

**A TEST OF THE MARKET POWER HYPOTHESIS
USING HORIZONTAL MERGERS**

Yuan Yuan Long

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ABSTRACT

A Test of the Market Power Hypothesis Using Horizontal Mergers

Yuan Yuan Long

This thesis tests the effects of merger proposal and antitrust complaint announcements on the abnormal performance of acquirers, targets, and their horizontal rivals. The market power hypothesis is examined for a sample of 195 horizontal mergers (152 unchallenged and 43 challenged) and their horizontal rivals. The predictions of the market power and economic efficiency hypotheses are that the bidder and target firms generate positive and negative (or zero) abnormal returns relative to the merger proposal and antitrust complaint announcements, respectively. These hypotheses also predict the sign for the horizontal rivals with regard to both announcements. Our evidence does not support the market power hypothesis since the performance of horizontal rivals exhibit positive abnormal returns over the merger proposal period and zero abnormal returns over the antitrust complaint announcement. Such abnormal returns are consistent with the information model of the economic efficiency hypothesis.

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A TEST OF THE MARKET POWER HYPOTHESIS USING HORIZONTAL MERGERS

1. INTRODUCTION

A large body of research examines the profitability of mergers by measuring the impact of merger announcements on stock prices. These studies consistently find that the shareholders of target firms earn large positive abnormal returns while the shareholders of acquiring firms tend to earn approximately normal returns, and that the shareholders of horizontal rivals of target firms earn positive abnormal returns relative to the merger announcement. The source of the positive abnormal returns to rivals during the merger announcement period is due to the potentially increased market power of all firms in the market. The signal provides positive information about the value of an industry or about increased synergies between rivals and subsequent bidders and/or the increased probability that the rivals themselves will be targets in future mergers. The collusion hypothesis implies that the horizontal rivals of the merging firms and the merging firms themselves should earn positive abnormal returns around the merger proposal announcement. A possible reason is that control over the resources of the target firms enables the successful bidder to initiate a revaluation of its own value by implementing a higher-valued operating strategy.

With the passage of the Celler-Kefauver amendment in 1950, Section 7 of the Clayton Act of 1914 replaced Section 2 of the Sherman Act of 1890 as the principal federal antitrust law regulating corporate mergers and acquisitions in the United States. Subsequently, the U.S pursued a vigorous antitrust policy towards horizontal mergers. Until the implementation of the Hart-Scott-Rodino Antitrust Improvement Act in

September 1978, more emphasis was placed on the examination of the effect of the regulations by the enforcement agencies (i.e., the U.S. Department of Justice and the Federal Trade Commission) on the merging firms and their horizontal rivals.

In theory, mergers between competitors can lead to the accumulation of market power. However, the most representative previous studies by Eckbo (1983) and Stillman (1983) reject the market power hypothesis. Both authors use stock price data to test the hypothesis that the mergers challenged by the government between 1963 and 1978 are anticompetitive. Inconsistent with the prediction of the market power hypothesis, both authors observe that the merging firms exhibit a significant positive abnormal return around the merger announcement, and that the rival firms exhibit a non-negative abnormal return around the antitrust announcement. Therefore, both authors conclude that, if the challenged mergers survived, they would be economically efficient on average rather than anticompetitive. All previous similar studies reach a similar conclusion; namely, that the enforcement agencies have challenged mergers that were economically efficient. However, these studies provide different explanations for their results.

Since all of these studies use data from the period 1960-1980, the primary purpose of this thesis is to revisit this issue by examining mergers that were consummated after 1990. This thesis uses advances in the event-study methodology to test if the market power hypothesis can still be rejected using a more recent sample. The sample used herein consists of 195 horizontal mergers, of which the government challenged 43 based on claims that they violated Section 7 of the Clayton Act. The findings of this study are similar to those reported in previous studies. Specifically, the antitrust policy in part protects relatively high-cost producers from relatively low-cost producers by restricting

the opportunities to implement lower-cost production techniques by means of merger.

The paper is organized as follows. Section 2 reviews the major results and conclusions from past studies. Section 3 provides a brief background for U.S antitrust law. Section 4 summarizes the hypotheses about the competitive effects of horizontal mergers. Section 5 describes the procedures used to select the merger sample and the portfolio of horizontal rivals for each merger. Section 6 introduces the empirical methodology used herein. Section 7 reports and analyzes the empirical results. Section 8 uses an improved methodology as a robustness check for the Section 7 results. Section 9 concludes the thesis.

2. LITERATURE REVIEW

Hundreds of previous studies intensively examine the effects of merger announcements on the stock prices of bidder and target firms using event study techniques. Target firms typically experience dramatic increases in their stock prices, while bidders exhibit little effect on their stock price on average. Jenson and Ruback (1983) summarize the results of thirteen studies prior to 1983 that indicate that the targets realize substantial and statistically significant abnormal returns around the merger announcement, with an average return of 29.09% for tender offers and 15.90% for mergers. In contrast, the price effects for bidders are insignificant and approximately zero, that is, no net gain or loss as the result of merger activity.

Ellert (1976) appears to be one of the earliest studies that links antitrust law enforcement with the effect of mergers on stockholder returns. Ellert examines the risk and return characteristics of 205 large corporations whose merger activities were

challenged by the Antitrust Division of the Department of Justice or the Federal Trade Commission over the period 1950-1972. Ellert uses stock prices before and after the issuance of Section 7 complaints to examine the abnormal rate of return behavior of challenged firms, and then compares these returns to the returns realized by stockholders in companies whose merger activity was not challenged under the antitrust law.

Ellert examines three hypotheses dealing with the relationships between merger activity, antitrust enforcement and the pattern of stockholder returns. The monopolistic hypothesis states that mergers involving large companies are likely to be motivated by monopoly power considerations or other anticompetitive advantages associated with increases in business size. Thus, an effective antimerger policy would result in abnormally low returns over time on stockholder investments in companies whose mergers are court-contested. This hypothesis is similar to the market power hypothesis that is introduced below.

The benign merger hypothesis states that those mergers that are actually challenged under Section 7 are relative benign in their anticompetitive effects. The third and final hypothesis is that mergers reflect the competitive process by which the assets of poorly managed companies are transferred to companies with superior capabilities to manage assets efficiently. This hypothesis is attributable to Dewey (1961) and Manne (1965) who assert that mergers perform a useful function in promoting a competitive market for corporate control.

Ellert uses the two-parameter asset-pricing model to estimate abnormal returns. He finds that stockholders in large companies indicted under the antimerger law earn abnormal returns of approximately 23%, on average, over the eight years preceding

antitrust complaints. These significant gains in the pre-complaint period are consistent with the predictions of both the “monopolistic hypothesis” and the “competitive market in corporate control hypothesis”. The market adjusts stockholder returns downwards by -1.83% on the announcement that the DOJ or FTC is filing an antimerger case. During the remainder of the litigation period and following court decisions, stockholders in these companies earn rates of return not statistically different from those obtained by stockholders in other companies with similar risk. This evidence leads the author to conclude that the evidence does not support the monopoly hypothesis.

In addition, Ellert observes that the mergers being ordered to divest or the acquirers ordered to limit their future attempts at external expansion exhibit no different losses from those mergers where divestiture was not required. This evidence is interpreted as being supportive of the last hypothesis that mergers perform a useful economic function in reallocating resources from less efficient to more efficient users.

The paper in the literature that is most representative of the work undertaken in this thesis is the paper by Eckbo (1983) that examines the effect of antitrust complaints on merging firms as well as their horizontal rivals. This paper tests the collusion hypothesis that “horizontal mergers generate positive abnormal returns to stockholders of the bidder and target firms because they increase the probability of successful collusion among rival producers”. Under the collusion hypothesis, rivals of the merging firms should earn positive abnormal returns around the merger proposal announcements, since successful collusion limits output and raises product prices and/or lowers factor prices. In contrast, rivals should earn negative abnormal returns around the antitrust challenge announcements, since such announcements decrease the probability of the merger being

consummated and increase the costs of collusion. The alternative "productive efficiency" hypothesis predicts an increase in the market value of the merging firms due to the implementation of a more cost-efficient production/investment policy after the merger is consummated, and predicts an unrestricted sign for the abnormal returns of rivals for each type of merger-related announcement. Eckbo explains the unrestricted sign prediction by arguing that each of the two merger-related announcements can have a product/factor price effect and a possible offsetting information effect with productive efficiency.¹

These two hypotheses are tested on a large sample of horizontal mergers, including mergers challenged by the government for violating antitrust laws and a control sample of vertical mergers taking place in the same industries. Consistent with most previous studies, Eckbo finds that the bidders and targets both earn positive abnormal returns around the merger proposal announcement, although only the abnormal returns for the latter are significant. The results are more apparent from the sample of challenged mergers where the 57 bidders and 29 targets earn 1.2% and 10.2%, respectively, over the three days surrounding the merger proposal announcement day. In response to the antitrust complaint announcement, both bidders and targets exhibit significantly negative abnormal performance of -0.73% and -4.63%, respectively, only on day 0. This evidence satisfies both the collusion and efficiency hypotheses.

However, the 65 horizontal rivals of the challenged mergers earn statistically significant positive abnormal returns relative to the merger proposal announcement, and

¹ The intensified competition in product and factor markets tends to result in lower product prices and higher factor prices. This price effect causes a negative change in the market value of the rivals at the time of the proposal announcement, and a positive effect at the time of the antitrust complaint. The news of a proposed efficient merger can also signal opportunities for rivals to increase their productivity. Similarly, the news of the antitrust complaint can signal a significant restriction in the future merger opportunities of the rivals. For each of the two announcements, the total wealth impact on the rivals is the sum of the product/factor price effect and the information effect, leaving no necessary restriction on the sign of the abnormal returns of rivals under the efficiency hypothesis.

zero or positive returns relative to the subsequent challenged announcements,² which is not consistent with the prediction of the collusion hypothesis. Therefore, Eckbo rejects the collusion hypothesis, and concludes that the antitrust law enforcement agencies systematically select relatively profitable mergers for prosecution. He also concludes that little evidence exists that indicates that the mergers would have had collusive, anticompetitive effects.

Stillman (1983) uses daily stock return data for a sample of rivals for 11 horizontal mergers attempted between 1964 and 1972 that were challenged by the antitrust enforcement agencies. The inefficiency hypothesis that is tested in the paper implies that challenged horizontal mergers should lead to increased product prices. In turn, this predicts that rival firms in industries affected by challenged mergers should rise or drop in value when the mergers become more or less likely, respectively. The prediction of this hypothesis is consistent with the prediction of the collusion hypothesis in the Eckbo paper.

Stillman finds that rivals exhibit a pattern of abnormal returns consistent with the prediction of the inefficiency hypothesis for only one merger in his sample. Additionally, he finds the somewhat ambiguous result that the abnormal return of the sole rival is significant in the direction of an anticompetitive result at the time of one event, but insignificant for another event. In the remaining nine cases, the rivals exhibit no abnormal returns. These findings led Stillman to reject the inefficiency hypothesis and

² When Eckbo divides his sample of cases by enforcement agency into FTC cases versus DOJ cases, the results are complicated to interpret. He finds that rivals earn, on average, significant positive abnormal returns on the day that the mergers were challenged by the FTC, but insignificant abnormal returns on the day the mergers were first announced and over numerous intervals surrounding such announcements. In cases challenged by DOJ, rivals exhibited positive abnormal returns over various intervals surrounding the announcement of mergers, but insignificant returns during the intervals including the challenges.

conclude that the government, on balance, has brought Section 7 cases against horizontal mergers that were not expected by investors to have any appreciable effect on product prices. In other words, the mergers challenged by the enforcement agencies would not be anticompetitive if they survived.

Both Eckbo (1983) and Stillman (1983) do not observe the stock price patterns predicted by the collusion hypothesis. Moreover, the data of Eckbo suggest that the challenged mergers in his sample would have been economically efficient on average rather than anticompetitive if they had survived. Thus, Eckbo and Wier (1985) test to determine if the legal constraints in effect during the Eckbo (1983) and Stillman (1983) sample periods were designed to prevent the agencies from obtaining the information needed for judging the competitive impact of a merger before the agencies filed a complaint. They use a sample of Section 7 cases filed after 1978 for evidence that the Hart-Scott-Rodino Act has enhanced the ability of the agencies to select anticompetitive mergers for prosecution. However, since they find no such evidence, this indicates that the government's tendency to challenge efficient mergers cannot be explained by constraints on the enforcement process.

The authors also test whether the earlier conclusions concerning the market power hypothesis depend on the method used to select the rival firms. Stillman (1983) uses records from court and agency proceedings to select his sample of rival firms and examines each case individually. In contrast, Eckbo (1983) selects rivals based on the SIC codes and reports the average effects over his entire sample. Eckbo and Wier (1985) use both methods for selecting rivals, and find that share price performance is similar across the two sets of rival firms and are uniformly inconsistent with the market power

hypothesis.

