# The Analytic Method of Ronald Coase:

# Lessons for Research on Mergers and Acquisitions

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1. Introduction

Ronald Coase is aptly lauded as a most innovative economist. He was awarded the Nobel Prize in 1991 for his path breaking emphasis of the importance of transaction costs for economic organization and legal institutions (Passell (1991)). He was a leader in the development of the field of law and economics (Coase (1993)). He has been dubbed the father of the spectrum auction and of carbon emissions trading (Littlewood (2013)). His impact on both economic research and judicial opinions has blossomed over time (Landes and Lahr-Pastor (2011)). His concepts first formulated in the 1930s continue to have relevance in the digitalized world of the internet (Varian (2002), Tapscott (2013)).

Yet amid these righteous accolades, what is often lost is the unique analytic method of Professor Coase. As stated in the first three sentences of his 1937 paper on the nature of the firm, Coase championed realism in economic modeling. In this respect, Coase's method of analysis placed him orthogonal to such economic luminaries as Milton Friedman (1953). Coase's emphasis on realism did not stem from antagonism against abstract economic thinking, per se, but instead reflected his strongly held view that a lack of understanding of the world as it actually existed could lead to incorrect inferences when attempting to discern between competing hypotheses (Coase (1982)).

In this paper, I draw lessons from the analytic method of Coase for research on mergers and acquisitions. My main premise is that a more detailed understanding of how the merger process evolves enables deeper insights on the causes and effects of merger activity. In

particular, Coase's emphasis on realism in economic analysis has direct relevance to the study of the valuation effects of mergers and acquisitions. Indeed, Coase called for a detailed analysis of merger activity in his 1972 critique of the state of research on industrial organization.

The paper proceeds as follows. Section 2 discusses the analytic method of Ronald Coase. In addition to noting Coase's emphasis on realistic models, Section 2 also reports the variety of information sources used by Coase in formulating his ideas.

Section 3 draws lessons from Coase's analytic method for research on mergers and acquisitions. I first provide a detailed schematic of the takeover process. I then note that much of the research on mergers and acquisitions fails to capture the depth of this process. Using new data, I show how this failure to model the richness of the takeover process can lead to misestimation in measuring the valuation effects of mergers and acquisitions.

Section 4 addresses related topics on mergers and acquisitions and makes suggestions for avenues of future research. The final section summarizes the analysis and offers concluding comments.

## 2. The Analytic Method of Ronald Coase[1]

### A. Realistic Assumptions

Beginning with his work on the nature of the firm (Coase (1937)) and continuing through his many other important papers, Coase inquired as to the factors that determine the causes and effects of economic organization and legal institutions. But as early as the 1937 paper, Coase

[1] For more detailed treatments of the analytic method of Coase, see Medema (1996), Peltzman (2011), and Shirley, Wang and Menard (2014).

also argued for a new approach in economic analysis. Consider the opening sentences in Coase (1937, p.386): "Economic theory has suffered in the past from a failure to state clearly its assumptions. Economists in building up a theory have often omitted to examine the foundations on which it was erected. This examination is, however, essential not only to prevent the misunderstanding and needless controversy which arises from a lack of knowledge of the assumptions on which a theory is based, but also because of the extreme importance for economics of good judgment in choosing between rival sets of assumptions."

Given his emphasis on realism, Coase might be dubbed the James Joyce of economics. In his Nobel address, Coase (1992, p.713) states, "My contribution to economics has been to urge the inclusion in our analysis of features of the economic system so obvious … they have tended to be overlooked." Compare this to a biography of James Joyce which states that the Irish writer's innovation was through "the examination of big events through small happenings in everyday lives."

Coase has stated that his emphasis on realism in economic modeling borrowed from both Alfred Marshall (Coase (1975)) as well as Coase's teacher Arnold Plant (Coase (1986)). Of course, Coase's approach of realistic assumptions placed him orthogonal to the method proposed by Milton Friedman (1953). Rather than start with predictions from an optimization model, Coase aimed to understand how and why the world operated as it did (Coase (1982)). In this respect, Coase's method resembled that of Armen Alchian. Alchian (1950, footnote 6) states: "Analytical models in all sciences postulate models abstracting from some realities in the belief that derived predictions will still be relevant. Simplifications are necessary, but continued attempts should be made to introduce more realistic assumptions into a workable model with an

increase in generality and detail." Alchian (footnote 7) further states: "In effect, we shall be reverting to a Marshallian type of analysis with the essentials of Darwinian natural selection."

Coase often expressed a disdain for blackboard economics which he described as theory without any empirical basis (Coase (1992, p.714)). He also cringed at the term 'Coasian world' which is often applied to a world with zero transaction costs. Coase stated (1988, p.174), "It is a world of modern economic theory, one which I was hoping to persuade economists to leave." A primary concern that Coase had regarding blackboard economics is that the "factual examples given are often quite misleading" (Coase, (1988, p. 29)).

One of Coase's most strident attacks on blackboard economics was the portrayal of the lighthouse as something that had to be provided by the government rather than the private sector. At the conclusion of Coase (1974), he notes that "Despite the extensive use of the lighthouse example in the literature, no economist, to my knowledge, has ever made a comprehensive study of lighthouse finance and administration." In related research, under the editorship of Coase, Steven Cheung (1973) dispelled a similar fable of blackboard economics tied to beekeeping. In an amusing anecdote related in Kitch (1983), Professor Cheung notes that he and Professor Coase once attended a fisheries conference in British Columbia and soon came to realize that many of the world's fishery "experts" had never actually seen a fishing boat.

