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I am submitting herewith a dissertation written by Philip Logan Baird, III entitled "On the Motives for Merger: An Empirical Investigation of the Long-Run Performance of Merging Firms and of Acquirers' Rivals." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Finance.

George C. Philippatos, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Associate Vice Chancellor
and Dean of the Graduate School

ON THE MOTIVES FOR MERGER: AN EMPIRICAL INVESTIGATION OF THE LONG-RUN PERFORMANCE OF MERGING FIRMS AND OF ACQUIRERS' RIVALS

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DEDICATION

This dissertation is dedicated to my wife, Lydia Wade Baird, and children, Rachel Callahan Baird and Philip Logan Baird, IV, on whom my life is grounded.

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ABSTRACT

This research investigates the efficiency and collusive effects of corporate combinations through an analysis of the three- to five-year post-acquisition performance of merging firms and of rivals of acquiring firms. A system of two simultaneous equations is employed in which long-run changes in the market values of merging firms and of acquirers' rivals are endogenous. Exogenous variables consist of pre-acquisition characteristics of merging firms and of acquirers' industries. The analysis focuses on long-run performance since market structure effects are unlikely to materialize in short-run periods surrounding merger announcement and consummation dates. The sample consists of successful mergers and tender offers involving New York Stock Exchange- and American Stock Exchange-listed firms that were completed from 1973 through 1987. In a separate analysis, the relation between announcement period abnormal stock returns and long-run changes in value is investigated in a test of capital market efficiency.

Results suggest the presence of efficiency, as opposed to collusive, effects which are attributable primarily to economies of scale and scope. In addition, these effects emerge after an implementation period of two to three years in length. Finally, capital markets appear efficient with respect to long-run effects of corporate combinations.

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ON THE MOTIVES FOR MERGER: AN EMPIRICAL INVESTIGATION OF THE LONG-RUN PERFORMANCE OF MERGING FIRMS AND OF ACQUIRERS' RIVALS

I. INTRODUCTION

Although mergers and tender offers have been the subject of numerous studies published in the finance and industrial organization literature, debate continues on the motivations for and economic effects of corporate combinations. Since the early 1970s, finance studies generally have employed some form of the "event study" methodology, focusing on average abnormal stock returns associated with merger-related announcements. The overall theme of empirical results is that value is created, at least on balance, since acquired-firm shareholders gain while acquiring-firm shareholders appear not to lose.[1] Ellert (1976) and Eckbo (1983,1985), among others, argue that since value gains can be attributed to efficiency improvements rather than to increased collusion, corporate combinations appear to increase welfare.

Nevertheless, important questions on the sources of merger-induced gains and losses remain unanswered. For example, the findings of Lang, Stulz and Walkling (1989),

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[1]See, for example, Jensen and Ruback (1983), Jarrell, Brickley and Netter (1988) and the studies reviewed therein.

Morck, Shleifer and Vishny (1990) and Servaes (1991) suggest that efficiency gains arise from the displacement of inefficient acquired-firm managers by the more efficient managers of acquiring firms. What is the basis of this differential efficiency? Are acquiring-firm managers innately superior, or does the business environment in which they operate play a role? Moreover, if corporate combinations produce efficiency gains, why have industrial organization studies found such little evidence of improved operating performance in accounting-based rates of return and other non-capital market data?[2]

Other important issues concern the efficacy of the event study methodology. Dennis and McConnell (1986) and Bradley, Desai and Kim (1988) examine combined bidder-target wealth effects. While they find average gains to be positive and statistically significant, they also find large dispersion in announcement-period returns and even value losses in a significant minority of cases. This dispersion calls into question the meaning of inferences based on cross-sectional average returns. In addition, several studies have found systematically negative post-acquisition returns which suggest the presence of measurement problems

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[2]For example, see Mueller (1977), who provides a comprehensive review of earlier studies, and more recently, Ravenscraft and Scherer (1987,1989), Herman and Lowenstein (1988) and Caves (1989).

associated with the event study methodology.[3] Furthermore, Roll (1988) points out that since the announcement of merger or tender offer conveys information about the acquirer that is unrelated to the outcome, attribution of the acquirer's common stock returns to the merger alone may be tenuous.

In this dissertation, a methodological innovation is introduced and applied in the re-evaluation of empirical support for efficiency- and collusion-based theories of corporate combinations. Four theories are considered, three of which depend on the existence of efficiency gains and the fourth on increased collusion. These theories are viewed as "strategic" in nature since shareholder gains and losses are attributed to the "market structure" effects of mergers, i.e., to changes in the competitive positions (or relative efficiency) of merging firms and in competitive behavior (or collusion) in the industries in which merging firms compete.

The methodology is based on the premise that market structure effects impact the market values of merging firms and their rivals. Specifically, a two-equation system of simultaneous equations is utilized in which the endogenous variables consist of long-run changes in the market values

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[3]These studies include Langetieg (1978), Chung and Weston (1982), Asquith (1983), Malatesta (1983), Choi and Philippatos (1983) and Agrawal, Jaffe and Mandelker (1991). Franks, Harris and Titman (1991) argue that their findings can be attributed to the mean-variance inefficiency of frequently used market portfolios.

of merging firms and acquiring firms' rivals.[4] Exogenous variables include measures of acquirers' relative efficiency, competitive behavior in acquirers' industries, the impact of mergers on competitive behavior, and the magnitude of bases of efficiency gains. These variables are measured during pre-acquisition periods and are designed to reflect potential market structure effects. Hence, they represent potential sources of gain and loss for the shareholders of merging firms and of acquiring firms' rivals. Other exogenous variables are included in order to control for gains and losses attributable to financial restructurings.

The utilization of simultaneous equations in the investigation of market structure effects is an improvement on previously employed methodologies.[5] Corporate combinations are heterogeneous phenomena in the sense that individual mergers can be driven by one or more of a number of motivations and can have a variety of possible effects. Consequently, in samples of the type employed in most studies, and here as well, identification of broadly based market structure effects may be difficult to accomplish.

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[4]Generally speaking, the market structure effects of mergers impact the rivals of both merging firms. However, this research focuses solely on the rivals of acquiring firms.

[5]To this author's knowledge, no previous studies have examined the determinants of changes in the values of merging firms and their rivals utilizing a system of simultaneous equations.

Indeed, such effects might not exist. However, if they do, they might be uncovered more readily by comparing the behavior of merging firms' values with that of rival firms' values than by focusing on merging firms alone. For example, since merger-induced efficiency gains imply that the values of merging firms and their rivals move in opposite directions, sources of gain (loss) for merging firms should be sources of loss (gain) for their rivals. On the other hand, since increased collusion implies that the values of merging firms and rivals move together, sources of gain (and loss) should be the same for both sets of firms. The simultaneous equations methodology provides a convenient framework for identifying these relations via tests of cross-equation restrictions on model parameters.

The rationale for employing a system of equations rests on the notion that, in general, changes in macroeconomic and industry conditions tend to affect the values of similar (i.e., competing) firms in the same direction. As a result, the values of merging firms and their rivals tend to move together for reasons unrelated to mergers. This is especially true where changes in values are measured over periods of several years in length. It is argued in section VI that failure to control for macroeconomic and industry effects can lead to biased estimates of the relation between changes in values and sources of gain and loss.

Unlike the majority of studies that have employed some form of event study methodology, this research focuses on the determinants of long-run changes in market value. A maintained hypothesis is that market structure effects are not likely to materialize in either financial statements or market values for several years following consummation. If, for example, the motive for a given merger is to obtain economies of scale or scope, relative efficiency gains will not be reflected in financial statements until procurement and deployment of new plant or equipment rationalized by the combination have been accomplished. This process is likely to require some period of time to complete, perhaps years.

Market structure effects might not be reflected immediately in market values if the uncertainty associated with efficiency- and collusion-based gains is so great that expected gains are near zero. These expectations are not likely to change until new information emerges which reduces or eliminates the uncertainty. Furthermore, informational asymmetry between managers and outside investors increases the uncertainty. Consequently, investors might not act on unsubstantiated claims about the benefits of mergers. Rather, they might respond only when substantiating evidence materializes, for example, in the form of corporate earnings reports. These considerations suggest that announcement-period common stock returns might not reflect the market structure effects of corporate combinations and that

evidence of these effects must be obtained from relatively long post-acquisition periods. For this reason, the evaluation of strategic theories focuses primarily on relations that emerge from three- to five-year post-acquisition periods.

The second primary focus of this thesis is motivated by negative post-acquisition stock price performance documented in several prior studies.[6] These findings undermine the notion that information is impounded in stock prices quickly and in an unbiased manner (i.e., the notion that capital markets are efficient). If informed investors form unbiased expectations at the announcements of mergers and tender offers, then no systematic trends in post-announcement returns should be observed. Furthermore, the relation between announcement-period returns and subsequent performance should be positive. Therefore, a test of capital market efficiency is structured in terms of the relation between announcement-period returns and long-run changes in value around acquisitions.

The sample consists of mergers and tender offers completed from 1973-1987 involving NYSE/AMEX-listed firms. For each merging firm and each acquiring-industry firm, a set of characteristics is obtained annually beginning two years prior to the year of consummation and ending up to

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[6]These studies include Langetieg (1978), Asquith (1983), Malatesta (1983), Choi and Philippatos (1983) and Agrawal, Jaffe and Mandelker (1991).

five years following consummation. In order to focus on the effects of individual combinations and given that these effects may materialize only over the long run, the sample is screened to minimize the potentially confounding effects of multiple acquisitions.[7]

The remainder of the thesis is organized as follows. Section II contains a review of previous studies of mergers and tender offers. Motives for merger are discussed in Section III. Sections IV and V describe the sample and data, respectively. Section VI presents the methodology. Results are reported and interpreted in section VII, and a summary is contained in section VIII.

[7]It is entirely possible that this screening procedure eliminates mergers undertaken by acquirers whose long-run strategies involve growth through periodic acquisitions. This possibility suggests the need for procedures by which the long-run effects of mergers undertaken by such acquirers can be investigated. This endeavor is left for future research.

II. PREVIOUS STUDIES

A. EVENT STUDIES

In order to facilitate the discussion, the "event studies" reviewed here are classified as those that focus on cross-sectional average wealth effects and those that investigate the cross-sectional determinants of such effects. The former are reviewed in section II.A.1 and the latter are discussed in II.A.2.

1. OVERALL GAINS TO MERGING FIRMS

The majority of financial studies of mergers and tender offers since Halpern (1973) and Mandelker (1974) have employed some form of the event study methodology. The most consistent finding is that the shareholders of acquired firms reap large positive and statistically significant gains in both mergers and tender offers.[8]

The evidence on gains for shareholders of acquiring firms is less conclusive. In studies of announcement-period abnormal returns in tender offers, the shareholders of

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[8]Most of the discussion in Section II.A.1. is based on studies conducted in the late-1970s and early-1980s that were reviewed by Jensen and Ruback (1983) and Roll (1986). These studies include Mandelker (1974); Dodd and Ruback (1977); Langetieg (1978); Jarrell and Bradley (1980); Bradley (1980); Asquith (1983); Malatesta (1983); and Eckbo (1983). Later studies in the same vein include Dennis and McConnell (1986); Bradley, Desai and Kim (1988); and Jarrell, Brickley and Netter (1988).

bidding firms are found to realize small positive and statistically significant gains on the order of 3% to 4%.[9] However, these returns appear to trend downward over time. Bradley, et al. (1988) find that the average abnormal return to bidding firms in tender offers completed from 1981 through 1984 fell to a statistically significant -2.9% from a positive and significant 4.1% in tender offers completed from 1963 through 1968.[10]

The majority of studies of announcement-period returns to acquiring firms in mergers find no statistically significant effects. Examining two-day announcement effects, Asquith (1983), Eckbo (1983) and Dennis and McConnell (1986) find no statistically significant abnormal returns, while Dodd (1980) finds small negative (-1.09%) and significant abnormal returns (t=-2.98). Abnormal returns during the month of announcement are generally of small magnitude and not statistically significant.[11] Asquith, Bruner and Mullins (1983) provide the exception. They find positive and significant abnormal returns to acquirers in mergers in the month prior to initial announcement. While the mixed nature of these results may be due to differences

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[9]Dodd and Ruback (1977); Bradley (1980); Jarrell and Bradley, (1980); Bradley, Desai and Kim (1988); and Jarrell, Brickley and Netter (1988).

[10]See also Jarrell, Brickley and Netter (1988) on this point.

[11]Dodd (1980); Asquith (1983); Eckbo (1983); and Dennis and McConnell (1986).

in samples and methodologies, they suggest that combinations have little effect on the shareholders of acquiring firms.

These findings suggest that acquired-firm shareholders gain, while acquiring-firm shareholders, on balance, appear not to lose. Thus, corporate combinations appear to be value-increasing transactions. However, a disturbing pattern in the behavior of post-acquisition abnormal returns has been documented in several studies. Langetieg (1978), Asquith (1983) and Malatesta (1983) find negative and significant abnormal returns following announcement and completion dates. Choi and Philippatos (1983) find that positive pre-merger abnormal returns are completely dissipated in the 36 months following merger in their sample of conglomerate mergers followed by no increase in financial leverage. Jensen and Ruback (1983) find these negative post-acquisition revaluations disturbing since "they are inconsistent with market efficiency and suggest that changes in stock price during takeovers overestimate the future efficiency gains from mergers" (p.20). As Asquith (1983) points out "[I]f all uncertainty is resolved at the (effective date of merger) and if the market on average correctly evaluates the effects of consolidation, then there should be no systematic pattern in the post-outcome excess returns" (p.74).

Much of the responsibility for these negative trends has been attributed to nonstationarity of market model

parameters and to other measurement problems. However, studies attempting to account for some of these problems have obtained inconclusive results. For example, Franks, Harris and Titman (1991) utilize a multi-factor model of returns to overcome the mean-variance inefficiency of frequently used market portfolios, and they find no evidence of systematically poor post-acquisition performance. In contrast, Agrawal, Jaffe and Mandelker (1991) find that acquirers' shareholders realize a statistically significant loss of 10% over the five-year post-acquisition period and that neither relative size effects nor beta estimation problems can account for these negative post-acquisition revaluations. Langetieg (1978) and Chung and Weston (1982) control for potential industry effects on the returns of merging firms. Each study finds that the poor post-acquisition performance of merging firms coincides with similar performance of firms in acquirers' industries, suggesting that negative post-acquisition returns are attributable to systematic changes in industry-wide conditions rather than to the effects of acquisition. The question arises as to why the performance of acquiring firms' industries appears to be negative.

Several studies have examined total dollar gains and losses to shareholders and other claimants, with results that do not support conclusively the notion that value is created. For example, Bradley, Desai and Kim (1988)

estimate total abnormal dollar gains to shareholders of firms combining via tender offer. Although they find a positive and significant mean dollar gain of $117 million, in one-fourth of their sample the total valuations are negative. Dennis and McConnell (1986) estimate the change in market-adjusted dollar values of all classes of securities outstanding. Over the 40-day interval surrounding the merger announcement date, the mean market-adjusted change in total dollar value is a positive $76.7 million (t=2.66). However, in over one-fourth of their sample, total market-adjusted changes in value are negative. Furthermore, had these values been estimated for other periods relative to announcement, the results would likely have been statistically nonsignificant or even negative.[12] The implication is that there appears to be sufficiently large dispersion in the data to question whether meaningful inferences can be gleaned from cross-sectional averages.

Perhaps a more crucial problem of event studies involves the interpretation of announcement-period returns of acquiring firms. As Roll (1988) points out, announcement of the intent to acquire contains information unrelated to the acquisition, i.e., that the condition of the acquirer is such that an acquisition can and will be attempted. The news may be good or bad, but its effect on value is independent of the outcome of the acquisition attempt. As

[12]See also Roll (1988) on this point.

Roll (1988) puts it, the announcement "can signal good things, e.g., that cash flow over the recent past has been higher than previously estimated and high enough to elicit a takeover attempt. It can also signal something less favorable, e.g., that the managers are going to use the company's cash in pursuit of an expensive and elusive target, for which they may overpay" (p.243).

2. SOURCES OF GAIN AND LOSS

A number of studies have attempted to identify merger-related sources of gain and loss by examining the cross-sectional determinants of common stock returns. One set of papers tests the hypothesis that merger-induced gains reflect increases in monopoly power by examining the abnormal returns of firms involved in mergers challenged by antitrust authorities.[13] Another set of studies investigates the relation between merger gains and the type of offer, the nature of the bidding contest and characteristics of the bidder and target.[14] A third set focuses on financial motives for merger by examining the

[13]These papers include Ellert (1976), Eckbo (1983,1985), Stillman (1983) and Eckbo and Wier (1985). The first three of these studies are discussed here.

[14]These studies include Lang, Stulz and Walkling (1989), Morck, Shleifer and Vishny (1990) and Servaes (1991).

relation between merger gains and the financial characteristics of merging firms.[15]

HORIZONTAL MERGERS AND MONOPOLY POWER

Ellert (1976) examined the abnormal returns of firms involved in mergers that were challenged by the Department of Justice and Federal Trade Commission. He classified the sample into 123 defendants ordered to divest acquired assets and 82 defendants not required to divest. During the 48-month period prior to the filing of complaint, shareholders of all defendants realized an average cumulative abnormal return of 7.2% (t=1.89).[16] In the month of complaint, the average abnormal return was -1.83% (t=-3.24), and from the month of complaint through the month of settlement, it was -3.7% (t-statistic not reported). Ellert argued that "if the abnormal returns realized in the pre-complaint period do reflect discounted monopoly gains, these gains are left relatively undisturbed by Section 7 proceedings" (p.724). Ellert attributed negative returns associated with antitrust complaints to direct legal costs, loss of managerial time, and the effect of increased uncertainty on decision-making. In his view, the results did not support the monopoly power hypothesis.

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[15]Recent studies of this type include Bruner (1988), Murphy and Nathan (1989) and Hanson (1992), among others. This list is by no means comprehensive.

[16]See Table 3 in Ellert (1976) p.721.

Closer inspection reveals that Ellert's results were driven primarily by 123 firms ordered to divest. For these defendants, the average cumulative abnormal return was 4.4% (t=1.88) during the twelve months prior to complaint, and it was 0.4% (t=0.08) during the same time frame for defendants not ordered to divest. From the month of complaint through the month of settlement, defendants required to divest earned average cumulative abnormal returns of -4.7%, while those not required to divest earned returns of -2.3%.[17] Apparently, defendants ordered to divest earned positive and statistically significant cumulative abnormal returns prior to the filing of complaint that were offset by negative returns from the month of complaint through settlement. This pattern of returns is consistent with the notion that defendants ordered to divest were in pursuit of monopoly profits and that their efforts were thwarted by antitrust regulators.