While the U.S. has pursued a vigorous antitrust policy towards horizontal mergers since 1950, mergers in Canada were permitted to take place in a virtually unrestricted antitrust environment until 1985. The absence of an antitrust overhang in Canada presents an interesting opportunity to test the conjecture that the rigid market share and concentration criteria of the U.S. policy effectively deters a significant number of potentially collusive mergers. Eckbo (1992) examines the effective deterrence hypothesis, which implies that the probability of a horizontal merger being anticompetitive is higher in Canada than in the U.S. He examines this implication by means of cross-sectional regressions with merger-induced abnormal stock returns to non-merging industry rivals as the dependent variable. Using an econometric procedure that explicitly accounts for the private information of managers concerning the true value of the merger as well as the effect of the antitrust overhang in the U.S., Eckbo (1992) reports evidence that rejects the market concentration doctrine for samples of both U.S. and Canadian mergers. The results also reject the effective deterrence hypothesis but are consistent with the alternative hypothesis that the horizontal mergers in either of the two countries were expected to generate productive efficiencies.

Schumann (1989) updates and re-examines the conclusions and methodology of Eckbo (1983) and Eckbo and Wier (1985). Based on an examination of rival firms of 37 mergers that were challenged by the Federal Trade Commission over the period 1981-1987, Schumann finds that the rivals benefit from the merger announcements given their significant positive abnormal returns, and are unaffected by the antitrust complaints given the zero abnormal returns when the antitrust complaints were announced. These results

are quite similar to those reported earlier by Eckbo (1983) and Eckbo and Wier (1985). However, Schumann argues that the study of the stock returns of rivals might not be an effective method for determining the competitive effects of horizontal mergers, since an antitrust challenge to a horizontal merger may have disparate effects on rivals depending on the relative sizes of rivals within the industry. His empirical evidence indicates that the value of small rivals increase significantly, although the values of rivals as a whole are unaffected on average by an antitrust complaint.³

In summary, all of the previous studies seem to reject the market power hypothesis and conclude that the mergers challenged by the FTC and DOJ are not anticompetitive. These results motivate a retest of this hypothesis to determine if the U.S. antitrust enforcement agencies have improved their performance during the past 20 years.

3. A BRIEF HISTORY OF ANTITRUST LAW

As a prelude to the analysis, it is necessary to review the history of U.S. antitrust law. Antitrust policy is the effort by the government to prevent the acquisition and exercise of monopoly power, and to encourage effective competition in the marketplace.

The history of antitrust regulation in the United States dates back to the Sherman Act in the late nineteenth century. Sec. 2 of the Sherman Act (1890) makes it unlawful for a company to "monopolize, or attempt to monopolize" trade or commerce. Monopolizing trade is a felony subject to penalty. Thus:⁴

Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or

³ In my study, an attempt is made to capture this effect by examining the abnormal returns for both equal- and value-weighted portfolios of rival firms.

⁴ <http://www.usdoj.gov/atr/foia/divisionmanual/ch2.htm>.

commerce among the several States, or with foreign nations, shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding \$10,000,000 if a corporation, or, if any other person, \$350,000, or by imprisonment not exceeding three years, or by both said punishments, in the discretion of the court.

According to Section 7 of the Clayton Act (1914):⁵

Except as exempted,⁶ no person shall acquire, directly or indirectly, any voting securities or assets of any other person, unless both persons (or in the case of a tender offer, the acquiring person) file notification to the FTC and the Assistant Attorney General in charge of the Antitrust Division of the Department of Justice (hereinafter "Assistant Attorney General"), and allowing the waiting period of 30 days (or in the case of a cash tender offer, the fifteenth day) begin on the date of the receipt of the completed notification by the FTC and the assistant attorney general. The notification must pursuant to rules that the FTC and the assistant attorney general shall require that the notification be in such form and contain such documentary material and information relevant to a proposed acquisition as

⁵ <http://www.usdoj.gov/atr/foia/divisionmanual/ch2.htm>.

⁶ The exemptions include: (1) acquisitions of goods or realty transferred in the ordinary course of business; (2) acquisitions of bonds, mortgages, deeds of trust, or other obligations which are not voting securities; (3) acquisitions of voting securities of an issuer at least 50% of the voting securities of which are owned by the acquiring person prior to such acquisition; (4) transfers to or from a Federal agency or a State or political subdivision thereof; (5) transactions specifically exempted from the antitrust laws by Federal statute; (6) transactions specifically exempted from the antitrust laws by Federal statute if approved by a Federal agency, if copies of all information and documentary material filed with such agency are contemporaneously filed with the Federal Trade Commission and the Assistant Attorney General; (7) transactions which require agency approval, if copies of all information and documentary material filed with any such agency are contemporaneously filed with the Federal Trade Commission and the Assistant Attorney General at least 30 days prior to consummation of the proposed transaction; (8) acquisitions, solely for the purpose of investment, of voting securities, if, as a result of such acquisition, the securities acquired or held do not exceed 10 per centum of the outstanding voting securities of the issuer; (9) acquisitions of voting securities, if, as a result of such acquisition, the voting securities acquired do not increase, directly or indirectly, the acquiring person's per centum share of outstanding voting securities of the issuer; (10) acquisitions, solely for the purpose of investment, by any bank, banking association, trust company, investment company, or insurance company, of voting securities pursuant to a plan of reorganization or dissolution; or assets in the ordinary course of its business.

is necessary and appropriate to enable them to determine whether such acquisition may, if consummated, violate the antitrust laws. Moreover, the FTC or the Assistant Attorney General may, prior to the expiration of the 30-day waiting period (or in the case of a cash tender offer, the 15-day waiting period) require the submission of additional information or documentary material relevant to the proposed acquisition, from a person required to file notification or from any officer, director, partner, agent, or employee of such person.

The amendments to the Clayton Act embodied in the Tunney Act, passed in 1974, sets forth the procedures designed to ensure that proposed antitrust settlements are in the public interest. These include a thorough judicial review of the settlement and its competitive impact, a description and evaluation of the settlement and alternative remedies, a public comment period, and disclosure of governmental contacts by antitrust defendants.

Section 5 of the Federal Trade Commission Act outlaws "unfair methods of competition" and is only enforced by the FTC. Rulings of the Supreme Court that deem that violations of the Sherman Act have occurred also are violations of Section 5. However, Section 5 covers some practices that are beyond the scope of the Sherman Act.

The Robinson – Patman Price Discrimination Act of 1936 restrains competition in order to protect small firms. The Act makes it unlawful for any seller engaged in commerce to discriminate in the sale price charged on commodities of comparable grade and quality where the effect might injure, destroy, or prevent competition.

The Celler-Kefauver Antimerger Act was passed in 1950 to amend Section 7 of the Clayton Act. The Act was designed to close a loophole regarding certain asset acquisitions involving firms that are not direct competitors in such purchases that reduce competition. While the Clayton Act prohibits stock purchase mergers that result in

reduced competition, shrewd businessmen found ways to bypass the Clayton Act by simply buying the assets of a competitor.

The Hart-Scott-Rodino Act of 1976 requires any investor seeking to acquire either a 15% stake or a stake valued at more than \$15 million in a particular security to notify the federal government. The 30-day review period begins upon the filing of the notification. Amendments to the Hart-Scott-Rodino Antitrust Improvements Act of 1976 became effective on February 1, 2001. The most significant amendment is that the threshold for HSR notification is raised from \$15 million to \$50 million and does not depend upon the percentage of voting securities or assets being acquired. Another significant amendment is that the length of the waiting period following substantial compliance with a Request for Additional Information is increased from 20 to 30 days.

Since the Celler-Kefauver Amendment of 1950, which revitalized the antimerger statute contained in Section 7 of the Clayton Act,⁷ U.S. antitrust authorities have placed strict regulatory limits on permissible levels of industry concentration and market shares of merging firms. The government has filed thousands of antitrust complaints against horizontal mergers to support this policy. With the C-K amendment, Section 7 replaced Section 2 of the Sherman Act of 1890 as the principal federal antitrust law regulating corporate mergers and acquisitions. The 1978 implementation of the Hart-Scott-Rodino or HSR Act addresses some perceived handicaps borne by the regulatory agencies charged with enforcing Section 7 of the Clayton Act.

⁷ Section 7 of the Clayton Act prohibits one corporation from acquiring the stock or assets of another “if the effect of such acquisition may be substantially to lessen competition or tend to create a monopoly”. Prior to this amendment, Section 7 did not cover mergers accomplished through asset purchases.

4. HYPOTHESES

The unifying theme of the various merger guidelines is that “*mergers should not be permitted to create or enhance market power or to facilitate its exercise.*”⁸ One of the functions of regulatory agencies is to lessen the ability of buyers and sellers to exert a discernible control over markets that enables them to attain higher individual welfare levels than they would achieve under competitive market conditions. Limiting the exercise of market power limits the wealth transfer from buyers to sellers or a misallocation of resources. For a seller, market power is the ability to beneficially maintain prices above competitive levels for a considerable period of time. When a few certain firms account for most of the sales of a product, those firms can exercise market power by either explicitly or implicitly coordinating their actions. Market power also includes the ability of a single buyer, or other such parties to lower the price paid for a product to a level that is below the competitive price and to thereby depress output.

The implications of the market power and economic efficiency hypotheses for the behavior of the stock prices of bidders, targets, and their competitors are summarized in Table 1. The predictions of both hypotheses are based on the presumption that stock prices are unbiased estimates of the present value of stockholders’ claims to the future cash flows of firms. Changes in these cash flow estimates caused by merger-related events will induce changes in stock prices when the events are announced. For all of the predictions outlined in Table 1, it is assumed that mergers are value enhancing or positive NPV investments for the merging firms. Therefore, events increasing the probability that a merger will consummate or survive are associated with positive abnormal returns for the merging firms. Events that decrease the probability that a merger will consummate or

⁸ <http://www.ftc.gov/bc/docs/horizmer.htm>.

survive (such as antitrust complaints) will result in negative abnormal returns for the merging firms. Since the price effects of mergers on rival firms depend on the competitive effects of the merger, it can be used to discriminate among alternative hypotheses. The only pattern of abnormal returns to rival firms that is inconsistent with the market power hypothesis and is consistent with the efficiency hypothesis is the one where the rivals experience nonnegative returns for both probability-increasing and probability-decreasing events.

The collusion hypothesis asserts that challenged mergers promote tacit or explicit cooperation among the members of the industries of the merging parties. This hypothesis implies that events that increase the possibility of merger success will cause the stock price of the merging firms and the prices of their rivals to rise. For the rivals, the rising price is due to the possible monopoly rents that are available to be shared among them. Events that decrease the possibility of a merger to be successful will result in a decline in share price for the merging firms and their horizontal rivals. On the other hand, mergers between larger firms may lead to predatory conduct where such firms will wage price wars against their competitors in the industry. Intuitively, in this case, the stock prices of rivals will fall as the survival of the merger becomes more likely, and will rise in response to probability-decreasing events.

If two merging firms achieve economies of scale (or reduce average costs) through their merger, this will increase the expected future cash flows to the merging firms. In turn, this will increase their stock price, and have a downward pressure on product prices. In turn, this will reduce the market values of their rivals in the industry. This is the “productivity increases” hypothesis given in Table 1. When the authorities challenge this

type of merger, the expected result is price drops for the merging parties and price rises for the competitive rivals. Alternatively, a merger can signal an increase in the demand for certain resources owned by the rival firms as well as by the target, so that the merger announcement contains good news for shareholders of the rival firms. These signaling scenarios are called the “information” hypothesis in Table 1.

5. SAMPLE SELECTION

5.1 Selection of mergers

The unchallenged sample of mergers is obtained from the SDC database on mergers and acquisitions drawn from the 11-year period from January 1991 through December 2001. Only publicly traded companies are included in the sample used herein so that the necessary returns are available from the University of Chicago Center for Research in Security Prices (CRSP) database.

A corresponding sample of challenged mergers is obtained from the Antitrust Case Filing posted on the website of the Federal Trade Commission and Department of Justice. Mergers are eliminated if: 1) the merger is not horizontal; 2) any of the merging parties belongs to the hospital, financial or not-for-profit industries; 3) the stock returns of the merging firms are not complete in CRSP for [-250,10] around the event announcement date; 4) the value of the transaction is less than 1 billion dollars;⁹ 5) no rival shares the same 4-digit SIC code with the target firm; or 6) the identifiable rivals are not traded on the New York or American Stock Exchanges.

From a total of 228 mergers identified for the studied period, 195 horizontal mergers

⁹ Due to the large volume of merger activities in the last decade, it is necessary to set some criteria to limit the sample size.

(152 unchallenged mergers and 43 challenged mergers) have the necessary available data and are retained for further study herein. The merger announcement dates are taken from the *Wall Street Journal (WSJ)*. Whenever there is inconsistency with regard to the merger announcement date between the SDC and *WSJ*, the date found in the *WSJ* is used if earlier, since it truly conveys new information to the capital markets. The antitrust complaint announcement dates are obtained either from *WSJ* or from the “Antitrust Case Filing” posted on the websites of the Federal Trade Commission and the U.S Department of Justice. Returns for each company and the CRSP value-weighted market index are obtained from the CRSP database.