Coase's delineation of the transaction costs in the real world has often been suggested to be tautological. Yet, as Cheung (1983) elucidates, Coase's emphasis on transaction costs provides testable hypotheses to contrast with competing hypotheses such as monopoly, risk aversion or managerial behavior. Coase himself laments that policymakers are often too quick to arrive at a monopoly hypothesis when faced with unusual business practices, at least in the

context of a zero transaction cost world (Coase (1988, p.9)). As an example, Coase (1972, p.67) cites a merger between Procter and Gamble and Clorox where the antitrust authorities interpreted data on television advertising as evidence of monopoly power. Yet a careful study by Peterman (1968) found instead a more benign explanation that the advertising rates were tied to variations in audience size at different hours.

B. Information Sources Used by Coase

In order to study the economic system and legal institutions, Coase relied on a variety of information sources. Table 1 sketches the information sources used by Coase in four of his most important papers: Coase (1937, 1959, 1960, 1974). As he later stated, Coase especially valued the richness of information available from government documents and agencies (Coase (1991)). Coase's method of analysis and sources followed that of Alfred Marshall, whom Coase (1975, p.28) noted "was a great collector of economic facts not only from sources such as Government reports but also from visits to factories and from questioning businessmen and workers."

The source material used to develop Coase's 1937 paper on the nature of the firm is most interesting. The original paper does not reveal the variety of sources that Coase used in formulating his ideas on transactions costs. But 50 years later, in Coase (1988a), we learn that the paper originated as a senior thesis where the laboratory was a study abroad in the United States. While on this journey, Coase conducted interviews with businessmen, read FTC reports, industry studies and trade periodicals, and even noted the variety of business services listed in the Yellow Pages.

In his landmark study of the Federal Communications Commission, Coase (1959) relied on various government documents from the U.S. Congress and the FCC itself. But he also used legal cases to illustrate his ideas on the impact of the allocation of property rights. As is recounted in Kitch (1983), Cheung (1987), and Coase (1993), an apparent error in the paper led to an invite for Coase, then at Virginia, to give a seminar at Chicago. Relying on a more detailed series of legal cases that formed the structure of Coase (1960), Coase was able to convince a formidable group of economists that, in the absence of transaction costs, the initial allocation of property rights would not determine the use of an asset. Instead, the asset would go to its highest valued user.

A central takeaway offered in Coase (1960) is that there are important lessons to learn from how economic activity and legal institutions actually interact, rather than concocting schemes that would apply in an ideal world. Hence, when addressing the lighthouse in economics, Coase (1974) made extensive use of historical documents to study the issues of lighthouse finance and economics, a novel approach compared to the standard textbook approach of blackboard economics.

## 3. Lessons for Research on Mergers and Acquisitions

In this section, I draw lessons from the analytic method of Ronald Coase for research on mergers and acquisitions. My main premise is that a better understanding of how the merger process actually unfolds can aid in more accurate estimation of how mergers affect firm value. To develop this premise, I first present the central questions in research on mergers and acquisitions. I then provide a detailed schematic of the takeover process. I then summarize the

information sources used in mergers and acquisitions research, contrasting the standard use of news stories with a more detailed approach relying on Securities and Exchange Commission (SEC) documents. The main body of this section then provides new evidence on the interaction of the takeover process and the effects of mergers on firm value.

## A. Central Questions in Research on Mergers and Acquisitions

As presented in Weston et al. (2014, p.130), there are three central questions in research on mergers and acquisitions: 1. Why do mergers occur? 2. What are the possible effects of merger activity on firm value? 3. How does the merger process unfold?

Question 1 on why mergers occur is certainly related to Coase's work on transaction costs. Indeed, Coase (1937) makes predictions as to how firm size will be altered by fundamental shocks such as changes in technology. Presumably, mergers would facilitate the response to such shocks. For supporting evidence, see Mitchell and Mulherin (1996) and Mulherin and Boone (2000).

My emphasis, however, will be on the interaction between questions 2 and 3. I will show that a deeper understanding as to how the merger process unfolds provides a clearer understanding as to how mergers affect firm value.

## B. A Schematic of the Takeover Process

Table 2 provides a schematic of the complex details of the corporate takeover process. Related discussion can be found in Hansen (2001), Boone and Mulherin (2002, 2007a, 2007b,

2009), and Mulherin and Womack (2014). In the table, the takeover process is divided into the private phase between the initiation of the deal and the announcement of an agreement and the public phase between the announcement and completion of a deal. A given deal is often initiated when a target firm's board of directors and executives meet to consider the strategic alternatives for their corporation. Conversely, an unsolicited bidder might approach the target with an offer.

Once the deal is initiated, the target firm hires financial advisors who aid in deciding the appropriate course of action including how many bidders to contact. At this stage, some target firms actually announce that they are "considering strategic alternatives," which is legalese to state that the firm is for sale. (See, "The Side Door to the M&A Market (1999)). Contacted bidders are asked to sign confidentiality/standstill agreements promising that they will not disclose private information nor will they make unsolicited offers.

