

Telecommunications Deregulation and the Motives for Mergers*

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Abstract

We study mergers in the regulated telecommunications industry to test theories of merger gains. We find that mergers yield positive returns to the combined firms. Because this effect is consistent with the collusion, competitive advantage and anticipation hypotheses, we study returns to rivals to differentiate the hypotheses. Our results indicate that rival firms earn positive abnormal stock returns upon the announcement of an industry merger and that returns exhibit substantial cross-sectional dispersion. Rivals that become targets in subsequent mergers earn significantly greater announcement returns than do subsequent non-targets. Financial characteristics of initial target firms and subsequent targets are statistically indistinguishable. Finally, rival abnormal returns are insignificantly related to market concentration and horizontal vs. vertical deal status. These results are consistent with predictions of the anticipation hypothesis and inconsistent with collusion. Thus, our findings indicate that deregulation did not foster collusion in mergers in the telecom industry but, instead, merger gains are due to merger-induced efficiencies.

JEL Classification: G34; G38

Keywords: Mergers, Deregulation, Rivals, Efficiency, Collusion

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1. Introduction

A rich literature examines the causes and effects of mergers and acquisitions. While the literature generally agrees on the effects of mergers, there is less agreement on the motives for mergers (see, e.g. Andrade et al., 2001; Harford, 2005).¹ Among the most widely cited explanations for the positive returns to combined firms in mergers are the collusion and competitive advantage hypotheses. However, the majority of papers that study sources of merger gains examine only the firms directly involved in the merger - the acquirer and the target. The handful of studies that also examine the wealth effects to rivals of the merging firms use the resulting evidence to reject the collusion hypotheses (Eckbo, 1983, 1985; Stillman, 1983; Eckbo and Weir, 1985; Song and Walkling, 2000; Akdogu, 2009; Cai, Song and Walkling, 2011; Becher, et al., 2012). Song and Walkling (2000) and Cai, Song and Walkling (2011) study rival gains and assert that the positive returns to rivals are due to the expectation that they themselves will be targets in the future.

Yet, despite the fact that collusion has been shown to occur in regulated industries - Kim and Singal (1993) and Singal (1996) find evidence of collusion following mergers in the airline industry and Sapienza (2002) in the banking industry - the focus of most of the work on rival gains is on unregulated firms². In this paper, we study the causes and effects of mergers in the highly regulated U.S. telecommunications (telecom) industry. We examine both merging firm and rival firm returns during the announcement of takeovers in the telecom industry to test several theories of merger gains: the collusion, competitive advantage and anticipation hypotheses.

¹ Empirical evidence shows that, on average, targets earn positive abnormal returns, combined firms earn less positive returns, and bidders, at best, break even.

² Studies that examine regulated industries: Becher, et al., (2012) examine the utility industry. Song and Walkling (2000) perform a robustness test using a sample of regulated firms. Akdogu (2009) studies the telecommunications industry.

The study of this single (regulated) industry allows a comprehensive examination of the dynamics that may enable collusive deals. It also enables a cleaner and more focused sample of rivals. We choose the telecom industry because it i) is a regulated industry, ii) experiences deregulation during our sample period via passage of the Telecommunications Act of 1996, and iii) experiences a merger wave following deregulation, conditions which have been demonstrated in the literature to affect the likelihood of our three hypotheses.

Determining the motivation for mergers also has important public policy implications. If market power / collusion are possible motives for recent attempts at industry consolidation, we may benefit by examining similar periods of industry consolidation (typically referred to in the literature as a merger wave) in the past to determine the drivers of those merger waves. The telecom industry has recently experienced a number of large deals that continue a trend of industry consolidation. In fact, several large deals were explicitly vetoed by the Justice Department over anti-competitive concerns (AT&T/T-Mobile and Comcast/Tie Warner Cable). In addition, legal action has been necessary to remedy recent collusive behavior among the largest players³, while the industry's move towards bundled product offerings has raised concerns about (tacit) collusion (see, e.g. Spector, 2007; Baranes, 2009; and Hahn and Kim, 2016).

The same trend has led to similar concerns in other industries. A handful of recent mergers involving the national carriers in the airline industry has reduced the number of major carriers from nine to five. As a result of this consolidation, the U.S. Justice Department in 2015 launched an investigation into possible collusion among the major airlines to limit seating capacity and lift prices⁴.

³ Justice Department sues AT&T-DirecTV, alleges collusion in blocking Dodgers channel, Los Angeles Times, November 2, 2016.

⁴ Airlines Under Justice Dept. Investigation Over Possible Collusion, New York Times, June 1, 2015.

The Justice Department has also blocked recent deals in other industries for anti-competitive reasons, including Halliburton/Baker Hughes in the energy industry, US Airways/American Airlines in the transportation industry and Staples/Office Depot in the retail industry.

The telecom industry proves to be a fruitful setting for this study. The industry was, for most of the past century, highly regulated. However, the Telecommunications Act of 1996 fundamentally changed the structure of the industry. Passage of the deregulatory Telecommunications Act, spurred largely by technological change, transformed the industry from a collection of distinct markets (segregated along product and geographical lines) into an industry in which any communications business was able to compete with any other communications business, in any market (Okoeguale and Loveland, 2017). The Telecommunications Act, for the first time, allowed mergers and integration of services previously prohibited by law. Mergers thus became a viable alternative to achieve scale and a vertically integrated product package, now allowed as a result of deregulation. The merger wave that dramatically reshaped the industry after passage of the Telecommunications Act raised the plausibility of collusion by reducing the number of potential competitors.

We examine 126 mergers and 6,787 rival firms from 1980 to 2009. Our sample period centers on the 1996 deregulation, which provides a fertile setting for tests of the possible motives – collusion, competitive advantage, anticipation as well as hubris – for acquisitions in the telecom industry. Similar to earlier findings in Eckbo (1983, 1985) and Mitchell and Mulherin (1996), we find that rival firms earn positive and significant mean abnormal stock returns upon the announcement of an industry merger. Mean returns to rivals are positive and significant in both the pre- and post-deregulation period and exhibit substantial cross-sectional dispersion. Collusion could explain the positive returns to rivals, but not the cross-sectional dispersion. Because effective collusion enables the firms remaining in the market after a merger to raise product prices, reduce output or increase coordination,

the collusion hypothesis predicts that rivals, on average, should earn positive abnormal returns around merger announcement; the potential gains to industry profitability from collusion via merger should be distributed across the entire set of competitors.

To test the collusion theory we examine announcement period returns to rivals in horizontal vs. non-horizontal deals; we find no statistically significant differences. This finding rejects the collusion hypothesis as a motive for mergers; horizontal mergers should increase the market power of the remaining firms to a greater extent than for vertical mergers. Multivariate tests confirm this finding. Controlling for time, regulatory, firm, industry and deal characteristics, we find that rival abnormal returns are insignificantly related to market concentration and horizontal / vertical deal status; results inconsistent with collusion.

We next examine efficiency theories as an explanation for rival gains. Efficiency theories do not restrict the sign of the abnormal returns to rivals. If a merger results in a more competitive combined firm, then rivals should earn negative abnormal returns, on average, upon the merger announcement – the competitive advantage hypothesis. But the result that rivals earn positive abnormal returns, on average, is not consistent with the competitive advantage hypothesis. Alternatively, if the announcement of a proposed merger signals potential synergies between rivals and subsequent bidders or an increased probability of future mergers, rivals should earn positive abnormal returns, on average, upon the merger announcement – the anticipation hypothesis.

Given the positive gains to rivals, we test the anticipation hypothesis following the approach used by Song and Walkling (2000). We first segregate rival firms according to their merger activity subsequent to the initial merger announcement and then examine their announcement period returns. We find that rivals that become subsequent targets earn significantly greater mean abnormal returns than do subsequent non-targets, at announcement of the initial merger. Thus, the market appears able

to distinguish, at the announcement of the initial merger, the rivals most likely to become future targets. This evidence supports the anticipation hypothesis and provides an explanation for the cross-sectional dispersion exhibited in announcement period returns.

We supplement these findings with further univariate and multivariate tests. We find that the financial characteristics of initial target firms and subsequent targets are statistically indistinguishable, while the financial characteristics of subsequent non-targets are significantly different than those of subsequent targets. These tests suggest that acquired telecom firms likely share a common financial profile. These results are consistent with predictions of the anticipation hypothesis. Multivariate tests reveal that rivals that are subsequent targets earn greater announcement returns than rivals not subsequently targeted, while rivals that are subsequent targets after deregulation earn lower announcement returns than before deregulation. Both of these results are consistent with predictions of the anticipation hypothesis and inconsistent with collusion.

