Industrial and Financial Economics
Masters Thesis

MERGERS & ACQUISITIONS TRENDS FORECASTED

-An Empirical and Fundamental Analysis on Aggregate Corporate Restructuring in the U.S. Economy

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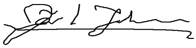

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ABSTRACT

M&A (Mergers and Acquisitions) is a topic of immense importance: in 1999 so far there have been over 9,218 transactions in the U.S. alone, with a total deal value of over $1.4 trillion[1]. The purpose of this thesis is to forecast which U.S. industries are likely to have the greatest growth in the number of M&As, as well as in the dollar volume of these transactions (excluding those that have had the greatest growth the last five years). The knowledge of which these potentially overlooked industries are can be very lucrative. Previous research on this topic is presented and evaluated. There are multiple careful empirical examinations (including time series, box plot, and cluster analyses) of the 1983-1997 aggregate M&A time series for each of the 50 largest U.S. industries. Careful surveys of fundamental factors are performed on the initial findings in order to complement the inherent limitations of pure empirical forecasts. It is found that the fundamental factors appear to support the initial empirical findings. The conclusion is that the following four industries have the greatest growth potential in the near future: "Plastics and Rubber"; "Electronics", "Real Estate"; and "Agricultural Production".

KEY WORDS

M&A, mergers, acquisitions, activity, transactions, prediction, future, time series analysis, aggregate, industry, restructuring, divestiture

[1] Mergerstat Review 1998, and updated with data published in www.mergerstat.com on 1/4/00.

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APPENDICES

1. INTRODUCTION

1.1. BACKGROUND

News about mergers and acquisitions (M&A) are in the headlines almost daily and the sums involved are astronomical, in 1999 so far there has been a total deal value of more than $1.4 trillion, and 9,218 transactions reported (Mergerstat, 1999)[2], (Appendix A, and Appendix B). The issues concerning mergers, acquisitions, restructuring, and corporate control have become central public and corporate policy issues. These strategic alternatives and techniques have for a very long time been a strong force in every economy that use them, and have the potential to lead them to new peak accomplishments of productivity and creativity. M&A has been, and likely always will be a main power in the modern financial and economic society. Almost every person in society is indirectly or directly affected by this activity, either by working for a firm that is involved in a M&A transaction, or by purchasing goods or services from a firm that is. On a more fundamental level it supports the most basic of all economic principles (i.e. that it allows funds to freely flow to those individuals and organizations that can put those funds into the most productive use). Thus this topic is of immense importance not only to the business, legal, and academic communities, but also to the general public.

Six distinct time periods of furious and widely fluctuating M&A activity dating back to the end of the 20th century have been identified (Mergerstat, 1998). 1893-1904, the Sherman Antitrust Act of 1890 that outlawed collusion stimulated horizontal (i.e. same industry) mergers of a large number of small firms into huge monopolistic entities. 1915-1929, oligopolies were created by horizontal mergers of secondary firms, so that a few large firms dominated an entire industry. In the 1940s, heavy estate taxes forced smaller privately held firms to be sold to larger companies by the corporate owners. The mid-1950s -1960s, when the theory that diversification into a variety of businesses would lessen the risk of business cycles triggered small and medium sized firms to acquire other small and medium sized firms in unrelated industries to create conglomerates (Server, 1988) , and (Chakravarty, 1998). During the mid-1970s -1980s, divestitures

[2] Mergerstat Review 1998, and updated with data published in www.mergerstat.com on 1/4/00.

of unprofitable or unrelated operations, and acquisitions of very large publicly traded organizations were financed by the introduction of the junk bond market. In the 1990s, banking, health care, utilities, and office supply industries are combining their operations in order to achieve, among other things, economies of scale, expand product offerings, and increase their market share with the resulting creation of dominant market players. Various fundamental factors such as deregulation and the search for synergies are triggering this.

From this discussion it is clear that M&A fluctuates widely over time. This can also be seen by plotting the activity from the last couple of decades (Appendix A, and Appendix B).