Eckbo (1983) examined the returns to rivals of merging firms in a large sample of horizontal mergers in mining and manufacturing industries, including some that were challenged by antitrust authorities. The abnormal returns of bidders, targets and their rivals were investigated in time periods surrounding the announcement of the merger

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[17]Average cumulative abnormal returns from the month of complaint through the month of settlement were not reported by Ellert. The figures reported above (-4.7%, -2.3%) were estimated in accordance with his footnote 8, p.723.

proposal and, for challenged mergers, the announcement of the antitrust complaint. Consistent with the collusion hypothesis, Eckbo found that the abnormal returns of bidders, targets and their rivals at the announcement of merger proposal were positive and statistically significant and that they were greater in challenged mergers than in unchallenged mergers. However, on the announcement date of the antitrust complaint, returns were negative and statistically significant for bidders and targets but slightly positive and nonsignificant for their rivals. If positive returns at the merger proposal date reflect increased monopoly profits expected to follow from the merger, then the returns of bidders, targets and rivals should have been negative at the announcement of antitrust complaint. Since the returns of rivals did not fit this pattern, Eckbo rejected the notion that merger gains arose from increased collusion. Instead, he argued that rivals' positive returns at the merger proposal reflected expected cost savings made possible by the release of information at the proposal announcement. However, this argument, like the collusion hypothesis, seems to imply that the returns of bidders, targets and rivals should have been negative at the complaint announcement since antitrust authorities could have been expected to challenge mergers between rivals. In addition, Eckbo's argument seems unable to explain the larger returns to bidders, targets and rivals observed in

challenged mergers unless one accepts the view that antitrust regulators systematically prosecuted those mergers in which the greatest amounts of cost-saving information were released. Finally, he reported that in his "common industry sample"[18], rivals' abnormal returns were -2.21% (t=-1.70) over days -20,10 relative to the complaint announcement, and in each event period leading up to the complaint, at least two-thirds of rivals' returns were negative. These results are consistent with the collusion hypothesis.

In a related study, Eckbo (1985) conducted a series of cross-sectional regressions using as dependent variables the announcement-period abnormal returns of merging firms and equally-weighted industry portfolios. Explanatory variables consisted exclusively of the four-firm concentration ratio (CR4) and a measure of change in concentration derived from the Herfindahl index (dH).[19] For equally-weighted bidder/target portfolios, the estimated coefficient of CR4 was positive and significant while the coefficient of dH was negative and significant. For equally-weighted rival portfolios, the coefficient of CR4 was negative and

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[18]The number of mergers in this sample is 18.

[19]The Herfindahl index is defined as $H = \sum_{i=1}^{N} s_i^2$, where N is the number of firms in the industry and s_i is the ith firm's market share. The change in the Herfindahl index from the merger of firms j and k is $dH = 2s_j s_k$

significant while the coefficient of dH was generally not significant. Since the collusion hypothesis predicts a positive relation between rivals' returns and both concentration and change in concentration, the evidence does not seem to support the hypothesis, on balance. However, it seems plausible that factors other than the level and change in concentration should affect the returns of merging firms and their rivals, e.g., the size and profitability of merging firms. If so, then Eckbo's model may have been misspecified.

MERGER GAINS AND THE CHARACTERISTICS OF MERGING FIRMS AND OF THE ACQUISITION

Lang, Stulz and Walkling (1989) (LSW), Morck, Shleifer and Vishny (1990) (MSV) and Servaes (1991) investigated the relation between merger gains and characteristics of the bidder and target, the nature of the bidding process, and the method of payment. LSW computed approximations to Tobin's q for bidders and targets in successful tender offers. They found that shareholders of high q bidders realized significantly larger gains than the shareholders of low q bidders and that shareholders of low q targets tended to benefit more from takeovers than those of high q targets. They interpreted these results as "consistent with the view that takeovers of poorly managed targets by well-managed bidders have higher bidder, target, and total gains" (p.137). These conclusions were based on the results of cross-sectional regressions with bidder, target and total

returns employed as dependent variables. Dummy variables were used to describe the relation between bidder and target q ratios. In their sample of opposed offers (N=27), bidder returns were significantly larger in takeovers of low q targets by high q bidders. None of the estimated coefficients were significant for their sample of unopposed offers (N=60). The authors concluded that "the tender offers in which the most value is created involve a high q bidder acquiring shares of a low q target" (p.152). However, regression results for combined bidder and target gains indicated that total gains were significantly larger in takeovers of high q targets by high q bidders in their sample of opposed offers. In both the full sample and the sample of unopposed offers, the coefficient of the High q bidder/low q target dummy was not statistically significant. Hence, their conclusions were based on a fairly small sample of 27 tender offers.

Servaes (1991) extended the analysis to mergers and found that "target, bidder, and total returns are larger when targets have low q ratios and bidders have high q ratios" (p.409). These authors assumed that q ratios reflect managerial efficiency. Although this is true to some extent, q ratios are influenced by other factors as well, e.g, industry-wide demand and cost conditions and measurement error. Thus, the notion that the largest gains

were created in takeovers of poorly-managed targets by well-managed bidders may have been somewhat tentative.

Morck, Shleifer and Vishny (1990) (MSV) investigated bidder returns in a large sample of mergers and tender offers. Announcement-period bidder returns were regressed against measures of the relatedness of merging firms, the target's prior growth rate and the bidder's past performance. Dummy variables were employed to identify the presence of multiple bidders, the method of payment, and whether the takeover occurred in the 1970s or 1980s. Their findings suggest that "the returns to bidding shareholders are lower when their firm diversifies, when it buys a rapidly growing target, and when its managers performed poorly before the acquisition. These results suggest that managerial objectives may drive acquisitions that reduce bidding firms' values" (p.31).

B. INDUSTRIAL ORGANIZATION STUDIES

In contrast to the relatively optimistic findings of finance studies, industrial organization studies paint a bleak picture. Hogarty (1970) summed up studies conducted prior to 1970 as follows: "Undoubtedly, the most significant result of this research has been that no one who has undertaken a major empirical study of mergers has concluded that mergers were profitable" (p.389).

More recent studies have obtained similar results. Ravenscraft and Scherer (1989) utilized Line of Business survey data collected by the Federal Trade Commission from 1975 through 1977 to examine the profitability of acquired businesses. Their results are inconsistent with the notions that acquisitions are undertaken to displace inefficient management and that acquisitions yield increases in postmerger profits relative to premerger profits or to peer industry averages.

Herman and Lowenstein (1988) utilized accounting data on size, leverage and profitability for bidding and target firms in 56 hostile takeovers completed from 1975-1983. They found that in terms of return on total capital, targets were on average more profitable than their acquirers in each of the five years preceding the year of takeover. They also found large declines in profitability for bidders following acquisition. Again, these results do not support the notion that hostile takeovers result in improved profitability or efficiency.

On balance, the evidence on sources of merger gains and losses is mixed. The studies by Ellert (1976) and Eckbo (1983,1985) suggest that the effects of mergers on collusion is, at most, minimal. The findings of LSW, MSV and Servaes (1991) are consistent with the view that merger gains arise from the differential efficiency of acquiring-firm managers. In contrast, industrial organization studies provide little

evidence to support the view that mergers produce gains in operating performance, or that gains arise from takeovers of poorly-managed targets by well-managed bidders.

III. MERGER MOTIVES

From the vast body of literature on the subject of corporate combinations, an array of hypothesized sources of gain and loss has emerged.[20] The primary purpose of this section is to develop the empirical implications of three hypotheses on the existence of efficiency gains and a fourth on gains from increased collusion. Section III.A develops the hypotheses that efficiency gains arise from economies of scale and scope and from the differential efficiency of acquiring-firm managers. Section III.B presents the argument, grounded in the market structure-conduct-performance paradigm traditional in the theory of industrial organization, that mergers are driven by the pursuit of monopoly (and monopsony) rents through increased collusion. This section also develops a third efficiency-based hypothesis which reflects the alternative view to the traditional paradigm.

The four hypotheses put forth in sections III.A and III.B constitute the set of "strategic" theories on which the attribution of gains and losses to the market structure effects of mergers is based. While the primary focus of this research is on the strategic theories, the methodology

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[20]Steiner (1975), Jensen and Ruback (1983) and Roll (1986), among others, provide good descriptive summaries of sources of merger gains.

lends itself to an investigation of four additional theories often cited in the finance literature. Sections III.C through III.E develop the empirical implications of theories which derive from agency costs associated with free cash flow, financial slack, and managerial self-interest. Section III.F presents Roll's (1986) hubris hypothesis.

A. EFFICIENCY EFFECTS[21]

At this point, a discussion of the notion of "relative efficiency" is in order. Since statements about efficiency are meaningful only to the extent that technological, economic, regulatory and other external constraints on firm behavior are considered, the notion of "relative efficiency" refers to the firm's operating cost structure **relative** to firms facing similar constraints (i.e., competitors). A gain in relative efficiency thus refers to a reduction in costs relative to the costs of competitors.

The theory of the firm indicates that an increase (decrease) in relative efficiency should lead to an increase (decrease) in the firm's market value and a decrease (increase) in the combined market value of its rivals. To see this, note that an increase in relative efficiency

[21]The discussion of efficiency effects draws from Baumol, Panzar and Willig (1988), especially chapters two through four.

generally implies an increase in firm output which, in turn, implies an increase in industry output and a fall in market price. Hence, for the firm realizing a gain in relative efficiency, two offsetting effects on its profits arise from lower unit cost and lower unit price. However, the net effect is positive since, following an efficiency gain, the firm can always realize a higher price-cost margin on existing output and, by holding output constant, eliminate downward pressure on the market price. Therefore, an increase in relative efficiency implies an increase in the market value of the firm. In contrast, the combined profit and market value of rivals will decline from market share lost to the relatively more efficient firm, i.e., their demand curves will shift downward. In general, then, changes in relative efficiency imply that the market value of the firm and the market value of its rivals move in opposite directions.

ECONOMIES OF SCALE AND SCOPE

Efficiency gains based on economies of scale or scope provide motives for merger through cost reductions which translate directly to higher profits and market value. Generally speaking, economies of scale and scope arise whenever merging firms' cost functions change such that either existing output can be produced more cheaply or new,

profit-increasing output levels or mixes can be attained.[22] In a single-product setting, cost reductions may be attributed to economies of scale which arise from more efficient utilization of indivisible inputs and specialization of tasks. Strictly interpreted, the concept of economies of scale implies declining average costs as the quantities of inputs are increased in constant proportion. In a more general sense, efficiency gains might also arise from changes in the input mix made possible by increased rates of output. In other words, higher output rates might rationalize investment in more efficient production technology requiring changes in input proportions.

In a multiproduct setting, the concept of economies of scope refers intuitively to cost reductions from the pooling, and thus more efficient utilization, of shared inputs and from profit-increasing changes in output mix. Economies of scope arise when two or more different outputs can be produced more profitably by a single firm than by two or more independent firms.

Since mergers driven by economies of scale or scope imply gains in relative efficiency, the market values of merging firms should increase relative to those of competitors. Moreover, since these gains depend on declining long-run average costs, they should be greater for

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[22]No demand-related effects are implied here since profit increases obtain even under conditions of perfectly elastic demand.

firms that have not attained "minimum efficient scale",[23] i.e., for firms that suffer a relative cost disadvantage because they are too small in some respect. Such firms are likely to appear relatively unprofitable and relatively small prior to combination.[24] In addition, it seems plausible that the basis for efficiency gains from economies of scale or scope should be increasing in the relative size of the acquisition. That is, if mergers are driven by efficiency gains made possible by increases in either the scale or scope of operations, then the gains should be greater the larger the acquired firm. Implications of the **Economies of Scale and Scope Hypothesis (ESSH)** are summarized in Table III-1.

ACQUIRERS' DIFFERENTIAL EFFICIENCY

Efficiency gains also have been attributed to the differential efficiency of acquiring-firm managers. In recent finance literature,[25] the market for corporate control is viewed as an arena in which competing management teams vie for control of corporate assets. In this view,

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[23]Minimum efficient scale refers to the lowest output level at which long-run average cost is minimized. Much of the ensuing discussion is couched in single product terminology. However, conclusions can be generalized to the multiproduct case.

[24]This assumes of course that some firms have already attained minimum efficient scale.

[25]See for example Jensen and Ruback (1983), Lang, Stulz and Walkling (1989), Morck, Shleifer and Vishny (1990), or Servaes (1991), among others.

TABLE III-1
IMPLICATIONS OF THE ECONOMIES OF
SCALE AND SCOPE HYPOTHESIS

1	negative relation between merging-firm gains and the acquirer's relative efficiency
2	negative relation between merging-firm gains and the acquiring firm's size relative to its rivals
3	positive relation between merging-firm gains and the relative size of the acquisition
4	positive relation between competitors' gains and the acquirer's relative efficiency
5	positive relation between competitors' gains and the acquirer's size relative to its rivals
6	negative relation between competitors' gains and the relative size of the acquisition

mergers and tender offers reflect the transfer of assets from relatively inefficient management teams to relatively efficient ones, with the most efficient managers producing the largest gains. Therefore, firms controlled by differentially efficient managers should appear larger and more efficient than their rivals. Furthermore, if differentially efficient managers create larger gains by acquiring larger firms, then the relation between merger gains and the size of the acquisition should be positive. The implications of the **Differential Efficiency Hypothesis (DEH)** are summarized in Table III-2.

TABLE III-2
IMPLICATIONS OF THE DIFFERENTIAL
EFFICIENCY HYPOTHESIS

1	positive relation between merging-firm gains and the acquirer's relative efficiency
2	positive relation between merging-firm gains and the acquirer's size relative to competitors
3	positive relation between merging-firm gains and the relative size of the acquisition
4	negative relation between competitors' gains and the acquirer's relative efficiency
5	negative relation between competitors' gains and the acquirer's size relative to competitors
6	negative relation between competitors' gains and the relative size of the acquisition.

B.COLLUSIVE EFFECTS

One source of monopoly profits (or rents) derives from cooperation (versus competition) on price and output decisions. In Stigler's (1964) oligopoly model, effective collusion gives rise to monopoly profits through coordinated output reductions which lead to product price increases. However, since individual firms may have incentive to undercut a supracompetitive price, the effectiveness of collusive agreements depends on the costs of identifying and punishing free-riders. These costs are a negative function of the number of firms in the industry. Thus, horizontal mergers result in higher monopoly profits because they

reduce the number of firms in the industry, thereby increasing the probability of effective collusion.[26]

Horizontal mergers also can be shown to increase monopoly profits in the context of a dominant-firm (or price-leader) model. In this model, a dominant firm (or group of firms) determines the product price by restricting output, allowing rival "fringe" firms to free ride on the maintained price. Monopoly profits might increase following the acquisition of a fringe firm by a dominant firm if the acquisition enables the acquirer to raise price through further output reductions.

Eckbo (1985) shows that both the oligopoly and dominant-firm models imply that increases in product prices resulting from horizontal mergers are positively related to merger-induced *changes* in concentration.[27] Furthermore, he argues that the extreme view of concentration embodied in antitrust policy implies that the anticompetitive effects of mergers, and thus merger gains, are related positively to the *level* of concentration. This result is obtained in the dominant-firm model by noting that the presence of dominant firms is manifest in higher concentration. Therefore, if, through horizontal mergers, industry leaders increase their

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[26]See Demsetz (1973), Smirlock, Gilligan and Marshall (1984) and Schmalensee (1987), among others, for statements of the traditional structure-conduct-performance paradigm and the alternative efficient structure view of the relation between concentration and profitability.

[27]See his footnote 8, p.328.

dominance by eliminating competition from the fringe, then merger gains should be related positively to the pre-acquisition level of concentration. When taken together, the oligopoly and dominant-firm models imply that changes in the values of merging firms and their rivals should be related positively to both the pre-acquisition level of and merger-induced change in concentration.

Horizontal mergers also might produce gains via coordination of purchasing decisions, i.e., from the exercise of monopsony power in input markets. Since horizontal mergers reduce the number of firms in an industry, they lower the costs of establishing and maintaining such coordination. Therefore, the probability with which effective price reductions are imposed on common suppliers increases, benefiting all buyers of the input(s).

While the relation between horizontal mergers and collusive behavior in product and input markets is fairly well-established, the effects of non-horizontal mergers are less clear.[28] For example, it is difficult to imagine the means by which mergers of firms operating in different product markets could have anticompetitive effects. On the

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[28]Non-horizontal mergers include vertical and conglomerate mergers, the latter of which consist of product-market extension, geographic-market extension, and pure conglomerate mergers as defined by the Federal Trade Commission. Vertical mergers are likely to have significant effects on competitive behavior. However, they are not treated here since they are likely to be few in number (see Stewart, et al.,1984) and they cannot be identified on the basis of SIC codes.

other hand, such mergers could have anticompetitive effects in common input markets through the exercise of monopsony power, i.e., collusion among buyers might produce gains in the form of wealth transfers from sellers.

The **Collusion Hypothesis**[29] is thus extended to include both horizontal and non-horizontal mergers. It asserts that acquirers from relatively concentrated industries increase monopoly profits and that the magnitude of the gain is related positively to the change in concentration. Since gains also accrue to rivals, the hypothesis implies that the values of merging firms and acquiring-industry firms move together around acquisitions. To see this, note that an increased collusion implies lower industry output and higher price, which, in turn, implies higher industry total revenue and lower industry total cost. Therefore, following an increase in collusion, monopoly profits in the industry should increase. However, the distribution of gains among firms in the industry depends on firm-level demand and cost conditions. For a given change in market price and firm output, the change in profit of a single firm is related positively to its cost elasticity and negatively to its demand elasticity.[30] Thus, following an increase in

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[29]Since the oligopoly and dominant-firm models have similar empirical implications, they are combined in the Collusion Hypothesis .

[30]"Cost elasticity" refers (approximately) to percent change in total cost divided by percent change in output.

collusion, firm-level monopoly profits can either increase, decrease or remain constant in proportion to industry profits. This result must be emphasized because it points to the inability of the Collusion Hypothesis to explain changes in the competitive positions of merging firms. Strictly interpreted, the Collusion Hypothesis implies that the relation of merging-firm value and rival-firm value to sources of gain are *equal in sign and magnitude.* Differential responses cannot be explained in terms of collusive behavior. The implications of the Collusion Hypothesis are summarized in Table III-3.

In contrast to the traditional structure-conduct-performance paradigm which holds that concentration facilitates collusion, the **Efficient Structure Hypothesis (ESH)** asserts that concentration reflects efficiency differences among firms in an industry. Demsetz (1973) argues that since relatively efficient firms tend to have larger market shares and to earn economic rents, concentration and profitability are related positively. By this line of reasoning, a positive relation between merger gains and concentration can be explained in terms of the differential efficiency of acquirers from concentrated industries. In other words, since acquirers from relatively concentrated industries are more efficient than those from less concentrated industries, they produce larger efficiency gains. Hence, the relation between merger gains and

TABLE III-3
IMPLICATIONS OF THE COLLUSION HYPOTHESIS

1	positive relation between merging-firm gains and acquiring-industry concentration
2	positive relation between merging-firm gains and the relative size of the acquisition
3	positive relation between merging-firm gains and the size of the acquirer relative to its industry
4	positive relation between competitors' gains and acquiring-industry concentration
5	positive relation between competitors' gains and the relative size of the acquisition
6	positive relation between competitors' gains and the size of the acquirer relative to its industry
7	no difference in magnitude between the relations embodied in 1 and 4
8	no difference in magnitude between the relations embodied in 2 and 5
9	no difference in magnitude between the relations embodied in 3 and 6

acquiring-industry concentration should be positive.