This study complements several existing single-industry studies.⁵ Akdogu (2009) studies vertical mergers in the U.S. telecom industry and finds that rivals to acquirers earn negative abnormal returns, on average, because acquirers gain a competitive advantage over those rivals via the acquisition. Like Akdogu (2009), we study the U.S. telecom industry around the passage of the Telecommunications Act of 1996, however, we study both horizontal and non-horizontal mergers and focus on rivals to targets. These are important difference as they allow us to contrast the collusion hypothesis against other hypotheses such as anticipation, competitive advantage, synergy and hubris. Becher, et al., (2012) examine mergers in the utility industry and find evidence consistent with synergy

⁵ In multi-industry settings, Song and Walkling (2000 and 2005) test both horizontal and non-horizontal mergers and find support for the anticipation hypothesis which posits that rivals earn positive abnormal returns due to the increased likelihood that they themselves will participate in a merger in the future.

and anticipation and inconsistent with collusion. Our single-industry study of a deregulated industry complements and supports the findings in Becher, et al. (2012) that merger activity following the deregulation of an industry need not foster collusion.

The remainder of this paper proceeds as follows. Section 2 lays out the hypotheses tested in this event study paper. Section 3 provides the background material supporting the hypotheses. Section 4 describes the merger data sample. Section 5 reports and discusses the empirical results of the event study analysis. Section 6 reports and analyzes results from univariate and multivariate tests of returns to rivals. Section 7 summarizes and concludes.

2. Testable hypotheses

2.1. Collusion hypothesis

The collusion hypothesis predicts that industry consolidation should lead to higher product prices and industry profitability. Mergers, by reducing the number of competitors, reduce the cost of monitoring any collusive agreement and increase the incentive to coordinate, thereby enhancing the ability of the remaining firms to exert market power (Stigler, 1964). Because the potential gains from higher product prices would be distributed across the entire set of competitors, the rivals of the merging firms should earn positive abnormal returns on the merger announcement.

By allowing mergers, acquisitions and vertical integrations that were previously barred under FCC rules, antitrust provisions of federal law, and the Modified Final Judgment that permitted the break-up of AT&T in 1984, the Telecommunications Act of 1996 paved the way for possible collusion via industry consolidation. A testable implication of this deregulation is that the effects of collusion should be more evident in the post-deregulation period because regulatory oversight has been

diminished (Stillman, 1983). Kim and Singal (1993) and Singal (1996) find evidence of collusion in the airline industry following deregulation.

Because horizontal mergers reduce the number of firms competing in the industry, and enhance the market power of the remaining firms, the probability of collusion should be greater for horizontal merger than for vertical mergers (Becher, et al., 2012). Thus, a testable prediction of the collusion hypothesis is that rivals to merging firms should earn greater abnormal returns upon announcement of horizontal mergers than upon announcement of vertical mergers.

2.2. *Efficiency hypotheses: competitive advantage vs. anticipation*

The implications of the collusion hypothesis are necessary, but not sufficient, to conclude that a given merger is anticompetitive (Eckbo, 1983). As Table 1a shows, the pattern of returns to the merging firms and their rivals may be consistent with both collusion and efficiency. While the collusion hypothesis restricts the sign of the abnormal returns to the rivals, the efficiency hypotheses do not. Eckbo (1983) notes that a merger announcement can have a product/factor price effect and an offsetting information effect. The price effect is at work when mergers following deregulation result in more competitive firms in the product markets; this effect should produce a decrease in the market value of rivals upon announcement of a merger, on average. We term this effect the competitive advantage hypothesis.

<Insert Table 1a about here>

Conversely, the information effect should produce an increase in the market value of rivals, on average, upon announcement of an (initial) merger because of the increase in market value of those rivals more likely to be subsequently acquired in similar future mergers. Moreover, the announcement of mergers following deregulation that signal a drive towards scale and industry consolidation should increase the probability that more firms will become targets in subsequent takeovers. If the merger

is informative about likely future targets, those rivals that subsequently become targets should earn positive abnormal returns upon announcement of the initial merger because of the increased probability that they themselves will become targets in the future (Song and Walkling, 2000). We term this effect the anticipation hypothesis.

The anticipation hypothesis also provides a potential explanation for the cross-sectional dispersion observed in abnormal returns to rivals. As Song and Walkling (2000) and Cai, Song and Walkling (2011) assert, if revisions to rivals' stock prices occur because of changes in the perceived probability of future acquisition attempts, these changes should be systematically linked to individual firm characteristics; the more alike the target and rival, the greater the rival's abnormal return at the announcement of the initial merger. Table 1b presents merger announcement abnormal return predictions for rivals conditioned on subsequent future merger activity.

<Insert Table 1b about here>

3. Background

Studies by Eckbo (1983) and Stillman (1983) do not support the collusion hypothesis as the source of gains in mergers of firms in unregulated industries. Those that do find evidence of collusion study regulated industries after deregulation; Kim and Singal (1993) and Singal (1996) find evidence of collusion following mergers in the airline industry and Sapienza (2002) in the banking industry. We study the telecom industry due to its regulated nature and because it provides a rich setting for the hypotheses tested in this paper. The discussion that follows in this section details a brief history of the U.S. telecom industry, the reasons the industry's competitive dynamics make collusion a real possibility and the concerns and actions of regulators in regards to the collusive effects of mergers.

3.1. *Brief history of the U.S. telecommunications industry and its deregulation*

The U.S. telecom industry has been subjected to heavy regulation throughout much of its history. Early in its life, the industry was dominated by AT&T which was viewed as a natural monopoly from which customers needed protection (Economides, 1999). However, following the court's break-up of AT&T in 1982 in response to an antitrust suit brought against it by the U.S. Department of Justice, the industry has since experienced progressive deregulation. The break-up of AT&T was designed to create competition in several telecom product areas. Increased competition and rapid technology development subsequently combined to lay the groundwork for a more radical, and sudden, change.⁶

The Telecommunications Act of 1996, signed into law in February 1996, completely overhauled existing law, as codified by the Communications Act of 1934. The goal of the new law was to let any firm enter into any communications business and to let any communications business compete in any market against another⁷. Passage of the Telecommunications Act essentially changed the structure of the telecommunications industry. Deregulation transformed the industry from a collection of distinct markets (along product and geographical lines) into an industry where every communications business was allowed to compete with every other communications business, in every market.

A deal announced shortly after deregulation in 1996, the acquisition of MFS Communications by WorldCom, characterized the changing industry landscape. The stated intention of the merger was for the new company, MFS WorldCom, to bring together local calling, long-distance and internet

⁶ Fransman (2001) and (Okoeguale and Loveland, 2017) provide a more complete review of the regulatory and market forces behind the deregulation of the industry.

⁷ From fcc.gov

access, thus providing end-to-end service. Upon announcement of the deal, the CEO of WorldCom commented that “what every company in this industry wants to accomplish is to be able to provide end-to-end service, i.e. from the point of origination to the point of destination, internationally, over a single company’s own facilities.”

3.2. *Regulatory concerns about the collusive effects of telecom mergers following deregulation*

The Telecommunications Act of 1996 left intact the Federal Communications Commission’s (FCC) authority to review communications industry mergers. The FCC’s role in merger reviews is to assess a proposed merger’s likely effects on competition by considering whether the deal will enhance the merged firm’s unilateral power to raise price or reduce output, or facilitate coordination among firms remaining in the markets. As part of this process, the FCC also considers whether 1) a merger might eliminate potential future competition from firms not yet participating in a relevant market, 2) entry by new competitors or expansion by existing competitors would be “likely, prompt, and effective” enough to counteract the price-raising and quantity-lowering incentives that may result from the proposed merger, and 3) a merger has any effect on concentration or has any “public interest benefits”.

The merger of Bell Atlantic and NYNEX (announced in 1996) illustrates regulators’ concerns about the collusive effects of telecom mergers.⁸ Bell Atlantic, operated in West Virginia, Washington, D.C., and the Mid-Atlantic. NYNEX operated in New York and most of New England. Both firms provided inter-local calling area service between their respective adjacent regions; they were also general partners in a wireless telephony firm, Bell Atlantic NYNEX Mobile. While the Department of

⁸ Other notable mergers with similar concerns following the 1996 deregulation include the acquisition of Pacific Telesis Group, in 1996 and Ameritech, in 1998, by SBC Communications Inc, the mergers of Qwest and US West in 1999, MCI Communications Corp and WorldCom in 1998, and AT&T and Teleport Communications Group in 1998.

Justice (DOJ) cleared the merger without conditions, the FCC found significant impacts on competition.

