

Stock Market Reactions to the Sprint-TMO Merger

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On April 29, 2018, the lingering prospect of a merger between Sprint and T-Mobile, the third- and fourth-largest mobile wireless providers in the United States, was formally realized.¹ T-Mobile will acquire a persistently struggling Sprint for \$26.5 billion in an all stock deal. Craig Moffett, a respected industry analyst, suggests that absent the deal, “Sprint can’t survive,” a position bluntly implied by the company’s poor financial condition.² More broadly, Chetan Sharma’s extensive analysis of global data leads him to conclude that mobile wireless markets tend to equilibrate at three large providers, and the proposed merger would result in such an outcome (with three, roughly equal sized firms).³ Economics even has a “Rule of Three,” suggesting that, in many industries, competition tends to result in three large providers serving the market.⁴

Still, the deal is a purely horizontal merger in an already concentrated industry, and these facts are serious impediments. Worse, the Department of Justice declared in 2011 that the transition from four to three mobile wireless providers in the U.S. would constitute an unacceptable reduction in the number of competitors.⁵ Given the rise in industry concentration resulting from this proposed combination (as measured by the Hirschman-Herfindahl Index or HHI, which stands to rise by over 400 points), the DOJ/FTC Horizontal Merger Guidelines advise that the merger “will be presumed to be likely to enhance market power.”⁶ The presumption is not determinative, but it must be overcome with compelling evidence.

A common evidentiary tool for analyzing the possible effects of a merger is the financial event study.⁷ Stock price movements on news of a transaction offer the market’s “democratic” assessment of its likely effects. In this PERSPECTIVE, I summarize the stock market evidence on the proposed merger. I apply the standard empirical methods and interpretation to the observed price responses.⁸

The pattern of returns for the merging firms and Verizon is consistent with a market power interpretation of the merger. AT&T’s returns appear unaffected by news of the transaction, so one might reasonably conclude the evidence is mixed.

On credible news of the merger on April 10, Sprint’s stock price rose 16% (market adjusted), and then rose another 8.5% on April 27 when the media reported that the official announcement would come two-days later on a Sunday.⁹ T-Mobile’s stock price likewise jumped 4.3% on the April 10 news, but was unaffected on the April 27 news. Verizon’s stock returns exhibited the same pattern, rising sharply on April 10 and again on April 27. This evidence, as I will explain, is compatible with a “market power” rather than “efficiency” assessment of the consequences of the merger.

These results are not the whole story, however. On the Monday, Tuesday, and Wednesday following the official statement (of Sunday, April 29), the market seemed to have second thoughts. On April 30, Sprint’s stock price fell 13% (much of that in after-hours trading on the 27th), losing an additional 3.4% on Tuesday, and another 3.9% on Wednesday. Thus, the price appreciation was all given back by Wednesday. T-Mobile’s price plummeted 5.5% on Monday, 2% on Tuesday, and 3.5% on Wednesday. Again, Verizon’s returns followed suit. Investors, it appeared, did not like the terms of the deal, or else quickly grasped the difficulties the merger would face obtaining approval.¹⁰ Nonetheless, it is significant that Verizon’s stock price movements paralleled the price changes for the merging parties.

On the other hand, AT&T’s stock returns were unaffected by the news, perhaps because the wireless business is a shrinking part of the increasingly diversified company. Whatever the reason, one might reasonably conclude the evidence may be mixed.

Event Study Methodology

Following Karafiath (1988), let $t = 1, 2, \dots, T$ denote the pre-event time period and $t = T+1, \dots, T+N$ denote the post-event period.¹¹ The regression model is

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \sum_{j=T+1}^{T+N} \gamma_{jn} D_{nt} + \varepsilon_t, \quad (1)$$

where R_{jt} denotes the daily return on security j at time t , R_{mt} is the return on the market index at time t , and D_{nt} is a dummy variable that is equal to one at time t and zero otherwise. The coefficient β_j is the financial Beta for security j ; γ_{jn} is the excess return on security j at time t . The event study focuses on the statistical significance of the γ values, or the sum thereof. Khotari and Warner (2005) detail the advantages of “short term” event studies, so the pre-event period consists of daily returns for 250 trading days.¹²

Including the event window adds 18 observations.