In contrast to the Collusion Hypothesis, the ESH implies that merging firms obtain increases in relative efficiency. Hence, the values of merging firms and their rivals should move in opposite directions. Thus, rivals' changes in value should be related negatively to concentration. The ESH also implies that merging-firm gains are related positively to acquirers' relative efficiency since for a given level of concentration, relatively efficient acquirers should produce larger efficiency gains. Furthermore, if the basis for efficiency gains is increasing in acquired-firm size, then merger gains are a positive

function of the relative size of the acquisition. Since relative efficiency gains for merging firms imply losses for rivals, rivals' merger gains are related negatively to concentration, the acquirer's relative efficiency, the relative size of the acquisition, and the size of the acquirer relative to the industry. Implications of the ESH are summarized in Table III-4.

C. FREE CASH FLOW THEORY OF CORPORATE TAKEOVERS

Jensen's (1986) Free Cash Flow Theory of corporate takeovers argues that firms are generally reluctant to return free cash flow[31] to shareholders and tend to waste corporate resources on negative net present value investments or excessive consumption of perquisites. Jensen cites diversifying acquisitions made by acquirers with high free cash flow and few internal investment opportunities as examples of low-benefit or value-decreasing investments and points to those made by firms in oil, food and tobacco industries. Hanson (1992) finds evidence suggesting that high free cash flow acquirers tend to engage in relatively low-benefit takeovers. The Free Cash Flow Hypothesis (FCF) thus predicts a negative relationship between acquirers'

[31]Free cash flow is defined as cash flow in excess of that required to fund all positive NPV investments, discounted at an appropriate required rate of return.

TABLE III-4
IMPLICATIONS OF THE EFFICIENT STRUCTURE HYPOTHESIS

1	positive relation between merging-firm gains and acquiring-industry concentration
2	positive relation between merging-firm gains and the relative size of the acquisition
3	positive relation between merging-firm gains and the acquirer's relative efficiency
4	positive relation between merging-firm gains and the acquirer's size relative to its industry
5	negative relation between competitors' gains and acquiring-industry concentration
6	negative relation between competitors' gains and the relative size of the acquisition
7	negative relation between competitors' gains and the acquirer's relative efficiency
8	negative relation between competitors' gains and the acquirer's size relative to its industry

free cash flow and acquisition-related value gains.

D.FINANCIAL SLACK

Myers and Majluf (1984) show that under asymmetric information, there is a relative cost advantage to internal financing vis-a-vis external equity financing since common stock issues signal to investors that the firm's equity is overvalued. Myers and Majluf define "financial slack" to include "large holdings of cash or marketable securities, or the ability to issue default risk free debt"[32]. In effect,

[32]p. 188.

financial slack reduces the cost of capital which implies increased investment. Thus, slack adds value.

The theory suggests that the use of cash or riskless debt to finance acquisitions, versus risky debt or common stock, will have more positive valuation effects on acquirers' common stock. Since slack-rich acquirers are less likely to issue risky debt or equity, the Financial Slack Hypothesis (FSH) predicts that acquisition-related value gains are positively related to acquirers' financial slack. The FSH also predicts that value gains are higher where cash is the method of payment as opposed to common stock or debt securities.

Bruner (1988) finds that slack-rich bidders pair with slack-poor targets to create value, and bidders' returns are associated with increases in leverage (i.e., decreases in slack) around acquisitions, consistent with the FSH.

E.MANAGERIAL SELF-INTEREST

Mueller (1969) argues that acquisitions might be pursued by reasons of managerial self-interest[33]. In his view, since managers seek to maximize firm size in order to increase their compensation, both pecuniary and non-pecuniary, they employ too-low required rates of return in

[33]Jensen and Meckling (1976) provide a thorough analysis of the agency costs of the owner-manager relationship.

the evaluation of investment alternatives and are more likely to engage in negative-NPV acquisitions. In more general terms, Jensen and Meckling (1976) show that managerial departures from shareholder wealth maximization are likely to arise when outsiders (i.e., non-managers) contribute capital to the firm. These departures may take the form of excessive consumption of perquisites and perverted investment policy (including bad acquisitions). If the scope of such departures is constrained by product market competition, the Managerialism Hypothesis predicts a negative relation between acquiring-industry concentration and acquisition-related value gains[34]. Furthermore, assuming that past managerial behavior is reflected in poor profitability comparisons with competitors and that such behavior is expected to continue, the Managerialism Hypothesis predicts a positive relationship between acquisition-related change in value and acquirers' pre-acquisition profitability measured relative to competitors. In addition, if the acquisition of relatively large firms creates larger losses, then acquisition-related value gains should be negatively related to the relative size of the acquisition. To summarize, the Managerialism Hypothesis predicts (a) a negative relation between acquiring-industry concentration and acquisition-related value gains, (b) a

[34]Provided that concentration and competition are inversely related.

positive relation between acquirers' relative profitability and acquisition-related value gains, and (c) a negative relation between the relative size of the acquisition and merger gains.

F. HUBRIS

Roll's (1986) Hubris Hypothesis asserts that acquiring-firm managers tend to overestimate their ability to create value and thus pursue low- or no benefit acquisitions for which they overpay. It seems plausible that hubris should be positively related to the acquirer's relative profitability. If so, then the Hubris Hypothesis predicts a negative relation between acquirers' relative profitability and acquisition-related value gains.

IV. THE SAMPLE

The sample includes mergers and tender offers completed from 1973 through 1987 involving NYSE/AMEX-listed firms. An initial sample of 1315 acquired firms is obtained using the Distribution Codes found on the CRSP NYSE/AMEX tape. These codes identify exchanges of cash, stock and other securities in mergers, tender offers, leveraged buyouts and other control transactions in which the common shares of the acquired firm cease trading[35]. Acquiring firms' identities and other information are obtained from the Wall Street Journal Index (WSJI). At this point, 827 observations are screened from the initial sample of 1315 for reasons indicated in Table IV-1. For approximately 22% of the sample (290 observations), either no announcement of the combination is found or the acquirer is not listed on both CRSP and COMPUSTAT data files. Another 315 observations (24%) are either going-private transactions or involve foreign firms; and 64 observations (5%) involve the retirement of minority interests in subsidiaries by parent corporations. Furthermore, the comparability of financial data is improved by excluding mergers involving financial

[35]A screened sample of mergers and tender offers compiled from the CRSP Delisting Codes was supplied by Professor Shrieves for comparison purposes. All of the combinations on this list are included among the initial sample of 1315 identified from the Distribution Codes.

TABLE IV-1
SAMPLE SCREENS

		Number	Percent
INITIAL SAMPLE		1315	100%
SCREENS			
	No announcement	-132	10%
	Acquirer not on CRSP and COMPUSTAT	-158	12%
	Going-Private	-236	18%
	Foreign firm	-79	6%
	SIC > 5999 or regulated industry	-158	12%
	Acquired by Parent	-64	5%
REMAINING OBSERVATIONS		488	37%

and other service-oriented firms (SIC > 5999); mergers in regulated industries (i.e., railroads and public utilities) are excluded as well.

For each of 488 remaining observations, the WSJI is searched over the two years preceding the year of consummation, the consummation year, and up to five years following consummation for announcements of other completed acquisitions. In order to focus on the effects of individual combinations, observations are excluded if the acquirer completed at least one other "major" acquisition during the two pre-acquisition years, the acquisition year, or the year subsequent. For this purpose, other acquisitions are considered "major" if either the total assets or sales of the acquired firm(s) exceed 5% of the acquirer's assets or sales. Observations are also excluded if the 5% limit is not met and the assets or sales of the

other acquired firm exceed those of the sample acquired firm. The length of post-acquisition history ranges from one to five years following the year of consummation, depending on the absence of other acquisition activity. For example, if the acquirer completed a major merger in the fourth post-acquisition year, then the history for this observation is three years in length. At this point, the remaining sample consists of **176** mergers and tender offers.

This dissertation focuses primarily on long-run effects of corporate combinations both on merging firms and on acquirers' industry groups. In the construction of industry groups, each merging firm's primary 4-digit SIC code in the year prior to consummation is obtained from Standard & Poor's Registry of Corporations. Each acquirer's industry group consists of firms assigned by CRSP to the same 4-digit SIC category at the same time. These firms have complete COMPUSTAT and CRSP data, and both the number and identity of firms in each industry group remain constant over the sample period. For example, if the length of post-acquisition history is three years, financial data for the acquirer and each firm in its industry group span six fiscal years: the two years preceding the fiscal year of consummation, the year of consummation, and three years subsequent to consummation. Table IV-2 presents summary information on the number of acquiring-industry firms per merger.

TABLE IV-2
DISTRIBUTION OF FIRMS IN ACQUIRERS' INDUSTRY GROUPS

MAXIMUM	UPPER QUARTILE	MEAN	MEDIAN	LOWER QUARTILE	MINIMUM
62.0	10.0	8.9	5.0	3.0	1.0

The sample size is reduced by 34 observations for which no industry firms with sufficient COMPUSTAT and CRSP data are found. For **142** observations remaining, the number of firms per industry group ranges from 1 to 62 with mean and median values of 8.9 and 5.0, respectively, as shown in Table IV-2. Importantly, the data exhibit large variation in the composition of industry groups which, ceteris paribus, should improve the odds that significant relationships emerge from statistical analyses.

Table IV-3 shows the annual distribution of mergers and tender offers for both the initial sample and the screened sample. The initial sample of 1315 observations provides a meaningful basis for comparison since the sample characteristics should be representative of the population of mergers, tender offers and going-private transactions that occurred in this period. Note that the greater level of acquisition activity observed in the 1980s versus that of the 1970s is reflected in Table IV-3 Perhaps of greater importance, the initial and screened samples exhibit no obviously meaningful differences in the annual distribution of acquisitions when measured in percentage terms.

TABLE IV-3
DISTRIBUTION OF SAMPLE BY YEAR, 1973-1987

	INITIAL SAMPLE		SCREENED SAMPLE	
YEAR	NUMBER	% TOTAL	NUMBER	% TOTAL
1973	46	3.5%	2	1.4%
1974	43	3.3%	4	2.8%
1975	24	1.8%	2	1.4%
1976	47	3.6%	6	4.2%
1977	75	5.7%	11	7.8%
1978	97	7.4%	7	4.9%
1979	114	8.7%	14	9.9%
1980	86	6.5%	11	7.8%
1981	103	7.8%	7	4.9%
1982	100	7.6%	6	4.2%
1983	78	5.9%	17	12.0%
1984	124	9.4%	14	9.9%
1985	117	8.9%	10	7.0%
1986	145	11.0%	23	16.2%
1987	116	8.8%	8	5.6%
TOTAL	1315	100.0%	142	100.0%

Table IV-4 presents method of payment characteristics for both initial and screened samples. The initial sample consists of 781 (59%) all-cash-for-stock exchanges, 313 (24%) all-stock-for-stock exchanges, and 221 (17%) exchanges

TABLE IV-4
DISTRIBUTION BY METHOD OF PAYMENT

	INITIAL SAMPLE		SCREENED SAMPLE	
	NUMBER	%TOTAL	NUMBER	%TOTAL
CASH	781	59.4%	75	52.8%
STOCK	313	23.8%	45	31.7%
OTHER	221	16.8%	22	15.5%
	1315	100.0%	142	100.0%

not counted in either of the first two groups, including exchanges of debt and preferred stock and those involving mixed modes of payment. Note that the two samples appear similar in terms of method of payment.

Table IV-5 classifies the sample according to merging firms' "Relatedness", which is defined using 4-digit SIC codes obtained from Standard & Poor's Registry of Corporations from the year preceding consummation. The Registry lists all 4-digit industry groups in which a firm operates, and these lists provide the basis for a five-part classification scheme. Specifically, if the merging pair shares at least one common 4-digit SIC, the observation is assigned to the first group. If at least one common 3-digit SIC is shared, the observation is assigned to the second group provided it is not already counted in the first group. The process is repeated for 2- and 1-digit SICs, until the fifth group contains merging firms that share no common SICs.

TABLE IV-5
DISTRIBUTION OF ACQUISITIONS BY RELATEDNESS OF MERGING FIRMS

	NUMBER	%TOTAL
1 COMMON 4-DIGIT SIC	53	37.3%
2 COMMON 3-DIGIT SIC	11	7.8%
3 COMMON 2-DIGIT SIC	17	12.0%
4 COMMON 1-DIGIT SIC	36	25.4%
5 NO COMMON SIC	25	17.6%
TOTAL	142	100.0%

Table IV-6 reports the sample breakdown by the first digit of the acquirer's primary 4-digit SIC. Acquirers from manufacturing industries (2000<SIC<4000) comprise roughly two-thirds of the sample (98); mining and heavy construction (1000<SIC<2000) accounts for approximately 13% (19 observations); wholesale and retail (5000<SIC<6000) contribute about 10% (15 observations); and transportation and communications comprise roughly 7% (10 observations) of the sample.

TABLE IV-6
DISTRIBUTION OF ACQUISITIONS BY ACQUIRERS' 1-DIGIT SIC INDUSTRIES

SIC	NUMBER	%TOTAL	INDUSTRIES
1000	19	13.4%	Mining and Heavy Construction
2000	39	27.5%	Food & related products; Wood products; Paper; Publishing & Printing; Chemicals; Petroleum
3000	59	41.6%	Plastics; Steel; Building Products; Machinery & Equipment; Motor Vehicles
4000	10	7.0%	Transportation and Communications
5000	15	10.6%	Wholesalers and Retailers
TOTAL	142	100.0%	

V. DATA

The variables employed in this thesis consist of performance measures and financial ratios constructed for merging firms and firms in acquirers' 4-digit SIC industry groups. Performance measures are based on excess market value, the ratio of market value of equity to book value of equity, and announcement period abnormal returns. Financial ratios include return on total capital, free cash flow and the net debt ratio. In addition, the entropy provides a measure of concentration for acquirers' industries. Method of payment and relative size are measured as well. These variables are obtained using data from COMPUSTAT and CRSP files, and their construction and rationale for their use are described in this section. Descriptive statistics are reported at the end of this section.

A. PERFORMANCE MEASURES

Measurement of acquisition-related performance is based on short- and long-run changes in value. Short-run valuation effects are measured in terms of announcement period abnormal returns which reflect investors' expectations on the benefits of merger or tender offer. Long-run valuation effects are measured in terms of changes in the ratio of excess market value to sales and the ratio

of market to book value of equity from one through five years following consummation.

1. EXCESS MARKET VALUE

Under perfectly competitive conditions in product and factor markets, all firms and factors of production should earn normal profits, i.e., excess profits should be zero[36]. Under these conditions, the market value of an asset should equal replacement value[37], defined as the discounted present value of future earnings the asset is expected to produce. Assuming investor rationality and efficient capital markets, the value of the firm reflects both the expected rate of return on current and future investment and the volume of future investment opportunities. To the extent that expected return exceeds the required rate of return, i.e., the cost of capital for firms of similar risk, the value of the firm will exceed the replacement cost of investment. The difference between market value and replacement cost reflects the capitalized value of future excess profits attributable to economic and monopoly rents[38,39].

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[36]This requires, of course, that Ricardian rents equal zero. Excess profit consists of monopoly rents plus Ricardian, or economic, rents which arise from relative efficiency.

[37]The terms "replacement value" and "replacement cost" are used interchangeably.

[38]Excess profit can be either positive or negative and arises whenever price diverges from average cost.

[39]Excess market value normalized by sales (or, simply, excess market value, EVS) has been utilized in industrial organization studies to measure the capitalized value of

"Excess market value" is defined[40] as the difference between market and book values of common equity, divided by sales:

$$EVS_{it} = \frac{MVE_{it} - BVE_{it}}{SALES_{it}}$$

where

MVE_{it} = the market value of common equity, defined as the average of the annual high and low stock prices multiplied by the number of common shares outstanding[41],

BVE_{it} = year end book value of common equity

SLS_{it} = net sales.

EVS_{it} is constructed for each merging firm and each acquirer's industry group beginning two years prior to the year of consummation through as many as five years following consummation. The length of post-acquisition history is

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future excess profit attributable to monopoly power and relative efficiency. Thomadakis (1977) finds that EVS is positively related to both market share and industry concentration. Connolly and Hirschey (1984) document positive effects of advertising and research and development expenditures on EVS. Defusco, Philippatos and Choi (1988) find a positive relation between the expected returns of U.S.-based multinational enterprises and EVS. Other studies have used approximations to Tobin's q, which is defined as the ratio of market value to replacement cost and is closely related to EVS both in concept and construction. These studies include Lindenberg and Ross (1981), Hirschey (1982), and Smirlock, Gilligan and Marshall (1984). This discussion is not meant to be an exhaustive summary of previous uses of these measures. Rather, its purpose is to indicate that sufficient precedent exists for their use in this thesis.

[40]The implications of measurement error for ordinary least squares regression are discussed below.

[41]These data are obtained from COMPUSTAT which records annual high and low stock prices by calendar year and book value by fiscal year. For this reason, Market Value is measured with error.

determined by the absence of subsequent major acquisition activity described above.

The change in unadjusted excess market value, $dEVS_{it}$, is measured as the difference between the acquirer's EVS_{it} in each post-acquisition year and the merging firms' pre-acquisition, or "base period", combined excess market value. Base period excess market value, EVS_{ib} is constructed in two steps. First, the sales-weighted average EVS_{it} for each pair of merging firms is computed for each pre-acquisition year. Second, base period excess market value, EVS_{ib}, is computed as the simple average of the combined excess market values obtained in step one. The change in EVS_{it} for each post-acquisition year is computed relative to the base period combined excess market value:

$$dEVS_{it} = EVS_{it} - IEVS_{ib} \qquad t = 1,\ldots,5$$

Sales-weighted average excess market values are estimated for each acquirer's 4-digit SIC industry group **excluding the acquirer**, and these values are used to obtain changes in normalized excess market value as follows:

$$dNEVS_{it} = NEVS_{it} - NEVS_{ib}$$

where

$$NEVS_{it} = EVS_{it} - IEVS_{it}$$

$$NEVS_{ib} = EVS_{ib} - IEVS_{ib}$$

$IEVS_{it}$ and $IEVS_{ib}$ denote sales-weighted industry averages obtained from post-acquisition periods t and the base

period, respectively.[42] Changes in unadjusted and normalized excess market value provide evidence of the effects of acquisitions on the future excess profits of merging firms both in absolute terms and relative to acquirers' competitors.

2. RATIO OF MARKET VALUE TO BOOK VALUE OF EQUITY

The ratio of market value of equity to book value of equity is an approximation of Tobin's q and closely related to EVS both in concept and construction. The concept was formulated initially by Tobin (1969) as a measure of the propensity to invest and is defined as the ratio of market value to replacement cost. Since then, approximations of Tobin's q have been used in industrial organization studies of industry structure.[43] The approximation used here is the ratio of market value of equity to book value of equity (*MVB*):

$$MVB_{it} = \frac{MVE_{it}}{BVE_{it}}$$

Accepting the proposition that performance is correctly measured in terms of value creation, any such measure should reflect (1) the difference between expected and required rates of return (i.e., excess return) on both current and

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[42]Except for calculation of entropies and market shares, described below, industry groups do not include acquiring firms, and thus consist of acquirers' competitors.