5.2 Selection of the horizontal rivals

The analysis focuses on the major industry of the target firm. To identify the horizontal rivals of the merging firms, a list of all of the firms in the CRSP file associated with the same 4-digit SIC code as the target firms are identified.¹⁰ Whenever the firm so identified has the available daily stock returns for the required estimation period (i.e., the 260 days around the event announcement date), the firm is deemed a "horizontal rival". Returns on these rival firms are obtained and a single equal-weighted portfolio initially is created for all of the rivals in order to deal with contemporaneous cross-correlations of returns among the rivals. Table 2 lists the number of identified rivals across several sub-samples of the total database.

¹⁰ CRSP assigns one four-digit SIC code to each firm, and the period over which the code is effective. This single code is intended to represent the major four-digit SIC industry of the firm.

6. METHODOLOGY

Assume that security returns follow a single factor market model return-generating process given by:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt} \quad (1)$$

R_{jt} is the rate of return of the common stock of the j th firm on day t ; R_{mt} is the rate of return of the market index on day t ; ε_{jt} is the error that has an expected value of zero by construction, and is assumed to be uncorrelated with R_{mt} and with R_{kt} for $k \neq j$, is not auto-correlated, and is homoscedastic. β_j is a parameter that measures the sensitivity of R_{jt} to R_{mt} . The abnormal return is computed as the difference between the actual return and the expected return using the estimated regression coefficients and R_{mt} . Thus, the abnormal return or prediction error for the common stock of the j^{th} firm on day t is:

$$A_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt}), \quad (2)$$

The coefficients $\hat{\alpha}_j$ and $\hat{\beta}_j$ are estimated using OLS regression and stock returns from 250 days before the announcement date (day 0) through 10 trading days after the event day, but excluding the window $[-50, -10]$ in order to minimize the effect of confounding events. The event period of interest is deemed to be the 21 trading days $[-10, 10]$ centered on the event date. This is designed to capture any pre-publication leakage of relevant information, which can be caused by a delay in the *WSJ* publication of the announcement, or the standard practice of the FTC and DOJ to ask for additional information from the merging firms before their formal challenge. It also is designed to capture any delay in the incorporation of the announced information. The abnormal performance is analyzed

for eight different window lengths or for the windows of [-10, 10], [-10,-4], [-10, 5], [-3, 3], [-1, 1], [0, 0], [0, 3] and [4, 10].

The average abnormal return or average prediction error or AAR_t is given by:

$$AAR_t = \frac{1}{N} \sum_{j=1}^N A_{jt}, \quad (3)$$

In (3), t is the trading day measured relative to the event date. For example, $t = -10$ refers to the 10th trading day before the event. Abnormal returns are summed to produce the Cumulative Abnormal Return (CAR), and CAAR are then computed as the cross-sectional averages of the CAR for each event. Over an interval of two or more trading days beginning with day T_1 and ending with T_2 , the cumulative average abnormal return is given by:

$$CAAR_{T_1, T_2} = \frac{1}{N} \sum_{j=1}^N \sum_{t=T_1}^{T_2} A_{jt}. \quad (4)$$

For the 195 horizontal mergers (152 unchallenged and 43 challenged mergers), the dummy variable method is used to obtain the daily abnormal returns for each merging firm. A dummy variable for each of the 21 days in the event period is included in the model as follows:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \sum \gamma_{jk} d_{jkt} + \varepsilon_{jt} \quad (5)$$

where

R_{jt} = the return on firm j over period t .

R_{mt} = return on the value-weighted market index over period t .

β_j = systematic co-movement of security j 's return with the return on the market portfolio.

d_{jkt} = an announcement dummy variable equal to one for day t for firm j during its

announcement window and is zero otherwise.

$\sum \gamma_{jk}$ = the sum of economic values (abnormal returns) of for the days in the announcement window (however defined) for firm j.

ε_{jt} = serially uncorrelated, zero mean error term that picks up the impact of non-market factors and random price fluctuations for firm j.

Confounding events are identified as follows. The *WSJ* is searched for all relevant news about the merger events for the merging firms over the year prior to the merger announcement dates. If either of the merger parties acquired or was acquired by firms other than the firms in the database, this case is considered as having confounding events. To illustrate, consider a hypothetical merger between firm A and B on December 13, 1995. Suppose that firm B had announced its intention to acquire firm C on May 5, 1995. In this case, three dummy variables for the [-1, 1] window centered on May 5, 1995 are added to the original 21 dummies centered on Dec 13, 1995. The new dummies should capture the influence of the events that are not of interest. Additionally, if more than one bidder indicated an intention to acquire the target as reported in the *WSJ*, this indicates that this target firm has multiple bidders. Such a merger event is also considered to be a confounding event. As in the previous case, the dummy variable approach is used to deal with these confounding events.

T-statistics are used to test the significance of the abnormal returns obtained using the dummy variable approach. The portfolio test statistic for day t in event time

$$is t = \frac{AAR_t}{\hat{\sigma}_{AAR_t} / \sqrt{N}}, \quad \text{where } \hat{\sigma}_{AAR_t}^2 = \frac{1}{N-1} \sum_{i=1}^N (A_{it} - \frac{1}{N} \sum_{j=1}^N A_{jt})^2. \quad \text{The test statistic for the}$$

$CAAR_{T_1, T_2}$ of an event window from T_1 to T_2 is $t_{CAAR} = \frac{CAAR_{T_1, T_2}}{\hat{\sigma}_{CAAR_{T_1, T_2}} / \sqrt{N}}$, where N is the sample size given by the number of firms in the cumulation, and T_1 and T_2 are the upper and lower bounds in relative time for that window.

In order to account for any contemporaneous correlations in the returns across firms in the same industry, the returns of the rival firms associated with a given merger are pooled into one equal- (or value-) weighted industry portfolio. For all of the horizontal rivals, SAS *Eventus* is employed to obtain their cumulative average abnormal returns.

The “Generalized Sign Test”, which is obtained from SAS *Eventus*, also is used to test the null hypothesis that the fraction of positive abnormal returns for the horizontal rivals is the same as in the estimation period. For example, if 46% of the market-adjusted returns are positive in the estimation period, and 60% of the firms have positive market-adjusted returns on event day -1, *Eventus* reports whether the difference between 60% and 46% is significant at levels of significance such as the one-percent level. This test uses the normal approximation to the binomial distribution. Moreover, for each trading day in the event period and for each event window, *Eventus* reports the number of securities with positive and negative average abnormal returns, whether cumulative or compounded for each event window.

7. EMPIRICAL RESULTS

7.1 *The performance of the merging firms*

The cumulative average abnormal returns or CAAR for bidder and target firms relative to the merger proposal and antitrust complaint announcements are plotted in figures 1, 2 and 3, and are reported in Table 3. For unchallenged mergers, bidder firms

earn strongly significant and negative abnormal returns over the seven out of eight periods centered on the merger proposal announcements. The results are inconsistent with the results reported in Eckbo (1983) but are consistent with those reported in Schumann (1989). Eckbo (1983) finds that over most event windows that include the merger announcements, the average abnormal returns of bidding firms are positive but statistically insignificant. Schumann (1989) finds a significant negative abnormal return over each of his three event windows.

In contrast, target shareholders of unchallenged mergers realize a significant cumulative average abnormal return of 15.67% over the 21 trading days in the -10 through 10 window, and a significant 8.4% on the announcement day itself. This indicates that any expected increases in profits from merger are captured entirely by the shareholders of the target firms. The evidence generally is consistent with the prediction of the value-maximizing firm hypothesis, which is a necessary condition for both the market power and economic efficiency hypotheses.

For the sample of challenged mergers, the bidders earn cumulative average abnormal returns of -2.62% and -2.35% for the windows [-3, 3] and [-1, 1], respectively. Both of these CAAR are significant at the 5% level. The cumulative average abnormal returns for target firms are significantly positive around the merger announcement dates. To illustrate, the CAAR are 21.8% and 12.0% over window [-10, 10] and [0], respectively, for the merger announcement day. As Eckbo (1983) finds, stockholders of bidder and target firms appear to earn larger abnormal returns from challenged mergers than do the corresponding shareholders in unchallenged mergers.

The cumulative average abnormal returns of the bidder firms around the antitrust

complaint announcements are slightly negative but are not significant. In contrast, the shareholders of target firms earn statistically significant negative CAAR of -4.006% over the event window [-10, 10] for the complaint announcements. These results are consistent with both the market power and economic efficiency hypotheses. Since the CAAR for challenged targets are larger in value than those for unchallenged targets, this could be interpreted as suggesting that these challenged mergers are more profitable to investors than the unchallenged mergers when they are first announced. However, when these mergers are challenged by the government, the market hardly reacts since only two out of the eight CAARs are significant. This may be due to the practice of the regulatory agencies to always require additional information from the merging parties before registering their formal challenge. Thus, the market may expect the challenge events before the formal complaint announcements as being part of standard practice.

However, this evidence is still consistent with the proposition that the complaint announcement signals an unanticipated increase in the perceived costs of collusion and a loss of monopoly rents or cost savings. Thus, a complaint against a truly collusive merger also should cause a drop in the market value of the horizontal rivals of the merging firms.

7.2 The performance of the horizontal rivals

The cumulative average abnormal returns for the rival firms relative to the merger proposal and antitrust complaint announcement dates are plotted in figures 4 and 5, respectively, and are reported in Table 4. Based on Table 4, the horizontal rivals of both unchallenged and challenged mergers systematically earn small but positive and strongly significant abnormal returns over all seven event windows that either surround or include the dates of the merger proposals. The cumulative average abnormal return or CAAR of

unchallenged horizontal rivals is a significant 0.51% (z-value of 4.72) over the [-3, 3] window, and a significant 0.35% (z-value of 5.39) for the announcement days itself. Based on a comparison of the performances of the rivals of challenged to unchallenged mergers, we find that the rivals of challenged mergers exhibit the larger abnormal returns. The CAAR of the challenged horizontal rivals is a significant 2.06% (z-value of 2.59) and a significant 0.96% (z-value of 4.92) over the same two event windows. These empirical results are quite consistent with the findings of Eckbo (1983), Eckbo and Wier (1985) and Schumann (1989).

To this point in the presentation of the empirical findings, the positive proposal-induced abnormal returns to rival firms do not support the predictions of either the predatory pricing model or productivity increases hypotheses listed in Table 1. To determine if they are supportive of either the collusion model or information hypotheses, the abnormal returns of horizontal rivals relative to the antitrust complaint announcement are now examined.

The evidence for the antitrust complaint announcements, which is summarized in Table 4 and depicted in figure 5, does support the collusion hypothesis. Recall from section 7.1 that the complaint announcement causes a reduction in the values of the merging firms. Therefore, under the collusion hypothesis, we expect a decline in the values of the rivals in response to the unanticipated loss of monopoly rents when regulators contest mergers. The sample of challenged horizontal rivals exhibit a significant -3.03% abnormal return (z-value of -2.195) over the 21 days centered on the complaint announcement date, and a significant -0.06% (z-value of 2.003) over the [-1, 1] event window.

This result differs from that obtained in almost all previous studies. Eckbo (1983) uses two sets of horizontal rivals when analyzing the effect of antitrust complaints on the abnormal returns of horizontal rivals. The first consists of rivals for the total sample, and the second sample is the “common industry sample”, which contains only the challenged mergers in the total database for which there is also an unchallenged merger taking place in the same industry. The evidence from the common industry sample around the antitrust complaint announcement is uniformly negative across all seven of his event windows. However, due to their low significance levels, Eckbo rejects the collusion hypothesis. In contrast, we are able to accept the collusion version of the market power hypothesis based on the negative and statistically significant abnormal returns of horizontal rivals during the antitrust complaint announcement period (see Table 4).

In order to better understand the formation of the abnormal performance results for the total sample, the total sample and their horizontal rivals are next split into nine industries based on their two-digit SIC codes.¹¹ Then, the abnormal performance for each sub-group is analyzed relative to the unchallenged merger announcements, challenged merger announcements and challenged antitrust complaint announcements, respectively. These empirical results are presented in Appendices A and B to this thesis.

¹¹ The names of the industries are provided in Table 2.

Based on these empirical findings, we observe that the performance across industries is quite different. However, the results for the whole sample are always more pronounced for the industries consisting of more firms, or the industries that have extreme results. More specifically, based on a comparison of Table 3 with Table A1, the cumulative average abnormal returns for bidders of -2.77% for the full sample for the [-1, 1] window is similar to the CAARs of -2.73% and -2.9% for industries 48 and 49 for the same event window. These two industries consist of the largest percentage of firms in terms of number.

8. A TEST OF ROBUSTNESS

8.1 Robustness Test for the merging firms

In section 6 of this thesis, the following dummy variable equation (5) was used to estimate the abnormal returns for the bidder and target firms:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \gamma_{jk} d_{jkt} + \varepsilon_{jt}. \quad (5)$$

In this section of the thesis, an alternative version of this equation is used, where beta is allowed to change on and after the announcement date. This is done to assess if the results obtained using regression (5) are robust under this more general dummy variable formulation for the return-generating process. The new formulation is given by:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \lambda D_1 R_{mt} + \sum \gamma_{jk} d_{jkt} + \varepsilon_{jt}, \quad (6)$$

Where

λ = the estimated change in beta on and after the event date;

$D_1 R_{mt}$ = a dummy variable that is equal to zero up to the event date, and is equal to the market return on and after the event date; and

All the other terms are as defined previously.