After receiving confidential information, a subset of bidders provide non-binding indications of interest. A further subset of bidders providing such indications are invited to make a binding final offer. The high bidder then signs a takeover agreement.

Once an agreement is signed, the target and the bidder publicly announce the deal. In the following months, other possible bids might be made. Once the deal is approved by regulators and shareholders, the deal is completed with the winning bidder.

C. Information Sources for Research on Mergers and Acquisitions

Table 3 reports the information sources commonly used for research in mergers and acquisitions. As reported in Panel A, much of the research on mergers and acquisitions has entailed event study analysis which focuses on the public phase of the takeover process. Assuming an efficient stock market, event studies on mergers estimate the valuation effects of a

deal by measuring the stock price response when the deal is announced. See Fama (1991) for background on efficient markets and event studies.

As reported in Panel A.1, many of the early event studies on mergers and acquisitions such as Bradley (1980) and Asquith (1983) devised a sample of mergers from sources such as tender offer filings or delistings of firms from the database of the Center for Research on Security Prices (CRSP) at the University of Chicago. The studies then found the announcement date of a given transaction using the Wall Street Journal and other news media. Other papers such as Huang and Walkling (1987) and Schwert (1996) directly developed their samples from media sources such as the Wall Street Journal and the Dow Jones News Retrieval.

In the late 1990s, papers on mergers and acquisitions began to make use of machine-readable data provided by the information vendor, Securities Data Corp (SDC). Mulherin and Poulsen's (1998) paper on proxy contests is an early example. In a recent survey of the literature, Mulherin and Simsir (2014, footnote 1) estimate that roughly 75 percent of the papers on mergers and acquisitions in major finance journals rely on SDC for their samples. Much of the current research follows Schwert (1996) in including a 42-day pre-announcement run-up window as part of the valuation effect of a given merger.

The availability of the large body of data on mergers and acquisitions provided by SDC obviously has facilitated a boon in research. But, the presence of SDC data is not without its downside. As a corollary to Coase's concerns about blackboard economics, the SDC data create what I will label a machine-readable syndrome. For one, the data provided by SDC focus on the public takeover process which begins with the announcement of a merger agreement. But Boone and Mulherin (2007b), employing the merger background of SEC documents on the private

takeover process, report that the public phase of the takeover process represents only the tip of the iceberg of the complexities of a given deal. Moreover, research such as Boone and Mulherin (2007a, 2011) and Mulherin and Simsir (2014) documents the inaccuracy of the information provided in the SDC database. Hence, researchers that rely solely on SDC fall prey to Coase's critique of not fully understanding the world they are studying.

## D. Evidence of the Interaction of the Takeover Process and the Measurement of the Effects of Mergers on Firm Value

In this section, I study the premiums received by target firms in a sample of recent takeovers. By design, all of the sample firms privately decided to put themselves up for sale. A fraction of the firms publicly announced that they were for sale. To illustrate the importance of understanding the takeover process, I address four questions:

1. What fraction of the sample firms publicly announce that they are for sale?
2. What is the length of time between the for-sale announcement and an actual merger agreement?
3. Why might a firm publicly announce it is for sale?
4. How does the pre-merger, for-sale announcement affect the measurement of deal premiums?

### D.1. The sample

To form the sample, I use the enhanced search capability of the Electronic Data Gathering and Retrieval (EDGAR) system of the U.S. Securities and Exchange Commission

(SEC). At any given date, full text search is available for the past four years. My data span 2006 to 2010, based on when the data were first collected. To find a sample of takeover auctions, I search under the keywords "strategic alternatives" AND "possible sale." I focus on the SEC filing used in cash mergers, DEFM14A, defined as a definitive proxy statement relating to a merger, acquisition or disposition.

Table 4 outlines the formation of the sample. The original search produced 186 observations. From these initial observations, I dropped 22 firms that were not traded on a major stock exchange, 26 deals that were not a cash merger, 7 mergers that were withdrawn (i.e., not completed), and 28 mergers where the stock price of the target firm on the day prior to the merger announcement (Day -1) was less than $5. The final sample entails 103 completed cash mergers.

Table 5 reports the number of observations in the sample by year, where the year is based on the date of the DEFM14A filing. The earliest filing date is March 1, 2006, and the latest is February 8, 2010. The bulk of the sample comes from 2006 and 2007, the years prior to the recent economic downturn.

Table 6 reports other attributes of the sample firms. Panel A reports the incidence of the sample by stock exchange. Five of the target firms are listed on the American Stock Exchange. Fifty five are listed on NASDAQ. Forty three are listed on the New York Stock Exchange.

Panel B of Table 6 reports summary statistics on the deal value of the sample mergers, where deal value is the deal price times the number of share outstanding for the target firm. The mean deal value is $1.87 billion and the median deal value is $0.55 billion. The largest deal in

the sample is Alltel which was acquired for $24.6 billion in 2007. The smallest deal in the sample is Vodavi Technology which was acquired for $28.2 million in 2006.

## D.2. Targets Publicly Announcing They Are for Sale

### A. Targets Publicly Announcing that They Are for Sale

The first question that I address is the fraction of firms in the sample that publicly announce that they are for sale. To answer this question, I read the "Background of the Merger" section of the DEFM14A filing for each target firm. I also search news stories on LexisNexis in the period prior to the merger announcement.