[43]See references cited above for examples.

future investment and (2) the volume of future investment opportunities that offer returns in excess of capital costs. The comparison of *MVB* and *EVS* as measures of firm performance proceeds on the basis of these criteria. In order to focus the analysis, the following simplifying assumptions are made: (a) all cash flows are perpetual, (b) rational investors value future cash flow streams according to risk, (c) markets for financial capital are frictionless and perfectly competitive, and (d) replacement value of productive capital is measured without error. Note that assumption (a) implies future investment is made solely for replacement of productive capital.

Let *NOI* denote the firm's net operating income, defined as sales less operating costs. Then the market value of an unlevered firm is given by equation (1):

$$MV = NOI / k \tag{1}$$

where k denotes the cost of capital and depends solely on the risk of the future stream of *NOI*. The expected rate of return on investment is given by equation (2):

$$ROI = NOI / TA \tag{2}$$

where *TA* denotes the replacement value of total assets. Solving (2) for *NOI* and substituting into (1) yields:

$$MV = (ROI \times TA) / k \tag{3}$$

Then the ratio of market value to replacement value is

$$MVB = ROI / k$$

indicating that *MVB* reduces to the ratio of expected return to required return.

Excess market value normalized by sales is found to be

$$EVS = ((ROI/k) - 1) \times (TA/SLS)$$

$$= (MVB - 1) \times (TA/SLS).$$

Thus, *EVS* is equal to the difference between expected and required returns, expressed as a percentage of the required rate of return, adjusted by the ratio of replacement value to sales.

Returning to the criteria set forth above, *MVB* captures the difference between expected and required rates of return but is insensitive to the volume of future excess return investment opportunities. In contrast, *EVS* reflects both of these effects, the latter through the *TA* term. Moreover, through the sales term, *EVS* also captures the difference between price and average cost. To see this, note that higher (lower) dollar sales imply lower (higher) profit (i.e., price-cost) margins, holding *ROI* and scale of investment constant, which, in turn, reflects lower (higher) excess profit per unit of output. Since, in general, price diverges from average cost whenever (a) demand is less than perfectly elastic or (b) the firm is an inframarginal producer, *EVS* captures excess profit arising from market power and relative efficiency.

Since firm-level replacement cost data are not readily available, prior studies have typically used accounting book

values of assets in measures of excess market value and Tobin's q. However, a number of considerations suggests that this procedure introduces errors of measurement due primarily to distortions created by accounting convention. For example, expenditures for advertising and research and development are written off in the period incurred. If these expenditures represent investments in intangible capital that produce income beyond the current accounting period, then book values provide downwardly biased indicators of replacement values.[44] In addition, depreciation schedules employed for financial reporting purposes probably bear little resemblance to true economic depreciation.[45] Moreover, book values differ across firms by reason of alternative methods of inventory valuation and of depreciation of fixed assets. As an attempt to correct known errors of measurement, Lindenberg and Ross (1981) illustrates a set of adjustments designed to more closely align book value with replacement value. However, a

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[44]An attempt was made to adjust book values for advertising and research and development expenditures in the manner suggested by Weiss (1969) and Fruhan (1979). However, these data are missing from COMPUSTAT tapes for approximately two-thirds of the sample, and the attempt was therefore abandoned. However, in regressions described below, a dummy variable was included that was set equal to one if either advertising or research and development expenditures were non-zero or missing. Otherwise, the variable received a value of zero. In no case did the coefficient for this variable approach statistical significance.

[45]Economic depreciation (or appreciation) is defined as the change in value of an asset due to change in the present discounted value of future earnings.

combination of fairly burdensome data requirements and necessary (perhaps unrealistic) assumptions make this approach somewhat less than satisfactory.

Since unadjusted book values are employed in this thesis, the econometric implications of measurement error for ordinary least squares regression must be addressed. First, note that where measurement errors on the dependent variable are distributed with zero mean and uncorrelated with the regression disturbance, all of the basic OLS assumptions hold. Thus, OLS estimators retain their desirable properties, and hypotheses tests remain valid. However, even if measurement errors are distributed with non-zero mean, it can be shown that standard tests of hypotheses that true coefficients equal zero are still valid. As a final consideration, both Fruhan (1979) and Lindenberg and Ross (1981) provide evidence that whatever bias may exist is reasonably stable over time.[46] If so, then dependent variables employed here are measured without bias since they are in the form of changes rather than levels.

3. ANNOUNCEMENT-PERIOD ABNORMAL RETURNS

Short-run valuation effects of mergers and tender offers are measured in terms of announcement period cumulative abnormal returns (CAR) which reflect investors'

[46]See Fruhan Table 1-5 (p. 20) and Lindenberg and Ross Figure 2 (p. 23).

expectations on the benefits of combination. For each merging firm and each firm in acquirers' industry groups, daily common stock returns are obtained from the CRSP NYSE/AMEX file for the sample period (t_a-240, t_a+20), where t_a denotes the announcement date of the merger or tender offer. These data are used to obtain announcement period abnormal returns for acquirers, merger portfolios and acquiring-industry portfolios, and normalized acquiring-firm returns are measured as the difference between acquirers' returns and acquiring-industry portfolio returns. Merger portfolios consist of acquiring- and acquired-firm common stocks and are rebalanced daily to reflect market values at the end of the previous trading day. The construction of acquiring-industry portfolios is described below. For each set of returns, the estimation of market model parameters utilizes returns from (t_a-241, t_a-41) with which abnormal returns are estimated for (t_a-20, t_a+20). These returns are cumulated over three event windows, (t_a-20, t_a), (t_a-1, t_a), (t_a, t_a+20), and employed as dependent variables in cross-sectional regressions.

The market model is given by:

$$R_{it}=\alpha_i+\beta_i R_{mt}+\varepsilon_{it}$$

where R_{it} and R_{mt} are daily rates of return for the security or portfolio i and the CRSP value-weighted market portfolio, respectively. α_i and β_i are regression constants, and ε_{it}

is a random variable assumed to be normally and independently distributed with zero mean and constant variance σ_i^2.

Daily abnormal returns are estimated as market model prediction errors:

$$AR_{it} = R_{it} - (a_i + b_i R_{mt})$$

where a_i and b_i are OLS estimates of α_i and β_i, respectively.

The daily standardized abnormal return is obtained by dividing the estimate by its standard error:

$$SAR_{it} = AR_{it} / \hat{\sigma}_{it}$$

where

$$\hat{\sigma}_{it} = \hat{\sigma}_i \left(1 + \frac{1}{S} + \frac{r_{mt}^2}{\sum_{s=1}^{S} r_{ms}^2}\right)^{1/2}$$

and $s \in (1, \cdots, S)$ denotes the estimation period. Furthermore,

$$r_{mt} = R_{mt} - \bar{R}_m$$

$$\bar{R}_m = \frac{\sum_{s=1}^{S} R_{ms}}{S}$$

$$\hat{\sigma}_i = \left(\frac{[\sum_{s=1}^{S} (R_{is} - a_i - b_i R_{ms})^2]}{S-2} \right)^{1/2}$$

and a_i and b_i are OLS estimates. Note that under the null hypothesis of no wealth effect and given the stated assumptions on the regression disturbance, SAR_{it} is approximately standard normal.

The cumulative standardized abnormal return over an event period of T days is given by:

$$CSAR_i = \sum_{t=1}^{T} SAR_{it}$$

and the test statistic for the null hypothesis H_0: $CSAR_i = 0$ is

$$Z_i = \frac{CSAR_i}{T^{1/2}}$$

Furthermore, the test statistic for the hypothesis that the cross-sectional mean CAR is equal to zero is given by:

$$Z = \frac{\overline{CSAR}}{\sqrt{\frac{T}{N}}}$$

where T is the number of days in the event period and N is the number of firms (or portfolios).

Acquiring-industry portfolios are based on the correlations of market model residuals.[47] For the

[47]This is the same weighting scheme used in Langetieg, 1978.

estimation period $s \in (1,S)$ the daily residual is $e_{is} = R_{is} - a_i - b_i R_{ms}$. In a simple linear regression of market model residuals of the i^{th} merging firm on the residuals of the j^{th} industry firm, the slope coefficient is given by $\rho_{ij} = \left(\sum_{s=1}^{S} e_{is} e_{js}\right) / \sum_{s=1}^{S} e_{js}^2$, where $j \in (1,\ldots,n_i)$, and n_i is the number of firms in the ith acquirer's industry group, excluding the acquirer. To construct acquiring-industry portfolios, the weight assigned to each industry firm is $w_{ij} = \rho_{ij}^2 / \sum_{j=1}^{n_i} \rho_{ij}^2$; and the daily return for the acquiring-industry portfolio is given by $R_{iIs} = \sum_{j=1}^{n_i} w_{ij} R_{js}$. The difference between the ith acquirer's abnormal return and that of its industry portfolio is $NAR_{it} = AR_{it} - AR_{It}$, where AR_{It} is the daily abnormal return for the industry portfolio.

B. FINANCIAL RATIOS

Three financial ratios are computed for each acquirer and each firm in its industry group: return on capital, free cash flow, and the net debt ratio.

1. RETURN ON CAPITAL

Acquirers' relative efficiency is measured in terms of profitability relative to firms in the same 4-digit SIC industry group. Profitability is defined as the return on total capital as follows:

$$ROC_{it} = \frac{CF_{it} - TAX_{it}}{TC_{it}}$$

where

CF_{it} = Sales minus cost of goods sold minus selling,general and administrative expense, before depreciation and amortization. CF_{it} represents before-tax operating cash flow.

TAX_{it} = income tax paid, defined as income taxes from the income statement less the change in deferred tax balance sheet account

TC_{it} = total capital, defined as the sum of book values of long-term debt, preferred stock and common equity

Normalized return on capital (*NROC*) is measured as the difference between the acquirer's *ROC* and that of its industry, where industry return on capital (*IROC*) is constructed as the capital-weighted mean *ROC* across firms in the industry, and normalized return on capital in a given year t is measured as

$$NROC_{it} = ROC_{it} - IROC_{it}$$

2. FREE CASH FLOW

The measure of free cash flow is adapted from Gentry, et al. (1990) who present a hierarchy of cash flow relationships useful in the evaluation of managerial performance. The measure used here is the ratio of before-tax operating cash flow (CF_{it}) to the sum of fixed coverage expenditures (FCE_{it}), preferred stock dividends ($PDIV_{it}$) and taxes (TAX_{it}):

$$FCF_{it} = \frac{CF_{it}}{FCE_{it} + PDIV_{it} + TAX_{it}}$$

In terms of the Free Cash Flow Theory of corporate takeovers (Jensen 1986)), FCF reflects indirectly the extent to which management "bonds" itself to pay out the firm's future cash flow and thus should be positively related to the agency cost of free cash flow. The free cash flow of the acquirer's industry (*IFCF*) is computed as a sales-weighted average of the free cash flows of firms in the acquirer's four-digit SIC industry.

3. NET DEBT RATIO

The term "financial slack" is used by Myers and Majluf (1984) to refer to cash and marketable securities plus the ability to issue default-risk-free debt. In their model, financial slack has value since it allows the firm to accept positive net present value investments that might be

foregone otherwise. Bruner (1988) investigates the use of excess cash and debt capacity as a motive for merger using the "Net Debt Ratio":

$$NDR_{it} = \frac{Net\ Debt_{it}}{PSTK_{it} + CSTK_{it} + Net\ Debt_{it}}$$

Net debt equals long-term debt minus cash and marketable securities, and *PSTK* and *CSTK* represent book values of preferred stock and common stock, respectively. The Net Debt Ratio provides an inverse measure of financial slack and is analogous to the conventional long-term debt to total capital ratio adjusted for holdings of liquid assets. The Net Debt Ratio of the acquirer's industry (*INDR*) is computed as the asset-weighted average of the net debt ratios of firms in the acquirer's four-digit SIC industry.

C. ENTROPY

The relation between acquirers' industry structures and post-acquisition performance are explored in this thesis employing the entropy as a measure of structure. Entropy has been used in communication theory to measure the degree of randomness or uncertainty in a system.[48] For example, consider a discrete random variable with i=1,...,N possible

[48]The discussion of entropy is based on Horowitz and Horowitz (1968).

outcomes each with probability of occurrence p_i. The entropy in the system is given by

$$H = -\sum_{i=1}^{N} p_i \ln p_i$$

If only one outcome is possible, there is no uncertainty and $H = 0$. For a given number of possible outcomes, H reaches its maximum value where $p_i = p_j$ for all i and j, at which point $H = \ln N$. Note that maximum H is increasing in N.

Horowitz and Horowitz (1968) suggest that an analogous relationship exists between the entropy of a communication source and the competitiveness of an industry. The more intense is the nature of competition, the greater the uncertainty about which seller might be chosen by a randomly selected buyer. If the p_i represent market shares, then H attains a minimum value under pure monopoly (i.e., where only one seller exists) and a maximum value, given N, where firm sales are equally distributed. In addition, for a constant N, any change toward equalization of market share increases H. Thus, entropy is an inverse measure of concentration.

Entropy is defined as follows:

$$H_{it} = -\sum_{j=1}^{n_i} p_{jt} \ln p_{jt} \qquad 0 \leq H_{it} \leq \ln n_i$$

where n_i is the number of firms in the i^{th} acquirer's industry **including** the acquirer, and p_j is the market share of either the j^{th} industry firm or the acquirer.

In general, the purpose of measuring firm size distribution is to quantify the intensity of competition. However, no statistic of size distribution accounts for barriers to entry. Thus, measures such as the entropy, four-firm concentration ratio and Hirschmann-Herfindahl index, for example, provide incomplete measures of conduct. For example, if barriers to entry are low, competitive behavior is likely to prevail even in relatively concentrated industries. In addition, these measures capture neither regional variations in competitive behavior nor foreign-based competition.

One may correctly point out that since acquirers' industry groups consist only of large public firms, inferences about competitive behavior might not be generalizable to smaller firms. Nevertheless, since industry groups consist of the the largest firms in each 4-digit SIC, competitive relationships among these firms should weigh heavily in the determination of overall industry conduct and performance.

The entropy is used as a measure of concentration since it can be computed for all firms and industries for which sales data are available. In contrast, the four-firm concentration ratio is typically taken from the Census of

Manufacturers and is available only for manufacturing and mining industries.

D. METHOD OF PAYMENT

The qualitative variable $DCASH_i$ receives a value of one for all-cash transactions and a value of zero otherwise. In the Myers and Majluf (1984) model, stock-for-stock exchanges provide a signal to investors that the acquirer's stock is overvalued. Thus, value gains should be smaller in such transactions, ceteris paribus. On the other hand, *DCASH* may reflect depreciation tax benefits due to the write-up of the acquired firm's assets to the acquisition price in acquisitions accounted for as purchases, which are typically cash transactions.[49]

E.RELATIVE SIZE OF THE ACQUISITION

The relative size of the acquisition is measured by the variable $RSLS_i$ defined as the ratio of acquired firm's sales to that of the acquirer. Sales are computed as base period values in the manner described above. Asquith, Bruner and Mullins (1983), Scanlon, Trifts, and Pettway (1989) and Servaes (1991), among others, find relative size to be an

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[49]See Hayn (1989), for example.

important determinant of announcement period wealth effects of mergers and tender offers.

The relative size of the acquisition can be viewed as a measure of the magnitude of, or the basis for, efficiency gains, since if such gains arise from mergers and tender offers, they should be larger in acquisitions of larger firms. On the other hand, if mergers are driven by the desire to increase collusion, *RSLS* provides a measure of the effect of merger on concentration. In other words, the larger the relative size of the acquisition, the greater the change in concentration due to the merger.

F. THE RELATIVE SIZE OF THE ACQUIRER

The relative size of the acquirer is measured by AGS_1 which is defined as the ratio of the acquirer's sales to the sales of the acquirer's largest competitor. From an efficiency perspective, *AGS* provides a measure of potential gains from economies of scale or scope. Since the realization of these gains suggests that merging firms face declining long-run average costs, these gains should be greater for firms that have not yet attained minimum efficient scale. Such firms are likely to appear small relative to their competitors. On the other hand, *AGS* can be viewed as a measure of the impact of mergers on industry

concentration, and in this sense, *AGS* provides a measure of potential gains from increased collusion.

G. DESCRIPTIVE STATISTICS

The following seven tables report descriptive statistics and correlation coefficients for the dependent and independent variables employed in cross-sectional regressions. In Table V-1, descriptive statistics for "base period" characteristics of acquiring firms and their industry groups are shown. Table V-1 indicates that acquirers enjoyed positive excess market values and market to book values exceeding unity during the two years preceding acquisition. For excess market value (EVS), MEAN

TABLE V-1
DESCRIPTIVE STATISTICS FOR BASE PERIOD EVS AND MVB.
The prefix 'I' denotes the weighted mean value of the acquirer's industry; 'N' denotes the acquirer's normalized value defined as the merged firm's value minus the acquirer's industry mean. MAX is the maximum value; UQ is the 75th percentile; MEAN is the unweighted mean; MEDIAN is the 50th percentile; LQ is the 25th percentile; and MIN is the minimum value. The superscript * denotes statistical significance at the .10 level for H_0: MEAN = 0.

	MAX	UQ	MEAN	MEDIAN	LQ	MIN	N
EVS	2.545	0.256	0.150*	0.033	-0.053	-0.325	142
IEVS	1.407	0.219	0.146*	0.059	-0.051	-0.344	142
NEVS	2.557	0.075	0.004	-0.014	-0.124	-1.040	142
MVB	3.832	1.605	1.313*	1.097	0.843	0.416	142
IMVB	4.656	1.626	1.361*	1.212	0.874	0.469	142
NMVB	2.851	0.175	-0.048	-0.008	-0.319	-1.946	142

and MEDIAN values are 0.15 and 0.03, respectively, pointing to the presence of positively skewed data. These findings suggest that, on average, acquirers are expected to earn positive rents in the future.[50] Table V-1 also indicates that acquiring-industry firms are expected to earn positive rents (MEAN and MEDIAN values for IEVS are 0.14 and 0.05, respectively), so that, on average, acquirers seem roughly similar to their competitors during the pre-acquisition period in terms of expected excess profits (MEAN and MEDIAN values for NEVS are 0.004 and -0.014, respectively).

Table V-2 reports descriptive statistics for base-period measures of acquired firms' excess market value, market to book value, return on capital, free cash flow, and

TABLE V-2
DESCRIPTIVE STATISTICS FOR ACQUIRED FIRMS.
MAX denotes the maximum value; UQ denotes the 75th percentile; MEAN is the unweighted mean; MEDIAN is the 50th percentile; LQ denotes the 25th percentile; and MIN is the minimum value. The superscript * denotes statistical significance at the .10 level for H_0: MEAN=0.

	MAX	UQ	MEAN	MEDIAN	LQ	MIN
EVS	5.991	0.182	0.16	0.027	-0.068	-0.765
MVB	8.712	1.563	1.32*	1.067	0.786	0.452
ROC	0.293	0.201	0.11*	0.158	0.116	-6.343
FCF	25.99	7.758	7.04*	4.352	2.898	-3.427
NDR	1.117	0.595	0.45*	0.482	0.360	-0.825

[50]Inferences based on the levels of EVS and MVB shown in Table V-1 must be made with caution, since the levels of these variables may be biased. As previously argued, differences in the levels of various approximations for Tobin's q seem reasonably stable over time, so that if EVS and MVB are biased, the biases should cancel out on taking differences.

net debt ratios. Comparison of Table V-2 with Table V-1 suggests that acquired firms appear undervalued relative to acquirers and less profitable as well. The data also indicate that merging firms appear similar in terms of free cash flow and net debt ratios.

