parties. However, the effect of firms' conduct on consumers may not be a result from this one simple story where firms always succeed. Rather, firms are surrounded by uncertainty, and a proposed plan may not proceed as originally intended. This paper suggests that, although it is unknown how much the competition authority should take into account such organizational and internal issues, merger evaluation would benefit from recognizing that pro- and anti-competitive effects of mergers can be affected by the degree of internal coordination.

When conducting an *ex-post* evaluation, competition policy authorities should have in mind that firms can take various courses, and that the consequences observed in the market are not necessarily a result of firms' successes. In accordance with Hosken, Miller, and Weinberg's (2017) emphasis on the importance of ex-post evaluation of antitrust policy to improve model predictions, the results of this paper would suggest that when evaluating antitrust policies, not necessarily limited to merger policies, competition authorities may need to take a moment to consider the possibility that the market outcomes at hand have realized not because the vertical merger is successful to the integrated entity but because it is unintentionally unsuccessful.

At the same time, when formulating an *ex-ante* prediction, competition policy authorities should prepare for an unintended result, notwithstanding the inherent difficulties in arriving at robust predictions. If competition authorities mistakenly judge that the resulting market outcomes will be harmful to consumers because they assumed a given merger would be successful, when in fact the merger has not paid off to the integrated entity, this raises important and interesting questions about the assumptions used in policy processes. In essence, competition policy formation should strive to be open-minded in terms of potential outcomes, and thus potential distributions of costs and benefits, as a result of changes such as mergers.

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