A test of whether the estimate of λ is different from zero indicates whether or not the event materially changed the systematic risks of the firms. If the estimated values of λ are not significantly different from zero, then our results reported earlier, which are not adjusted for possible beta changes, are robust. Because the data stops at day ten after the event primarily due to thin or non-existent trading thereafter, the event period for this set of tests is narrowed from the 21 days to the seven days centered on the event date. Therefore, only four event periods [-3, 3], [-1, 1], [0] and [0, 3] are explored for the tests of robustness that are reported in this section of the thesis.

Over 95% of the λ estimates are not significant. This implies that the systematic risks of the merging firms have not changed materially after the merger event. There are two possible reasons for this phenomenon. First, since the targets and bidders in our sample are in the same industry, any macroeconomic (or market) events are likely to have similar impacts on the companies in the same industry. Furthermore, the fundamental factors which underlie the own-risk portion of investment risk, such as fixed costs, products and competitors, also are likely to be similar. For that reason, merger between them will not change their market risk significantly. Second, since our time period ends at the tenth day after the merger announcement, it is very possible that such a short period cannot capture any shift in systematic risk due to the effects of the event itself.

The cumulative average abnormal returns for bidder and target firms relative to the merger proposal and antitrust complaint announcements are plotted in figures 6, 7 and 8, and are reported in Table 5. For unchallenged mergers, bidder firms earn strongly significant and negative abnormal returns over the four event windows surrounding and

including the merger proposal announcement dates. This result is quite similar to what was reported and discussed earlier in section 7.1 of this thesis. Similarly, unchallenged target firms exhibit significant positive cumulative average abnormal returns, as was reported in section 7.1. The CAAR are 15.25% and 8.4% over the [-3, 3] and [0] windows, respectively. Both are significant at the 0.01 level, and are roughly equivalent in magnitude to the results reported in Table 3 when no adjustment is made for possible beta changes.

For the sample of challenged mergers, the bidders earn a significant cumulative average abnormal return of -2.86% over the [-1, 1] window. The cumulative average abnormal returns for target firms are 22.45% and 12.98% over the windows [-3, 3] and [0], respectively, for the merger announcement dates. The CAAR for the challenged mergers are still larger than the CAAR of unchallenged mergers, as was reported earlier in section 7.1.

The cumulative average abnormal returns for the bidder firms around the antitrust complaint announcements are negative for window [-3, 3] and slightly positive for the other three event windows, but none of them are significant. For the target firms, the CAAR around the antitrust complaint announcement is -1.47% for window [-3, 3], which is significant at 0.10 level, and are insignificantly close to zero for the other three windows. These results are still quite similar to the results obtained earlier in section 7.1.

These results indicate that the inferences drawn in section 7.1 are robust, and are consistent with the predictions of both the market power and economic efficiency hypotheses.

8.2 Robustness test for the horizontal rivals

Earlier in section 6, SAS *Eventus* was used to obtain the cumulative average abnormal returns relative to the merger-related events for an equal-weighted portfolio for the returns of horizontal rivals. In this section, the market-adjusted dummy variable approach that allows for beta shifts is used to obtain the CAAR for both value- and equal-weighted portfolios of the rival firms. The use of these two types of portfolios allows for a test of whether or not different impacts exist for large versus small rivals. The formation of the value-weighted portfolios uses the market values calculated for each rival as the daily “adjusted market price” multiplied by “shares outstanding” one month prior to the merger proposal announcement date. The market weight of each rival is then obtained by dividing its own market value by the sum of the market values of all of the rivals of the target firm.

The cumulative average abnormal returns for the rival firms relative to the merger proposal and antitrust complaint announcements are plotted in figures 9, 10, 11 and 12, and are reported in Tables 6 and 7. In each of these two tables, the cross-sectional average estimate of beta and its associated t-value is reported in the third column. All of the beta estimates are smaller than unity and are strongly significant, which indicates that the overall sample firms have an average risk that is lower than that of the market.

The λ estimates for both the value- and equal-weighted portfolios are significantly different from zero for only 20 of the 152 horizontal mergers, and for only 6 of the 43 challenged mergers. Therefore, our results that do not adjust for beta changes appear to be robust to this possible misspecification of the return-generating model used herein.

Based on Table 6, the value-weighted portfolio of horizontal rivals of unchallenged

mergers earn slightly positive and significant abnormal returns of 0.623% and 0.465% for the [-1, 1] and [0] windows, respectively. For the rivals of the challenged mergers, the respective CAAR are insignificant and small in magnitude. Thus, these new results differ from the earlier observation in section 7.2 that rivals of challenged mergers earn larger CAAR than the rivals of unchallenged mergers.

Based on Table 7, the equal-weighted portfolios of horizontal rivals for both unchallenged and challenged mergers systematically earn small positive and significant CAAR over three event windows. Specifically, for the [-3, 3], [-1, 1] and [0] windows, the CAAR are 0.723%, 0.63% and 0.25%, respectively, for rivals of unchallenged mergers, and are 0.94%, 0.705% and 0.48%, respectively, for rivals of challenged mergers. Two observations can be drawn from these results. First, the CAAR for rivals of challenged mergers are larger than the CAAR for rivals of unchallenged rivals, which is consistent with the results reported earlier in section 7.2. Second, almost all of the cumulative average abnormal returns for both unchallenged and challenged mergers, which are reported in Table 7, are larger than the CAARs reported in table 6. A possible explanation for this difference is the different weightings of the portfolios of rivals, where the small rivals are given more weight in the equal-weighted portfolios. The results are then consistent with the notion that an antitrust challenge will benefit small rivals more than their larger counterparts.

These findings are consistent with the findings of Schumann (1989) that an antitrust challenge may benefit smaller rivals at the expense of larger rivals if the merger is anticompetitive because it signals potential efficiencies. Schumann offers two reasons for this expected market behavior. First, a challenge may act to protect smaller producers that

would be unable to realize the potential efficiency themselves through consolidation. Second, a challenge may signal the increased possibility that the small rivals will be taken over since the acquisition of a small rival may not raise antitrust concerns.

The empirical findings discussed in this section are similar to the findings discussed in section 7, and both sets of results support both the collusion model and information hypotheses listed in Table 1. To determine if the evidence only supports the collusion model, as was found earlier, a further test now is conducted of the abnormal returns of horizontal rivals relative to the antitrust complaint announcement.

The evidence for the CAAR relative to the antitrust complaint announcement dates, which is depicted in figures 10 and 12, does not support the collusion model. In contrast, the findings from both Tables 6 and 7 for the value- and equal-weighted portfolios of rivals support the information hypothesis. The portfolio of value-weighted horizontal rivals of challenged mergers exhibits insignificant CAAR of 0.057% and 0.144% over the [-3, 3] and [0] windows, respectively. The portfolio of equal-weighted horizontal rivals exhibits insignificant CAAR of -0.332% and 0.03% over the same two event periods, respectively.

These results are similar to those reported by Eckbo (1983) and Eckbo and Wier (1985), and contrary to our findings reported in section 7.2. These results indicate that the inferences drawn in section 7.2 are not robust when the testing methodology incorporates contemporaneous cross-correlations in the sample of rivals for each merger.

9. CONCLUSION

A number of published studies have used the stock price reactions of rivals to study the competitive effects of horizontal mergers. These studies, which focus on mergers consummated before 1990, consistently fail to find any evidence of anticompetitive effects. A key difference between the work reported in this thesis and previous work is the time period being studied. In this thesis, we examine the daily abnormal returns for the two parties to each horizontal merger and the major horizontal competitors of target firms around merger proposal and antitrust complaint announcements over the period from 1991 through 2001.

This examination retests the predictions of the market power hypothesis, and assesses whether the antitrust enforcement agencies continue to challenge horizontal mergers that would have earned monopoly profits from such combinations. The basic proposition tested is that the rivals can expect to benefit from the news of a horizontal merger that significantly reduces the costs of enforcing a tacit collusive agreement within the industry of the merging firms. Subsequent news that the government has challenged the mergers under Section 7 of the Clayton Act reverses the expectations of such monopoly rents. In turn, this should lead to negative abnormal performance for the rivals.

The empirical results reported herein suggest that the findings of earlier studies by Eckbo et al are still robust even after two decades have elapsed. Like previous studies, our findings reject the market power hypothesis and support the conclusion that both the Justice Department and the Federal Trade Commission tend to attack efficient horizontal mergers. Another implication of this study, as McAfee and Williams (1988) and Schumann (1989) suggest, is that there may be an inherent problem in applying the event

study methodology in an assessment of the anticompetitive effects of mergers. A study of the stock returns of rival by itself may be an ineffective means of determining the competitive effects of horizontal mergers. This may occur, for example, when the rivals are large, multiproduct firms that derive only a small fraction of their revenues from the affected market.¹²

Some potential limitations of this study can be addressed in future work. One such potential limitation is that the evidence is not differentiated by various payment methods of cash only, stock only or a mix of the two. A second potential limitation is that the findings do not differentiate between the mergers that were cancelled by both merging parties or were rejected by the targets a few months after the merger announcements or were eventually consummated.

¹² Williams (1988) collects four-digit SIC revenue data for 293 of the rivals used in Eckbo (1983). Only 15% of the rivals derived more than 75% of their revenues from the same four-digit SIC code as the target firm. 32% of these rivals derived less than 25% of their revenues from the same four-digit SIC code as the target firm.

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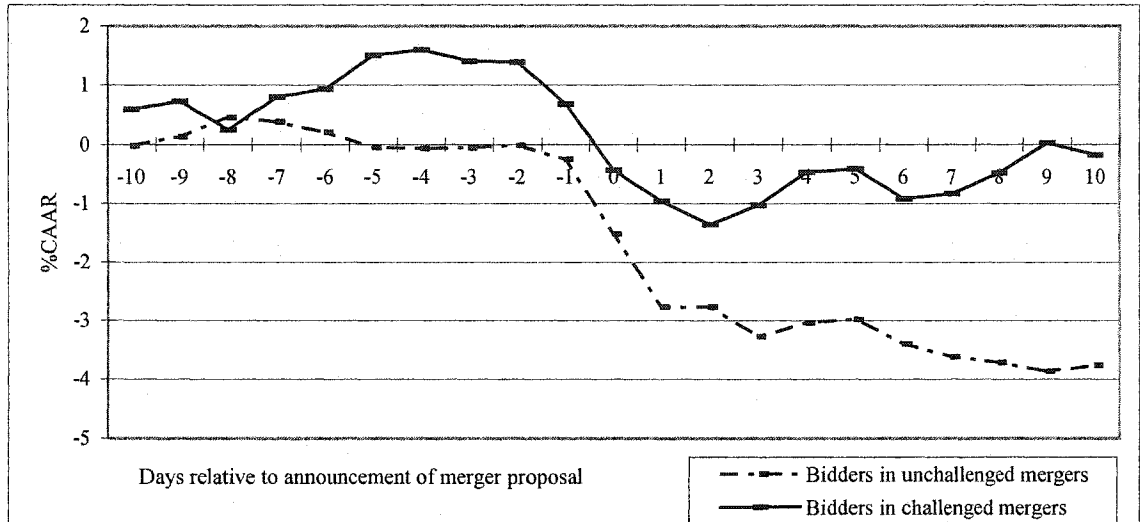


Figure 1. Daily cumulative average abnormal returns or CAAR for bidder firms in horizontal mergers relative to the merger proposal announcement date for the period, 1991-2001

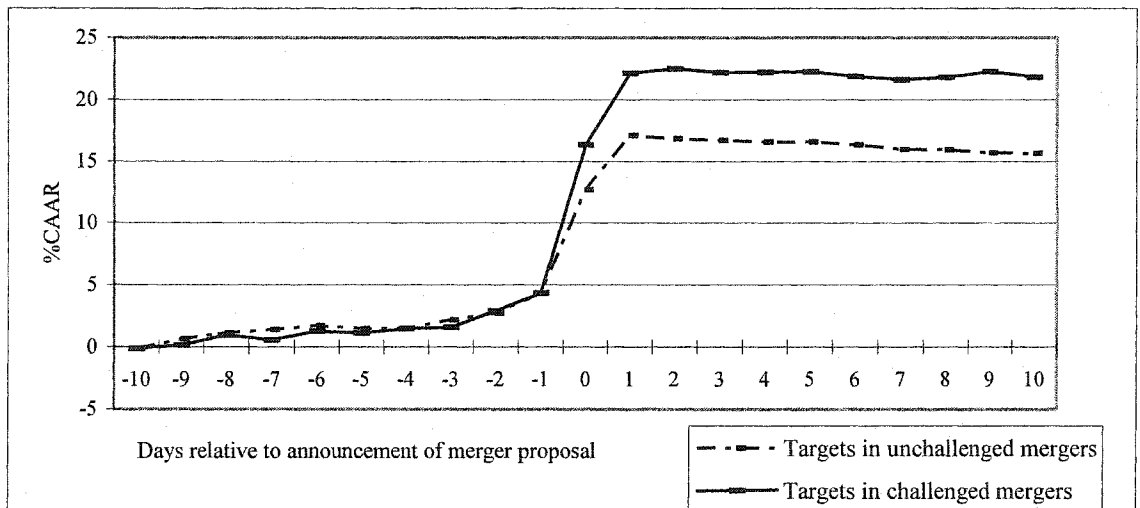


Figure 2. Daily cumulative average abnormal returns or CAAR for target firms in horizontal mergers relative to the merger proposal announcement date for the period, 1991-2001