Table V-3 reports summary statistics for post-acquisition changes in excess market value and market to book values. The data indicate that, on average, the excess market values of both merging firms and acquiring-industry groups increase following combination. MEAN values for dEVS and dIEVS are positive and statistically significant in each of the first four post-acquisition years, and MEDIAN values generally increase throughout the post-acquisition period. In addition, merging firms exhibit relatively poor performance in comparison with acquiring-industry firms. MEAN values for dNEVS are negative in years two through five and statistically significant in years three and five, and MEDIAN values are negative and consistently declining throughout the post-acquisition period. These data seem consistent with an explanation of mergers and tender offers based on collusive behavior. However, large dispersion in these measures makes tenuous any conclusions based on cross-sectional means.

Table V-4 reports descriptive statistics for announcement period CARs of acquiring-firms (AG), merger portfolios (MP), normalized acquiring-firm returns, and

TABLE V-3

DESCRIPTIVE STATISTICS FOR CHANGES IN EVS AND MVB.

The prefix 'dI' denotes the change in the weighted mean value of acquirers' industries; 'dN' denotes the change in normalized value defined as change in merged firm's value minus change in acquirer's industry mean value. MAX is the maximum value; UQ is the 75th percentile; MEAN is the unweighted mean change; MEDIAN is the 50th percentile; LQ is the 25th percentile; and MIN is the minimum value. The superscript * denotes statistical significance at the .10 level respectively for H_0: MEAN = 0.

	MAX	UQ	MEAN	MEDIAN	LQ	MIN	N
dEVS1	1.480	0.131	0.052*	0.024	-0.044	-0.912	142
dEVS2	1.507	0.151	0.057*	0.033	-0.077	-1.420	117
dEVS3	0.939	0.136	0.042	0.051	-0.053	-0.959	97
dEVS4	1.371	0.202	0.066*	0.067	-0.092	-1.012	81
dEVS5	1.210	0.132	0.039	0.081	-0.021	-1.502	57
dNEVS1	1.269	0.093	0.015	-0.007	-0.094	-0.844	142
dNEVS2	1.260	0.095	0.002	-0.028	-0.156	-1.518	117
dNEVS3	0.755	0.075	-0.056*	-0.030	-0.183	-1.184	97
dNEVS4	1.095	0.137	-0.055	-0.067	-0.193	-1.186	81
dNEVS5	0.678	0.073	-0.101*	-0.073	-0.180	-1.537	57
dIEVS1	0.820	0.117	0.037*	0.039	-0.043	-0.865	142
dIEVS2	0.675	0.163	0.056*	0.051	-0.048	-0.820	117
dIEVS3	1.004	0.179	0.087*	0.073	-0.035	-0.988	97
dIEVS4	0.837	0.235	0.120*	0.125	-0.011	-0.571	81
dIEVS5	1.016	0.265	0.140*	0.123	0.001	-0.576	57
dMVB1	2.477	0.383	0.114*	0.073	-0.180	-1.714	142
dMVB2	5.247	0.391	0.185*	0.123	-0.199	-1.526	117
dMVB3	12.687	0.379	0.284*	0.158	-0.162	-1.356	97
dMVB4	4.154	0.472	0.061	0.171	-0.318	-1.024	81
dMVB5	3.458	0.550	0.249*	0.235	-0.109	-1.612	57
dNMVB1	1.912	0.241	-0.031	-0.025	-0.323	-1.890	142
dNMVB2	2.964	0.311	0.008	-0.097	-0.327	-1.970	117
dNMVB3	12.120	0.240	0.013	-0.123	-0.557	-1.584	97
dNMVB4	2.575	0.303	-0.258	-0.232	-0.572	-1.712	81
dNMVB5	2.299	0.492	-0.065	-0.150	-0.568	-2.331	57
dIMVB1	3.965	0.377	0.145*	0.120	-0.070	-2.416	142
dIMVB2	2.283	0.414	0.177*	0.219	-0.107	-2.300	117
dIMVB3	4.248	0.543	0.239*	0.216	-0.107	-2.824	97
dIMVB4	1.772	0.688	0.313*	0.332	-0.014	-1.646	81
dIMVB5	1.613	0.714	0.314*	0.293	-0.054	-1.669	57

TABLE V-4

DESCRIPTIVE STATISTICS FOR ANNOUNCEMENT PERIOD CARs. Acquiring-firm (AG), merger portfolio (MP), normalized acquiring-firm (NAG) and acquiring-industry portfolio CARs (AGI). MAX is the maximum value; UQ is the 75th percentile; MEAN is the unweighted mean; MEDIAN is the 50th percentile; LQ is the 25th percentile; MIN is the minimum value; the superscript * denotes statistical significance at the .10 level for H_0: MEAN = 0. The test statistic is described in the text.

	Event Window	MAX	UQ	MEAN	MEDIAN	LQ	MIN
AG	-20,0	0.2574	0.0412	-0.014*	-0.0149	-0.0709	-0.3199
AG	-1,0	0.1557	0.0118	-0.013*	-0.0114	-0.0446	-0.1271
AG	0,+20	0.4127	0.0507	0.0056	0.0027	-0.0475	-0.1912
MP	-20,0	0.4040	0.1306	0.0625*	0.0459	-0.0185	-0.1738
MP	-1,0	0.2688	0.0453	0.0252*	0.0163	-0.0070	-0.0798
MP	0,+20	0.2203	0.0410	0.0007	0.0002	-0.0389	-0.2574
NAG	-20,0	0.2221	0.0472	-0.018*	-0.0199	-0.0702	-0.3119
NAG	-1,0	0.1556	0.0135	-0.015*	-0.0173	-0.0479	-0.1374
NAG	0,+20	0.3375	0.0595	0.0052	0.0006	-0.0447	-0.3943
AGI	-20,0	0.2418	0.0406	0.0038	0.0002	-0.0465	-0.1602
AGI	-1,0	0.0747	0.0110	0.0015	0.0005	-0.0092	-0.0493
AGI	0,+20	0.5426	0.0345	0.0004	-0.0091	-0.0466	-0.1956

acquiring-industry portfolios (AGI). The results indicate that, on average, acquiring-firm shareholders suffer statistically significant wealth losses, both in absolute and normalized terms, during the period preceding announcement. CARs for merger portfolios, reflecting the gains for acquired-firm shareholders, are positive and statistically significant in each event window leading up to announcement. These results are generally consistent with

previous findings that suggest overall positive wealth effects with most of the gains (and more) going to acquired-firm shareholders. However, note that large dispersion in the data, again, calls into question inferences based on cross-sectional mean returns.

TABLE V-5

PEARSON CORRELATION COEFFICIENTS FOR EXPLANATORY VARIABLES. The superscript * denotes statistical significance at the .10 levels.

	H	NROC	NDR	FCF	RSLS	AGS	IROC	IFCF
H	1.00							
NROC	0.06	1.00						
NDR	0.08	0.02	1.00					
FCF	-0.00	0.04	-0.28*	1.00				
RSLS	-0.04	-0.06	-0.12	-0.06	1.00			
AGS	-0.24*	0.08	0.06	-0.02	-0.15*	1.00		
IROC	0.02	-0.27*	0.08	0.07	-0.21*	-0.13	1.00	
IFCF	0.22*	-0.07	-0.17*	0.20*	0.04	-0.06	0.19*	1.00
INDR	0.10	-0.01	0.44*	-0.12	0.03	-0.34*	-0.18*	-0.18*

TABLE V-6
PEARSON CORRELATION COEFFICIENTS FOR DEPENDENT AND EXPLANATORY VARIABLES.
* denotes statistical significance at the .10 level.

	H	NROC	NDR	FCF	RSLS	AGS	INDR	IFCF
dEVS1	-0.16*	0.01	-0.02	-0.06	0.28*	-0.00	0.01	0.01
dEVS2	-0.18*	-0.11	0.01	-0.04	0.26*	0.01	0.03	0.02
dEVS3	-0.15	-0.24*	0.10	-0.08	0.23*	0.07	-0.01	0.12
dEVS4	-0.04	-0.28*	0.08	-0.10	0.20*	0.07	-0.06	0.19*
dEVS5	-0.11	-0.23*	0.27*	-0.07	0.03	0.11	0.06	-0.15
dNEVS1	-0.19*	-0.02	-0.12	-0.06	0.25*	-0.02	-0.07	-0.22*
dNEVS2	-0.20*	-0.16*	-0.13	-0.01	0.21*	-0.13	-0.05	-0.11
dNEVS3	-0.28*	-0.26*	-0.08	-0.03	0.22*	-0.18*	0.03	-0.06
dNEVS4	-0.14	-0.37*	-0.02	-0.06	0.26*	-0.19*	-0.01	-0.05
dNEVS5	-0.06	-0.34*	0.19	-0.01	-0.16	-0.26*	0.24*	-0.32*
dIEVS1	0.03	0.05	0.13	-0.01	0.04	0.03	0.12	0.32*
dIEVS2	0.05	0.09	0.22*	-0.03	0.05	0.22*	0.13	0.20*
dIEVS3	0.06	0.05	0.24*	-0.03	0.00	0.30*	-0.04	0.19*
dIEVS4	0.13	0.11	0.13	-0.05	-0.07	0.36*	-0.06	0.32*
dIEVS5	-0.05	0.17	0.07	-0.08	0.26*	0.51*	-0.25*	0.25*
dMVB1	-0.14*	0.01	0.15*	-0.05	0.25*	0.03	0.07	-0.02
dMVB2	-0.10	-0.07	0.19*	-0.04	0.28*	0.05	0.09	0.01
dMVB3	-0.01	-0.24*	0.21*	-0.05	0.20*	0.03	-0.01	0.02
dMVB4	0.05	0.12	0.05	-0.03	-0.05	0.16	0.09	0.06
dMVB5	0.01	-0.01	0.36*	-0.07	-0.01	0.11	0.18	-0.16
dNMVB1	-0.07	0.02	-0.01	-0.02	0.07	-0.01	-0.04	-0.23*
dNMVB2	-0.08	-0.14	0.04	-0.01	0.21*	-0.08	-0.00	-0.07
dNMVB3	-0.04	-0.25*	0.10	-0.03	0.15	-0.06	-0.01	-0.02
dNMVB4	0.01	0.09	-0.02	-0.00	-0.05	0.05	0.07	-0.03
dNMVB5	-0.02	-0.08	0.24*	-0.01	-0.17	-0.18	0.25*	-0.32*
dIMVB1	-0.08	-0.00	0.17*	-0.03	0.18*	0.04	0.10	0.17*
dIMVB2	-0.05	0.07	0.23*	-0.05	0.16*	0.17*	0.14	0.10
dIMVB3	-0.02	-0.01	0.27*	-0.05	0.13	0.19*	0.01	0.10
dIMVB4	0.10	0.06	0.20*	-0.07	0.01	0.29*	0.04	0.24*
dIMVB5	0.04	0.10	0.17	-0.09	0.20	0.38*	-0.08	0.20

TABLE V-7

DESCRIPTIVE STATISTICS FOR EXOGENOUS VARIABLES.

MAX is the maximum value; UQ is the 75th percentile; MEAN is the unweighted mean change; MEDIAN is the 50th percentile; LQ is the 25th percentile; and MIN is the minimum value. The superscript * denotes statistical significance at the .10 level for H_0: MEAN = 0.

	MAX	UQ	MEAN	MEDIAN	LQ	MIN	N
H	2.763	1.563	1.171*	1.218	0.644	0.053	142
NROC	0.176	0.038	0.009*	0.003	-0.021	-0.176	142
FCF	524.76	9.056	11.55*	5.443	3.488	-2.481	142
NDR	0.838	0.574	0.468*	0.490	0.368	-0.123	142
RSLS	4.351	0.692	0.556*	0.247	0.106	0.008	142
AGS	12.66	0.940	0.928*	0.670	0.137	0.001	142
IROC	0.351	0.196	0.164*	0.167	0.134	-0.008	142
IFCF	538.70	10.65	18.23*	6.466	4.203	-0.316	142
INDR	0.892	0.572	0.480*	0.490	0.397	-0.370	142

VI. METHODOLOGY AND HYPOTHESES

A primary purpose of this research is to evaluate the nature of empirical support for the "strategic" theories formulated in section III as the Economies of Scale and Scope Hypothesis (ESSH), the Differential Efficiency Hypothesis (DEH), the Efficient Structure Hypothesis (ESH) and the Collusion Hypothesis (CH). Evidence on the long-run economic importance of the Free Cash Flow Hypothesis (FCFH), Financial Slack Hypothesis (FSH), Managerialism Hypothesis (MH) and Hubris Hypothesis (HH) is reported as well. The evaluation of these theories utilizes a two-equation system of simultaneous equations leading to a series of hypothesis tests described in section VI.A. The second primary focus of this research involves a test of capital market efficiency based on the relation between announcement-period returns and long-run changes in excess market value. These tests are described in section VI.B.

A. STRATEGIC THEORIES OF CORPORATE COMBINATIONS

The statistical framework introduced in this research derives from the following maintained hypotheses:

1. The market structure effects of mergers impact merging firms and their rivals.

2. These effects are unlikely to materialize in either financial statements or market values for several years following consummation.

3. The financial statements and market values of competing firms are affected similarly by macroeconomic and industry-wide conditions.

The strategic theories imply that shareholder gains and losses arise from the "market stucture" effects of corporate combinations which consist of changes in the competitive positions (or relative efficiency) of merging firms and changes in competitive behavior (or collusion) in the product- and input markets in which merging firms operate. From the theory of the firm, it follows that these changes impact the values of merging firms and their rivals. For example, changes in relative efficiency imply that the values of merging firms and their rivals move in opposite directions while changes in collusion imply that these values move together.[51]

Market structure effects are unlikely to materialize in either financial statements or market values for several years following consummation. If, for example, the motive for a given merger is to obtain economies of scale or scope, relative efficiency gains will not be reflected in financial statements until the procurement and deployment of new plant or equipment rationalized by the combination has been accomplished. This process is likely to require years to

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[51]See section III.

complete with a highly uncertain outcome. Furthermore, in the presence of informational asymmetry between insiders and outsiders, investors would be unlikely to act on unsubstantiated claims about the benefits of mergers. Rather, they would respond only when substantiating evidence materializes, for example, in the form of corporate earnings reports. Therefore, under quite plausible conditions, announcement-period stock returns are unlikely to reflect the market structure effects of corporate combinations. For this reason, the nature of empirical support for the strategic theories is evaluated on the basis of evidence taken from three- to five-year post-acquisition periods.

The rationale for employing simultaneous equations rests on the notion that, in general, changes in macroeconomic and industry conditions affect the values of similar (i.e., competing) firms in more or less the same direction. Consequently, the values of merging firms and their rivals tend to move together for reasons unrelated to mergers, especially where changes in value are measured over periods of several years in length. As shown below in this section, failure to account for common effects can produce biased estimates of the relation between changes in value and sources of gain and loss.

The simultaneous equations framework employed in this research represents an innovation on existing methodologies in that it uses information largely overlooked in previous

studies. An important problem of merger studies in general stems from the fact that corporate combinations are heterogeneous phenomena, i.e., individual mergers can be driven by one or more of a number of motivations and can have a variety of possible effects. For example, Williamson (1968) shows that individual horizontal mergers can produce simultaneously gains from both efficiency improvements and increased collusion. Consequently, broad-based market structure effects may be difficult to identify. This research overcomes the problem, at least to some extent, by comparing the behavior of merging-firm values with that of rival-firm values. For example, since relative efficiency gains imply that the values of merging firms and their rivals move in opposite directions, sources of gain (loss) for merging firms are sources of loss (gain) for their rivals. On the other hand, since increased collusion implies that the values of merging firms and their rivals move together, sources of gain are the same for both sets of firms. The simultaneous equations methodology provides an integrated framework for capturing information on the differential behavior of merging-firm values and rival-firm values with respect to sources of gain and loss. This framework involves a series of tests of cross-equation restrictions on model parameters.

Another distinguishing feature of this research is that it employs a more comprehensive set of measures of sources

of gain than is characteristic of previous studies. These measures reflect acquirers' relative efficiency, competitive behavior in acquirers' industries, the impact of mergers on competitive behavior, and the magnitude of bases of efficiency gains. Other variables reflect gains that might arise from financial restructurings. While previous studies tend to focus either on market stucture effects or on financial effects, this research incorporates both in an integrated framework.

1. THE SIMULTANEOUS EQUATIONS MODEL

The model is specified by equations (1) and (2):[52]

$$dEVS_{it} = a_0 + a_1 dIEVS_{it} + a_2 H_{i0} + a_3 RSLS_{i0} + a_4 AGS_{i0} + a_5 NROC_{i0} + a_6 FCF_{i0} + a_7 NDR_{i0} + e_{it} \quad (1)$$

$$dIEVS_{it} = b_0 + b_2 H_{i0} + b_3 RSLS_{i0} + b_4 AGS_{i0} + b_5 NROC_{i0} + b_6 IFCF_{i0} + b_7 INDR_{i0} + u_{it} \quad (2)$$

where

dEVS	=	change in merging-firm EVS
dIEVS	=	change in acquiring-industry EVS
H	=	acquiring-industry entropy
RSLS	=	target sales / bidder sales

[52]The disturbances in each equation are assumed to be normally and independently distributed random variables, each with expected value of zero and constant variance. The contemporaneous correlation between the disturbances is assumed to be nonzero. Although the discussion of the model is couched in terms of dEVS and dIEVS, the model is estimated for dMVB and dIMVB and for announcement-period CARs, as well.

AGS	=	bidder sales / sales of bidder's largest rival
NROC	=	acquirer's normalized return on capital
FCF	=	acquirer's free cash flow
NDR	=	acquirer's net debt ratio
IFCF	=	acquiring-industry free cash flow
INDR	=	acquiring-industry net debt ratio

Equation (1) asserts that the change in merging-firm EVS is related linearly to contemporaneous changes in acquiring-industry excess market value (dIEVS), the distribution of firm size in the acquirer's industry, i.e., concentration as measured by the entropy (H), the acquirer's relative profitability (NROC) and relative size (AGS), the acquirer's free cash flow (FCF) and net debt ratio (NDR), and the relative size of the acquisition (RSLS). The endogenous variables are dEVS and dIEVS, and the remaining variables are exogenous.