As reported in Panel A of Table 7, I find that 29 of the sample firms publicly announce that they are for sale. Panel B reports that the mean (median) length of time between the for-sale announcement and the formal merger announcement is 92 (80) trading days. Hence, the pre-merger announcement that the target firm is for sale often occurs well before the formal merger announcement. Indeed, as reported in Panel C, in 24 of the 29 deals (83 percent), the pre-merger announcement that the target firm is for sale occurs more than 42 trading days prior to the formal merger announcement. Hence, for most targets announcing that they are for sale, the first public takeover-related announcement is outside the run-up window used in conventional event study analysis such as Schwert (1996).

Table 8 sketches the takeover process for Eagle Hospitality Properties Trust (Eagle), a sample firm that publicly announces that it is for sale. The takeover process for this firm began on June 14, 2006, when Eagle privately formed a committee of independent directors to explore

strategic alternatives. Eagle then chose to publicly announce it was for sale on January 29, 2007, when it produced a press release stating that it had established a committee to explore strategic alternatives and had retained Morgan Stanley as its financial adviser. Subsequent to this announcement, Eagle and Morgan Stanley contacted a total of 66 potential bidders. Thirty two of these potential bidders signed confidentiality agreements and received non-public information about the target. Nine bidders then provided price ranges indicating their level of interest in the target. Eagle ultimately entered into a merger agreement with Apollo Real Estate Advisers.

The agreement between Eagle and Apollo was announced on April 30, 2007, which was 63 trading days after the target firm publicly announced that it was for sale. The deal price of $13.35 per share was a premium of 12 percent over the target's price on the day before the merger was announced but was a premium of 42 percent over the target's price on the day before Eagle announced that it was for sale. The merger was completed on August 15, 2007.

### D.3. For Sale Announcements and Takeover Competition

I next address the question as to why a sample firm would choose to publicly announce that it was for sale. I consider how the for-sale announcement is related to takeover competition during the auction process for the firms in the sample. To gauge takeover competition, I use data obtained from "Background of the Merger" section of the DEFM14A filing for each target firm. I estimate the number of potential bidders contacted by the targets and their investment banks. I also compute the number of potential bidders that sign confidentiality agreements as well as the number of bidders that provide indications of interest in the target. Finally, I also record the number of bidders that publicly make a formal offer for the target firm.

Summary statistics for the measures of competition are reported in Table 9. For the full sample, the target firm contacts an average of 34 potential bidders. On average, 16 bidders sign confidentiality agreements and 5 make indications of interest. The average number of public bidders is 1.12.

For the sub-sample of 29 firms that publicly announce that they are for sale, the level of competition appears to be higher. In this sub-sample, the target firm contacts an average of 42 potential bidders. On average, for this sub-sample, 24 bidders sign confidentiality agreements and 8 bidders make indications of interest. The average number of public bidders is 1.14.

Table 10 reports regression analysis that formally tests whether the for-sale sub-sample has greater takeover competition. In the three regressions the dependent variable is the natural log of one of the three measures of competition: contact, confidentiality, and indications of interest. In all regressions, the explanatory variable is a dummy variable equal to one for deals where the target publicly announces it is for sale. For all three measures of competition, the coefficient on the for-sale dummy variable is positive and significant. Hence, a straightforward reason as to why a firm would pre-announce that it is for sale is that such an announcement enhances takeover competition by attracting a greater number of potential buyers.

## D.4. Measuring Deal Premiums

I next address the measurement of premiums in takeover auctions. In particular, I consider how the decision to pre-announce that a target is for sale impacts the estimation of deal premiums. In the analysis, the basic formula for a deal premium is:

(Deal Price – Benchmark Price) / (Benchmark Price).

I contrast (a) deal premiums relative to the benchmark of one day prior to the merger announcement (Day -1 Benchmark) with (b) premiums relative to the day before the first public information that the target is in play (In Play Benchmark). In the full sample of 103 firms, there are 52 cases where the merger announcement is the first date that the firm is known to be a takeover target. In the remaining 51 cases, there is an in play date prior to the formal merger announcement, which includes the 29 firms that publicly announce that they are for sale as well as 22 other cases where a rumor, unsolicited offer, or other information leakage is reported in the financial media.

Table 11 reports the merger premiums for the two benchmarks: the Day -1 Benchmark and the In Play Benchmark. For the full sample of 103 mergers, the mean (median) for the Day -1 Benchmark is 19.7 percent (16.0 percent). The mean (median) premium for the In Play Benchmark is 28.0 percent (25.0 percent).

Panel B of Table 11 reports the premiums for the sub-sample of 29 targets that publicly pre-announce that they are for sale. The difference between the two estimates of premiums is even more striking than that for the full sample. Using the Day -1 Benchmark, the mean (median) premium is 12.5 percent (12.2 percent). By contrast, the premium using the In Play Benchmark is more than twice as large. The mean premium is 27.6 percent and the median premium is 29.6 percent.

To gauge the importance of the differences in premiums between benchmarks for the sub-sample that announces it is for sale, Table 12 reports regression analysis for the full sample of 103 mergers. In the two regressions, the dependent variable is one of the two measures of

premiums based on the Day -1 Benchmark and the In Play Benchmark. In both regressions, the explanatory variable is a dummy variable equal to 1 for the deals where the target firm announces that it is for sale.