That was a quick review of the past, but what will the future hold for M&As?

1.2. OBJECTIVE, PROBLEM FORMULATION, AND DELIMITATIONS

There are several industries today where there are a large number of M&A transactions and where the total dollar size of those transactions are enormous. However, as we have seen, and as we will see more proof of, this activity fluctuates over time. Industries that have the highest intensity of M&A activity today might not be the ones that will have it in the future. The main objective of this thesis is to forecast which specific industries will be the new runners-up and that likely have been overlooked by others.

A series of questions needs to be answered in order to achieve that objective:

- First, which industries will have the strongest forecasted trend in the number of total M&A transactions per year, and in the total dollar size of those transactions in the future?

- Second, which industries have already had the strongest increase in M&A activity the last few years, and have thus obviously been identified by most observers of M&A transactions as being already "hot" industries?

- Third, if one takes the answer from the second question and subtracts that from the first question, which industries are we left with (i.e. which are the runners-up that other observers likely have overlooked because they are not obviously hot since they have not increased the strongest the last few years)?

But first, in order to make this problem more manageable, some crucial delimitations need to be set in order to limit the scope. One limitation is that the forecast should be based on U.S. industries. There are several reasons for why the problem is focused in this way. First, the U.S. is the nation that historically has had the most M&A activity, both in the number of M&A transactions, as well as in the total dollar size of those transactions. Second, the U.S. is the nation with the longest published data on the M&A subject. Third, the U.S. has one of the leading economies in the world which greatly influences other countries, and thus, the findings based on an analysis of U.S. data might be applicable towards other countries as well. The second delimitation is that only M&A transactions where there is a transfer of ownership of at least 10% of a company's equity and where there is a transaction size of at least $1 million will be examined. This delimitation was made due to the choice of time series data provided by Mergerstat which covers transactions meeting those specific criteria. A third delimitation is to identify the industry by the seller.

The main audience I have in mind when positioning the perspective of the research objective, is the business person involved in M&A transactions, primarily the investment banker specializing in M&As, but also any other business person active in the giving or taking of buying- or selling-advice of operating companies, or involved in evaluations of companies.

The value of this paper to the business person is the identification of potential new hot industries, so that he / she can prepare for a potential increase in its activity. Thus, he can get a head start on the competition and become an "industry expert" for a certain niche. It assumed that those industries have been overlooked by the competitors since it is not obvious from their activities of the past few years that they will be industries with M&A activities significantly above average in the near future. The obvious ones that have seen great increase the last few years are excluded since it is assumed that the competitors are strong in those industries already.

Another argument for the value of the answer to the research question is apparent in an Interview with Addison L. Piper. Mr. Piper is the Chairman and CEO of Piper Jaffray Cos., Inc. which is one of the leading Investment Banks in the M&A field (Naficy, 1997). In this interview Mr. Piper says:

> *"This is a relationship business. Corporations are looking for investment bankers who really understand their industry and what's affecting them on a day-to-day basis. Who know what their competition is doing and can provide an ongoing resource to them well beyond just doing transactions for them, and who will be become an important adjunct to their team. You distinguish yourself by becoming an industry expert."*

The importance to the business person can also be seen by the claim of another industry expert: In order to achieve success, one must not copy and try to do what one's top competitors are doing, since if you try to be someone else, the best you can ever be is second best (McNeilly, 1996). This I applied in this thesis by suggesting not to follow and try to compete in the industries where we already have seen high levels of M&A activities the last few years, since there are assumed to be many investment banking firms that are already providing M&A advisory services in those, since they are so obvious. Instead, it would be more strategic to choose the road less traveled by finding other industries, preferable the up and coming ones, for one's effort in providing outstanding M&A advisory services. And that it is exactly the purpose of this thesis, to forecast which those industries are.