The inclusion of dIEVS in equation (1) establishes the system of simultaneous equations. The argument for including dIEVS among the regressors in (1) stems from the notion that in general the values of firms in an industry are affected similarly by changes in macroeconomic and industry-wide conditions. Inclusion of dIEVS in equation (1) provides a control for such effects that would otherwise lead to biased estimates of the other parameters. For example, suppose that the "true" model is given by (A) and (B) and that equation (C) is estimated:

$$dEVS_{it} = a_0 + a_1 dIEVS_{it} + a_4 AGS_{i0} + E_{it} \qquad (A)$$

$$dIEVS_{it} = b_0 + b_4 AGS_{i0} + U_{it} \quad (B)$$

$$dEVS_{it} = c_0 + c_4 AGS_{i0} + e_{it}. \quad (C)$$

Equation (C) is in reduced form, and the coefficient c_4 reflects both the direct effect of AGS on dEVS and the indirect effect operating through dIEVS; i.e., $c_4 = a_1 b_4 + a_4$. By the ESSH, for example, the change in merging-firm value (dEVS) is related negatively to AGS ($a_4 < 0$) while the change in acquiring-industry value (dIEVS) is related positively to AGS ($b_4 > 0$). However, if a_1 tends to be positive, then c_4 provides an upwardly biased estimate of a_4 under the ESSH. Thus, the estimate of c_4 is not meaningful for tests of the ESSH. This argument can be extended to other hypotheses and other variables.

In broad terms, changes in acquiring-industry excess market value, dIEVS, depend on the market structure effects of mergers (i.e., on collusive and efficiency effects) and on factors unrelated to mergers (e.g., changes in macroeconomic and industry-wide conditions). Consequently, a_1 in equation (1) tends to be positive regardless of the effects of acquisitions,[53] making this coefficient unsuitable for hypothesis testing. For example, relative efficiency gains imply that merging-firm values and acquiring-industry values move in opposite directions.

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[53]Recall the findings of Langetieg (1978) and Chung and Weston (1982), cited in Section II, which suggest that the post-acquisition returns of merging firms and acquiring industries tend to be positively correlated.

Thus, the efficiency-based theories, for example, would be supported by a finding that $a_1 < 0$. However, to reject these hypotheses on the basis of $a_1 > 0$ imposes an unduly burdensome test since a_1 tends to be positive for reasons unrelated to the acquisition. In other words, in a test of efficiency theories based on H_0: $a_1 => 0$, the probability of a Type II error is unacceptably high.[54] On the other hand, the Collusion Hypothesis is clearly inconsistent with $a_1 < 0$ but is not necessarily supported by $a_1 > 0$. Therefore, in a test of the Collusion Hypothesis based on H_0: $a_1 <= 0$, the probability of a Type I error is unacceptably high.

Equation (2) asserts that changes in acquiring-industry EVS are related linearly to the market structure effects of mergers (as reflected in H, RSLS, AGS and NROC) and to industry free cash flow (IFCF) and net debt ratio (INDR). Market structure effects are discussed in section III. The inclusion of IFCF in equation (2) stems from the notion, put forth by Jensen (1986), that significant agency costs are associated with large free cash flow. These costs derive from managers' reluctance to return free cash flow to investors and their tendency to waste it on value-decreasing investments. The inclusion of INDR in equation (2) reflects

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[54]A Type I error is defined as the false rejection of the null hypothesis, i.e., the rejection of H_0 when it is true. A Type II error is the false acceptance of H_0, i.e., the failure to reject H_0 when it is false.

the Myers and Majluf (1984) argument that financial slack adds value since it enables firms to undertake value-increasing investments that might be foregone otherwise.

2. ESTIMATION

Equations (1) and (2) are estimated via three stage least squares regressions (3SLS). Generally speaking, consistent estimation of a system of equations cannot be accomplished using ordinary least squares regression since the disturbances are correlated with the endogenous variables employed as regressors. 3SLS removes this correlation (asymptotically) by using predicted values of the endogenous variables as regressors instead of their actual values. Predicted values are obtained from reduced form OLS regression of the right-hand-side endogenous variable on all of the exogenous variables in the system. Substitution of predicted values into the regression equation produces two stage least squares (2SLS) estimators that are asymptotically consistent. However, if the disturbances are contemporaneously correlated across equations, 2SLS estimators are not asymptotically efficient. The residuals from second stage regressions can be used to obtain consistent estimates of the error correlation matrix with which 3SLS estimates can be obtained that are asymptotically consistent and efficient.[55]

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[55]In the estimation of a system of simultaneous equations, the main distinguishing feature of the exogenous variables is that they are uncorrelated with the disturbances of the

3. HYPOTHESIS TESTS

The evaluation of empirical support for the strategic theories utilizes three statistical tests designed to overcome the difficulty, noted above, of identifying significant relations in heterogeneous samples of mergers and tender offers.[56] The analysis utilizes information on the differential behavior of merging-firm values and acquiring-industry values with respect to potential market structure effects in hypothesis tests on individual coefficients and on cross-equation coefficient differences. The purposes are to evaluate the extent to which corporate combinations improve the relative efficiency of merging firms, to identify the source(s) of relative efficiency gains (if such gains appear to exist), and to examine effects on the intensity of competition in acquiring-firms' industries.

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equation in which they appear. A test of the hypothesis formulated by Spencer and Berk (1981) was conducted for each of the exogenous variables in equation (1). In each case, the null hypothesis of no correlation was not rejected at the .10 level of significance. In addition, tests of overidentifying restrictions on the structural parameters were conducted in accordance with Wegge (1978). For equation (1), the null hypothesis that the coefficients of IFCF and INDR equal zero was not rejected at the .10 level. For equation (2), the hypothesis that the coefficients of FCF and NDR equal zero was rejected at the .10 level of significance but not at the .05 level.

[56]Econometric problems associated with measurement error and the use of proxy variables, characteristic of studies of this nature, compound the difficulty.

Each of the strategic theories is evaluated against an unspecified null hypothesis in a series of three tests. Given the heterogeneous nature of mergers and tender offers, the data are unlikely to point clearly to any single theory as an overriding explanation. The more probable result is that, say, one or two theories appear to be more consistent with the data than others. Therefore, in view of the comparative nature of the analysis and the heterogeneity of corporate combinations, the series of tests is formulated in a manner such that each test is less stringent than the one prior. The tests are described in Panels A, B and C of Table VI-1.

The "first-level" tests are described in Panel A and focus on individual coefficients.[57] In these tests, the theory under consideration is rejected if the sign of at least one of the coefficients differs from that implied by the theory or at least one of the coefficients is not significantly different from zero. For example, the Collusion Hypothesis (CH) implies that the coefficients of H, RSLS, and AGS in equations (1) and (2) take the following signs:

CH1: $a_2 < 0$, $a_3 > 0$, $a_4 > 0$, $b_2 < 0$, $b_3 > 0$, $b_4 > 0$.

Thus, at the first level, the CH is rejected unless the sign of each coefficient is consistent with CH1 and statistically

[57]Predictions on the signs of the coefficients are based on the discussion in section III.

Table VI-1

HYPOTHESIS TESTS FOR STRATEGIC THEORIES

Panel A summarizes the implications of the CH, ESSH, DEH and ESH for the signs of individual coefficients. Panel B summarizes the implications for coefficient differences across equations. Panel C summarizes the implications for sums of cross-equation coefficient differences.

PANEL A: FIRST-LEVEL TESTS: INDIVIDUAL COEFFICIENTS								
	EQUATION 1				EQUATION 2			
HYPOTHESIS	a_2 H	a_3 RSLS	a_4 AGS	a_5 NROC	b_2 H	b_3 RSLS	b_4 AGS	b_5 NROC
C1	−	+	+		−	+	+	
ESSH1		+	−	−		−	+	+
DEH1		+	+	+		−	−	−
ESH1	−	+	+	+	+	−	−	−

PANEL B: SECOND-LEVEL TESTS: COEFFICIENT DIFFERENCES				
C2	$a_2-b_2=0$	$a_3-b_3=0$	$a_4-b_4=0$	
ESSH2		$a_3-b_3>0$	$a_4-b_4<0$	$a_5-b_5<0$
DEH2		$a_3-b_3>0$	$a_4-b_4>0$	$a_5-b_5>0$
ESH2	$a_2-b_2<0$	$a_3-b_3>0$	$a_4-b_4>0$	$a_5-b_5>0$

PANEL C: THIRD-LEVEL TESTS: SUMS OF DIFFERENCES	
C3	$a_2-b_2 + a_3-b_3 + a_4-b_4 = 0$
ESSH3	$a_3-b_3 + b_4-a_4 + b_5-a_5 > 0$
DEH3	$a_3-b_3 + a_4-b_4 + a_5-b_5 > 0$
ESH3	$b_2-a_2 + a_3-b_3 + a_4-b_4 + a_5-b_5 > 0$

significant at the .10 level or better. The Economies of Scale and Scope Hypothesis (ESSH) implies that the coefficients of RSLS, AGS and NROC take the following signs:

ESSH1: $a_3 > 0$, $a_4 < 0$, $a_5 < 0$, $b_3 < 0$, $b_4 > 0$, $b_5 > 0$

The ESSH is rejected in the first-level test unless the sign of each coefficient is consistent with ESSH1 and significantly different from zero at the .10 level or better. First-level tests of the Differential Efficiency Hypothesis (DEH) and Efficient Structure Hypothesis (ESH) proceed in the same manner.

Given the heterogeneous nature of corporate combinations, the first-level tests are likely to be overly stringent. Hence, the second-level tests focus on cross-equation coefficient differences. For example, the CH implies that the relevant coefficients in equation (1) are equal in sign and magnitude to comparable coefficients in equation (2) (see Panel B). The second-level test of the CH is structured as follows:

$$\text{CH2: } a_2 - b_2 = a_3 - b_3 = a_4 - b_4 = 0.$$

An F-statistic is computed for the restrictions embodied in CH2, and the CH is rejected if the probability of observing an F-value greater than the test statistic is less than .10 or if any of the coefficient differences are significantly different from zero.

The ESSH implies that the coefficients of RSLS, AGS and NROC in equation (1) are of opposite sign from the

comparable coefficients in equation (2) and that the signs of these differences are as follows: $a_3-b_3>0$, $a_4-b_4<0$, and $a_5-b_5<0$. Thus, the second-level test of the ESSH is structured as follows:

ESSH2: $a_3 - b_3 = a_4 - b_4 = a_5 - b_5 = 0$.

An F-statistic is computed for the restrictions embodied in ESSH2. In this test, the ESSH is rejected unless the test statistic is significant at the .10 level or better and the sign of each statistically significant difference is consistent with the ESSH. The second-level tests of the DEH and ESH are structured in a similar manner.

In the second-level test of the CH, the theory is rejected if the test statistic is significant, regardless of the signs of the differences. On the other hand, the ESSH, DEH and ESH are rejected if the test statistics are not significant or if the signs of any of the significant differences are inconsistent with the theory being tested.

Third-level tests are based on sums of coefficient differences (see Panel C). For example, the third-level test of the CH is structured as follows:

CH3: $a_2 - b_2 + a_3 - b_3 + a_4 - b_4 = 0$.

The CH is rejected if the sum is significantly different from zero, where statistical significance is based on the computed F-value. Note that CH3 is a less stringent test than CH2 since one or more of the differences can be

statistically significant while the sum remains non-significant.

The third-level test of the ESSH is given by

ESSH3: $a_3 - b_3 + b_4 - a_4 + b_5 - a_5 = 0$.

The third-level tests of the efficiency theories are formulated such that positive differences are consistent with the theories. For example, the ESSH is rejected unless the sum defined by ESSH3 is significantly positive at the .10 level or better. ESSH3 is a less stringent test than ESSH2 since one or more of the differences can be negative and statistically significant while the sum is positive and significant. Third-level tests of the DEH and ESH are structured in a similar manner (see Panel C).

Since the first-level tests are the most stringent, the greatest weight should be assigned to the first-level results if they support any of the theories. However, in view of the heterogeneous nature of corporate combinations, the first-level tests are likely to be inconsistent with each of the theories. Furthermore, the third-level tests are perhaps too weak since the sums can be consistent with the theories while individual coefficient differences are not. For these reasons, greatest weight is attached to the first- and second-level tests.

The series of tests are not independent across either levels or hypotheses. For example, if the ESSH is consistent with, say, the first-level results, it will be

consistent with the second- and third-level results as well; and if the ESSH is consistent with a given test, then the DEH is likely to be inconsistent with the same test.

Furthermore, the second- and third-level results for the CH are consistent with the theory if the test statistics are not significant, while the efficiency theories are consistent with test statistics that are significant. Therefore, the second- and third-level tests may be biased in favor of the CH. The third-level test, in particular, should receive little weight since, conceivably, all of the coefficient differences can be statistically significant while the sum remains non-significant. In addition, the third-level test of the CH will not lead to rejection of the hypothesis if the individual coefficients are not significant. This is clearly an undesirable feature and suggests that greater importance should be attached to the results of the second-level tests of the Collusion Hypothesis.

The predictions of the Free Cash Flow Hypothesis (FCFH), Financial Slack Hypothesis (FSH), Managerialism Hypothesis (MH) and Hubris Hypothesis (HH) are summarized in Table VII-2 and are based on the discussion in section III. The tests of these hypotheses are conducted in a manner similar to the first-level tests described above. For example, the MH is rejected unless the signs of a_2, a_3 and a_5 are each consistent with the theory and statistically

TABLE VI-2
HYPOTHESIS TESTS FOR NON-STRATEGIC THEORIES
Hypotheses on individual coefficients of equation (1) implied by the Free Cash Flow Hypothesis (FCFH), Financial Slack Hypothesis (FSH), Managerialism Hypothesis (MH), and Hubris Hypothesis (HH).

Hypothesis	a_2 H	a_3 RSLS	a_5 NROC	a_6 FCF	a_7 NDR
FCFH		−		−	
FSH					−
MH	+	−	+		
HH		−	−		

significant at the .10 level or better.

B. ANNOUNCEMENT-PERIOD RETURNS AND LONG-RUN CHANGES IN VALUE

The second primary focus of this thesis is motivated by evidence of negative post-acquisition stock price performance which undermines the notion that information is impounded in stock prices quickly and in an unbiased manner (i.e., the notion that capital markets are efficient). If, at the announcement of merger or tender offer, investors form unbiased expectations, then there should be no observable trend in post-announcement returns. Furthermore, the relation between announcement-period returns and subsequent performance should be positive. Therefore, a test of capital market efficiency is structured in terms of

the observed relations between announcement-period abnormal returns and long-run changes in value.

The analysis takes the form of a set of cross-sectional regressions in which dependent variables consist of two-day announcement-period CARs of acquiring-firms and merger portfolios. The explanatory variables consist of a dummy variable for cash transactions (DCASH), changes in the excess market values of merging firms (dEVS), and a variable reflecting the possible interaction between the form of financing and the relation between announcement-period returns and long-run changes in value. In addition, since industry effects might contaminate the results, normalized acquiring-firm CARs are regressed against changes in normalized excess market value (dNEVS).

VII. DISCUSSION OF RESULTS

Overall three stage least squares regression results and first-, second- and third-level hypothesis tests for dEVS and dIEVS are discussed in section VII.A.[58] In section VII.B, the results of ordinary least squares regressions of announcement-period CARs on long-run changes in value are discussed.

A. THREE STAGE LEAST SQUARES RESULTS

The analysis focuses primarily on 3SLS results for changes in excess market value (reported in tables VII-1 and VII-2) since the results for market-to-book values (tables VII-3 and VII-4) are much less significant. The latter results are reported primarily for comparative purposes. However, the two sets are consistent with each other in that in no cases are individual coefficients statistically significant and of opposite signs.

For the reasons discussed in section VI, the analysis is comparative in nature, i.e., interpretation of test results focuses on the strength of support for individual

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[58]First-, second- and third-level hypothesis tests were conducted based on regression results with dMVB and dIMVB as endogenous variables. These tests were also conducted for regressions with announcement-period CARs as endogenous variables. None of the theories were supported by any of these tests.

TABLE VII-1

THREE STAGE LEAST SQUARES REGRESSION RESULTS FOR EQUATION (1) WITH dEVS AND dIEVS AS ENDOGENOUS VARIABLES.

t-values are shown beneath the parameter estimates. * indicates statistical significance at the .10 level in two-tailed tests. R^2 = system-weighted R-square; F = the regression F-value; S_{12} = cross-model error correlation; N = number of observations

	Dependent Variable				
	dEVS1	dEVS2	dEVS3	dEVS4	dEVS5
CONSTANT	0.1109	0.1364	0.1678	-0.0514	-0.2909
	1.28	0.90	0.98	-0.36	-1.50
dIEVS	0.2502	0.5342	1.6170	0.9781	-0.4954
	0.94	1.28	2.90*	2.73*	-0.92
H	-0.0710	-0.1097	-0.2335	-0.0883	-0.0068
	-2.06*	-2.12*	-2.95*	-1.25	-0.07
RSLS	0.0975	0.0896	0.0474	0.1051	0.1519
	3.23*	2.08*	1.10	2.01*	1.25
AGS	-0.0019	-0.0164	-0.0708	-0.0310	0.0614
	-0.13	-0.75	-2.01*	-1.03	1.26
NROC	0.1621	-0.6442	-0.9720	-2.2653	-1.6544
	0.44	-1.33	-1.78*	-3.43*	-1.85*
FCF	-0.0003	-0.0001	-0.0001	-0.0002	0.0004
	-0.63	-0.19	-0.28	-0.31	0.62
NDR	-0.0751	-0.0078	0.0781	0.2415	0.6147
	-0.52	-0.03	0.31	1.13	2.19*
R^2	0.146	0.125	0.219	0.269	0.364
F	2.69*	2.21*	3.33*	2.94*	1.54
S_{12}	0.244	-0.095	-0.572	-0.281	0.404
N	142	117	97	81	57

TABLE VII-2

THREE STAGE LEAST SQUARES REGRESSION RESULTS FOR EQUATION (2) WITH dEVS AND dIEVS AS ENDOGENOUS VARIABLES

t-values are shown beneath the parameter estimates. * denotes significance at the .10 level in two-tailed tests. R^2 = system-weighted R-square; F = the regression F-value; S_{12} = cross-model error correlation; N = number of observations

	Dependent Variable				
	dIEVS1	dIEVS2	dIEVS3	dIEVS4	dIEVS5
CONSTANT	-0.1503	-0.2272	-0.1303	-0.1434	-0.1424
	-2.15*	-2.28*	-1.37	-1.27	-1.12
H	-0.0142	0.0292	0.0979	0.0473	0.0383
	-0.54	0.76	2.24*	1.02	0.68
RSLS	0.0129	0.0226	0.0134	-0.0031	0.1416
	0.59	0.75	0.42	-0.08	2.60*
AGS	0.0170	0.0454	0.0586	0.0661	0.0812
	1.50	3.00*	3.62*	4.03*	4.79*
NROC	0.2939	0.0467	-0.1684	0.3136	0.1918
	1.08	0.12	-0.41	0.68	0.34
IFCF	0.0013	0.0008	0.0004	0.0011	0.0008
	4.77*	2.40*	1.36	3.23*	1.96*
INDR	0.3238	0.3947	0.1115	0.2405	0.1299
	2.87*	2.43*	0.74	1.31	0.66
R^2	0.146	0.125	0.219	0.269	0.364
F	4.51*	2.50*	2.09*	4.38*	6.66*
S_{12}	0.244	-0.095	-0.572	-0.281	0.404
N	142	117	97	81	57

TABLE VII-3

THREE STAGE LEAST SQUARES REGRESSION RESULTS FOR EQUATION (1) WITH dMVB AND dIMVB AS ENDOGENOUS VARIABLES.