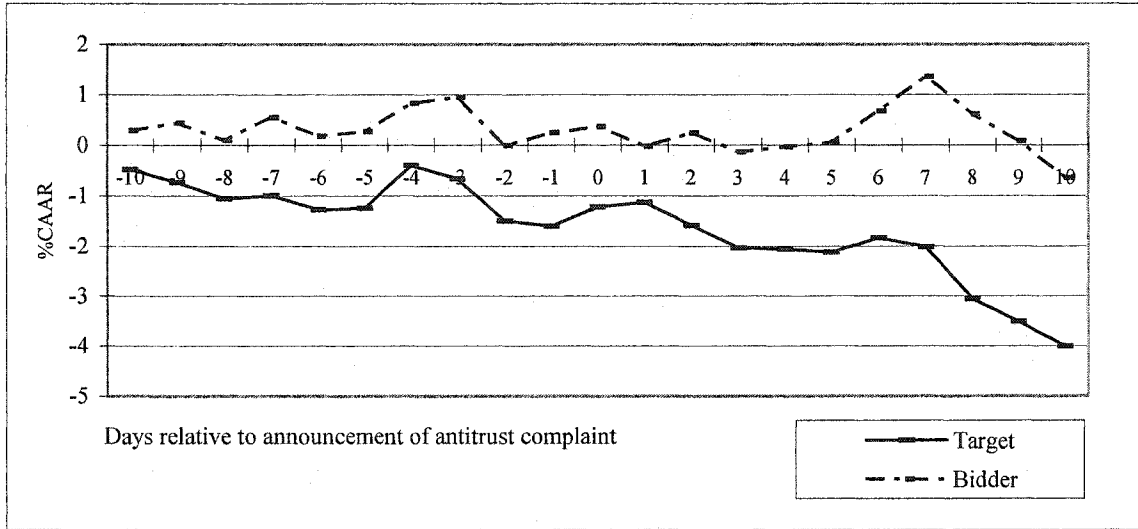


Figure 3. Daily cumulative average abnormal returns or CAAR for bidder and target firms in horizontal mergers relative to the antitrust complaint announcement date for the period, 1991-2001.

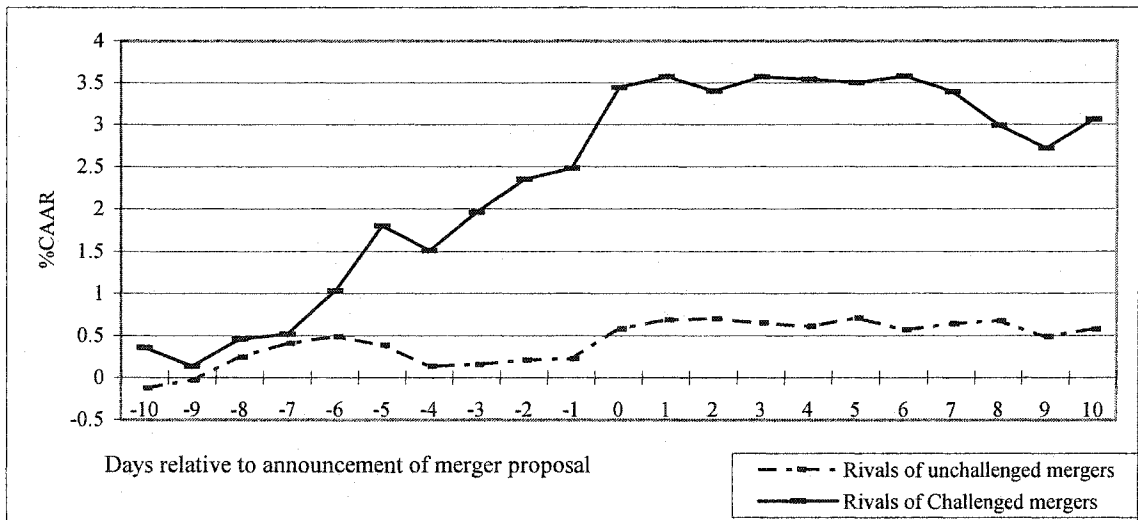


Figure 4. Daily cumulative average abnormal returns or CAAR for rivals of target firms in horizontal mergers relative to the merger proposal announcement date for the period, 1991-2001

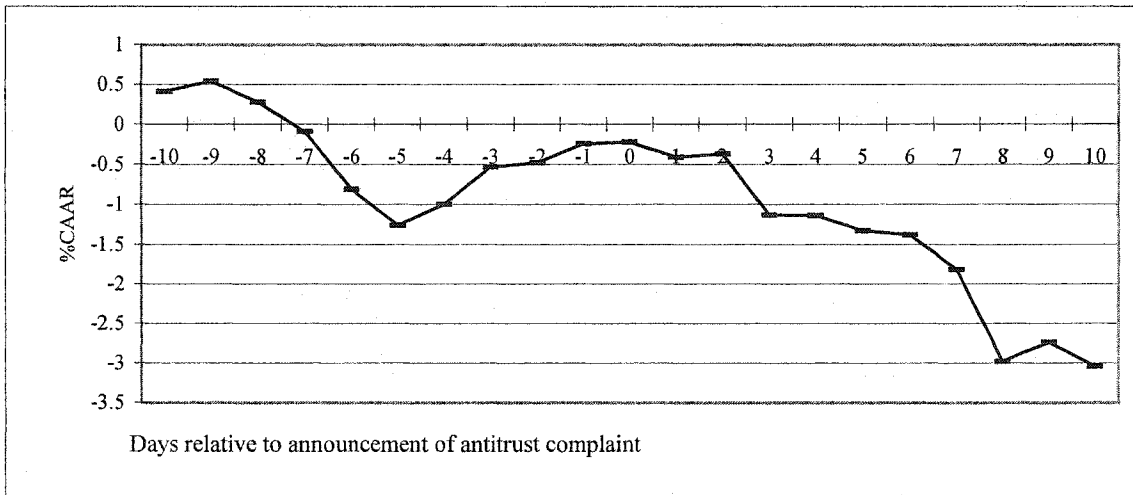


Figure 5. Daily cumulative average abnormal returns or CAAR for rivals of target firms in horizontal mergers relative to the antitrust complaint announcement date for the period, 1991-2001.

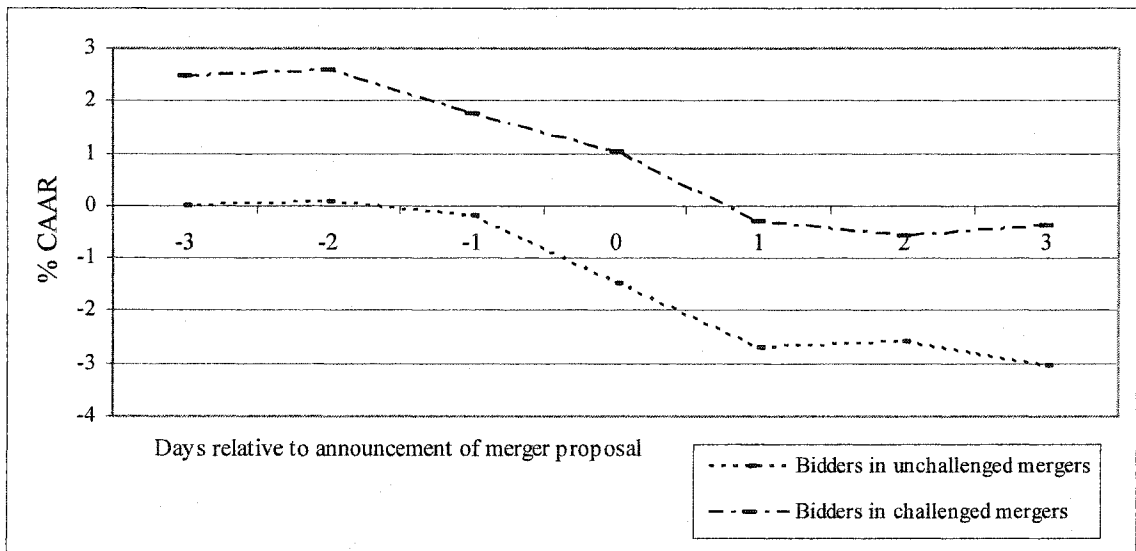


Figure 6. Daily cumulative average abnormal returns or CAAR for bidder firms in horizontal mergers relative to the merger proposal announcement date for the period, 1991-2001

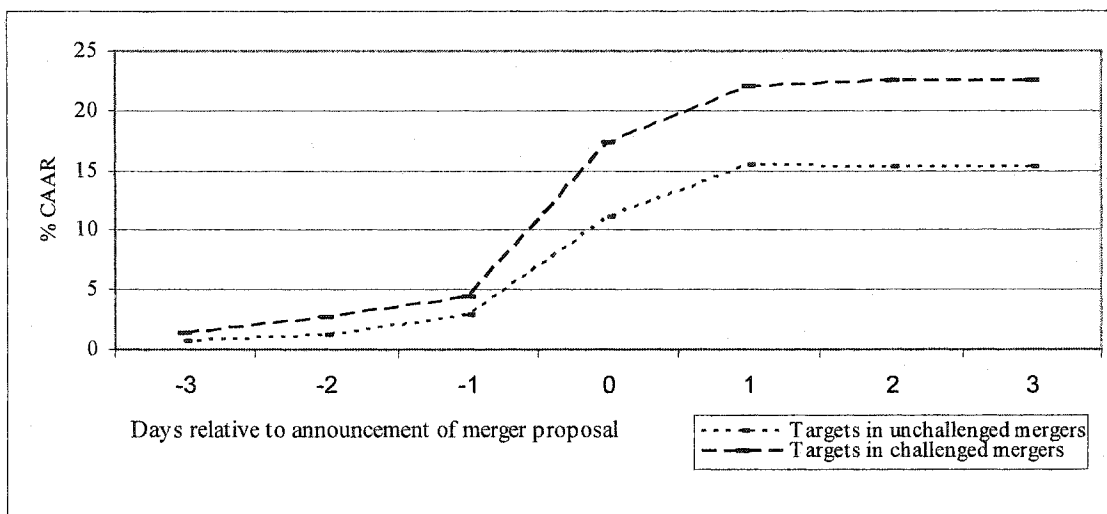


Figure 7. Daily cumulative average abnormal returns or CAAR for target firms in horizontal mergers relative to the merger proposal announcement date for the period, 1991-2001

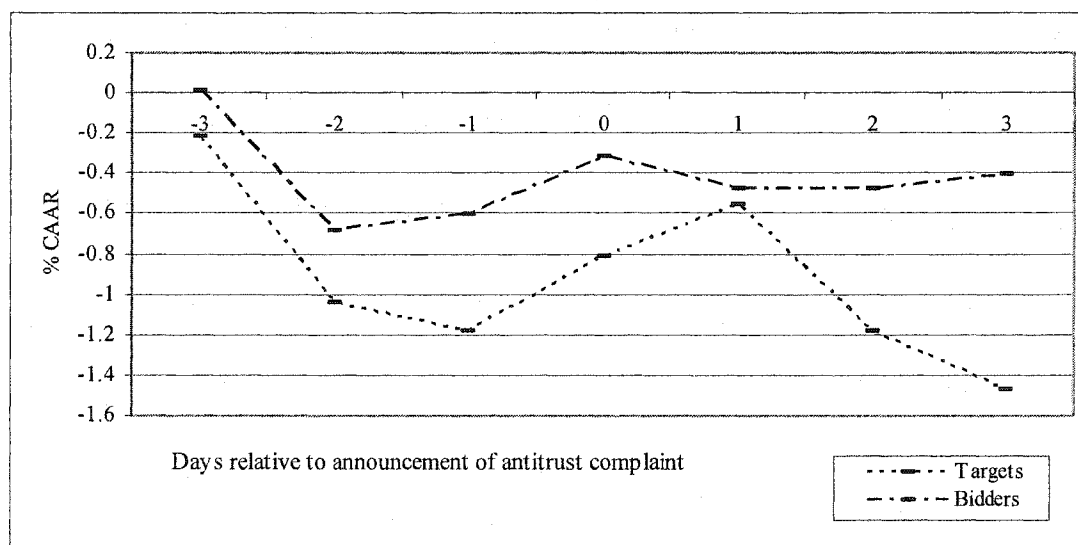


Figure 8. Daily cumulative average abnormal returns or CAAR for bidder and target firms in horizontal mergers relative to the antitrust complaint announcement date for the period, 1991-2001.