In its review of the merger, The FCC determined that by eliminating Bell Atlantic as a potential entrant into the New York area, and as a likely “second choice” for current NYNEX customers, the merger would facilitate the exercise of unilateral power in the market for mass market local services by the merged entity. The FCC further concluded that the merger would facilitate discrimination in the provision of local loop services to competing long-distance carriers. Most importantly, the FCC found that the merger would enhance the risk of coordinated pricing, particularly in the market for bundled local and long-distance services. The FCC imposed significant conditions on the merger based on its determination that the merger posed risks to competition. Notably, neither the DOJ nor the FTC flagged these risk factors during their review of the transaction; the DOJ cleared the merger without conditions.

The telecom industry’s move towards a vertically-integrated product package, after deregulation, raised the plausibility of collusion by increasing the need for competitors to reach interconnection agreements in order to offer packaged services (given technical infrastructure constraints in the telecommunications industry). These interconnection agreements raised concerns because evidence shows that even simple co-operative agreements can foster collusion (Buigues and Rey, 2004). Collusion is enabled in several ways: first, mutual interconnection among competitors enables interaction and creates more scope for collusion. Second, incumbents may collude in the terms they propose to new entrants in order to protect their incumbency advantages. Third, and perhaps more importantly, interconnection agreements have a direct impact on the operators’ perceived costs, and thus exert a direct influence on their pricing decisions, as well as on their decisions

concerning new capacity investments, technological choices, etc. Operators may also design the agreements so as to soften competition.

However, there is little scope for collusion in the absence of barriers to entry and in innovation-driven markets. The broad intent of the Telecommunications Act was to allow every communication business to compete with every other in every market using any communication technology infrastructure. By opening markets for local and long distance phone services to competition from new communication technologies, deregulation facilitated entry and the expansion of new technologies. Thus, while industry consolidation and interconnectedness raised concerns about collusion, new legal and market structures post-1996 ostensibly blunted those concerns. It is thus an empirical question whether mergers in the U.S. telecom industry after 1996 enable collusion. We examine this question in the following sections.

4. Data sample

4.1. Construction of sample of telecommunications industry firms

We examine the telecom industry over the period 1980 to 2009, a time frame that centers on the 1996 deregulation. To construct the industry sample, we begin with the universe of firms listed on the CRSP monthly stock file, which consists of publicly traded firms on the NYSE, AMEX and Nasdaq stock exchanges. We restrict the sample to firms belonging to the Standard Industry Classification (SIC) codes 4810 to 4813, the telephone communications sector of the broader communication industry. We identify firms with CRSP Share Code 10 and 11, and thus exclude foreign firms (incorporated outside the U.S. and ADRs). This leaves us with a sample consisting only of domestic public U.S. telecom firms. This classification scheme produces a sample with 2,161 firm-year observations, 304 unique firms and an annual mean of 72 firms. Table 2 summarizes the sampling procedure.

<Insert Table 2 about here>

Table 3 presents the time-series distribution of the sample of publicly traded U.S. telecom firms. The industry is comprised of 27 public firms at the end of 1980. The number of public firms rises steadily to 90 in 1995, just prior to passage of the Telecommunications Act in January, 1996. At the peak of the industry boom that followed the 1996 deregulation, the industry reaches 122 public firms in 2000; industry count then declines rapidly during the 2001 recession to end at 76 public firms in 2002. The industry consolidates further during the 2000s, settling at a total of 45 publicly traded firms at the end of 2009.

<Insert Table 3 about here>

4.2. *Construction of merger sample*

To construct the sample of mergers we begin by tracking every firm (using its unique CRSP identifier, PERMNO) over the sample period, from the time it enters the sample to the time it exits. This procedure reveals that 258 telecom firms exit the public markets over the 1980 to 2009 sample period. We identify 138 of those exits as mergers using Security Data Corporation's (SDC) Mergers and Acquisitions database and information from news wires on LexisNexis. Merger announcement dates used for event study analysis are sourced from SDC and confirmed or updated with information from news wires on LexisNexis. Column 3 in Table 3, titled "All mergers", reports the distribution of merger activity in the telecom industry over the sample period. We require that all bidders, targets and rival firms have the requisite financial data reported in the CRSP / Compustat merged database. We lose 12 merger observations because of this data screen, leaving us with a sample of 126 deals. Column 4 "Merger sample" shows that our sample of mergers well represents the population of public mergers.

The most prominent trend is the cluster of merger activity between 1996 and 2000, following the passage of the deregulatory 1996 Telecommunications Act. In a test unreported in the table, a Wilcoxon test of differences shows that mean annual mergers are greater in the period following industry deregulation in 1996 than before (significant at the 1% level). This pattern of clustering is consistent with evidence from multi-industry studies that mergers cluster in response to industry shocks (e.g., Mitchell and Mulherin, 1996 and Harford, 2005). The last column reveals that, of the 138 mergers, 89 deals involve bidders listed on CRSP.

Figure 1 presents a time-series plot of merger activity based on the annual market values of the merger targets. The trend in merger activity mirrors that reported in Table 3, but using this measure of activity reveals a more extreme pattern. After a dormant period during the 1980s, merger activity rises in the early 1990s and then spikes in 1996. Aggregate deal value stays very high through the year 2000, before disappearing during the 2001 recession. Deal value then picks up again in the mid-2000s economic boom. Hence, merger activity as measured by market value confirms the trend revealed in Table 3 that deregulation in the telecom industry led to a significant increase in merger activity.

<Insert Figure 1 about here>

5. Abnormal returns to merging and rival firms

5.1. Abnormal returns to the merging firms

Table 4 reports merger announcement abnormal returns for targets, bidders and combined firms over a 3-day event window (-1, +1), where day 0 is the merger announcement date. We use the

Fama French three factor model (Fama and French, 1993) to compute abnormal returns.⁹ Combined firm returns are a weighted average return, computed as the sum of target returns multiplied by pre-merger market value, plus the sum of bidder returns multiplied by pre-merger market value, scaled by the sum of target and bidder pre-merger market values. We report merger announcement abnormal returns for the overall sample period as well as several sub-periods centered on the year 1996, when the industry was deregulated. The number of observations vary between bidders and target/combined firms because the merger sample includes 37 mergers in which the bidders are not listed on CRSP. Targets* reports returns for observations in which the listing status of the bidders is not restricted. All other computations are based on merger observations where bidder data is available on CRSP.

<Insert Table 4 about here>

Panel A of Table 4 reports that the mean target abnormal return is 15.60% for the full sample period; mean bidder abnormal return is -2.62%, and mean combined abnormal return is 1.47%. All three return estimates are statistically significant. Median returns are similar, however, combined firm median returns are not significant. Thus, returns to mergers in the telecom industry are consistent with evidence in the merger literature (see, e.g. Jarrell et al., 1988; Andrade et al., 2001): targets earn positive abnormal returns, combined firms earn less positive returns and bidders lose, on average.

Panel B reports that during the pre-deregulation period, 1980 to 1995, the mean target abnormal return is 12.19%, mean bidder abnormal return is -2.56%, and mean combined abnormal return is -0.13%. The target and bidder returns are statistically significant, combined returns are not. Panel C reports on the post-deregulation period, 1996 – 2009. Mean target abnormal return is 17.03%, mean bidder abnormal return is -2.49%, and mean combined abnormal return is 2.07%; returns are

⁹ Results (unreported in this paper) are robust to using alternative estimation methods such as a net-of-market and a market model with a 200-day estimation period (-210, -11).

significant. We find similar patterns of abnormal returns for the 5-year pre-deregulation and 5-year post-deregulation periods reported in Panels D and E, respectively.

To summarize, abnormal returns to targets are significantly positive across all sample periods examined while abnormal returns to bidders are significantly negative. Abnormal returns to the combined firms are not significantly different from zero in the pre-deregulation period, but are significantly positive in the post-deregulation period. Hence, it appears that mergers are more profitable for telecom firms, overall, in the post-deregulation period. The losses incurred by bidders in telecom mergers could be the result of empire building or hubris on the part of bidding managers (Roll, 1986). However, it should be noted that the empire building and hubris hypotheses, in the absence of synergies, predict non-positive abnormal returns for the combined firm.

The negative abnormal returns to bidders could be the result of a competitive environment in which firms are willing to bid up the price of potential synergies. Bradley, Desai, and Kim (1988) and Eckbo and Betton (2000) note that competition lowers bidder returns. Cai, Song and Walkling (2011) find that abnormal returns to firms bidding on public targets are negative, on average, and more negative for bids occurring in a more frequent bidding environment. Finally, the positive wealth effect for the combined merging firms in the post-deregulation period is consistent with the collusion hypothesis as well as the competitive advantage and anticipation hypotheses. In the following analysis, we perform tests to distinguish between these alternative hypotheses.