Another audience that is considered in this thesis is that large part of the general public that is engaged in investing. There are huge premiums paid when a firm is acquired. If one knew in which industries these future M&As would occur on an increasing level, one would have a better chance to spot the likely buyout targets which can be extremely lucrative (Server, 1988). One convenient way to do so is to invest in any of the several mutual funds specializing in merger arbitrage[3] (Grover, 1993), and in particular to pick those funds specializing in those industries that the this paper intend to point out.

[3] Merger arbitrage is the attempt to profit on the spread between a target's stock price after an acquisition is announced and the price the acquirer intends to pay for it.

1.3. DISPOSITION

The rest of the report follows this straightforward and logical structure:

In the second chapter the research issues and theoretical framework of the thesis are presented. This is done by establishing a theoretical background and by examining previous studies into this topic, followed by the description of this study's unique positioning and intended contribution to science. The chapter is concluded with an extensive and critical review of the available time series data on M&A.

The third chapter contains the methodology used. First the data sources, data collection, statistical tests, and evaluations are presented. Followed by a discussion of the forecasting methods to be used.

Several advanced empirical analyses are performed in the fourth chapter. All the results are presented, which includes a forecast of which specific industries have been found to be likely runners up.

In the fifth chapter there is an careful review and analysis of the fundamental factors that affect the industries identified in the empirical analysis. This is intended to function as a complement to the previous chapters' pure mathematical analyses.

The last chapter serves as a summary of this paper, and it is also here where the recommendations and conclusions are made.

2. RESEARCH ISSUES AND THEORETICAL FRAMEWORK

In this chapter there is an introduction to the theoretical background of the M&A phenomenon in general. Here is also a thorough presentation and discussion of past studies that are of particular relevance to the research question at hand. The intention behind this is to clarify why a certain study design is chosen, as well as to give a general theoretical background to the topic. The a priory assumptions that have been made, such as the past can be used to predict the future, are also explained through a proper reasoning with the help of previous studies and findings. There is also a discussion on why M&A activities are studied on an industry level in this paper.

2.1. GENERAL THEORETICAL BACKGROUND

2.1.1. M&A Activity Fluctuates

In the introductory chapter it was briefly shown that M&A activities fluctuate over time. Here there will be a deeper discussion about that aspect of the M&A topic.

M&A is an economic process in which resources are allocated and reallocated in the economy (Cyert, 1988). Resources are provided to those economic units (i.e. firms or individuals) who can best utilize those resources by the identification and capitalization on new investment and profit opportunities.

It appears that M&A obeys and follows the same laws of physics as the universe (Rock, 1996)[4]. The parallel of this can be seen in the M&A process where industries and firms first go through a period of rapid expansion through acquisitions, which is then followed by a period of relative calm, when the new business units are assimilated and integrated into the

[4] According to some physical scientists, the universe was not created by a singular event like the "Big Bang" but instead it was created by what they call an "Oscillation
states that there is a continuous process of unbound expansion, that is later followed by a cataclysmic contraction, which in turn is followed by yet another expansion. This cycle of birth, death, and rebirth is grounded by the physics of momentum and gravitation (Rock, 1996).

organizations. On other occasions the momentum will be broken due to the process of breaking some components into parts (divesting), and then it is expanding again through acquisitions.

Certain industries have strong increases in M&A activities while others have slower increases or possibly even have decreasing activities. This becomes very clear when plotting the yearly activity of a sample of industries (Appendix C). A study of industry-level patterns of mergers and acquisitions transactions in 51 sample industries during the 1980s found empirical evidence of the fact that activity levels and timings of M&A transactions were very different among industries and that a majority of all transactions occurred in just a few industries (Mitchell & Mulherin, 1996).

2.1.2. Fundamental Factors of Fluctuations in M&A Activities

A review of current research papers and articles which attempt to identify today's reasons for why firms engage in M&As reveals several plausible fundamental factors that tend to trigger M&A activity.