t-values are shown beneath the parameter estimates. * indicates significance at the .10 level in two-tailed tests. R^2 = system-weighted R-square; F = the regression F-value; S_{12} = cross-model error correlation; N = number of observations

	dMVB1	dMVB2	dMVB3	dMVB4	dMVB5
CONSTANT	-0.1183	-0.3409	-0.5500	-0.0225	-0.8946
	-0.65	-1.00	-0.54	-0.03	-1.83*
dIMVB	0.0930	0.1071	1.3993	2.2285	-0.1857
	0.30	0.23	0.93	2.89*	-0.39
H	-0.1062	-0.1011	-0.2067	-0.1404	0.0915
	-1.43	-0.88	-0.65	-0.41	0.40
RSLS	0.1921	0.3320	0.1920	-0.1966	0.1362
	2.39*	2.63*	0.61	-0.72	0.55
AGS	0.0074	0.0210	-0.0650	-0.1128	0.0710
	0.25	0.41	-0.39	-0.82	0.77
NROC	0.1427	-1.1987	-5.6385	1.2830	-0.6305
	0.19	-1.03	-2.00*	0.38	-0.30
FCF	0.0003	0.0008	0.0009	-0.0009	0.0012
	0.34	0.58	0.32	-0.29	0.72
NDR	0.5059	0.9565	1.5397	-0.4150	2.0608
	1.44	1.50	0.82	-0.38	2.92*
R^2	0.100	0.122	0.163	0.231	0.243
F	2.54*	2.94*	3.25*	1.50	1.42
S_{12}	0.488	0.412	-0.196	-0.406	0.323
N	142	117	97	81	57

TABLE VII-4

THREE STAGE LEAST SQUARES REGRESSION RESULTS FOR EQUATION (2) WITH dMVB AND dIMVB AS ENDOGENOUS VARIABLES.

t-values are shown beneath the parameter estimates. * indicates significance at the .10 level in two-tailed tests. R^2 = system-weighted R-square; F = the regression F-value; S_{12} = cross-model error correlation; N = number of observations

	dIMVB1	dIMVB2	dIMVB3	dIMVB4	dIMVB5
CONSTANT	-0.2400	-0.4047	-0.2868	-0.5082	-0.5901
	-1.25	-1.80*	-1.00	-1.97*	-1.72*
H	-0.0990	-0.0125	0.1380	0.0867	0.1589
	-1.30	-0.14	1.12	0.81	1.07
RSLS	0.1389	0.1385	0.1410	0.0834	0.2854
	2.17*	1.95*	1.58	0.96	1.98*
AGS	0.0434	0.0938	0.1200	0.1475	0.1777
	1.34	2.66*	2.61*	3.87*	3.94*
NROC	0.1841	0.2057	-0.8079	0.1962	-0.1431
	0.23	0.23	-0.70	0.18	-0.10
IFCF	0.0022	0.0012	0.0009	0.0017	0.0017
	2.84*	1.60	0.89	2.28*	1.55
INDR	0.7241	0.8897	0.4415	1.0433	0.7400
	2.39*	2.47*	0.91	2.49*	1.38
R^2	0.100	0.122	0.163	0.231	0.243
F	2.84*	2.31*	1.45	3.18*	3.70*
S_{12}	0.488	0.412	-0.196	-0.406	0.323
N	142	117	97	81	57

strategic theories relative to other theories. In addition, since the analysis is based on broad relations emerging from a heterogeneous sample of corporate combinations, relative support for one or more theories can not be interpreted as evidence that other theories are never operative. Finally, the analysis focuses on regressions results for the third- through fifth post-acquisition years for two reasons, since, as argued in section VI, market structure effects are unlikely to materialize in either financial statements or market values for several years following consummation.

1. OVERALL RESULTS

Before turning to the hypothesis tests, some comments on the overall 3SLS results are in order. From Table VII-1, the explanatory power of equation (1) seems to peak at about the third or fourth post-acquisition year, reflecting primarily the statistical significance of the coefficients of the "market structure" variables: H, RSLS, AGS and NROC. Apparently, the market structure effects of mergers and tender offers emerge over a fairly long period, consistent with prior expectations. When combined with the general lack of statistical significance of the "financial" variables (FCF,NDR),[59] these results suggest that long-run

[59]From Tables VII-1 and VII-3, note that, except for the coefficient of NDR in the fifth year, the coefficients of FCF and NDR are not statistically significant. The significance of the coefficient of NDR in the fifth post-acquisition year probably reflects a spurious correlation since financial gains should seemingly appear fairly soon after consummation.

changes in value are driven primarily by merger-induced changes in demand and cost conditions rather than by financial effects. In other words, the data appear consistent with the notion that corporate combinations are motivated by strategic objectives which require an implementation stage of approximately two to three years.

Table VII-2 reports 3SLS results for equation (2). First, note that the coefficients of IFCF are positive and statistically significant in every year except the third, and the coefficients of INDR are significantly positive in each of the first two years. These results lie in contrast to the findings for equation (1) where FCF and NDR appear to have little or no explanatory power. Although IFCF and INDR are included in equation (2) to serve primarily as control variables, these findings nevertheless shed new light on the Free Cash Flow and Financial Slack Hypotheses. The FCFH implies that the relation between change in value and free cash flow should be negative since firms tend to waste free cash flow on negative net present value investments. The FSH implies that the relation between change in value and financial slack should be positive since slack-rich firms can finance positive NPV investments without the need to issue risky debt or equity. Hence, positive coefficients of IFCF and INDR are inconsistent with the implications of the

FCFH and the FSH.[60] Furthermore, since no theory suggests that these effects should be confined to the realm of corporate combinations, the interpretation appears to be quite general.

Turning to the market structure variables, the coefficient of H in equation (2) is positive and statistically significant in the third post-acquisition year, suggesting that the merger gains of rivals are related negatively to industry concentration.[61] In itself, this result is inconsistent with the Collusion Hypothesis which implies that rivals' gains should be related positively to concentration.

Under the Collusion Hypothesis, concentration is assumed to reflect collusive behavior. If, however, concentration reflects efficiency differences among firms in an industry (as assumed by the Efficient Structure Hypothesis), then the positive coefficient for H in equation (2) indicates that rivals' gains are larger (smaller) where efficiency differences are smaller (larger). In the third-year regression of equation (1), the coefficient of H is significantly negative, suggesting that merging firms' gains

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[60]To investigate the possibility that IFCF proxies for industry profitability, the model was estimated using industry return on capital (IROC) in place of IFCF. The coefficients of IROC were much less significant than those of IFCF reported here. Thus, IFCF does not appear to be proxying for profitability.

[61]Recall that H is an inverse measure of concentration.

are related positively to concentration. If concentration reflects efficiency differences, then the negative coefficient for H in equation (1) indicates that merging firms' gains are larger (smaller) where efficiency differences are larger (smaller).

Considering that merging-firm- and rival-firm values respond differently to concentration (H) and to the acquirer's relative size (AGS), these results seem to reflect changes in efficiency rather than changes in collusion.[62] Moreover, the data appear consistent with the notion that where concentration is relatively high (low) and thus efficiency differences are relatively large (small), merging firms' gains relative to acquiring-industry rivals are larger (smaller).

From the perspective of antitrust policy, an important question is whether these results reflect industry leaders increasing their dominancy through acquisitions (resulting in higher concentration), or whether they reflect acquirers marginal in their industries pursuing efficiency gains in order to compete more effectively with industry leaders (resulting in lower concentration). On this question, the coefficients of AGS and NROC are relevant. In the third-year regression of equation (1), the coefficient of AGS is negative and statistically significant, suggesting that

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[62]Recall that although broad trends may be consistent with efficiency gains, some mergers nevertheless may produce anticompetitive effects.

merging firms' gains are larger (smaller) where acquirers are smaller (larger) relative to their rivals. In the third-year regression of equation (2), the coefficient of AGS is positive and statistically significant, suggesting that rivals' gains are larger (smaller) where acquirers are larger (smaller) relative to their rivals. The pattern that seems to emerge suggests that relatively small acquirers obtain larger efficiency gains than do relatively large acquirers. Furthermore, in the third-year regression of equation (1), the coefficient of NROC is negative and statistically significant, suggesting that larger (smaller) gains accrue to relatively unprofitable (profitable) acquirers.

In sum, broad relations emerging from the data suggest that larger gains arise where acquirers are relatively small and relatively unprofitable and that efficiency gains arise to a large extent from economies of scale or scope. It seems, therefore, that corporate combinations are stimulated largely by competitive pressures and tend to be followed by decreases in concentration.

The relative absence of support for the Collusion Hypothesis is consistent with Eckbo's (1985) results. However, this does not mean that under no circumstances do mergers produce monopoly profits since, as Williamson (1968) has shown, mergers can produce increases in both monopoly and economic profits. Furthermore, relative support for the

Economies of Scale and Scope Hypothesis versus the Differential Efficiency Hypothesis is inconsistent with Lang, Stulz and Walkling (1989), Morck, Shleifer and Vishny (1990) and Servaes (1991) who suggest that efficiency gains are likely to arise from the differential efficiency of acquiring firms' managers.

Table VII-5 reports 3SLS regression results for two-day announcement-period CARs. In Model 1, endogenous variables are acquiring-firm CARs (denoted CAR^{AG}) and acquiring-industry portfolio CARs (CAR^{AGI}), and in Model 2, endogenous variables are merger portfolio CARs (CAR^{MP}) and, again, acquiring-industry portfolio CARs.

In the regressions of equation (2) in both models, t-statistics never exceed one in absolute value, suggesting that the announcement- period impact on acquiring firms' competitors can not be explained in terms of either market structure effects or industry financial characteristics. These results can be interpreted in one of two ways: either announcement-period expectations for rivals are close to zero (perhaps due to significant uncertainty) or expectations respond to factors other than those included in the model.

Three stage least squares regression results for equation (1) of Model 1 are reported in the first column of Table VII-5. The coefficient of DCASH attains statistical significance at the .10 level, consistent with the findings

TABLE VII-5

THREE STAGE LEAST SQUARES RESULTS FOR TWO-DAY CUMULATIVE MARKET MODEL PREDICTION ERRORS.

Superscripts AG, AGI and MP denote acquiring firms, acquiring-industry portfolios and merger portfolios, respectively. Model 1 employs acquiring-firm CARs and acquiring-industry CARs as endogenous variables, while Model 2 employs merger portfolio CARs and acquiring-industry CARs. t-values are shown beneath the parameter estimates. R^2 = system-weighted R-square; F = the regression F-value; S_{12} = cross-model error correlation; N = number of observations

MODEL 1				MODEL 2			
Equation 1: DepVar=CAR^{AG}		Equation 2: DepVar=CAR^{AGI}		Equation 1: DepVar=CAR^{MP}		Equation 2: DepVar=CAR^{AGI}	
CONST	0.0137	CONST	-0.0048	CONST	-0.0414	CONST	0.0011
	0.55		-0.58		-1.21		0.16
CAR^{AGI}	-1.4207			CAR^{AGI}	-7.4769		
	-0.74				-3.09[a]		
H	-0.0123	H	-0.0003	H	0.0032	H	0.0001
	-1.61		-0.09		0.23		0.03
RSLS	0.0068	RSLS	-0.0004	RSLS	0.0355	RSLS	0.0001
	0.99		-0.14		2.81[a]		0.04
AGS	-0.0057	AGS	-0.0010	AGS	-0.0092	AGS	-0.0011
	-1.35		-0.71		-1.30		-0.79
NROC	-0.0519	NROC	0.0285	NROC	0.2311	NROC	0.0290
	-0.58		0.95		1.54		0.97
FCF	0.0000	IFCF	0.0000	FCF	0.0002	IFCF	0.0000
	0.17		0.85		1.30		0.11
NDR	-0.0400	INDR	0.0121	NDR	0.0737	INDR	-0.0002
	-0.96		0.92		1.47		-0.02
DCASH	0.0153			DCASH	0.0302		
	1.76[c]				3.01[a]		
R^2	0.100	R^2	0.100	R^2	0.094	R^2	0.094
F	2.36[b]	F	0.45	F	1.61	F	0.13
S_{12}	0.420	S_{12}	0.420	S_{12}	0.830	S_{12}	0.830
N	126	N	126	N	126	N	126

of both Travlos (1987) and Murphy and Nathan (1989) that acquirers' returns are higher in all-cash transactions. This finding can be explained in terms of an information effect and a tax effect. The FSH asserts that cash transactions signal to investors that the acquirer's stock is undervalued and that, therefore, higher acquirer returns should be observed in cash transactions. On the other hand, the purchase method of accounting for mergers typically applies to all-cash transactions.[63] By this method, the assets of the acquired firm are written up to the acquisition price, yielding depreciation-related tax benefits for the acquirer. When combined with the non-significance of the coefficient of NDR (discussed in the following paragraph), the tax effect appears to be a more plausible explanation than the information effect.

Coefficients of the financial variables in equation (1) of Model 1 are not statistically significant. The FCFH asserts that since acquirers waste free cash flow on negative net present value investments, acquirers' returns should be negatively related to free cash flow. Thus, the non-significant coefficient for FCF does not support the FCFH. Hanson (1992) finds that acquirers' returns appear unrelated to mismatches between growth and free cash flow, consistent with the finding reported here.

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[63]See Hayn (1989), for example.

The coefficient of NDR is negative but not statistically significant. Myers and Majluf (1984) argue that financial slack enables a firm to undertake positive net present value investments that might not be economically feasible where the issuance of risky debt or equity securities is required. By the FSH, since slack-rich acquirers can finance their acquisitions without having to resort to relatively high cost debt or equity, acquirers' returns should be negatively related to NDR.[64] The negative coefficient obtained for NDR thus supports the FSH, although the lack of statistical significance suggests this support is, at most, weak.

Coefficients of the market structure variables in equation (1) of Model 1 are not significant at conventional levels, although in one-tailed tests, the coefficients of H and AGS are significant at the .10 level. The negative coefficients obtained for H and AGS provide some evidence that acquiring-firm CARs are related positively to acquiring-industry concentration and negatively to the acquirer's relative size. However, the lack of significance for the coefficients of RSLS and NROC provides little support for any of the strategic theories. It should be noted that these theories pertain to total wealth effects which might not be reflected clearly in acquiring-firm CARs.

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[64]Recall that NDR is an inverse measure of financial slack.

This is because the announcement-period returns of acquiring firms reflect wealth transfers between the shareholders of acquiring- and acquired firms. The overall lack of significance for acquiring-firm CARs might be attributable to such wealth transfers.

The third and fourth columns of Table VII-5 report regression results for equations (1) and (2) of Model 2, in which merger-portfolio CARs are employed with acquiring-industry CARs as endogenous variables. Unlike acquiring-firm CARs, merger-portfolio CARs are not influenced by wealth transfers between shareholders of merging firms and thus reflect total gains attributable to mergers. Supporting this assertion are generally higher levels of significance observed for the coefficients of equation (1) in Model 2 versus those of Model 1.

The coefficient of CAR^{AGI} in equation (1) is negative and highly significant. Under the Collusion Hypothesis, merger gains should accrue to merging firms and their rivals. Thus, the announcement-period returns of merging firms and acquiring-industry firms should be related positively. On the other hand, the efficiency theories imply that gains for merging firms suggest losses for competitors and that, therefore, these returns should be related negatively. The negative coefficient of CAR^{AGI} is consistent with the efficiency theories.

With the exception of H, coefficients of the market structure variables in equation (1) are generally larger in magnitude and statistical significance in Model 2 than in Model 1. The coefficient of RSLS is positive and highly significant. The coefficient of AGS is negative but significant in a one-tailed test only, and the coefficient of NROC is positive and also significant only in a one-tailed test. The positive coefficient of NROC is consistent with both the DEH and ESH but is not consistent with the ESSH. On the other hand, the negative coefficient of AGS is consistent with the ESSH but is not consistent with the DEH and ESH. Thus, these results do not support unambiguously any of the efficiency theories. First-, second- and third-level hypothesis tests were conducted based on these results and did not support any of the strategic theories. For the sake of brevity, these results are not reported.

The coefficients of FCF and NDR in equation (1) of model 2 are positive and significant in one-tailed tests. These findings are not consistent with either the FCFH or the FSH. The coefficient of DCASH is larger both in magnitude and statistical significance in Model 2 than in Model 1, suggesting that announcement-period returns of acquired firms are larger in all-cash transactions. Consistent with Wansley, Lane and Yang (1983), these results tend to support a tax effect as opposed to an information effect.

2. FIRST-LEVEL TEST RESULTS

First-level test results are reported in Table VII-6 where the "Consistent Coefficients" column shows the coefficients which are consistent with the theory and statistically significant at the .10 level or better. The "Inconsistent Coefficients" column contains coefficients which are inconsistent with the theory and significant at the .10 level. Nonsignificant coefficients are not shown.

The strategic theories are rejected in first-level tests if the sign of at least one of the relevant coefficients is different from that predicted by the theory or is not significantly different from zero. In other words, each theory is rejected unless all of the relevant coefficients appear in the "Consistent Coefficients" column of Table VII-6. As discussed previously, due to sample heterogeneity first-level test results are unlikely to provide outright support for any of the theories. This is indeed the case. However, based simply on the numbers of coefficients appearing in each of the "Coefficients" columns, the ESSH receives more support than the other theories. In the third-year regressions, for example, none of the statistically significant coefficients from equations (1) and (2) are inconsistent with the ESSH while at least two are inconsistent with each of the other theories. Excepting the CH, the same is true of the fourth-year results as well. On balance, the data appear to be

TABLE VII-6
FIRST-LEVEL HYPOTHESIS TEST RESULTS

Based on 3SLS estimation of equations (1) and (2) with dEVS and dIEVS as endogenous variables. The third column reports coefficients that are consistent with the theory and statistically significant at the .10 level or better, and the fourth column reports the coefficients that are inconsistent with the theory and statistically significant at the .10 level or better.

YEAR	HYPOTHESIS	CONSISTENT COEFFICIENTS	INCONSISTENT COEFFICIENTS
1	CH1	a_2 a_3	
2	CH1	a_2 a_3 b_4	
3	CH1	a_2 b_4	a_4 b_2
4	CH1	a_3 b_4	
5	CH1	b_3 b_4	
1	ESSH1	a_3	
2	ESSH1	a_3 b_4	
3	ESSH1	a_4 a_5 b_4	
4	ESSH1	a_3 a_5 b_4	
5	ESSH1	a_5 b_4	b_3
1	DEH1	a_3	
2	DEH1	a_3	b_4
3	DEH1		a_4 a_5 b_4
4	DEH1	a_3	a_5 b_4
5	DEH1		a_5 b_3 b_4
1	ESH1	a_2 a_3	
2	ESH1	a_2 a_3	b_4
3	ESH1	a_2 b_2	a_4 a_5 b_4
4	ESH1	a_3	a_5 b_4
5	ESH1		a_5 b_3 b_4

relatively inconsistent the DEH and ESH.

In third-year regressions, the ESSH receives support primarily from the significantly negative coefficients on the acquirer's relative size (a_4) and relative profitability (a_5) in equation (1) and from the positive coefficient on AGS (b_4) in equation (2). Morever, the coefficients of acquiring-industry entropy (a_2,b_2) are significant and differ in sign across equations which, as mentioned previouly, lends weight to the view that concentration, measured by the entropy, reflects efficiency differences rather than collusion. It appears, then, that larger efficiency gains arise where efficiency differences in acquirers' industries are relatively large and that these gains arise from economies of scale or scope.