5.2. *Abnormal returns to rivals of the merging firms*

To test the collusion and efficiency (competitive advantage and anticipation) hypotheses we follow the approach pioneered by Eckbo (1983) and Stillman (1983). Their approach uses the announcement period returns to the rivals of merging firms to make inferences about the possible motives for the mergers. As outlined in the foregoing discussions, the collusion hypothesis predicts

positive abnormal returns to rivals of the merging firms due to the resulting increase in product prices and industry profitability from the consolidating mergers. The competitive advantage hypothesis predicts negative abnormal returns to rivals of the merging firms because the merging firms become more efficient industry competitors. The anticipation hypothesis predicts positive abnormal returns to rivals of the merging firms because of the increased probability that rivals will become targets themselves in future takeovers.

To construct the sample of rival firms, we assemble a portfolio of rival telecom firms for each merger; the rival portfolios consist of all U.S. telecom firms, i.e., firms that belong to SIC codes 4810 to 4813 with CRSP Share codes 10 and 11. We exclude from each portfolio rivals that are a target or bidder in a separate merger deal announced within the 3-day window of the merger. Repeating this procedure for each of the 126 merger observations in our sample produces 6,787 rival observations. For each merger observation, using Fama French three factor model returns, we compute the average abnormal return to the portfolio of rivals for the 3-day window (-1, +1) centered on the merger announcement date.

Table 5 reports the abnormal returns to rivals of the merging firms for the full sample period, as well as the pre-deregulation and post-deregulation periods. For the full sample period reported in Panel A, the mean abnormal return to rivals is a significant .31%. The median return is an insignificant -.12%. In unreported results, we find that rival abnormal returns exhibit substantial cross-sectional dispersion; about half (49%) of the rivals experience positive abnormal returns upon announcement of initial mergers. Song and Walking (2000) report a similar pattern in the returns to rivals of merging firms. Panels B and C report similarly positive and significant mean abnormal returns to rivals for both the pre-deregulation and the post-deregulation periods; both periods also exhibit substantial cross-sectional dispersion of returns.

<Insert Table 5 about here>

The positive mean abnormal returns to rivals are consistent with the notion that telecom mergers are motivated by collusion and, as a result, are expected by the market to lead to higher product prices and industry profitability. But the collusion hypothesis offers little help in explaining the cross-sectional dispersion in the abnormal returns to rivals. Moreover, the insignificantly different mean abnormal returns to rivals in the pre- and post-deregulation era (demonstrated in an unreported Wilcoxon test of differences) is inconsistent with predictions for the collusion hypothesis that suggest the collusive effects of telecom mergers should increase in the post-deregulation era when regulatory oversight is relaxed.

To further test the collusion hypothesis, we next analyze returns to rivals by industrial organization, for both the pre-deregulation and post-deregulation samples, in the spirit of Becher, et al., (2012). We define a horizontal merger as one in which the firms in the (initial) merger are both telecom firms, belonging to the digit SIC code 481; a non-horizontal merger is one in which the bidder is not a telecom firm. Results in Panels A, B and C show that rivals in horizontal mergers earn significantly positive mean returns; non-horizontal rivals earn insignificant returns. However, tests of difference find no significant differences between horizontal and non-horizontal mergers. This result is inconsistent with implications of the collusion hypothesis that predict greater returns in horizontal mergers – mergers that result in less competition and greater market power for the surviving firms.

The positive mean abnormal return to all rivals reported in Table 5 is also inconsistent with the competitive advantage hypothesis that predicts merging firms gain a competitive advantage over their rivals via the merger. However, given the substantial cross-sectional dispersion in the abnormal returns to rivals, the possibility that some telecom mergers result in a more competitive merged entity cannot be ruled out. We test this hypothesis by examining the dispersion of rival returns across merger

observations. A chi-square test of the hypothesis that the proportion of rivals with positive abnormal returns is equal across all merger observations rejects the null at the .01% level. However, we also find that in two-thirds of our merger sample, the hypothesis that the proportion of rivals with positive abnormal returns is equal to 50%, cannot be rejected. These results demonstrate that, while there is some variability in the distribution of gains across mergers, much of the gains are dispersed symmetrically around zero. These tests are again inconsistent with the collusion hypothesis but provide some evidence supporting the competitive advantage hypothesis. These results are consistent with the findings in Akdogu (2009) that mergers in the telecom industry are a means of achieving a competitive advantage in a fiercely competitive industry.

The positive mean abnormal return to all rivals reported in Table 5 is, however, consistent with the notion that mergers signal potential synergies between rivals and subsequent bidders and an increased probability that rivals will become targets themselves. This notion, the anticipation hypothesis, could explain the cross-sectional dispersion in the returns to rivals of the merging firms upon announcement of the initial merger. Song and Walkling (2000) note that, in a changing technological environment, firms exhibit different adoption rates/costs, different degrees of information about new processes, or different attitudes towards risk associated with new processes. Thus, merger-specific information that causes the mean and/or variance of the distribution of expected gains from future mergers to vary across rival firms could lead to cross-sectional variation in abnormal returns to rivals.

We test the anticipation hypothesis by segregating rival firms according to their subsequent merger activity after the initial merger announcement. Of course, information about which rivals will become subsequent targets, bidders, or remain independent, is uncertain at the time of merger announcement, thus the use of ex-post information about actual subsequent merger activity serves

only as a proxy for the unobservable ex-ante information. Table 6 reports results for the full sample period. Results show that rivals that do not become targets within three years after the initial merger earn a significant .19% mean return. In contrast, rivals that become targets within one year after the initial merger earn a significant .98% mean return, while rivals who are targets within three years earn a significant .88% mean return. Median returns for non-targets and targets within one year are insignificant; the median return for rivals that become targets within three years is a significant .05%.

<Insert Table 6 about here>

Tests of the hypothesis that subsequent targets earn greater mean abnormal returns than do non-targets (at announcement of the initial merger), reported in the bottom panel, reveal significant differences (at the 1% level for one year targets, at the 5% level for the three year targets). Similar one-tailed tests for median returns reports a significant difference for three year targets at the 10% level; insignificant difference for one year targets. Thus, the market appears able to distinguish, at the announcement of the initial merger, the rivals most likely to become future targets. This evidence supports the anticipation hypothesis and provides a plausible explanation for why some rivals accrue positive announcement returns while others accrue negative announcement returns.

Given that the degree of surprise regarding the announcement of acquisitions is likely to vary over time with the level of merger activity, we also analyze separately the sub-periods before and after deregulation of the industry in 1996. Song and Walking (2000) find that abnormal return to rivals tends to increase with the magnitude of surprise about an acquisition. We expect the degree of surprise about acquisitions to be greater, on average, in the pre-deregulation period than in the post-deregulation period because telecommunications deregulation enabled a “mergers possible state”.

<Insert Table 7 about here>

Table 7 reports mean and median announcement period returns for rivals who subsequently become targets, bidders, or remain independent, for the sub-periods 1980 to 1995 and 1996 to 2009. Results are similar to those reported for the full sample in Table 6. In both sub-periods, subsequent targets earn greater mean abnormal returns at announcement of the initial merger than do non-targets. However, tests of the hypothesis that subsequent targets earn greater abnormal returns in the pre-deregulation period (1980 to 1995) are insignificant. This result is inconsistent with the anticipation hypothesis. However, given the lack of a significant dormant period (as in Song and Walking, 2000) and the consistent, albeit low, level of merger activity pre-deregulation, the power of this test is admittedly weak.

5.3. Rival returns following deregulation

Given the insignificant difference in rival returns during the periods before and after deregulation, we next perform a more refined test to uncover the driver of this (non) effect. Because the Telecommunications Act explicitly allowed mergers and vertical consolidations, the increased probability of future mergers after the Act's passage should have been incorporated in the stock prices of likely future targets around the time the Telecommunications Act was passed in January 1996, not during successive mergers. This hypothesis is consistent with empirical evidence from other deregulated industries such as banking (Becher, 2009). In contrast, mergers were less likely prior to industry deregulation due to regulatory prohibitions, thus, initial merger announcements immediately after the Act's passage would have contained more truly new information that caused the market to reassess the likelihood of future mergers; these probabilities would have been reflected in the announcement period abnormal returns to rivals that subsequently become merger targets (Song and Walking, 2000).