My analysis looks at stock returns for four companies: Sprint (S); T-Mobile (TMUS), AT&T (T), and Verizon (VZ).¹³ I consider a three-day period around major news events, including April 10, April 28, and April 30 (creating some overlap), and also add May 2. The standard interpretation of the patterns of signs of the coefficients is outlined in Table 1.¹⁴

Table 1. Interpretation of Price Effects

Merging Parties	Rivals	Interpretation
+	+	Reduced competition, higher prices, lower consumer welfare or no change in competitive conditions but re-evaluation by market
+	-	Increased efficiency of merged firm, lower prices, higher consumer welfare
-	+	Decreased efficiency in merged firm, higher prices, reduced competition, lower consumer welfare
-	-	Increased competition, lower prices, higher consumer welfare or no change in competitive conditions but re-evaluation by market

Equation (1) is estimated by ordinary least squares. The return on the market index is measured using the S&P 500 Index. In light of research by Ford and Kline (2005) and Jackson, Kline and Skinner (2006), statistical significance of the event coefficients is determined by bootstrapping the critical t-statistics for the pulse dummy variables (using 1,000 simulations).¹⁵ This approach confirms asymmetric critical t-values and departures from asymptotic theory. An asterisk (*) indicates statistical significant at the 10% level or better.

Results

Results are summarized in Table 2 for the major mobile wireless providers.¹⁶ Positive and statistically-significant price effects are observed

for the merging firms on April 10, with Sprint having a 16% one-day (abnormal) return. Sprint also had a positive return on April 27 of 8.4%, another large price effect. T-Mobile, alternately, saw no abnormal price movement on April 27.

Both Sprint and T-Mobile had large negative returns on April 30, May 1 and May 2, the three days following the official announcement of the transaction. In fact, Sprint traded down heavily on after-hours trading on April 27 as further details on the transaction leaked.¹⁷

Table 2. Wireless Rivals

	S	TMUS	VZ	T
β	0.745*	0.838*	0.693*	0.708*
Apr 9	-0.003	-0.001	-0.0017	-0.0006
Apr 10	0.161*	0.043*	0.017*	0.0069
Apr 11	0.003	0.002	-0.010	-0.011
Apr 26	-0.009	-0.006	-0.014	-0.066*
Apr 27	0.084*	0.006	0.036*	-0.002
Apr 30	-0.129*	-0.055*	-0.037*	-0.004
May 1	-0.034*	-0.020	-0.125	-0.006
May 2	-0.038*	-0.034*	-0.017*	-0.009

We see large positive effects on the unofficial but credible rumors, but then see large negative effects after the announcement. For Sprint, the negative returns after the announcement took back all the positive gains on merger rumors; the cumulative return of 3.4% is not statistically different from zero.¹⁸ T-Mobile gave back more, with a statistically-significant cumulative return over the event dummies of -6.5% (statistically different from zero at the 10% level), perhaps indicating the market's assessment that the deal's actual terms were a net negative for the company.¹⁹

Verizon's returns follow the same pattern as merging firms. Verizon had positive and statistically-significant abnormal returns on both April 10 and 27, and large negative abnormal returns after the official announcement. Looking back to Table 1, this pattern of returns is

consistent with a market power consequence of the merger.

AT&T's returns, on the other hand, are unrelated to the Sprint/T-Mobile deal. A large negative abnormal return is observed on April 26, but there were a number of news stories on AT&T on April 25th and 26th that might affect its stock price, including disappointing quarterly financial results.²⁰ In contrast, there was little news for Verizon on the major event dates, making the company's returns more potent evidence of the effects of the proposed merger.

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With a number of confounding news events for AT&T and its increasingly diverse portfolio of businesses, it is Verizon's stock returns that offer the most compelling evidence in the event study. The pattern of returns points to the market's prediction of a beneficial market power consequence of the proposed Sprint/T-Mobile merger for Verizon, but not for AT&T. The power of the evidence, however, is weakened by a lack of a supporting signal from AT&T and the fact all the positive gains on rumors were returned in the days following the official announcement. The stock market evidence is admittedly opaque.