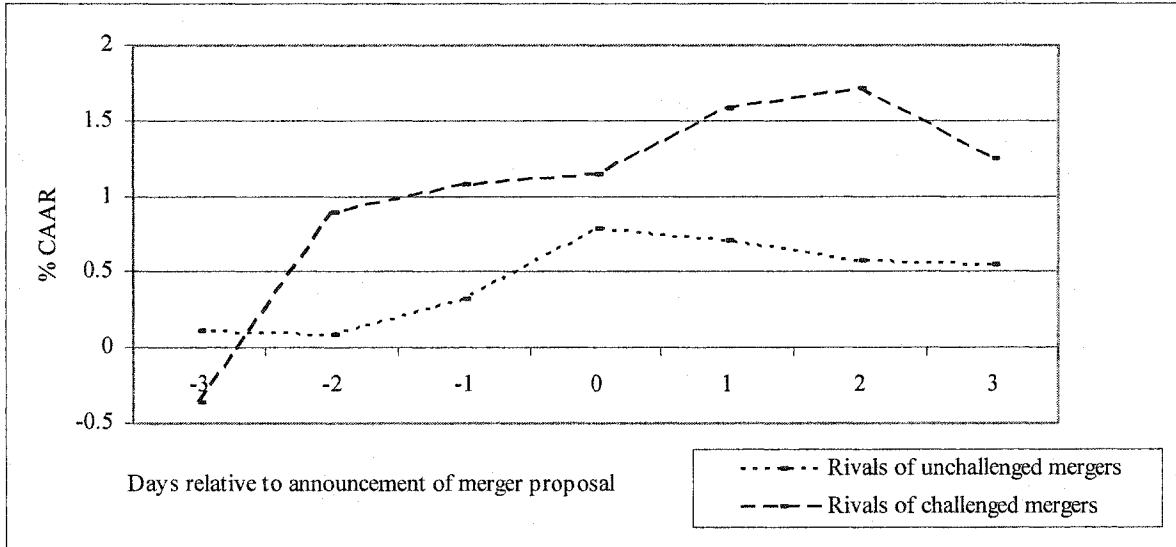


Figure 9. Daily cumulative average abnormal returns or CAAR for rivals of target firms (value-weighted portfolio) in horizontal mergers relative to the merger proposal announcement date for the period, 1991-2001

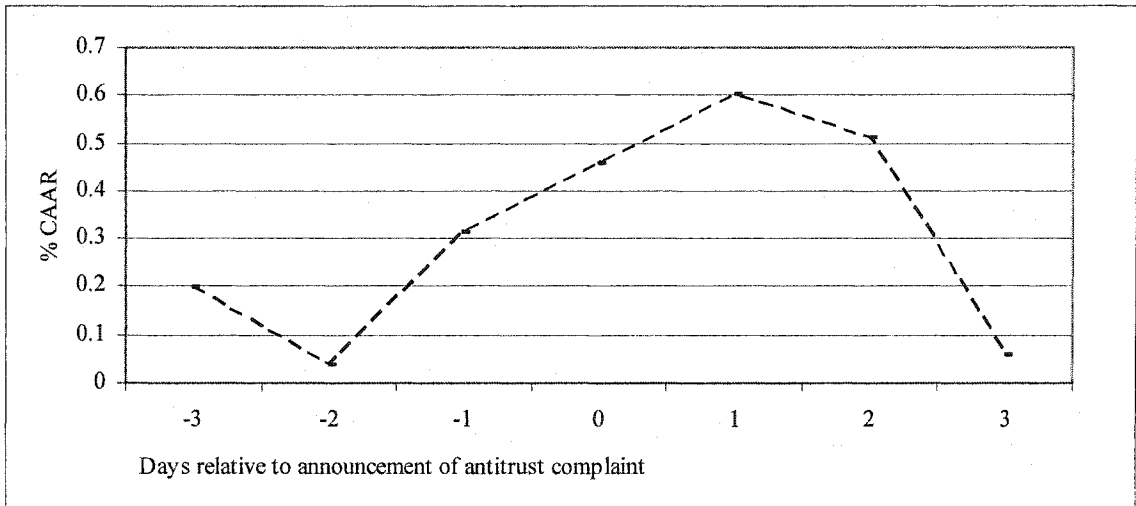


Figure 10. Daily cumulative average abnormal returns or CAAR for rivals of target firms (value-weighted portfolio) in horizontal mergers relative to the antitrust complaint announcement date for the period, 1991-2001.

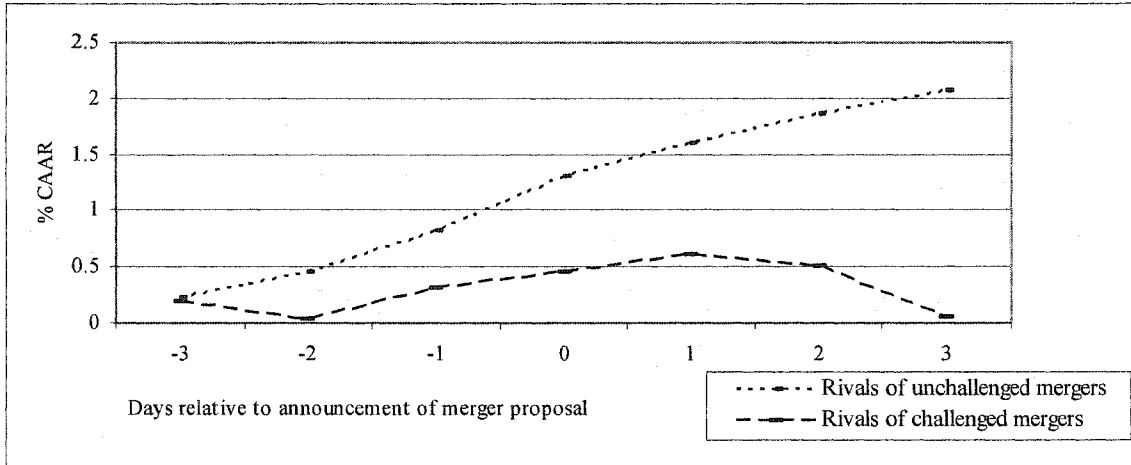


Figure 11. Daily cumulative average abnormal returns or CAAR for rivals of target firms (equal-weighted portfolio) in horizontal mergers relative to the merger proposal announcement date for the period, 1991-2001

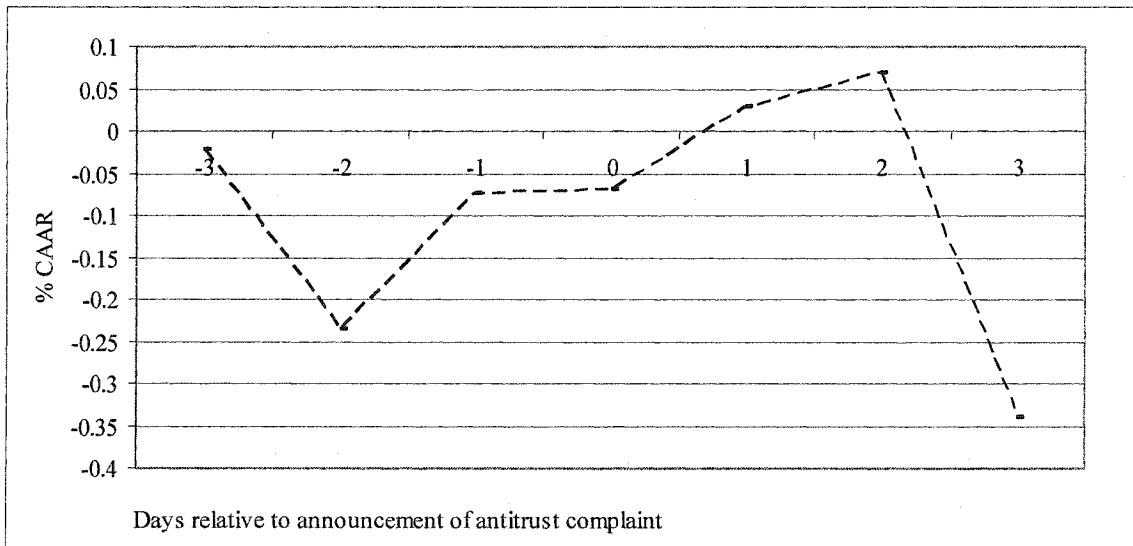


Figure 12. Daily cumulative average abnormal returns or CAAR for rivals of target firms (equal-weighted portfolio) in horizontal mergers relative to the antitrust complaint announcement date for the period, 1991-2001.

Table 1. Predictions for the abnormal returns to the merging firms and their rivals under the market power and economic efficiency hypotheses

Theory Predicting the Source of the Merger Gains ¹	Abnormal Returns to Merging Firms	Abnormal Returns to Rivals Firms
<i>Probability-Increasing Events: Merger proposal</i>		
Market power		
Collusion, Cournot model	+ (Monopoly rents)	+ (Monopoly rents)
Predatory pricing model	+ (Monopoly rents)	- (Costs of price war)
Economic efficiency		
Productivity increases	+ (Cost savings)	- (Competitive disadvantages)
Information ²	+ (Undervalued resources)	+ / 0 (undervalued resources, and /or possible productivity increases)
<i>Probability-Decreasing Events: Antitrust Complaint</i>		
Market power		
Collusion, Cournot model	- (Loss of monopoly rents)	- (Loss of monopoly rents)
Predatory pricing model	- (Loss of monopoly rents)	+ (Avoidance of price war)
Economic efficiency		
Productivity increases	- (Loss of cost savings)	+ (Avoidance of competitive disadvantage)
Information ³	0	0

¹ Under the assumption of managerial value maximization, the sum of the gains to the merging firms will be positive, regardless of the sources of the gains.

² Examples of positive information effects on rival firms are the case where the merger announcement reveals possibilities for efficiency gains (also available to non-merging firms), and the case where the merger signals an increase in demand for resources generally owned throughout the industry of the merging firms.

³ The information effect on rival firms is negative if the complaint or case outcome also signals a restriction on the future merger opportunities of the rival firms.

Table 2. Industry classification of the whole sample and the distribution of the number of rival firms

This table classifies the mergers based on the first two digits of the target's major four-digit SIC code. The total sample period is 1991 – 2001.

Major 2-digit SIC Industry of target	Horizontal Unchallenged	Horizontal Challenged	Number of Rivals per merger		
			Range	Mean ^a	Median ^b
20, Food and kindred products	8	2	2 - 8	4 (6)	5 (6)
26, Paper and allied products	4	2	5 - 21	13 (10)	9 (10)
28, Chemical and allied products	14	6	1 - 49	22 (19)	39 (30)
29, Petroleum and coal products	0	5	24 - 27	0 (24)	0 (27)
32, Stone, clay and concrete products	2	1	2 - 3	3 (2)	3 (2)
33, metal and metal products	1	1	4 - 5	5 (4)	5 (4)
36, Electronic machinery	15	3	5 - 161	16 (66)	15 (19)
37, Transportation equipment	12	2	1 - 21	9 (2)	4 (2)
45, Air transportation and shipping	0	1	9	0 (9)	0 (9)
48, Telecommunication, TV station	51	9	2 - 69	17 (32)	4 (6)
49, Electric, gas and water distribution	37	6	4 - 68	43 (29)	51 (10)
51, Wholesale trade	0	2	5 - 6	0 (6)	0 (6)
59, Miscellaneous retail trade	1	1	6 - 27	27 (6)	27 (6)
73, Prepackaged software	7	2	37 - 46	40 (30)	37 (30)

^aThe number in the parenthesis is the mean of the challenged rivals.

^bThe number in the parenthesis is the median of the challenged rivals.