3. SECOND-LEVEL TEST RESULTS

Table VII-7 contains the second-level test results which are based on cross-equation coefficient differences. These tests utilize information on the differential behavior of merging-firm value and acquiring-industry value which, as argued in section VI, facilitates the identification of broad market structure effects in heterogeneous samples of corporate combinations.

For each theory and each post-acquisition year, a test is conducted for the hypothesis that all of the relevant coefficient differences equal zero. F-values and associated probabilities are reported in the columns labelled "F" and

TABLE VII-7

SECOND-LEVEL HYPOTHESIS TEST RESULTS.

The null hypothesis in each case is that all differences in relevant coefficients are equal to zero. Numerator degrees of freedom for each F-statistic is 3 under CH2, ESSH2 and DEH2; it is 4 under ESH2. Denominator degrees of freedom for years one through five are 269, 219, 179, 147 and 99, respectively. PrF is the probability of observing an F-value greater than the computed F. Coefficient differences significant in separate tests are reported in the "Significant Differences" column . Superscripts 'Y' and 'N' indicate whether the sign of the difference is consistent with the hypothesis.

YEAR	HYPOTHESIS	F	PrF	Significant Differences	
1	CH2	3.64	.013		$a_3-b_3>0^N$
2	CH2	3.46	.017	$a_2-b_2<0^N$	$a_4-b_4<0^N$
3	CH2	3.06	.030	$a_2-b_2<0^N$	$a_4-b_4<0^N$
4	CH2	3.06	.030		$a_4-b_4<0^N$
5	CH2	0.18	.910		
1	ESSH2	3.16	.025		$a_3-b_3>0^Y$
2	ESSH2	3.29	.022		$a_4-b_4<0^Y$
3	ESSH2	3.19	.025		$a_4-b_4<0^Y$
4	ESSH2	5.96	.001	$a_4-b_4<0^Y$	$a_5-b_5<0^Y$
5	ESSH2	1.78	.156		$a_5-b_5<0^Y$
1	DEH2	3.16	.025		$a_3-b_3>0^Y$
2	DEH2	3.29	.022		$a_4-b_4<0^N$
3	DEH2	3.19	.025		$a_4-b_4<0^N$
4	DEH2	5.96	.001	$a_4-b_4<0^N$	$a_5-b_5<0^N$
5	DEH2	1.78	.156		$a_5-b_5<0^N$
1	ESH2	2.85	.024		$a_3-b_3>0^Y$
2	ESH2	3.03	.018	$a_2-b_2<0^Y$	$a_4-b_4<0^N$
3	ESH2	2.94	.022	$a_2-b_2<0^Y$	$a_4-b_4<0^N$
4	ESH2	4.49	.002	$a_4-b_4<0^N$	$a_5-b_5<0^N$
5	ESH2	1.40	.240		$a_5-b_5<0^N$

"PrF", respectively. In addition, separate tests are conducted for each pair of coefficients relevant to each theory. The column labelled "Significant Differences" shows the sign of each statistically significant difference and whether the sign is consistent with the theory. For example, in the first-year test of the CH, the difference a_3-b_3 is significantly positive, and the superscript 'N' indicates that the sign of the difference is not consistent with the CH. Since non-significant differences are not reported, it can be inferred that a_3-b_3 is the only significant difference from the first post-acquisition year relevant to the CH.

The second-level tests of the CH differ from those of the ESSH, DEH and ESH. Tests of the CH lead to rejection of the theory if the computed F-value is significantly non-zero or if any of the relevant coefficient differences are significantly non-zero. In contrast, the efficiency theories are rejected if the F-value is not significantly different from zero or if the sign of any significant difference is inconsistent with the theory. In view of the difficulties associated with identifying broad market structure effects, the second-level tests may be biased in favor of the CH vis-a-vis the efficiency theories. However, these tests are well-suited for a comparative analysis of sources of efficiency gains since it is improbable that the

results would be consistent with both the ESSH on one hand and with the DEH and ESH on the other.

Turning to the results, the hypothesis that all relevant pairs of coefficient differences equal zero is rejected for each theory and in each of the first four post-acquisition years. Hence, the data are consistent with the view that the behavior of merging-firm value and acquiring-industry value reflect efficiency effects as opposed to collusive effects. Although the CH is not rejected in the fifth-year test, this is apparently due to deterioration of the explanatory power of the market structure variables (see Table VII-1). Therefore, broad trends emerging from the data seem to support the efficiency theories as opposed to the collusion hypothesis.[65]

Focusing on the third- through fifth-year tests, the results appear to support the ESSH relative to both the DEH and the ESH. This result arises primarily from the differences in the coefficients of AGS (a_4-b_4) and NROC (a_5-b_5). However, significant differences in the coefficients of H (a_2-b_2) are consistent with the ESH. As discussed previously, if concentration, as measured by the entropy, reflects efficiency differences among firms in an industry, then on the whole, these results are consistent with the view that acquirers marginal in their industries realize

[65]Again, this should not be taken as evidence that anticompetitive effects are in no case irrelevant.

efficiency gains enabling them to compete more effectively with their larger and more profitable rivals. Furthermore, these efficiency gains appear to be attributable to economies of scale or scope.

4. THIRD-LEVEL TEST RESULTS

Table VII-8 reports third-level test results which are based on sums of coefficient differences. The columns labelled "F" and "PrF" contain the F-values and associated probabilities, respectively, for the hypotheses that sums of relevant coefficient differences equal zero. Again, the Collusion Hypothesis is rejected if the sum is significantly different from zero. The efficiency theories are rejected if sums are not significantly positive, i.e., restrictions embodied in third-level tests are constructed such that positive sums are consistent with the efficiency theories. The column labelled "Sum of Differences" shows the sums, and superscripts 'Y' and 'N" indicate whether each sum is consistent with the theory under investigation.

Given the heterogeneous nature of corporate combinations, the behavior of merging-firm- and acquiring-industry values with respect to sources of gain and loss might reflect efficiency effects in some instances and collusive effects in others. Consequently, comparative analyses of the strategic theories based on individual coefficients and coefficient differences might yield ambiguous results. Third-level tests are designed to

TABLE VII-8
THIRD-LEVEL HYPOTHESIS TEST RESULTS

For dEVS and dIEVS. The null hypothesis in each case is that the sum of cross-equation coefficient differences is equal to zero. The numerator degrees of freedom for each F-statistic is one, and the denominator degrees of freedom for years one through five are 269, 219, 179, 147 and 99, respectively. PrF is the probability of observing an F-value greater than the test statistic. Sums of coefficient differences are reported in the fifth column. Statistically significant sums are superscripted by 'Y' and 'N' to indicate whether the sign of the sum is consistent with the hypothesis.

YEAR	HYPOTHESIS	F	PrF	Sum of Differences
1	CH3	0.02	.879	0.009^{Y}
2	CH3	1.41	.236	0.134^{Y}
3	CH3	4.37	.038	-0.427^{N}
4	CH3	0.65	.422	-0.125^{Y}
5	CH3	0.07	.790	-0.054^{Y}
1	ESSH3	0.34	.559	0.235
2	ESSH3	1.54	.216	0.820
3	ESSH3	0.87	.352	0.967
4	ESSH3	8.11	.005	2.784^{Y}
5	ESSH3	4.91	.029	1.876^{Y}
1	DEH3	0.03	.871	-0.066
2	DEH3	1.05	.308	-0.686
3	DEH3	0.74	.391	-0.899
4	DEH3	6.86	.010	-2.568^{N}
5	DEH3	4.71	.032	-1.855^{N}
1	ESH3	0.00	.982	-0.009
2	ESH3	0.66	.416	-0.547
3	ESH3	0.28	.595	-0.568
4	ESH3	6.09	.015	-2.432^{N}
5	ESH3	4.42	.038	-1.810^{N}

minimize the ambiguity by producing a single value whose sign and statistical significance can be readily interpreted as either consistent or inconsistent with the particular theory being investigated. The ambiguity is not eliminated entirely, however, since the results might reflect the presence of one large coefficient difference which outweighs the others.

Table VII-8 indicates that the sum defined by CH3 is not significantly different from zero except for the third post-acquisition year. Therefore, based on the stated decision rule, the data appear to be consistent with the Collusion Hypothesis. However, third-level tests of the CH are quite weak in that they fail to reject the CH if individual coefficients are non-significant. Furthermore, first- and second-level test results, as discussed previously, suggest that the behavior of merging-firm- and acquiring-industry values with respect to concentration (entropy) and the acquirer's relative size are more consistent with changes in relative efficiency than with changes in collusive behavior. For these reasons, third-level results cannot be interpreted as supporting the CH over the efficiency theories.

Turning to the efficiency theories, the sums of coefficient differences defined by ESSH3, DEH3 and ESH3 are each significantly different from zero in the fourth- and fifth years only. Furthermore, ESSH3 is positive in all

years while DEH3 and ESH3 are negative in all years. Thus, in a comparison of the efficiency theories, the ESSH again appears to receive the strongest support from the data, consistent with first- and second-level results. As before, these results are driven primarily by the differential behavior of merging-firm value and acquiring-industry value with respect to acquiring-industry concentration (H), and the acquirer's relative size (AGS) and profitability (NROC).

B. ANNOUNCEMENT-PERIOD RETURNS AND LONG-RUN CHANGES IN VALUE

The second primary focus of this thesis is motivated by evidence of negative post-acquisition stock price performance which undermines the notion that information is impounded in stock prices quickly and in an unbiased manner (i.e., the notion that capital markets are efficient). If, at the announcement of merger or tender offer, investors form unbiased expectations, then there should be no observable trend in post-announcement returns. Furthermore, the relation between announcement-period returns and subsequent performance should be positive. Therefore, a test of capital market efficiency is structured in terms of the observed relations between announcement-period abnormal returns and long-run changes in value.

The analysis takes the form of a set of cross-sectional regressions in which dependent variables consist of two-day announcement-period CARs of acquiring-firms and merger portfolios. The explanatory variables consist of a dummy variable for cash transactions (DCASH), changes in the excess market values of merging firms (dEVS), and a variable reflecting the possible interaction between the form of financing and the relation between announcement-period returns and long-run changes in value.[66] In addition, since industry effects might contaminate the results, normalized acquiring-firm CARs are regressed against changes in normalized excess market value (dNEVS).

In Table VII-9, regression results are reported in which the dependent variable is the two-day announcement-period CAR of acquiring firms.[67] The coefficient of DCASH is positive and statistically significant in each of the first three post-acquisition years, as expected, while that of dEVS is not significant in any regression. The coefficient of dEVSxDCASH is positive and statistically

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[66]I am grateful to Dr. Wansley for pointing out that the relation between announcement-period returns and long-run changes in value might differ between stock transactions and cash transactions.

[67]The explanatory variables appearing in these regressions are the result of some experimentation using different permutations of these variables. Although the coefficient of DCASH sheds no light on the hypothesis being tested, the inclusion of this variable marginally improves the statistical significance of the coefficients of dEVS and dEVSxDCASH. Thus, the decision was made to report the results using this particular set of variables.

TABLE VII-9
ORDINARY LEAST SQUARES REGRESSION RESULTS FOR ACQUIRING-FIRMS' TWO-DAY CARs

* denotes statistical significance at the .10 level in two-tailed t-tests. The F-value (F), adjusted R-square (R^2) and number of observation (N) are shown at the bottom of the table.

	POST-ACQUISITION YEAR				
	1	2	3	4	5
CONSTANT	-0.0237	-0.0256	-0.0297	-0.0298	-0.0265
	-3.71*	-3.49*	-3.84*	-3.31*	-2.58*
DCASH	0.0172	0.0217	0.0215	0.0176	0.0210
	2.01*	2.20*	2.07*	1.45	1.37
dEVS	-0.0140	-0.0002	0.0060	-0.0073	-0.0130
	-0.76	-0.01	0.29	-0.46	-0.57
dEVS X DCASH	0.0307	0.0099	0.0497	0.0486	-0.0011
	1.09	0.34	1.38	1.35	-0.02
R^2	0.023	0.026	0.075	0.031	-0.017
F	2.07	1.89	3.31*	1.75	0.73
N	122	103	86	72	51

significant at the .10 level in one-tailed t-tests for years three and four, consistent with the notion that in all-cash transactions investors form unbiased expectations on the effects of mergers and tender offers. These results are also consistent with 3SLS results reported above which suggest that the effects of corporate combinations emerge after an implementation period of approximately two to three years. It appears, then, that investors not only form unbiased expectations but that these expectations are focused on a time frame during which the benefits of combinations should emerge. The lack of significance of the

coefficients of dEVS suggests that acquirers' announcement-period returns in non-cash transactions appear to be influenced at least to some extent by factors related to the form of financing.

In Table VII-10, the results for merger portfolio CARs are reported. The coefficient of DCASH is positive and statistically significant for each year in one-tailed tests, and the coefficients of dEVS and dEVSxDCASH are not significant in any of these regressions. Here, the explanatory of the model is highest in the first year and declines throughout the post-acquisition period, reflecting primarily the effect of DCASH. The deterioration of statistical signicance vis-a-vis the results reported in Table VII-9 is somewhat puzzling. Presumably, merger portfolio CARs yield more precise estimates of the total gains expected from mergers than do acquiring-firm CARs since the latter may reflect wealth transfers between the shareholders of merging firms. If this is true, then the relation between merger portfolio CARs and dEVS should be stronger than that between acquiring-firm CARs and dEVS. Clearly, this is not the case. It may be that merger portfolio CARs are influenced by factors unrelated to the long-run effects of mergers. This interpretation is supported to some extent by 3SLS results reported in Table VII-5 which indicate that merger-portfolio CARs respond to the financial characteristics of the acquirer in a stronger

TABLE VII-10
ORDINARY LEAST SQUARES REGRESSION RESULTS FOR
MERGER PORTFOLIO TWO-DAY CARs

* denotes statistical significance at the .10 level in two-tailed t-tests. The F-value (F), adjusted R-square (R^2) and number of observation (N) are shown at the bottom of the table.

	POST-ACQUISITION YEAR				
	1	2	3	4	5
CONSTANT	0.0099	0.0084	0.0094	0.0078	0.0109
	1.41	1.05	1.07	0.92	1.10
DCASH	0.0257	0.0293	0.0214	0.0185	0.0263
	2.72*	2.73*	1.81*	1.62	1.77*
dEVS	-0.0126	0.0011	0.0035	-0.0061	0.0020
	-0.62	0.05	0.15	-0.41	0.09
dEVSx DCASH	0.0006	-0.0121	0.0256	0.0240	-0.0153
	0.02	-0.38	0.62	0.71	-0.30
R^2	0.045	0.042	0.022	0.014	0.006
F	2.80*	2.51*	1.63	1.33	1.10
N	122	103	86	72	51

fashion than do acquiring-firm CARs.

Table VII-11 contains the regression results using normalized acquiring-firm CARs and changes in normalized excess market value. The coefficient of DCASH is positive and significant in one-tailed t-tests in each of the first four post-acquisition years. The coefficient of dNEVS is positive and significant in the third year, and the coefficient of dNEVSxDCASH does not approach statistical significance in any of these regressions. As is true of the results for acquiring-firm CARs, the explanatory power of the model for normalized returns seems to peak in the third

TABLE VII-11
ORDINARY LEAST SQUARES REGRESSION RESULTS FOR ACQUIRERS' NORMALIZED TWO-DAY CARs

* denotes statistical significance at the .10 level in two-tailed t-tests. The F-value (F), adjusted R-square (R^2) and number of observation (N) are shown at the bottom of the table.

	POST-ACQUISITION YEAR				
	1	2	3	4	5
CONSTANT	-0.0259	-0.0228	-0.0227	-0.0276	-0.0176
	-3.78*	-2.88*	-2.59*	-2.85*	-1.52
DCASH	0.0190	0.0187	0.0187	0.0199	0.0138
	2.06*	1.79*	1.65	1.53	0.88
dNEVS	0.0045	0.0208	0.0382	0.0105	0.0268
	0.21	1.07	1.92*	0.55	1.12
dNEVSx DCASH	0.0078	-0.0247	0.0107	0.0069	-0.0171
	0.25	-0.79	0.30	0.17	-0.33
R^2	0.013	0.017	0.085	-0.003	-0.003
F	1.52	1.57	3.57*	0.94	0.95
N	120	101	84	71	51

post-acquisition year. However, the effect here appears not to be confined to all-cash transactions. Nevertheless, these results support the earlier interpretation that investors form unbiased expectations on the effects of corporate combinations and that they expect these effects to emerge after an implementation period of approximately two years.

VIII. SUMMARY

The motivation for this dissertation stems from generally inconclusive results reported in previous studies of the sources of merger gains. Focusing on the determinants of announcement-period stock returns, studies in the literature of corporate control suggest that gains arise from the displacement of inefficient acquired-firm managers by more efficient managers of acquiring firms. However, industrial organization studies have found little evidence of improved operating performance in accounting-based rates of return and other non-capital market data. In addition, systematically negative post-acquisition returns suggest that at announcement, investors may overestimate the gains from mergers.

This research investigates the market structure (i.e., efficiency and collusive) effects of corporate combinations through an analysis of the long-run post-acquisition performance of merging firms and of rivals of acquiring firms. The analysis focuses on the determinants of long-run performance since, due to uncertainty and information asymmetry, market structure effects are unlikely to materialize in short-run periods surrounding announcement and consummation dates. In order to control for the effects of non-merger-related events on merging firms and their rivals, a system of two simultaneous equations is employed

which describes changes in the market values of merging firms and of acquirers' rivals. By incorporating information on both sets of firms, this approach leads to new insights on the efficiency and collusive effects of corporate combinations.

In contrast to the findings of Lang, Stulz and Walkling (1989), Morck, Shliefer and Vishny (1990) and Servaes (1991), the notion that efficiency gains arise from the differential efficiency of acquiring-firm managers is not supported by the data. Consistent with Ellert (1976) and Eckbo (1983,1985), the results do not support the view that mergers are driven by the pursuit of monopoly profits through increased collusion. Furthermore, the findings do not support the contention that acquirers with free cash flow pursue low- or no-benefit acquisitions (in contrast to Hanson (1992)), nor do they support the view that merger-induced gains are positively related to acquirers' financial slack (in contrast to Bruner (1976) and Murphy and Nathan (1989)).

The second primary focus of this thesis addresses the issue of capital market efficiency raised by negative post-acquisition stock price performance. If investors form unbiased expectations at the announcement of merger (as implied by the notion of capital market efficiency), then the relation between expectations and subsequent performance should be positive. This prediction is supported by the

results of cross-sectional regressions of announcement-period abnormal returns on measures of long-run changes in value.

The explanatory power of the simultaneous equations model of long-run changes in value seems to peak in the third or fourth post-acquisition year. Furthermore, the relation between announcement-period CARs and long-run changes in value also appears to be strongest in the third or fourth post-acquisition year. When taken together, these findings suggest that investors form unbiased expectations on both the benefits of mergers and tender offers and on the time period over which these benefits are likely to emerge.

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