Alternative Takes on the Merger

While the Sprint/T-Mobile merger will substantially increase the HHI, it will also create a large third competitor of a size nearly equal to Verizon and AT&T. The combined firm will have a market share of around 30%, which is very close to the 35.5% and 33.4% market shares of Verizon and AT&T. Empirical research suggests this

change in the distribution of market shares might materially affect market performance. In his seminal empirical study on market performance and the distribution of market shares, John Kwoka concludes:

... [I]ndustry margins when all three firms are large are much the same as when all are small. Equality of size among three large firms appears to breed a rivalry capable of simulating competitive performance levels.²¹

Kwoka's research suggests that the combination of Sprint and T-Mobile may be a more potent competitor than provided by these two firms acting independently. Kwoka's empirical analysis is not specific to the mobile wireless industry, and further research on this sort of dynamic change to the nature of competition specific to the mobile industry is certainly warranted.

The idea that the U.S. mobile market has an equilibrium of four firms (nationally, at least) is an emotional and not a scientific conclusion.

Moreover, any proper review of the Sprint/T-Mobile merger must consider that, as with prices and quantities, the number of firms serving a market is an equilibrium outcome.²² The process of reaching a structural *equilibrium* is greatly influenced by regulation. Indeed, the FCC intentionally overshot the financially-viable number of mobile wireless providers when designing the first spectrum auction in the 1990s.²³ The Commission's choice of the number of licenses to auction in any given market would determine, in part, the number of firms offering mobile wireless services. Chairman Reed Hundt, influenced by advice from Professor Michael Porter at the Harvard Business School, chose to offer enough licenses so that the number of firms initially in the market was, if anything, too large. The Commission designed the auction to permit

up to seven firms. Over time, the market would iterate to the equilibrium number of firms through mergers and acquisitions.²⁴

Another consideration is potential for the increased efficiency in the use of spectrum resulting from the merger. Beard, Ford, Spiwak and Stern (2012) show that if there is too little spectrum to meet customer demand for data transmission (that is, the spectrum constraint is binding), then competition among fewer firms with more spectrum leads to lower prices than competition among more firm with less spectrum.²⁵ This seemingly peculiar result arises from the "scale economics" in spectrum use that permits more than a proportional increase in output from the summing of spectrum resources. Whether the spectrum constraint is binding for the merging firms is a technical question that deserves some attention.

The idea that the U.S. mobile market has an equilibrium of four firms (nationally, at least) is an emotional and not a scientific conclusion. Industry analysts, including for instance Craig Moffett and Chetan Sharma, believe that the equilibrium in the mobile wireless industry is (no more than) three firms, which is a view entirely consistent with the financial struggles of Sprint and T-Mobile. Knee jerk reactions to the deal should be discouraged. The proposed merger will require careful and dispassionate analysis, and this PERSPECTIVE is a small step in that direction.

Conclusion

Stock returns are often used as a tool in merger analysis. Market responses to news of mergers signals investors' expectations about how the merger will affect the firms directly involved and firms in the same or related industries. In this PERSPECTIVE, I conduct an event study on the proposed \$26.5 billion merger between Sprint and T-Mobile. Positive and statistically-significant stock price effects are observed for the merging firms in response to credible rumors of the transaction, but large and negative returns

are observed after the official announcement, reflecting perhaps fears of antitrust impediments to the deal or a response to the release of greater details on the transaction.

The pattern of returns for the merging firms and Verizon is consistent with a market power interpretation of the merger. AT&T's returns appear unaffected by news of the transaction, so one might reasonably conclude the evidence is mixed.

Event studies are but one piece in a portfolio of evidence. Industry structure in the mobile

wireless industry has been heavily influenced by past regulatory decisions thereby requiring modification to the traditional assessment of the horizontal mergers. The combination of Sprint and T-Mobile warrants thoughtful analysis as it may affect market performance in the mobile wireless industry in either positive and negative ways, or both.