In the first regression in Table 12 where the premium is based on the Day -1 benchmark, the coefficient on the dummy variable for the Publicly For Sale deals is negative, large in magnitude, and statistically significant. Hence, if one were relying on the day -1 Benchmark to estimate deal premiums, then one would obtain the obstreperous result that target management and boards that choose to announce that they are for sale end up obtaining below-average premiums for their shareholders.

However, in the second regression in Table 12 where the premium is based on the In Play Benchmark, the coefficient on the dummy variable for the Publicly For Sale deals is negative, but small in magnitude, and not statistically significant. This result indicates that target management and boards do not harm their shareholders by pre-announcing that they are for sale. The analysis in Table 12 confirms the importance of using the correct date to estimate premiums in corporate takeover auctions.

Similar inferences arise by studying the event-study stock returns of the target firms. For the target firms that pre-announce that they are for sale, the stock return averages 9.4 percent on the day that the merger is announced. This compares with a merger announcement return of 18.3 percent for the target firms that do not pre-announce that they are for sale. However, for the target firms that pre-announce that they are for sale, the stock return averages 9 percent on the day that the pre-merger, for-sale announcement is made. Hence, the average summed returns over the two dates (for-sale announcement and merger announcement) for the firms that pre-

announce that they are for sale is roughly 18 percent, which is comparable in magnitude to the merger announcement returns for the targets that do not pre-announce that they are for sale. Similar to the data on merger premiums, the data on announcement returns indicate that it is important to include the for-sale announcement date as part of the gains to target shareholders.

## 4. Related Questions in Mergers and Acquisitions Research

In this section, I pose further questions in mergers and acquisitions research that can benefit by applying Ronald Coase's analytic method. Table 13 sketches the questions that I will discuss.

### A. What is a Takeover Auction?

The first question that can clearly benefit from a more detailed treatment in mergers and acquisitions research is: What is a takeover auction? Conventional analysis such as Schwert (1996) focuses on the public takeover process and defines an auction as the number of bidders publicly reported in the financial press. Applying this definition, notable researchers such as Andrade, Mitchell and Stafford (2001) conclude that the takeover process became less competitive in the 1990s relative to past decades.

However, a more detailed analysis of the takeover process via SEC merger documents indicates that the public bidding reflects only the tip of the iceberg for takeover competition (Boone and Mulherin (2007b)). To see this, refer back to Table 9 of this paper. For the full sample of target firms, the average number of public bidders was 1.12, implying that only 12 percent of the deals in the sample would be classified as auctions by conventional measures. Yet

the remaining data in the table reveal that the private, pre-announcement takeover process is very active. On average, the target firms contacted 34 potential bidders, provided confidential information to 16 potential bidders and received indications of interest from 5 potential bidders. Data not reported in the table indicate that 98 percent of the target firms contacted two or more bidders, 95 percent signed confidentiality agreements with two or more bidders, and 87 percent received indications of interest from two or more bidders. Hence, research on mergers and acquisitions should make more effort to study the full merger process, rather than only the public phase.

B. Who Initiates the Deal?

One reason that merger and acquisitions research such as Schwert (1996) focuses on the public phase of takeovers when classifying auctions may be that the definition was formed during the 1980s when bidders often initiated the takeover. For example, in his survey of takeover research, Roll (1986) assumes that the takeover process commences when a bidding firm identifies a potential target. Similarly, Easterbrook and Fischel (1981) and Bebchuk (1982) engaged in a debate as to how a target firm should react to an initial bidding firm. Indeed, the terms "bidder" and "target" imply that the process is initiated by the buying firm.

Regardless of the origins of the auction terminology, the assumption that the bidding firm always initiates the takeover is clearly inaccurate. Indeed, all of the target firms in the analysis of Section 3 of this paper initiated the transaction themselves. Hence, future research should address the factors affecting how a takeover is initiated. Gorbenko and Malenko (2013) have new work addressing this important question.

The results in Section 3 above suggest caution when studying the valuation impact of the initiator of a takeover. In the sample in Section 3, all deals are initiated by the target and 29 percent of the firms pre-announce that they are for sale. Hence, when measuring the valuation effect when target firms initiate the deal, one should be sure to check to see whether the target made an announcement to say that the firm was for sale.

C. Why not always Conduct an Auction?

In the sample of firms studied in Section 3, virtually all of the deals would be labeled an auction, at least after accounting for the private takeover process. But in more general samples, roughly half of the deals are auctions with multiple bidders taking part in the process, while the other half are negotiations with only a single bidder involved (Boone and Mulherin (2007b)). Hence, another question about the takeover process is why all target firms do not conduct an auction.

Applying a zero transaction cost model, Bulow and Klemperer (1996) theoretically conclude that auctions provide more value to target firms than negotiations. They argue that the failure of some targets to auction themselves stems from managerial entrenchment and agency costs. However, inconsistent with this inference, Boone and Mulherin (2007b) find that negotiations lead to as great a value increase for target firms as do auctions. Also counter to the implications of the Bulow and Klemperer (1996) model, Boone and Mulherin (2007a) find that termination provisions promote rather than impede auctions during the takeover process.