Table 3. Abnormal returns to bidders and target firms in horizontal mergers relative to the merger proposal and antitrust complaint announcements

1991-2001 Merger sample	Announcement	Summary Statistic	Period relative to the Wall Street Journal announcement (day [0])									
			[-10,10]	[-10,-4]	[-10,5]	[-3,3]	[-1,1]	[0]	[0,3]	[4,10]		
Panel A: Bidders												
Unchallenged	Merger proposal	CAAR	-3.7	-0.061	-2.94	-3.2	-2.77	-1.3	-3.03	-0.493		
		t-value	-4.26***	-0.13	-4.1***	-4.4***	-4.24***	-3.5***	-4.7***	-0.966		
Challenged	Merger proposal	CAAR	-0.18	1.55	-0.411	-2.62	-2.35	-1.14	-1.7	0.83		
		t-value	-0.12	1.71**	-0.23	-1.74**	-1.86**	-1.16	-1.26	0.87		
Challenged	Antitrust complaint	CAAR	-0.642	0.84	0.06	-0.96	-0.017	0.118	-0.377	-0.51		
		t-value	-0.314	0.82	0.034	-1.1	-0.0412	0.403	-0.45	-0.41		
Panel B: Targets												
Unchallenged	Merger proposal	CAAR	15.67	1.5	16.61	15.22	14.41	8.4	12.41	-1.055		
		t-value	10.47***	2.38***	11.48***	11.44***	11.6***	8.72***	9.7***	-2.58***		
Challenged	Merger proposal	CAAR	21.8	1.37	22.2	20.8	19.2	12.0	17.9	-0.38		
		t-value	5.0***	1.68**	5.07***	4.55***	4.2***	3.3***	3.8***	-0.42		
Challenged	Antitrust complaint	CAAR	-4.006	-0.4	-2.12	-1.634	0.37	0.38	-0.434	-1.98		
		t-value	-1.867**	-0.4	-1.22	-1.608*	0.577	0.866	-0.616	-1.45		

***, **, and * indicate significance at the 0.1, 0.05 and 0.01 levels, respectively.

Table 4. Abnormal returns to the horizontal rivals of target firms relative to the merger proposal and antitrust complaint announcements

1991-2001 Horizontal Rivals	Number of Rivals	Announcement	Summary Statistic	Period relative to the Wall Street Journal announcement (day [0])							
				[-10,10]	[-10,4]	[-10,5]	[-3,3]	[-1,1]	[0]	[0,3]	[4,10]
Unchallenged	2017	Merger proposal	CAAR	0.64	0.14	0.71	0.51	0.48	0.35	0.42	-0.01
			Generalized Sign Z	2.49***	1.87*	1.86*	4.72***	6.56***	5.39***	3.74***	1.85*
			Positive: Negative	1003:1014	789:1228	989:1028	1053:964	1101:916	1068:949	1031:986	988:1029
Challenged	855	Merger Proposal	CAAR	3.07	1.51	3.5	2.06	1.23	0.96	1.1	-0.51
			Generalized Sign Z	4.03***	2.16**	4.17***	2.59***	1.84*	4.92***	2.52***	-2.56***
			Positive: Negative	457:398	426:429	459:396	436:419	425:430	470:385	435:420	348:507
Challenged	691	Antitrust complaint	CAAR	-3.03	-1.0	-1.33	-0.13	-0.06	0.02	-0.89	-1.91
			Generalized Sign Z	-2.195**	-0.86	-0.82	1.85	2.003**	1.163	-0.439	-2.02**
			Positive: Negative	290:401	356:335	308:383	343:348	345:346	334:357	313:378	314:377

* **, and *** indicate significance at the 0.1, 0.05 and 0.01 levels, respectively.

Table 5. Robustness test of the abnormal returns to bidders and target firms in horizontal mergers relative to the merger proposal and antitrust complaint announcements

1991-2001 Merger Sample	Announcement	Summary Statistic	Period relative to the Wall Street Journal announcement (day [0])			
			[-3,3]	[-1,1]	[0]	[0,3]
Panel A: Bidders						
Unchallenged	Merger proposal	CAAR	-3.1	-2.83	-1.32	-2.91
		t-value	-4.5***	-4.39***	-3.5***	-4.7***
Challenged	Merger proposal	CAAR	-0.4	-2.86	-0.714	-2.15
		t-value	-0.142	-2.24**	-0.74	-1.51
	Antitrust complaint	CAAR	-0.41	0.21	0.28	0.197
		t-value	-0.47	0.49	0.999	0.227
Panel B: Targets						
Unchallenged	Merger proposal	CAAR	15.25	14.32	8.4	12.46
		t-value	11.3***	11.4***	8.66***	9.57***
Challenged	Merger proposal	CAAR	22.45	19.39	12.98	18.16
		t-value	4.56***	4.15***	3.41***	3.75***
	Antitrust complaint	CAAR	-1.47	0.49	0.37	-0.288
		t-value	-1.51*	0.799	0.904	-0.373

*, ** and *** indicate significance at the 0.1, 0.05 and 0.01 levels, respectively.

Table 6. Robustness test of the abnormal returns to rival firms (value-weighted portfolio) for horizontal mergers relative to the merger proposal and antitrust complaint announcements

1991-2001 Merger Sample	Announcement	Beta / T- value	Summary Statistic	Period relative to the Wall Street Journal announcement (day 0)			
				(-3,3)	(-1,1)	[0]	(0,3)
Unchallenged	Merger proposal	0.813	CAAR	0.54	0.623	0.465	0.21
		19.8***	t-value	1.48*	3.23***	2.55***	0.803
Challenged	Merger proposal	0.703	CAAR	1.247	0.684	0.068	0.171
		8.33***	t-value	0.741	0.69	0.178	0.175
	Antitrust complaint	0.763	CAAR	0.057	0.56	0.144	-0.256
		9.3***	t-value	0.092	1.2	0.523	-0.67

*, ** and *** indicate significance at the 0.1, 0.05 and 0.01 levels, respectively. Beta stands for the value of the estimated regression coefficient for the variable "market return".

Table 7. Robustness test of the abnormal returns for rival firms (equal-weighted portfolio) in horizontal mergers relative to the merger proposal and antitrust complaint announcements

1991-2001 Merger Sample	Announcement	Beta / T- value	Summary Statistic	Period relative to the Wall Street Journal announcement (day [0])			
				[-3,3]	[-1,1]	[0]	[0,3]
Unchallenged	Merger Proposal	0.728	CAAR	0.723	0.63	0.25	0.26
		20.2***	t-value	1.79**	3.37***	1.93**	0.99
Challenged	Merger proposal	0.69	CAAR	0.94	0.705	0.48	0.60
		9.71***	t-value	1.496*	1.90**	1.58*	1.435*
	Antitrust complaint	0.72	CAAR	-0.332	0.26	0.03	-0.26
		9.3***	t-value	-0.447	0.697	0.014	-0.61

*, ** and *** indicate significance at the 0.1, 0.05 and 0.01 levels, respectively. Beta refers to the estimate of the regression coefficient for the variable "market return".

Appendix A

Table A1. Cumulative average abnormal returns or CAAR for bidder and target firms for nine industries for unchallenged horizontal mergers relative to the merger proposal

1991-2001 Merger Sample (By Industries)	N	Summary Statistic	Period relative to the WSJ announcement (day 0)						
			[-10,10]	[-10,5]	[-3,3]	[-1,1]	0	[0,3]	[3,10]
Panel A: Bidders									
20	8	CAAR	-3.84	-3.9	-2.32	-4.57	-2.79	-4.21	2.76
		t-value	-1.73*	-2.03**	-0.83	-1.54*	-1.15	-1.42*	2.03**
26	4	CAAR	-1.78	-1.77	-6.26	-4.44	-0.84	-3.55	-1.24
		t-value	-0.61	-0.53	-3.86***	-2.2**	-0.59	-2.37**	-0.37
28	8	CAAR	-1.88	-1.16	-0.74	-0.77	-0.74	0.58	-0.71
		t-value	-0.64	-0.41	-0.28	-0.38	-0.50	0.28	-0.57
32	2	CAAR	-8.23	-4.67	-0.28	-0.044	-3.17	0.9	-3.53
		t-value	-0.7	-0.49	-0.039	-0.016	-1.69	0.68	-6.3***
36	15	CAAR	-5.34	-5.8	-6.48	-3.04	-2.41	-5.8	-2.2
		t-value	-2.59**	-0.89	-0.99	-0.47	-0.37	-0.89	-0.33
37	12	CAAR	1.08	0.97	1.16	0.47	0.92	0.78	0.06
		t-value	0.44	0.13	0.16	0.06	0.13	0.11	0.008
48	51	CAAR	-4.1	-3.05	-3.48	-2.73	-1.11	-3.31	-2.11
		t-value	-2.38**	-2.12**	-2.57***	-2.07**	-1.53*	-2.74***	-1.93**
49	37	CAAR	-2.8	-2.77	-2.69	-2.9	-1.59	-2.72	0.41
		t-value	-2.72***	-3.04***	-3.64***	-4.4***	-3.09***	-3.51***	0.72

73	7	CAAR	-14.35	-7.73	-10.38	-9.01	-1.29	-10.48	-3.79
		t-value	-1.66*	-1.49*	-1.53*	-1.2	-0.86	-1.78*	-0.51
Panel B: Targets									
20	8	CAAR	15.15	15.9	12.61	13.83	8.28	11.72	-0.42
		t-value	2.52**	2.62**	1.68*	2.02**	1.26	1.73*	-0.96
26	4	CAAR	30.99	31.84	22.65	23.21	12.49	21.8	-1.1
		t-value	11.95***	8.9***	4.82***	6.9***	1.64*	3.72**	-0.59
28	14	CAAR	25.33	25.81	28.59	25.47	9.35	24.6	0.2
		t-value	4.3***	4.4***	4.96***	3.8***	2.77***	3.63***	0.24
32	2	CAAR	20.6	20.77	24.87	23.98	19.71	21.17	-1.13
		t-value	25.7***	18.7***	6.01**	3.37**	2.67*	3.61**	-3.31**
36	15	CAAR	24.71	26.16	25.53	25.73	11.91	21.76	-4.48
		t-value	3.79***	4.01***	3.91***	3.95***	1.83**	3.34***	-0.69
37	12	CAAR	22.95	23.925	22.75	19.43	11.87	17.59	-0.085
		t-value	4.04***	3.28***	3.12***	2.66**	1.63*	2.41**	-0.01
48	51	CAAR	11.03	11.15	9.63	9.52	5.53	7.12	-0.86
		t-value	4.86***	5.48***	5.51***	5.84***	3.74***	4.166***	-1.066
49	37	CAAR	9.11	9.40	9.54	8.31	7.14	7.62	-0.43
		t-value	1.67**	3.57***	2.09**	2.76***	2.37**	1.96**	-1.1
73	7	CAAR	18.87	26.29	16.83	19.66	12.02	14.27	-6.4
		t-value	1.67*	3.57***	2.08**	2.76**	2.37**	1.96**	-1.1

N is the sample size.
 *, ** and *** indicate that the hypothesis of zero abnormal returns is rejected at the 0.1, 0.05 and 0.01 levels of significance, respectively.

Table A2. Cumulative average abnormal returns or CAAR for bidder and target firms for nine industries for challenged mergers relative to the merger proposal

1991-2001 Merger sample (By Industries)	N	Summary Statistic	Period relative to the WSJ announcement (day 0)									
			[-10,10]	[-10,5]	[-3,3]	[-1,1]	0	[0,3]	[3,10]			
Panel A: Bidders												
20	2	CAAR	2.18	3.32	6.17	6.58	4.69	8.22	4.62			
		t-value	4.5**	1.28	1.44	0.64	0.41	1.04	1.03			
26	2	CAAR	-1.29	-1.03	-3.16	-3.67	-0.048	-0.343	2.51			
		t-value	-0.63	-0.41	-0.28	-0.35	-0.006	-0.036	1.49			
28	6	CAAR	1.39	2.36	-1.51	1.21	-1.1	-2.52	-0.76			
		t-value	0.58	1.2	-0.56	0.58	-0.547	-1.71*	-0.5			
29	5	CAAR	3.78	2.11	-0.27	-2.42	-2.34	0.515	3.43			
		t-value	1.411	0.972	-0.106	-1.099	-1.327	0.141	2.38**			
36	3	CAAR	2.003	0.24	-6.87	-4.7	-3.88	-1.69	3.006			
		t-value	0.217	0.0126	-0.569	-0.518	-0.813	-0.173	0.227			
37	2	CAAR	9.46	10.55	1.93	-2.48	2.23	1.46	1.54			
		t-value	1.91*	3.04**	0.35	-0.66	2.13*	0.38	2.26*			
48	9	CAAR	-3.47	-5.05	-6.29	-4.45	-4.64	-5.89	1.59			
		t-value	-1.47*	-2.4**	-2.62**	-2.2**	-4.6***	-2.21**	0.67			
49	6	CAAR	-12.18	-12.55	-11.08	-11.06	-2.37	-7.28	0.44			
		t-value	-6.2***	-6.7***	-2.57**	-3.3***	-0.69	-1.88*	0.217			

73	2	CAAR	-6.58	-5.525	0.052	3.566	7.7	1.05	-4.49
		t-value	-2.198*	-0.82	0.011	5.237**	6.94**	0.537	-2.23*
Panel B: Targets									
20	2	CAAR	2.60	1.74	3.35	2.57	1.756	2.69	1.477
		t-value	1.416	6.1**	0.79	3.68**	18.7***	2.13*	0.543
26	2	CAAR	10.07	11.54	12.54	14.82	14.09	14.18	-1.15
		t-value	0.375	0.428	0.693	0.766	0.69	0.7	-4.31**
28	6	CAAR	37.4	37.5	34.6	35.25	6.96	30.04	-0.75
		t-value	1.955**	1.977**	1.72*	1.77*	0.89	1.39	-0.52
29	5	CAAR	22.73	21.35	16.41	8.51	7.09	10.55	3.08
		t-value	6.43***	6.35***	6.05***	1.67*	1.67*	1.86*	1.81*
36	3	CAAR	13.053	18.59	20.38	17.34	13.08	17.92	-6.14
		t-value	1.055	1.26	1.097	1.325	1.453	1.09	-0.41
37	2	CAAR	21.34	24.48	19.76	18.59	-0.26	20.39	-2.23
		t-value	3.98**	3.21**	3.28**	4.175**	-0.73	3.56**	-11***
48	9	CAAR	13.56	14.69	11.85	11.71	8.08	7.86	-1.27
		t-value	2.55**	2.79***	2.57**	2.52**	1.97**	1.998**	-1.27
49	6	CAAR	16.44	15.66	15.16	12.2	10.88	10.55	0.57
		t-value	3.12**	3.17***	3.147**	2.56**	2.18**	1.899*	0.48
73	2	CAAR	92.87	93.79	94.81	94.42	91.51	94.82	-4.27
		t-value	2.42*	2.26*	1.75	1.68	1.84	1.72	-1.71

N is the sample size.
 *, ** and *** indicate that the hypothesis of zero abnormal returns is rejected at the 0.1, 0.05 and 0.01 levels of significance, respectively.