NOTES:

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¹ A. Sherman, *Sprint and T-Mobile Agree to \$26.5 billion, and John Legere Will Be Chief*, *Sources Say*, CNBC (April 27, 2018) (available at: <https://www.cnbc.com/2018/04/27/t-mobile-sprint-merger-near-value-at-26-billion.html>).

² C. Moffett, *Sprint CQ1 2018 Earnings: Why the Merger is Urgent*, MOFFETT/NATHANSON RESEARCH (May 2, 2018).

³ C. Sharma, *Competition – How May Mobile Operators Does a Country Need?*, Chetan Sharma Consulting (2018) (available at: <http://www.chetansharma.com/publications/competition-many-mobile-operators-country-need>).

⁴ See, e.g., R.S. Sisodia, J.N. Sheth, and J.N. Sheth, *Competitive Markets and the Rule of Three*, IVY BUSINESS JOURNAL (September/October 2022) (available at: <https://iveybusinessjournal.com/publication/competitive-markets-and-the-rule-of-three>).

⁵ *U.S. Department of Justice v. AT&T Inc., T-Mobile USA, Inc., and Deutsche Telekom, AG*, Case 1:11-cv-01560 (August 31, 2011) (available at: <https://www.justice.gov/atr/case-document/file/487776/download>).

⁶ *Horizontal Merger Guidelines*, U.S. DEPARTMENT OF JUSTICE AND FEDERAL TRADE COMMISSION (August 19, 2010) at Section 5.3 (available at: <https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf>). Market share data available at: <https://www.statista.com/statistics/199359/market-share-of-wireless-carriers-in-the-us-by-subscriptions>.

⁷ See, e.g., M. Cichello and D.J. Lamdin, *Event Studies and the Analysis of Antitrust*, 13 INTERNATIONAL JOURNAL OF THE ECONOMICS OF BUSINESS 229-245 (2007) (available at: <https://www.tandfonline.com/doi/abs/10.1080/13571510600784557?mobileUi=0&journalCode=cjib20>); A.J. Cox and J. Portes, *Mergers In Regulated Industries: The Uses and Abuses of Event Studies*, 14 JOURNAL OF REGULATORY ECONOMICS 281-304 (1998); G.S. Ford & A.D. Kline, *Event Studies for Merger Analysis: An Evaluation of the Effects of Non-Normality on Hypothesis Testing*, in ANTI-TRUST POLICY ISSUES (P. Mariati, ed.) (2006) at Ch. 8. A draft is available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=925953).

⁸ For a review of the methods, see, e.g., G.S. Ford & A.D. Kline, *id.*

⁹ M. Davis, *Sprint and T-Mobile Back in Merger Talks, Unconfirmed Report Says*, KANSAS CITY STAR (April 10, 2018) (available at: <http://www.kansascity.com/news/business/technology/article208459199.html>).

¹⁰ *Why Sprint Shares Are Plummeting on News of Its Takeover by T-Mobile*, BLOOMBERG (April 30, 2018) (available at: <http://fortune.com/2018/04/30/sprint-t-mobile-antitrust-wireless-competition>); G. Rapier, *Sprint Sinks as Regulatory Uncertainty Weighs on its T-Mobile Merger*, MARKETS INSIDER (April 30, 2018) (available at: <http://markets.businessinsider.com/news/stocks/sprint-stock-price-sinks-after-announcing-146-billion-merger-with-t-mobile-2018-4-1022887565>).

¹¹ See, e.g., I. Karafiath, *Using Dummy Variables in the Event Methodology*, 23 THE FINANCIAL REVIEW 351-7 (1988). See also J. Glascock and I. Karafiath, *Statistical inference in Event Studies Using Multiple Regression*, in ALTERNATIVE IDEAS IN REAL ESTATE INVESTMENT: RESEARCH ISSUES IN REAL ESTATE SERVICE, A. Schwartz ed (2000) at 177-89.

¹² S.P. Khotari and J.B. Warner, *Econometrics of Event Studies* (October 20, 2004) (available at <http://ssrn.com/abstract=608601>), also published in HANDBOOK OF CORPORATE FINANCE: VOLUME 1, B. Espen Eckbo, ed. (2007).