Moving away from the zero transaction cost world of Bulow and Klemperer (1996), several authors, a la Coase, point out that there are significant transaction costs in the takeover

process. French and McCormick (1984) note that bidding is not costless, with the burden of the costs being borne by the selling firm. Hence, sellers have incentives to optimize on the number of bids being made. Hansen (2001) argues that a notable cost in the takeover process is the possible revelation of proprietary information to rivals of the target firm. Future research should empirically model the costs of the takeover process and how these costs impact the choice between auctions and negotiations. For targets choosing an auction, related research might address why some of the auctioning firms choose to publicly announce that they are for sale.

D. What Determines the Type of Takeover?

Another important research question is what determines the type takeover. In his seminal paper on the market for corporate control, Manne (1965) notes three main methods of takeover: mergers, tender offers and proxy contests. Yet a complete understanding of the factors affecting the method chosen in a particular deal is still not known. Consistent with the model of Alchian and Demsetz (1972), Mulherin and Poulsen (1998) find that proxy contests tend to occur at poorly performing firms. A recent paper by Offenberg and Pirinsky (2013) models the choice between mergers and tender offers. Future work should continue to study such choices.

E. How Have Takeovers Changed Over Time?

A final question is how has the takeover process changed over time? In the past half century, the players, tactics and regulations impacting the takeover market have gone through

several sea changes. How have such changes affected gains to targets, management incentives, and the rate of takeover activity?

Ryngaert and Scholten (2010) address some of these questions in their analysis of defeated takeover bids. They explore whether rules and regulations that tend to impede hostile corporate takeovers have entrenched management at the expense of the shareholders of potential targets. They conclude that the changes in the rules of the game for corporate takeovers have not led to management entrenchment and find that alternatives to hostile takeovers such as proxy contests have arisen as substitutes for previously used hostile tender offers.

Future research could benefit by an even more comprehensive study of the takeover process over time. What has been the variation over time in the initiator of the deal, the choice between auctions and negotiations, and the type of takeover method? The costs of such research are non-trivial. Access to SEC documents is less attainable prior to the 1990s since the filings available on the SEC EDGAR system start in 1994. But such documents remain available on microfiche in many libraries.

Legal cases serve as another resource for analysis of the details of merger activity in the 1980s. For example, Mobil Corporation v. Marathon Oil Company (1981) provides a rich amount of information on the takeover process in an early 1980s deal where the target was Marathon Oil. The takeover was initiated when Mobil made an unsolicited offer. In response, Marathon hired First Boston as an investment bank to advise on possible alternatives. First Boston contacted several possible buyers including Allied and Gulf. The ultimate winning bidder was U.S. Steel. Hence, as is true for the analysis of Ronald Coase, legal cases are a useful information source when studying mergers and acquisitions.

## 5. Summary and Concluding Comments

The criteria for productive economic research are threefold: (1) Test competing hypotheses; (2) Have policy implications and (3) Make use of unique data. The research of Professor Ronald Coase begins with step 3. His unique data are amassed by a detailed scrutiny of the phenomenon that he is studying. Coase held that only through realistic modeling of economic organizations and legal institutions could one properly test competing hypotheses. This same realistic modeling enables more accurate policy implications.

A main tenet of the blackboard economics of the neoclassical economics textbook is: "You can't make money off a constraint." In other words, in a zero transaction cost world, resources are guided by markets to their highest valued uses. Ronald Coase and other scholars such as Armen Alchian turned neoclassical economics on its head by asking why various constraints survive in the real world away from the blackboard. Why are there property rights? Why do firms exist? What determines the length of contracts?

I have drawn lessons from the insights of Coase for research on mergers and acquisitions. I provide evidence to support my premise that a deeper understanding of the takeover process enables a more accurate estimation of the valuation effects of mergers. I pose a number of questions for future research that can benefit from the modeling approach of Coase such as: What is a takeover auction? What determines who initiates a takeover? Why aren't auctions always used in a corporate takeover? What determines the type of takeover? How has the takeover process changed over time?

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**Table 1. Information Sources Used by Ronald Coase**

This table reports the information sources used by Ronald Coase in some of his most important papers. The sources were determined from the particular papers, except for the sources used in developing Coase (1937) where the actual sources used in the paper are reported in Coase (1988a).

| Paper | Information Sources |
|---|---|
| The Nature of the Firm (1937) | Interviews with businessmen |
| | Federal Trade Commission reports |
| | Industry studies |
| | Trade periodicals |
| | The Yellow Pages |
| The Federal Communications Commission (1959) | Congressional committee documents |
| | FCC reports and decisions |
| | Legal cases |
| The Problem of Social Cost (1960) | Legal cases |
| The Lighthouse in Economics (1974) | Parliamentary reports |
| | Trinity House documents |
| | Maritime histories |

**Table 2. Schematic of the Takeover Process**

This table provides a schematic of the takeover process. A related discussion of this process can be found in Hansen (2001), Boone and Mulherin (2002, 2007a, 2007b, 2009) and Mulherin and Womack (2014).