Table A3. Cumulative average abnormal returns or CAAR for bidder and target firms for nine industries for challenged mergers relative to the antitrust complaint

1991-2001 Merger sample (By Industries)	N	Summary Statistic	Period relative to the complaint announcement (day 0)									
			[-10,10]	[-10,5]	[-3,3]	[-1,1]	0	[0,3]	[3,10]			
Panel A: Bidders												
20	2	CAAR	8.64	12.71	0.788	2.12	-0.27	-0.91	-4.35			
		t-value	2.05*	2.23*	0.283	-0.62	-1.1	-1.81	-3.67**			
26	2	CAAR	6.11	1.64	-0.87	2.53	0.91	2.97	6.27			
		t-value	23.78***	25.64***	-0.13	53.31***	0.678	44.1***	1.27			
28	6	CAAR	5.94	5.99	2.96	-0.49	-0.076	2.08	1.43			
		t-value	1.93*	2.03**	1.66*	-0.289	-0.089	0.855	0.64			
29	5	CAAR	-6.7	-5.95	-2.35	0.22	0.144	-2.15	-1.19			
		t-value	-2.595**	-5.78***	-1.43	0.206	0.413	-1.21	-0.316			
36	3	CAAR	-23.06	-13.22	-7.13	1.43	1.36	-6.01	-17.42			
		t-value	-1.26	-1.017	-1.064	0.822	1.79*	-1.35	-1.68*			
37	2	CAAR	-13.43	-12.16	-1.1	-1.2	-1.95	-1.003	-4.7			
		t-value	-3.53**	-2.1*	-0.65	-2.55*	-1.14	-0.828	-2.68*			
48	9	CAAR	-2.07	-3.29	-3.9	-0.97	0.158	-3.77	-0.366			
		t-value	-0.58	-0.903	-2.516**	-1.455*	0.212	-2.75**	-0.17			
49	6	CAAR	4.9	4.8	1.23	-0.948	-0.347	1.56	3.56			
		t-value	1.253	1.65*	0.667	-1.52*	-0.803	0.803	0.693			

73	2	CAAR	11.95	10.1	8.1	4.67	0.95	4.87	4.95
		t-value	0.937	0.88	2.38*	12.07***	0.338	2.085*	0.588
Panel B: Targets									
20	2	CAAR	-1.52	-1.46	-0.81	-0.247	-0.378	-1.182	-1.303
		t-value	-0.48	-0.567	-0.46	-0.306	-0.65	-1.55	-25.9***
26	2	CAAR	7.27	7.27	4.09	4.55	3.14	3.92	-0.246
		t-value	2.71*	2.71*	3.09**	1.55	5.55**	2.91*	-1
28	6	CAAR	0.346	2.053	1.644	0.878	0.301	1.052	-1.544
		t-value	0.125	0.634	1.21	0.503	0.385	0.603	-1.68
29	5	CAAR	-6.793	-5.61	-3.04	-0.069	0.21	-2.39	-0.926
		t-value	2.817**	-3.63***	-1.55*	-0.053	0.406	-0.986	-0.308
36	3	CAAR	-7.19	-13.44	-7.61	0.773	2.17	-4.84	-0.58
		t-value	-0.404	-0.944	-1.19	0.434	1.52	-1.03	-0.049
37	2	CAAR	-22.62	-20.21	-4.47	-1.316	-0.325	-1.59	-4.106
		t-value	-2.378*	-1.705	-1.66	-0.707	-0.41	-1.28	-1.87
48	9	CAAR	-5.76	-1.35	-1.96	-0.65	0.206	-1.14	-5.74
		t-value	-1.36	-0.39	-1.28	-0.669	0.232	-0.817	-1.23
49	6	CAAR	-8.17	-3.16	-2.45	-1.94	-1.8	-0.003	-4.33
		t-value	-0.934	-0.815	-0.745	-1.215	-0.78	-0.003	-0.88
73	2	CAAR	8.58	11.71	10.83	10.85	4.13	8.65	-4.23
		t-value	1.88	1.82	2.75*	2.07*	2.08*	3.68**	-2.18*

N is the sample size.
 *, ** and *** indicate that the hypothesis of zero abnormal returns is rejected at the 0.1, 0.05 and 0.01 levels of significance, respectively.

Appendix B

Table B1. Cumulative average abnormal returns or CAAR for horizontal rivals of target firms for nine industries for unchallenged mergers relative to the merger proposal

1991-2001 Horizontal Rivals (By Industry)	N	Summary Statistic ^a	Period relative to the WSJ announcement (day 0)						
			[-10,10]	[-10,5]	[-3,3]	[-1,1]	0	[0,3]	[3,10]
20	17	CAAR	0.46	1.65	2.83	1.57	-0.22	2.67	-0.97
		Gen. Sign Z	-0.002	1.94*	1.94*	0.969	-0.974	2.427**	-0.488
		+-	8:9	12:5	12:5	10:7	6:11	13:4	7:10
26	37	CAAR	-0.19	0.56	0.28	1014	0.98	1.52	-1.34
		Gen. Sign Z	0.135	.793	0.793	1.781*	0.793	2.439**	-1.84*
		+-	18:19	20:17	20:17	23:14	20:17	25:12	12:25
28	326	CAAR	1.12	0.76	1.28	0.64	-0.01	1.31	0.44
		Gen. Sign Z	0.656	-0.342	1.876*	1.987*	-0.12	3.65***	0.545
		+-	160:166	151:175	171:155	172:154	153:173	187:139	159:167
36	249	CAAR	-0.02	0.55	-0.26	0.13	0.35	-0.38	-2.17
		Gen. Sign Z	-0.842	-0.46	-0.206	1.194	-0.46	-1.478	-2.878**
		+-	107:142	110:139	112:137	123:126	110:139	102:147	91:158

37	77	CAAR	-0.23	-0.22	0.1	0.91	0.57	0.68	1.15
		Gen. Sign Z	-0.094	-0.55	0.134	1.96*	1.732*	0.59	1.5
48	307	+-	36:41	34:43	37:40	45:32	44:33	39:38	43:34
		CAAR	2.25	1.35	0.99	0.67	0.8	0.89	1.06
		Gen. Sign Z	2.762**	2.762**	2.19*	2.991**	4.02***	1.732*	0.817
49	771	+-	167:140	167:140	162:145	169:138	178:129	158:149	150:157
		CAAR	0.3	0.41	0.89	0.59	0.39	0.77	0.17
		Gen. Sign Z	2.215*	0.772	4.738***	6.54***	6.69***	3.585***	3.8***
73	201	+-	398:373	378:393	433:338	458:313	460:311	417:354	420:351
		CAAR	0.99	1.7	-0.22	-0.39	0.14	-2.43	-0.3
		Gen. Sign Z	0.523	1.372	-0.043	-0.893	-1.6	-2.025*	0.381
		+-	96:105	102:99	92:109	86:115	81:120	78:123	95:106

N is the sample size.

*Gen. sign Z refers to Generalized Sign Z; and +- refers to positive : negative.

*, ** and *** indicate that the hypothesis of zero abnormal returns is rejected at the 0.1, 0.05 and 0.01 levels of significance, respectively.

Table B2. Cumulative average abnormal returns or CAAR for horizontal rivals of target firms for nine industries in challenged mergers relative to the merger proposal

1991-2001 Horizontal Rivals (By Industry)	N	Summary Statistic ^a	Period relative to the WSJ announcement (day 0)						
			[-10,10]	[-10,5]	[-3,3]	[-1,1]	0	[0,3]	[3,10]
20	5	CAAR	2.01	-0.28	-2.95	1.04	1.14	-0.85	0.76
		Gen. Sign Z	0.592	0.592	-1.2	0.592	1.488	-1.2	0.592
		+:-	3:2	3:2	1:4	3:2	4:1	1:4	3:2
26	28	CAAR	1.83	1.63	-1.48	-1.59	-0.1	-0.1	0.68
		Gen. Sign Z	1.473	1.095	-1.557	-2.314*	-1.178	-0.42	0.716
		+:-	17:11	16:12	9:19	7:21	10:18	12:16	15:13
28	99	CAAR	4.63	4.34	2.58	2.31	0.84	1.75	-1.14
		Gen. Sign Z	1.538	1.74*	0.128	1.74*	1.74*	0.934	-2.69**
		+:-	54:45	55:44	47:52	55:44	55:44	51:48	33:66
29	125	CAAR	0.82	0.36	0.43	-0.73	0.3	0.7	0.15
		Gen. Sign Z	0.133	-0.494	0.761	-3.26***	0.186	1.336	0.292
		+:-	62:63	63:62	60:65	49:76	67:58	66:59	64:61
36	174	CAAR	13.21	15.43	9.92	5.87	2.92	5.58	0.29
		Gen. Sign Z	5.097***	5.55***	5.86***	5.097***	4.945***	4.032***	-0.686
		+:-							

Table B3. Cumulative average abnormal returns or CAAR for horizontal rivals of target firms for nine industries in challenged mergers relative to the antitrust complaint

1991-2001 Horizontal Rivals (By Industry)	N	Summary Statistic	Period relative to the complaint announcement (day 0)							
			[-10,10]	[-10,5]	[-3,3]	[-1,1]	0	[0,3]	[3,10]	
20	5	CAAR	4.8	4.65	5.78	-0.29	-0.23	1.62	-0.5	
		Gen. Sign Z	2.394**	1.497	1.497	-0.296	-0.296	0.601	-0.296	
		+-	5:0	4:1	4:1	2:3	2:3	3:2	2:3	
26	27	CAAR	0.66	-1.58	-0.66	-1.22	0.52	1.13	2.04	
		Gen. Sign Z	-0.201	-0.201	0.571	-0.201	-0.201	2.115	2.115	
		+-	12:15	12:15	14:13	12:15	12:15	18:9	18:9	
28	87	CAAR	-1.06	-1.16	-0.86	-0.1	0.16	-0.52	-0.31	
		Gen. Sign Z	0.195	1.916	0.841	1.486	0.41	2.13*	0.195	
		+-	41:46	49:38	44:43	47:40	42:45	50:37	41:46	
29	101	CAAR	-4.39	-5.15	-2.18	-1.51	-1.18	-1.57	0.25	
		Gen. Sign Z	-4.12***	-5.91***	-2.322*	-2.12*	-2.92**	-3.7***	0.864	
		+-	28:73	19:82	37:64	38:63	34:67	30:71	53:48	
36	185	CAAR	-4.16	-0.79	1.06	0.71	0.74	-1.25	-6.2	
		Gen. Sign Z	-0.165	-0.165	1.314	0.279	2.2*	-0.91	-3.87***	
		+-								

			81:104	81:104	91:94	84:101	97:88	76:109	56:129
		+-							
37	4	CAAR	0.74	3.44	0.04	2.15	0.78	1.06	-2.59
		Gen. Sign Z	1.05	1.05	0.05	2.05*	0.05	1.05	0.05
		+-	3:1	3:1	2:2	4:0	2:2	3:1	2:2
48	149	CAAR	-4.51	-1.98	-1.06	0.61	-0.11	-1.69	-2.91
		Gen. Sign Z	-1.492	-0.342	0.315	5.78**	0.479	-1.66*	-0.835
		+-	60:89	67:82	71:78	86:63	72:77	59:90	64:85
49	77	CAAR	-2.4	2.36	2.33	0.59	-0.2	0.71	-4.53
		Gen. Sign Z	-1.494	2.842**	3.53***	2.16*	1.017	2.39**	-2.178*
		+-	30:47	49:28	52:25	46:31	41:36	47:30	27:50
73	29	CAAR	-1.13	-2.83	-0.85	-0.83	0.18	-0.94	0.64
		Gen. Sign Z	0.479	-1.02	-0.269	0.479	1.6	-0.27	0.479
		+-	14:15	10:19	12:17	14:15	17:12	12:17	14:15

N is the sample size.

^aGen. sign Z refers to Generalized Sign Z; and +- refers to positive; negative.

*, ** and *** indicate that the hypothesis of zero abnormal returns is rejected at the 0.1, 0.05 and 0.01 levels of significance, respectively.