To test this hypothesis we compare rival returns from a handful of mergers immediately following passage of the Act to the average return for rivals in the post deregulation period. The initial merger announcement following the passage of Telecommunications Act of 1996 was the \$16.7 billion acquisition of Pacific Telesis Group by SBC Communications Inc. on April 1, 1996. The merger would create what was then the second largest U.S. phone company behind AT&T Corp. The second merger announcement was the acquisition of Cellular Communications Inc. by AirTouch Communications Inc. on April 6, 1996. The third merger was the acquisition of Nynex Corp by Bell Atlantic Corp, announced on April 22, 1996, about 20 days after the first merged described above. This merger of two Baby Bells of roughly equal size would create (again) the second largest U.S. telephone company after AT&T. These mergers kicked off a race for scale and survival in the telecom industry and provided an indication to the market that more mergers were likely to come (Akdogu, 2009).

<Insert Table 8 about here>

Table 8, Panel A reports mean and median announcement period returns for the rivals in the three mergers; Panel B reports rival returns for the sub-period 1996 to 2009 (less the three merger observations). We again test returns for rivals who subsequently become targets, bidders, or remain independent, for the sub-periods 1980 to 1995 and 1996 to 2009. In both panels, returns for subsequent non-targets are insignificantly different than zero, while mean returns for subsequent targets are positive and significant. For the initial merger group, mean returns for rivals that become targets within one year are a significant 2.87%. For the 1996 to 2009 sub-period, mean returns for rivals that become targets within three year are a significant 0.65%.

Panel C reports the results from tests of the hypothesis that subsequent targets from the three initial mergers earn greater abnormal returns than do subsequent targets in the post-deregulation period. Tests results show that rivals that become targets within one year from the three initial mergers

earn significantly greater mean returns (at the 5% level) than the average one year target in the sub-period 1996 to 2009. The other differences are insignificant. Hence, these tests provide additional evidence that the market anticipates future merger targets at the time of an industry rivals takeover.

6. Cross-sectional analysis of returns to rival firms

Given the preceding evidence that the market is able to identify, at the time of initial merger, those rivals most likely to become targets in subsequent industry mergers, we next follow the approach used by Song and Walking (2000) to analyze and identify the firm and industry characteristics most important in explaining the cross-sectional variation in abnormal returns to rivals.

6.1. Target and rival firm characteristics

The purpose of the analysis in this section is to compare the characteristics of target firms in the initial mergers to the characteristics of all rivals and to the rivals that become targets in subsequent industry mergers. Table 9 presents descriptive statistics for these firms. The first three columns present means of firm variables for targets in the initial mergers, all rivals and rivals that become targets within three years of the initial mergers, respectively. The fourth column presents results from *t*-tests of differences between firm variables for initial targets and all rivals. Results show that initial targets are significantly smaller than rivals, as measured by sales, and have significantly higher leverage and liquidity than rivals.

Column five presents results from *t*-tests of differences between firm variables for initial targets and rivals that become targets within three years. No significance differences are reported. Thus, results from these tests show that there are significant differences in the firms initially targeted for takeover and those firms that are not. However, when we compare the initial targets to subsequent targets, these differences disappear; initial and subsequent targets are statistically indistinguishable.

These findings are generally consistent with the extant literature on characteristics of merging firms (see, e.g. Hasbrouck, 1985; Song and Walking, 2000; Sorensen, 2000).

<Insert Table 9 about here>

Our final univariate test, reported in the last column, presents results from *t*-tests of differences between firm variables for all rivals and rivals that become targets within three years. All differences are significant, thus reinforcing the preceding finding that general industry rivals and eventual targets are unlike. A review of the variables tested shows that rivals that subsequently become targets are more like initial rivals across five of the seven representative firm variables: sales, market value, leverage, cash flow and ROA. All industry rivals are more like initial targets for Tobin's Q and ROS.

6.2. Multivariate tests of target and rival firm characteristics

This section examines differences in the firm characteristics of initial targets and rivals in a multivariate setting. Table 10 presents results of logistic regression where the outcome variable is one for initial targets and zero for rivals. To normalize variables, all are winsorized at the 1% and 99% level. Model one tests initial targets and all rivals. Reported results show that initial targets have greater leverage and cash flow than do all rivals, consistent with the univariate test results. Models two and three test the same specification for all initial targets and those rivals that subsequently become targets within one year, and three years, respectively. Results from these tests demonstrate that there are no significant differences between initial targets and rivals that become subsequent targets, a finding again consistent with the univariate results.¹⁰ Thus, there appear to be certain firm

¹⁰ Unreported tests reveal that firm sales is not significantly different between initial targets and rivals that become targets in a multivariate setting.

variables that characterize acquisition targets in the telecommunications industry. If this is the case, we expect rivals with similar financial profiles to have higher abnormal returns at the time of the initial merger, a reflection of the increased probability of a future takeover bid. We test this theory using rival abnormal returns in the next section.

<Insert Table 10 about here>

6.2. Cross-sectional regression analysis of rival abnormal returns

We next use ordinary least squares (OLS) regression analysis to examine the influence of firm and industry characteristics on abnormal returns to rivals, following the approach pioneered by Eckbo (1983) and Stillman (1983). Utilizing the approach favored by Petersen (2009), regressions incorporate time fixed-effects and standard errors are corrected for clustering at the firm level. Variables are again winsorized at the 1% and 99% level. In addition to the firm variables used in the preceding logit regressions, we control for future takeover status, time period, market concentration, industrial organization and other characteristics. Variable definitions are reported in Appendix A.

Table 11 reports regressions of rival announcement period abnormal returns on variables expected to affect the probability of acquisition. Model one tests the firm characteristics tested in the logistic regressions. Reported results show rivals' Tobin's Q and return on sales are negatively related to rival abnormal returns, consistent with findings in the literature. However, the finding that leverage and cash flow are insignificantly related to rival abnormal returns is inconsistent with the anticipation hypothesis, given the results from logistic regressions in Table 10. Model 2 adds proxies for industry and deal characteristics. The coefficients on the HHI and horizontal merger variables are insignificant. These findings are inconsistent with the collusion synthesis. The collusion hypothesis predicts that industries with greater concentration provide more possibilities for collusive pricing, while horizontal mergers produce greater industry concentration and, thus, greater likelihood of collusion. The positive

and significant coefficient on the control variable relative size (log of the ratio of rival market value to the acquirer's market value) indicates that the market judges the likelihood of subsequent mergers not just in relation to the rival but in relation to similar acquirers as well.

<Insert Table 11 about here>

Model 3 adds a dummy variable for rivals that subsequently become targets in a merger within one year of the initial merger. The variable enters the regression with a positive and significant coefficient, indicating that the market recognizes, at the time of the initial merger, the heightened likelihood of these rivals subsequently becoming targets. Model 4 substitutes a dummy variable for rivals that subsequently become targets in a merger within three years of the initial merger. The estimated coefficient is again positive and significant. These results are consistent with the anticipation hypothesis.

Model 5 adds a dummy variable for initial acquisitions that occur after industry deregulation in 1996 and an interaction term (future target x post 1996) that captures rivals that become targets within three years of the initial merger when the initial merger is announced after 1996. The estimated coefficient for the interaction variable is negative and significant. This result indicates that, conditioned on firm and industry characteristics, mergers that occurred after the industry was deregulated in 1996 contained less new information about the likelihood of future mergers, on average, than before deregulation because the "merger possible state" that characterized the industry after 1996 made mergers more likely. This result is consistent with the tests of initial mergers after deregulation reported in Table 8. The result is also inconsistent with collusion, but consistent with the anticipation hypothesis.

Model 6 substitutes an interaction term (future target x horizontal initial merger) that captures the effect on abnormal returns from rivals that become targets within three years of the initial merger

when the initial merger is a horizontal merger. The collusion hypothesis predicts that the coefficient for this variable is significantly positive (future merger targets should benefit from collusive mergers that give the combined firms market power). Our regression results show an insignificant effect. This evidence supports prior test results that show horizontal mergers in the telecom industry do not appear to be driven by collusive motivations.

Test in this section support the results from event study analysis of gains to rivals in telecom mergers. Financial characteristics of initial target firms and subsequent targets are statistically indistinguishable, while the financial characteristics of subsequent non-targets are significantly different than those of subsequent targets. Regression analysis finds that rivals that become targets in subsequent mergers earn significantly greater announcement returns than do subsequent non-targets, while subsequent targets in the post-deregulation period earn lower announcement returns than before deregulation. These results are consistent with predictions of the anticipation hypothesis and inconsistent with collusion.