¹³ Stock price data is from finance.yahoo.com.

¹⁴ Cox and Portes, *supra* n. 7; Ford and Kline, *supra* n. 7.

¹⁵ Ford and Kline, *supra* n. 7; J.D. Jackson, A. Kline, and S. Skinner, *The Impact of Non-Normality and Misspecification on Merger Event Studies*, 13 INTERNATIONAL JOURNAL OF ECONOMICS AND BUSINESS 247-264 (2006) (available at: <https://www.tandfonline.com/doi/abs/10.1080/13571510600784490?journalCode=cjib20>). I bootstrap using the normal rather than robust standard errors. See, e.g., T. Fomby and J. Murfin, *Inconsistency of HAC Standard Errors in Event Studies with I.I.D. Errors*, 1 APPLIED FINANCIAL ECONOMIC LETTERS 239-42 (2005); G.S. Ford, J.D. Jackson and S.J. Skinner, *HAC Standard*

NOTES CONTINUED:

Errors and the Event Study Methodology: A Cautionary Note, 17 APPLIED ECONOMIC LETTERS 1153-1156 (2009) (available at: <https://www.tandfonline.com/doi/abs/10.1080/17446540902817601>).

¹⁶ Critical t-statistics are: S [-1.321, 1.489]; TMUS [-1.800, 1.772]; VZ [-1.450, 1.559]; T [-1.331, 1.424].

¹⁷ R. Krause, *Sprint Falls On Report T-Mobile Merger Deal Offers No Premium*, INVESTORS.COM (April 27, 2018) (available at: <https://www.investors.com/news/technology/sprint-falls-on-report-t-mobile-merger-deal-offers-no-premium/>).

¹⁸ A test that the sum of coefficients is zero has an F-Stat of 0.23, far below the 10% critical value of 2.73 (or bootstrapped at 2.71).

¹⁹ The F-statistic is 3.18 with a 10% critical value of 2.73 (bootstrapped at 2.66).

²⁰ S. Moritz, *AT&T Declines After Slump Puts More Pressure on Time Warner Deal*, BLOOMBERG (April 25, 2018) (available at: <https://www.bloomberg.com/news/articles/2018-04-25/at-t-s-disappointing-results-put-pressure-on-time-warner-deal>); H. Gold and J. Schneider, *DOJ Antitrust Chief Leaves Door Open to Settlement in AT&T Trial*, CNN (April 26, 2018) (available at: <http://money.cnn.com/2018/04/26/media/att-trial-final-day/index.html>); T. Johnson, *AT&T-Time Warner Trial: Testimony Ends, Closing Arguments Set for Monday*, VARIETY (April 26, 2018) (available at: <http://variety.com/2018/politics/news/att-time-warner-trial-antitrust-1202789140>).

²¹ J.E. Kwoka, *The Effect of Market Share Distribution on Industry Performance*, 61 REVIEW OF ECONOMICS AND STATISTICS 101-109 (1979), at p. 107 (available at: https://www.jstor.org/stable/1924836?seq=1#page_scan_tab_contents).

²² See, e.g., G.S. Ford, T.M. Koutsy, and L.J. Spiwak, *Competition After Unbundling: Entry, Industry Structure, and Convergence*, 59 FEDERAL COMMUNICATIONS LAW JOURNAL 331-367 (2007) (available at: <https://www.repository.law.indiana.edu/fclj/vol59/iss2/4>).

²³ G.S. Ford, *Should the Government Allow Further Consolidation in the U.S. Mobile Market?*, @LAWANDECONOMICS BLOG (March 20, 2014) (available at: <http://www.phoenix-center.org/blog/archives/1861>).

²⁴ *Competition After Unbundling*, supra n. 22.

²⁵ T.R. Beard, G.S. Ford, L.J. Spiwak, and M. Stern, *Wireless Competition Under Spectrum Exhaust*, 65 FEDERAL COMMUNICATIONS LAW JOURNAL 79-97 (2012) (available at: <http://www.phoenix-center.org/FCLJSpectrumExhaust.pdf>).