| Step | Description |
|---|---|
| A. Private Takeover Process | |
| 1. Deal initiation | Target considers alternatives or bidder makes offer |
| 2. Select advisors | Target hires investment bank |
| 3. Contact possible bidders | Target decides how many bidders to contact |
| | May announce: "considering strategic alternatives" |
| 4. Confidentiality/standstill | Bidders agree not to disclose private information<br>Also agree not to make an unsolicited offer |
| 5. Indications of interest | Subset of bidders make non-binding offers |
| 6. Formal private bids | Further bidder subset makes binding offers |
| 7. Takeover agreement | High bidder signs takeover agreement<br>Detailed document includes background of the deal<br>Specifies payment terms and termination provisions |
| B. Public Takeover Process | |
| 8. Takeover announcement | Agreement with the high bidder is announced |
| 9. Possible further bidding | Possible public offers from other bidders |
| 10. Deal approval | Regulatory and shareholder approval |
| 11. Deal completion | Merger with winning bidder is completed |

**Table 3. Information Sources for Research on Mergers and Acquisitions**

This table reports the information sources used in selected research on mergers and acquisitions.

| Information Source(s) | Paper |
|---|---|
| A. The Public Takeover Process: Event Study Analysis | |
| 1. Early Event Study Analysis | |
| Tender Offer Filings / News Stories | Bradley (1980) |
| CRSP Delistings / News Stories | Asquith (1983) |
| Wall Street Journal | Huang and Walkling (1987) |
| Dow Jones News Retrieval | Schwert (1996) |
| 2. More Recent Event Study Analysis | |
| Securities Data Corp (SDC) | Mulherin and Poulsen (1998) |
| | Mulherin and Simsir (2014) |
| B. The Private Takeover Process | |
| Consulting Experience / Investment Bank Documents | Hansen (2001) |
| Securities and Exchange Commission Merger Documents | Boone and Mulherin (2007b) |

**Table 4. Sample Formation**

This table reports the formation of the sample of takeover auctions. The initial observations were obtained through a keyword search of the SEC EDGAR database. The time period available when the search was conducted was March 1, 2006, to February 8, 2010. The SEC filing searched was DEFM14A, defined as a definitive proxy statement relating to a merger, acquisition or disposition. The keywords employed were "strategic alternatives" AND "possible sale." The initial number of observations was 186. Observations were dropped for targets not traded on a major exchange (AMEX, NASDAQ or NYSE), transactions that were not a cash merger, withdrawn mergers, and mergers where the price of the target on day -1 (the day prior to the merger announcement) was less than $5. The final sample has 103 observations.

| Sampling Criteria | # of Observations |
|---|---|
| Initial number of observations | 186 |
| Target not on a major exchange | -22 |
| Not a cash merger | -26 |
| Withdrawn merger (not completed) | -7 |
| Day -1 stock price of the target less than $5 | -28 |
| Final sample | 103 |

**Table 5. Sample by Year**

This table reports the sample by year, where year is based on the date of the DEFM14A proxy filing related to the merger.

| Year | # of Observations |
|---|---|
| 2006 | 32 |
| 2007 | 45 |
| 2008 | 15 |
| 2009 | 10 |
| 2010 | 1 |
| Total | 103 |

**Table 6. Sample Statistics**

This table reports attributes about the sample of 103 mergers. Panel A reports the exchange on which the target traded. Panel B reports summary statistics of deal value, defined as the deal price times the number of shares outstanding for the target firm.

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Panel A. Exchange on which the Target is Traded

| Exchange | # of Observations |
|---|---|
| AMEX | 5 |
| NASDAQ | 55 |
| NYSE | 43 |
| Total | 103 |

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Panel B. Deal Value

| | |
|---|---|
| Largest | $24.6 billion (Alltel) |
| Mean | $1.87 billion |
| Median | $0.55 billion |
| Smallest | $28.2 million (Vodavi Technology) |

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**Table 7. Targets Publicly Announcing that They Are For Sale**

This table reports information on the sample targets that publicly announce that they are for sale. Panel A reports the number and fraction of mergers where the target firm publicly announces that it is for sale. Panel B reports the mean and median number of days between the for sale announcement and the actual merger agreement announcement. Panel C reports the number and fraction of mergers where the for sale announcement is more than 42 trading days prior to the merger agreement announcement.

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Panel A. Targets Publicly Announcing that They Are For Sale

| | |
|---|---|
| Number of Observations | 29 |
| Fraction of the Sample | 28% |

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Panel B. Trading Days between For Sale Announcement and Merger Agreement Announcement

| | Number of Trading Days |
|---|---|
| Mean | 92 |
| Median | 80 |

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Panel C. Mergers where Sale Announcement is more than 42 Trading Days prior to Merger Announcement

| | |
|---|---|
| Number of Mergers | 24 |
| Fraction of the Subsample | 83% |

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**Table 8. Example of a Target Firm that Publicly Announces It Is For Sale**

This table provides an example of a sample target firm that publicly announces it is for sale. *Private Date* is the date on which the target firm privately initiated the takeover process, as reported in the DEFM14A filing for Eagle Hospitality Properties Trust. *First Public Announcement* is the date on which the target firm publicly put itself up for sale. *Contact* is the number of potential bidders contacted by the target firm. *Confidential* is the number of potential bidders that signed a confidentiality agreement with the target firm. *Indications of Interest* is the number of potential bidders that made a non-binding offer for the target firm.

| | |
|---|---|
| Target | Eagle Hospitality Properties Trust |
| Bidder | Apollo Real Estate Advisors |
| Private Date | June 14, 2006 |
| | Formed a committee of independent directors to explore strategic alternatives |
| First Public Announcement | January 29, 2007 |
| | Has established a committee to explore strategic alternatives |
| | Has retained Morgan Stanley as a financial advisor |
| Contact | 66 |
| Confidential | 32 |
| Indications of Interest | 9 |
| | |
| Merger Announcement Date | April 30, 2007 |
| Merger Completion Date | August 15, 2007 |
| | |
| Merger Premium | |
| Based on first public announcement | 42% |
| Based on merger announcement | 12% |