6. Summary and conclusions

Previous research generally finds that mergers are not driven by collusive intent. Studies that do find evidence of collusion share a common focus – formerly regulated industries that undergo deregulation. Yet, concerns about collusion in these deregulated industries have only intensified in recent years. Regulators have recently sought legal redress to collusive mergers and product pricing in several industries, including the airline and telecom industries. We study mergers in the regulated U.S. telecom industry, by examining merging and rival firm returns, to test several theories of merger gains: the collusion, competitive advantage and anticipation hypotheses.

We examine 126 mergers and 6,787 rival firms from 1980 to 2009. Our sample period centers on industry deregulation in 1996, effected via passage of the Telecommunications Act. The merger

wave that dramatically reshaped the industry after passage of the Telecommunications Act raised the plausibility of collusion by allowing mergers and vertical integrations that were previously prohibited by law.

We find that mergers yield positive returns to the combined firms. Because this initial result is consistent with the collusion, competitive advantage and anticipation hypotheses, we next study returns to rivals to differentiate the hypotheses. Our results indicate that rival firms earn significantly positive abnormal stock returns upon the announcement of an industry merger and that returns exhibit substantial cross-sectional dispersion. We also find that returns to rivals are positive and significant in both the pre- and post-deregulation period and that returns are not significantly different across periods. Moreover, rival abnormal returns are insignificantly related to market concentration and horizontal vs. vertical deal status. These results are all inconsistent with the collusion hypothesis.

Further univariate and multivariate testing reveals that rivals that become targets in subsequent mergers earn significantly greater announcement returns than do subsequent non-targets; these results are robust to a number of relevant controls. Financial characteristics of initial target firms and subsequent targets are statistically indistinguishable, while the financial characteristics of subsequent non-targets are significantly different than those of subsequent targets. We also find that, after controlling for firm and industry characteristics, subsequent targets in the post-deregulation period earn lower announcement returns than before deregulation. These results are consistent with predictions of the anticipation hypothesis and inconsistent with collusion.

Our single-industry study of the deregulated telecom industry complements and supports the small handful of studies that study rival returns in order to test for the existence of collusion in mergers of regulated firms. Although deregulation has created conditions ripe for collusion in mergers in several formerly regulated industries, our findings indicate that deregulation did not foster collusion

in mergers in the telecom industry. Instead, the evidence indicates that merger gains to telecom firms are due to merger-induced efficiencies.

Appendix A

This table defines the variables used in our analyses and identifies the source of the data used to calculate the variables. Variables in bold are used in analyses. Variables unbolded are components used to compute other variables.

Variable	Definition	Source
<i>Tobin's Q</i>	Market value of assets / book value of assets	CRSP, Compustat
<i>Market value of equity, log</i>	Natural log of (share price x shares outstanding)	CRSP
<i>Leverage</i>	1 – equity (book value) / total assets	Calculated, Compustat
<i>Cash flow</i>	(Operating income before depreciation – taxes) / total assets	Calculated, Compustat
<i>Return on Sales</i>	Net income / Sales	Calculated, Compustat
<i>Return on assets</i>	(Net income + interest)/total assets	Calculated, Compustat
<i>Herfindahl-Hirschman index</i>	Sum of the squared sales-based market shares of firms in the industry at the time of the merger	Calculated, Compustat
<i>Relative size</i>	Natural log of (rival's equity (market value) / acquirer's equity (market value))	Calculated, CRSP
<i>Horizontal merger</i>	Binary variable equal to 1 if merger if acquirer and target in initial merger have the same three-digit SIC code	
<i>Post 1996</i>	Binary variable equal to 1 if merger is announced in 1996 or after	
<i>All cash</i>	Binary variable equal to 1 if medium of payment in the initial merger is 100% cash	
<i>Future merger target, 1 year</i>	Binary variable equal to 1 if rival becomes a merger target in deal announced within one year of initial merger	

Variable	Definition	Source
<i>Future merger target, 3 years</i>	Binary variable equal to 1 if rival becomes a merger target in deal announced within three years of initial merger	
<i>Future target x post 1996</i>	Interaction variable: Future merger target, 3 years X merger announced post 1996	
<i>Future target x horizontal merger</i>	Interaction variable: Future merger target, 3 years X horizontal initial merger	
<i>Book value of assets</i>	Total assets	Compustat
<i>Market value of assets</i>	Equity (market value) + assets (book value) – equity (book value) – deferred taxes	Calculated, CRSP, Compustat
<i>Book value of equity</i>	Common stock outstanding + capital surplus + retained earnings - treasury stock adjustments	Calculated, Compustat
<i>Sales</i>	Gross sales – (cash discounts + trade discounts + returned sales + allowances)	Calculated, Compustat
<i>Net income</i>	Net income (loss)	Compustat

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Figure 1: Annual time-series of merger activity (by target market value)

This figure presents a plot of the annual time-series of the market value of target firms in mergers over the sample period.

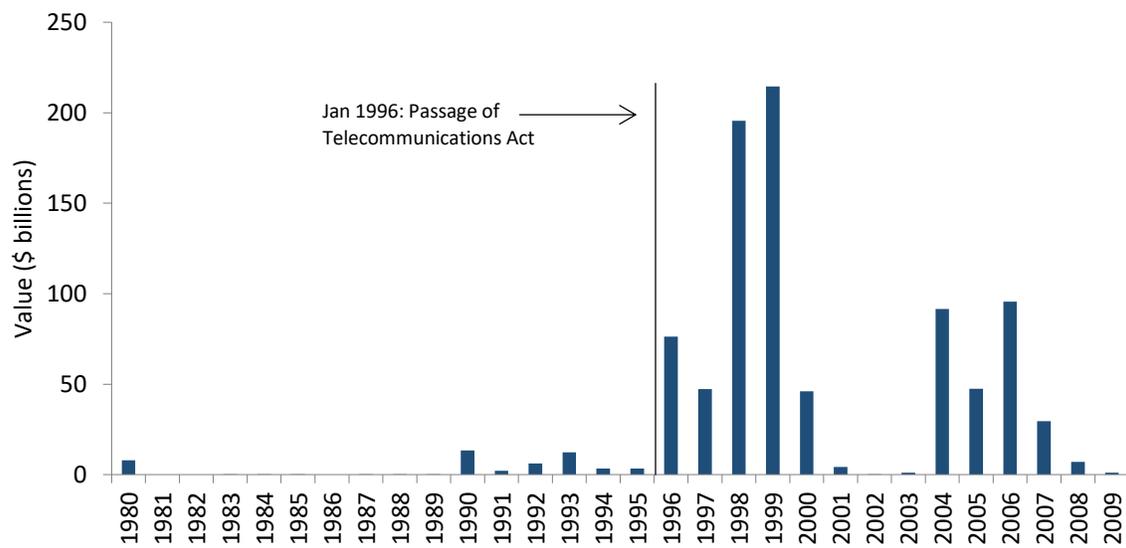


Table 1a: Predictions for abnormal returns to merging firms and rivals

This table presents the sign of merger announcement abnormal returns to the combined merging firms and their rivals, as predicted by the collusion and efficiency hypotheses.

Hypothesis	Merging firms	Rivals
Collusion	Positive	Positive
Efficiency:		
Competitive hypothesis	Positive	Negative
Anticipation hypothesis	Unrestricted	Positive

Table 1b: Predictions for abnormal returns to rivals, given subsequent merger activity

This table presents the signs of merger announcement abnormal returns for samples of rivals, given their participation in subsequent takeover activity, as predicted by the collusion and anticipation hypotheses.

Hypothesis	Target's subsequent merger activity
Collusion	No prediction
Efficiency:	
Competitive hypothesis	No prediction
Anticipation hypothesis	Positive

Table 2: Sampling procedure and data

This table details the procedures used to construct the industry and merger samples analyzed in this study.

Panel A: Sampling procedure

Industry sample

- a. Publicly traded firms listed on CRSP (NYSE, AMEX and Nasdaq) for the period 1980 to 2009
- b. Firms belonging to the three-digit SIC code 481 – telephone communications segment of telecommunications
- c. Firms with CRSP Share Codes 10 and 11, which excludes foreign incorporated firms and ADRs
- d. Firms with dual class shares are identified using the CRSP Share Class and adjusted for
- e. Firms that enter and exit CRSP listing in the same year are excluded

Merger sample

- f. Exits identified by tracking every firm's unique PERMNO from the first to the last time it appears on CRSP
- g. Initial merger sample identified from sample of exits using SDC's M&A database and news stories on LexisNexis
- h. Final merger sample with requisite CRSP and Compustat data for each bidder, target and rival used in analysis

Panel B: Sample

a. Initial # of firms in 1980:	27
b. Final # of firms in 2009:	45
c. Total unique firms:	304
d. Firm-year observations:	2, 161
e. Exits	258
f. Initial merger sample	138
g. Final merger sample	126

Table 3: Annual time-series of telecom firms and merger activity

This table reports the time-series distribution of the sample of U.S. public telecom firms and the number of mergers by year of announcement, for the time period 1980-2009. All Telecom Firms reports public telecom firms identified from CRSP at the end of each year. These firms belong to the three-digit SIC code 481, which identifies firms in the telephone communications segment of the telecommunications industry. The sample is comprised of domestic firms, excluding foreign incorporated firms and ADRs. The table also reports the sub-samples of telecom mergers where the bidder is a public firm with CRSP data.

Year	All telecom firms	All mergers	Merger sample	CRSP-listed bidders
1980	27	3	2	2
1981	32	1	0	0
1982	32	0	0	0
1983	40	1	1	0
1984	52	1	1	1
1985	53	1	1	0
1986	59	3	0	0
1987	64	2	2	1
1988	69	2	2	1
1989	72	1	1	1
1990	70	5	5	4
1991	73	4	4	2
1992	72	3	3	2
1993	81	3	2	2
1994	90	8	8	6
1995	90	4	4	4
1996	109	8	8	8
1997	107	10	10	8
1998	107	11	11	8
1999	116	15	12	9
2000	122	10	9	7
2001	92	4	4	2
2002	76	1	1	0
2003	76	2	2	0
2004	76	4	4	3
2005	78	9	8	7
2006	63	7	7	2
2007	62	8	7	3
2008	56	2	2	2
2009	45	5	5	4
Sum	2,161	138	126	89
Average	72	5	4	3

Table 4: Abnormal returns to merging firms

This table reports merger announcement abnormal returns to target, bidder, and combined firms for various samples of telecom mergers. The abnormal returns are computed using the Fama-French 3-factor model for the 3-day event window (-1, +1); the CRSP value-weighted index is the market proxy. Day 0 is the merger announcement date. Targets* reports returns for observations in which the listing status of the bidders is not restricted. All other computations are based on merger observations where bidder data is available on CRSP. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

	Mean	(t-stat)	Median	(t-stat)	Merger obs
<i>Panel A: Full Sample, 1980 - 2009</i>					
Targets*	15.60% ***	8.15	13.03% ***	6.81	126
Targets	16.60% ***	7.43	14.37% ***	6.43	89
Bidders	-2.62% ***	3.73	-1.45% **	2.07	89
Combined	1.47% **	2.09	0.66%	0.93	89
<i>Panel B: Pre-deregulation Sample, 1980 - 1995</i>					
Targets*	12.19% ***	3.08	11.59% ***	2.93	37
Targets	16.26% ***	3.49	9.31% *	2.00	26
Bidders	-2.56% ***	3.51	-1.92% **	2.64	26
Combined	-0.13%	-0.13	-0.57%	-0.60	26
<i>Panel C: Post-deregulation Sample, 1996 - 2009</i>					
Targets*	17.03% ***	8.60	13.83% ***	6.98	100
Targets	16.75% ***	7.23	14.37% ***	6.20	71
Bidders	-2.49% ***	2.91	-0.61%	0.72	71
Combined	2.07% **	2.53	1.39% *	1.70	71
<i>Panel D: Pre-deregulation (5-yr) Sample, 1991 - 1995</i>					
Targets*	15.01% ***	3.58	14.02% ***	3.34	21
Targets	18.03% ***	4.07	15.61% ***	3.52	17
Bidders	-3.13% ***	3.29	-3.20% ***	3.36	17
Combined	-0.29%	-0.2	-0.49%	0.34	17
<i>Panel E: Post-deregulation (5-yr) Sample, 1996 - 2000</i>					
Targets*	15.57% ***	8.21	15.62% ***	8.23	60
Targets	16.11% ***	7.35	15.63% ***	7.13	48
Bidders	-2.81% **	2.35	-0.42%	0.35	48
Combined	2.64% **	2.33	1.16%	1.02	48

Table 5: Abnormal returns to rivals of the merging firms by industrial organization and time period

This table reports abnormal returns to rival firms for the sample of mergers during the 1980 to 2009 period. The abnormal returns are computed using the Fama-French 3-factor model for the 3-day event window (-1, +1); the CRSP value-weighted index is the market proxy. Day 0 is the merger announcement date. Rivals of the merging firms are publicly traded U.S. telecom firms at the time of the merger announcement and neither target nor bidder in the deal. Panel A reports abnormal returns to rivals of the merging firms for the full sample period from 1980 to 2009. Panel B reports abnormal returns to rivals of the merging firms for the period prior to industry deregulation (1980 to 1995). Panel C reports abnormal returns to rivals of the merging firms for the period following industry deregulation (1996 to 2009). The last row of each panel reports *p*-values of tests of differences in means and medians. *p*-values are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Abnormal announcement period returns (-1, +1)			
Industrial organization	Mean	Median	# of rivals
<i>Panel A: 1980 - 2009</i>			
All rivals	0.31% *** (.002)	-0.12% (.864)	6,787
Horizontal rivals	0.37% ** (.002)	-0.16% (.551)	4,733
Non-horizontal rivals	0.18% (.302)	0.01% (.588)	2,054
Difference (<i>p</i> -value)	0.466	0.167	
<i>Panel B: 1980 - 1995</i>			
All rivals	0.42% ** (.018)	-0.13% (.746)	1,638
Horizontal rivals	0.36% * (.054)	-0.19% (.344)	1,264
Non-horizontal rivals	0.62% (.167)	0.04% (.318)	374
Difference (<i>p</i> -value)	0.188	0.126	
<i>Panel C: 1996 - 2009</i>			
All rivals	0.28% ** (.017)	-0.12% (.924)	5,149
Horizontal rivals	0.38% * (.011)	-0.15% (.824)	3,469
Non-horizontal rivals	0.09% (.651)	0.01% (.886)	1,680
Difference (<i>p</i> -value)	0.812	0.399	

Table 6: Abnormal returns to rivals of the merging firms by subsequent merger activity

This table reports abnormal returns to rival firms for the sample of mergers during the 1980 to 2009 period. The abnormal returns are computed using the Fama-French 3-factor model for the 3-day event window (-1, +1); the CRSP value-weighted index is the market proxy. Day 0 is the merger announcement date. Rivals of the merging firms are publicly traded U.S. telecom firms at the time of the merger announcement and neither target nor bidder in the deal. Rival firms are categorized by merger activity in the three years following the initial merger. The lower panel reports one-tailed p -values of tests of the hypothesis that subsequent targets earn greater abnormal returns than do non-targets, in means and medians. p -values are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Abnormal announcement period returns (-1, +1)			
Rivals that were subsequently:	Mean	Median	# of rivals
Non-targets within three years	0.19% * (.083)	-0.14% (.237)	5,580
Targets within one year	0.98% *** (.008)	0.09% (.147)	479
Targets within three years	0.88% *** (.000)	0.05% ** (.032)	1,207
	One-tailed P values		
Tests of differences between:	Mean	Median	
Targets within one year and non-targets	0.008 ***	0.146	
Targets within three years and non-targets	0.045 **	0.07 *	

Table 7: Abnormal returns to rivals of the merging firms by subsequent merger activity and time period

This table reports abnormal returns to rival firms for the sample of mergers during the 1980 to 2009 period. The abnormal returns are computed using the Fama-French 3-factor model for the 3-day event window (-1, +1); the CRSP value-weighted index is the market proxy. Day 0 is the merger announcement date. Rivals of the merging firms are publicly traded U.S. telecom firms at the time of the merger announcement and neither target nor bidder in the deal. Rival firms are categorized by merger activity in the three years following the initial merger. Panel A reports abnormal returns to rivals of the merging firms for the period prior to industry deregulation (1980 to 1995). Panel B reports abnormal returns to rivals of the merging firms for the period following industry deregulation (1996 to 2009). The last rows of panels A and B report one-tailed p -values of tests of the hypothesis that subsequent targets earn greater abnormal returns than do non-targets, in means and medians. Panel C reports one-tailed p -values of tests of the hypothesis that subsequent targets earn greater abnormal returns in the pre-deregulatory period (1980 to 1995) than the post-deregulatory period (1996 to 2009), in means and medians. p -values are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Abnormal announcement period returns (-1, +1)			
Rivals that were subsequently:	Mean	Median	# of rivals
<i>Panel A: 1980 - 1995</i>			
Non-targets within three years	0.16% (.373)	-0.13% (.337)	1,360
Targets within one year	2.22% ** (.017)	0.20% (.187)	93
Targets within three years	1.69% *** (.003)	-0.09% (.182)	278
<u>Tests of differences between:</u>			
Targets within one year and non-targets	0.082 *	1.000	
Targets within three years and non-targets	0.075 *	0.332	
<i>Panel B: 1996 - 2009</i>			
Non-targets within three years	0.20% (.133)	-0.15% (.378)	4,220
Targets within one year	0.68% * (.087)	0.09% (.351)	386
Targets within three years	0.64% *** (.005)	0.06% * (.090)	929
<u>Tests of differences between:</u>			
Targets within one year and non-targets	0.027 **	0.129	
Targets within three years and non-targets	0.125	0.242	
<i>Panel C: Tests of differences between sub-periods:</i>			
Targets within one year	0.205	0.712	
Targets within three years	0.333	0.800	