**Table 9. For Sale Announcements and Takeover Competition**

This table reports measures of takeover competition for the full sample of 103 mergers and for the subsample of 29 targets that publicly announce that they are for sale. *Contact* is the average number of potential bidders contacted by the target firm. *Confidential* is the average number of potential bidders that signed a confidentiality agreement with the target firm. *Indications of Interest* is the average number of potential bidders that made a non-binding offer for the target firm. *Public Bidders* is the average number of potential bidders that made a formal bid for the target firm that was reported in the financial press.

| | Full Sample (N=103) | Publicly For Sale (N=29) |
|---|---|---|
| Contact | 34 | 42 |
| Confidential | 16 | 24 |
| Indication of Interest | 5 | 8 |
| Public Bidders | 1.12 | 1.14 |

**Table 10. Regression Analysis of Takeover Competition**

This table reports regression analysis of the measures of competition on a dummy variable for the target firms that publicly announce that they are for sale. *Contact* is the natural log of the number of potential bidders contacted by the target firm. *Confidential* is the natural log of the number of potential bidders that signed a confidentiality agreement. *Indications of Interest* is the natural log of the number of potential bidders that made a non-binding offer for the target firm. *Publicly For Sale* is a dummy variable equal to 1 for target firms that publicly announce that they are for sale. (p-values are in parentheses.)

| | | Dependent Variable | |
|---|---|---|---|
| Explanatory Variable | Contact | Confidential | Indications of Interest |
| Intercept | 2.89 | 2.03 | 1.17 |
| | (<.0001) | (<.0001) | (<.0001) |
| Publicly For Sale | 0.70 | 0.95 | 0.72 |
| | (.004) | (<.0001) | (<.0001) |
| Adjusted R-square | 0.07 | 0.16 | 0.18 |
| # of Observations | 103 | 103 | 103 |

**Table 11. Merger Premiums**

This table reports merger premiums for the full sample of 103 mergers and for the subsample of 29 targets that publicly announce that they are for sale.

Panel A reports the premiums for the full sample. The Day -1 Benchmark in the first column reports the premium where the deal price is relative to the price of the target on Day -1, the day prior to the announcement of the formal merger. The In Play Benchmark in the second column reports the premium where the deal price is relative to the price on the day before the earliest in play announcement, which includes 51 cases where the target is in play prior to the formal merger announcement (including rumors, public announcements that the target is for sale, and other cases).

Panel B reports the premiums for the targets that publicly announce that they are for sale. The Day -1 Benchmark in the first column reports the premium where the deal price is relative to the price of the target on Day -1, the day prior to the announcement of the formal merger. The In Play Benchmark in the second column reports the premium where the deal price is relative to the price of the target on the day prior to the public announcement that the target is for sale.

Panel A. Full Sample (N=103)

| | Day -1 Benchmark | In Play Benchmark |
|---|---|---|
| Mean | 19.7% | 28.0% |
| Median | 16.0% | 25.0% |

Panel B. Subsample that Publicly Announce For Sale (N=29)

| | Day -1 Benchmark | In Play Benchmark |
|---|---|---|
| Mean | 12.5% | 27.6% |
| Median | 12.2% | 29.6% |

**Table 12. Regression Analysis of Merger Premiums**

This table reports regression analysis of merger premiums.

*Day -1 Premium* is the premium where the deal price is relative to price of the target price on the day prior to the formal announcement of the merger. *In Play Premium* is the premium where the deal price is relative to the price of the target on the day prior to the earliest in play announcement date.

*Publicly For Sale* is a dummy variable equal to 1 for target firms that publicly announce that they are for sale. (p-values are in parentheses.)

| | Dependent Variable | |
|---|---|---|
| Explanatory Variable | Day -1 Premium | In Play Premium |
| Intercept | 0.23 | 0.28 |
| | (<.0001) | (<.0001) |
| Publicly For Sale | -0.10 | -0.005 |
| | (.006) | (.92) |
| Adjusted R-square | 0.06 | -0.01 |
| # of Observations | 103 | 103 |

**Table 13. Related Questions in Mergers and Acquisitions Research**

This table outlines various questions in mergers and acquisitions research.

| Question | Relevant Paper |
|---|---|
| What is a takeover auction? | Schwert (1996) |
| | Andrade, Mitchell and Stafford (2001) |
| | Boone and Mulherin (2007b) |
| Who initiates the deal? | Roll (1986) |
| | Easterbrook and Fischel (1981) |
| | Bebchuk (1982) |
| | Gorbenko and Malenko (2013) |
| Why not always conduct an auction? | Bulow and Klemperer (1996) |
| | Boone and Mulherin (2007a, 2007b) |
| | French and McCormick (1984) |
| | Hansen (2001) |
| What determines the type of takeover? | Manne (1965) |
| | Mulherin and Poulsen (1998) |
| | Offenberg and Pirinsky (2013) |
| How have takeovers changed over time? | Ryngaert and Scholten (2010) |
| | Mobil v. Marathon (1981) |