Table 8: Abnormal returns to rivals of the merging firms in mergers immediately following deregulation

This table reports abnormal returns to rival firms in the first three mergers following passage of the 1996 Telecommunications Act. The abnormal returns are computed using the Fama-French 3-factor model for the 3-day event window (-1, +1); the CRSP value-weighted index is the market proxy. Day 0 is the merger announcement date. Rivals of the merging firms are publicly traded U.S. telecom firms at the time of the merger announcement and neither target nor bidder in the deal. Rival firms are categorized by merger activity in the three years following the initial merger. Panel A reports abnormal returns to rivals of the merging firms in the first three mergers following passage of the 1996 Telecommunications Act. Panel B reports abnormal returns to rivals of the merging firms for the period following industry deregulation (1996 to 2009), less the three merger observations reported in Panel A. Panel C reports one-tailed p -values of tests of the hypothesis that subsequent targets earn greater abnormal returns in the first three mergers following deregulation than in the post-deregulatory period (1996 to 2009), in means and medians. p -values are reported in parentheses. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

Abnormal announcement period returns (-1, +1)			
Rivals that were subsequently:	Mean	Median	# of rivals
<i>Panel A: Initial mergers</i>			
Non-targets within three years	0.26% (.521)	-0.23% (.933)	189
Targets within one year	2.87% ** (.034)	3.03% * (.057)	17
Targets within three years	0.50% (.399)	-0.39% (.819)	67
<i>Panel B: 1996 - 2009 (less initial mergers)</i>			
Non-targets within three years	0.20% (.153)	-0.15% (.362)	4,031
Targets within one year	0.58% (.159)	0.02% (.584)	369
Targets within three years	0.65% *** (.007)	0.08% * (.095)	862
<i>Panel C: Tests of differences:</i>			
Non-targets within three years	0.372	0.470	
Targets within one year	0.047 **	0.108	
Targets within three years	0.416	0.266	

Table 9: Univariate analysis of initial targets and rivals that subsequently become targets

This table reports results from univariate analysis comparing initial targets and rivals that subsequently become targets in mergers in the telecommunications industry during the 1980 to 2009 sample period. Rivals of the merging firms are publicly traded U.S. telecom firms at the time of the merger announcement and neither target nor bidder in the deal. Variables are defined in Appendix A. All variables are winsorized at the 1% and 99% levels. p -values for difference tests are reported in the final three columns. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

	Initial target firms	All rival firms	Rival firms that become targets within 3 years	Difference, initial target firms		Difference
				(p-value)		(p-value)
				All rival firms	Rival firms that become targets within 3 years	Rival firms
	Mean	Mean	Mean			
Sales	2,054.14	2,810.05	1,956.40	0.03 **	0.14	0.04 **
Firm market value	3,992.22	5,960.44	3,860.32	0.78	0.62	0.05 **
Tobin's Q	2.02	2.06	1.89	0.48	0.80	0.06 *
Leverage	0.77	0.69	0.74	0.07 *	0.83	<.0001 ***
Cash flow	0.09	0.05	0.08	0.05 *	0.58	<.0001 ***
Return on assets	-0.02	-0.05	-0.01	0.14	0.94	<.0001 ***
Return on sales	-2.76	-1.39	0.07	0.78	0.68	0.10 *
# of observations	126	6,787	1,207			

Table 10: Logistics regressions analysis of initial targets and rivals that subsequently become targets

This table reports results from logistic regression analysis comparing initial targets and rivals that subsequently become targets in mergers in the telecommunications industry during the 1980 to 2009 sample period. Rivals of the merging firms are publicly traded U.S. telecom firms at the time of the merger announcement and neither target nor bidder in the deal. The dependent variable is equal to one if the firm is a target in a merger. Explanatory variables are defined in Appendix A. All variables are winsorized at the 1% and 99% levels. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

<i>Dependent variable: target = 1, rival = 0</i>	Initial targets & all rivals	Initial targets & targets in 1 year	Initial targets & targets in 3 years
Explanatory Variables			
Tobin's Q	0.032 (0.22)	-0.028 (0.10)	0.114 (1.91)
Market value of equity, log	-0.03 (0.60)	-0.05 (1.02)	-0.04 (0.59)
Leverage	0.81 *** (8.74)	-0.31 (1.08)	0.26 (0.82)
Cash flow	1.92 *** (7.75)	0.82 (1.06)	0.40 (0.28)
Return on sales	-0.01 (0.63)	-0.01 (0.68)	0.01 (0.31)
Constant	-4.60 *** (177.41)	-0.82 ** (4.25)	-2.47 *** (41.20)
Log Likelihood	-621.59	-308.04	-415.45
χ^2	15.48	3.00	3.34
Observations	6,913	605	1,333

Table 11: Regressions of rival returns on explanatory variables

This table reports results from OLS regression analysis of abnormal returns to rival firms on explanatory variables for the 1980 to 2009 sample period. The abnormal returns are computed using the Fama-French 3-factor model for the 3-day event window (-1, +1); the CRSP value-weighted index is the market proxy. Day 0 is the merger announcement date. Rivals of the merging firms are publicly traded U.S. telecom firms at the time of the merger announcement and neither target nor bidder in the deal. Explanatory variables are defined in Appendix A. All variables are winsorized at the 1% and 99% levels. T-stats reported in parentheses are corrected for clustering at the firm level. The symbols *, **, and *** denote statistical significance at the 0.10, 0.05 and 0.01 levels, respectively.

<i>Dependent Variable = CAR (-1,1)</i>						
Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)
Future target x post 1996					-0.008 *	
					(1.67)	
Future target x horizontal initial merger						-0.004
						(1.04)
Future merger target, 3 years				0.005 **	0.011 ***	0.008 **
				(2.19)	(2.90)	(2.57)
Future merger target, 1 year			0.006 *			
			(1.77)			
Post 1996					0.092	0.089
					(1.46)	(1.40)
All cash		-0.002	-0.002	-0.002	-0.003	-0.003
		(0.98)	(0.96)	(0.95)	(1.12)	(1.12)
Horizontal initial merger		0.003	0.003	0.003	0.002	0.003
		(1.33)	(1.33)	(1.32)	(1.19)	(1.44)
Herfindahl index		0.168	0.147	0.341	-19.686	-19.226
		(0.12)	(0.10)	(0.23)	(1.45)	(1.42)
Relative size, initial acquirer		0.002 *	0.002 *	0.002 *	0.002 **	0.002 **
		(1.92)	(1.89)	(1.90)	(2.20)	(2.17)
Tobin's Q	-0.002 ***	-0.002 ***	-0.002 ***	-0.002 ***	-0.002 ***	-0.002 ***
	(2.98)	(2.88)	(2.94)	(2.87)	(2.86)	(2.87)
Market value of equity, log	0.000	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.12)	(1.29)	(1.27)	(1.29)	(1.53)	(1.52)
Leverage	-0.0004	-0.0005	-0.0010	-0.0012	-0.0011	-0.0012
	(0.14)	(0.15)	(0.30)	(0.35)	(0.34)	(0.35)
Cash flow	-0.0004	-0.0006	0.0011	-0.0016	-0.0012	-0.0015
	(0.05)	(0.09)	(0.16)	(0.24)	(0.18)	(0.22)
Return on sales	-0.0002 *	-0.0002 *	-0.0002 *	-0.0002 *	-0.0002 *	-0.0002 *
	(1.91)	(1.88)	(1.87)	(1.74)	(1.84)	(1.75)
Constant	-0.001	0.004	0.004	0.002	0.145	0.143
	(0.19)	(0.26)	(0.28)	(0.13)	(1.47)	(1.45)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.01	0.01	0.01	0.01	0.01	0.01
Observations	6,787	6,787	6,787	6,787	6,787	6,787