Rapidly Expanding Industries
Industries that are experiencing a rapid expansion phase tend to have an increasing level of M&A activities (Cyert, 1988). Firms operating in that type of environment need to expand as well, and in most cases it is better for a firm to expand through a takeover rather than through *green field operations*[5] (Friedman, 1989). Better because this artificial form of increased growth enables the acquiring firm to accelerate the growth process in a substantial way with a single transaction which is much faster and cheaper than what is possible through internal growth, and is considered to be the most common motive behind M&As (Morris, 1995). Better also because of the potential to achieve synergy effects, and economies of scale and scope in the areas of product lines, distribution network, R&D, management, or market share (Marcial, 1994), and (Friedman, 1989).

Declining and Highly Competitive Industries
In an industry with the combination of being comprised of firms that are highly competitive and being in a declining trend, firms may want to merge in order to create an opportunity to remove chronic excess capacity due to

[5] Setting up new operations from scratch.

lower levels of demand (Cyert, 1988). Alternatively to remove a management team that is showing declining quality, or a capital stock biased towards old equipment.

Advantages of Vertical Integration

Other determinants can be seen in the desire to achieve vertical integration, such as when a supplier is acquired by a manufacturer (Morris, 1995). The acquiring firm can then benefit from a more stable supply market.

Potential Rewards of a Certain Organizational Form

Firms sometimes reorganize themselves in order to gain advantage of the greater flexibility that can be achieved through a looser organization (Damodaran, Job, & Liu, 1997). Other times organizations reorganize themselves into a tighter organization in order to take advantage of tax benefits.

Foreign Competition

One study found that foreign competition[6] also influenced the level of M&A activities (Mitchell & Mulherin, 1996). The shoes, machine tools, apparel, construction equipment, office equipment and supplies, autos and auto parts, tire and rubber, and steel industries were those industries found to be impacted the most by foreign competition in recent times.

Absence of Well-Developed Capital Markets

Firms merge to form their own internal capital markets in the absence of formal well-developed external capital markets, in particular in economies with less developed countries (Hubbard & Palia, 1999). This since some firms are believed to have advantages over the external capital markets. Thus, as many emerging markets develop, large diversified firms may use their capital strengths in order to help target companies achieve efficient financing.

Internal Excess Capital

If a firm has excess capital but no good potential investment opportunities within its own area of expertise, nor in the traditional financial markets, it

[6] In the Mitchel and Mulherin study it was the changes in the import penetration ratio (measured by the ratio of imports to total industry supply) that was used as the main measure of foreign competition.

looks for other alternatives. One such alternative can be the acquisition of a firm from an unrelated business that has good potential for excess returns (Business Owner Magazine, 1995). The acquiring firm then will be acting as a holding company (Morris, 1995).

Changes in the Input Factors

When there are significant changes in the input factors there are often increased M&A levels (Mitchell & Mulherin, 1996). An example of this was seen when the oil prices increased dramatically in the 1970s (1973-1979), which triggered dramatic changes in the M&A activities in the petroleum, natural gas, air transportation, coal, and the trucking industries. Interesting to note is that it was not only the oil industry itself that was impacted by this, but also industries like air transport and trucking industries where the energy costs contributed to 10% or more of the total input costs.

The Role of Leadership

Managers tend to follow the current trends of the leading firms in an industry, if the top firms are engaged in heavy M&A activities, then others tend to follow (Wasserstein, 1998). Individual managers might also be led by selfish motives, such as greed or ego.

Fluctuations in the financial markets

M&A activities and stock market activities appear to be correlated (Marcial, 1997), (Golbe & White, 1988), and (Wasserstein, 1998). This pertains to the availability of capital to fund the takeover activities, which sometimes can have astronomical price tags[7]. Thus, if the stock market is showing signs of strengthening, then the level of M&A activities would increase as well since more firms get access to the funds necessary to finance M&A transactions (Marcial, 1994). The level of acquisitions and the size of the firms that were acquired were increased by the ability to utilize public markets for leveraged financing (Mitchell & Mulherin, 1996).

Regulatory and Other Policy Reforms

Changes in legislation and other policies often have significant impact on the level of M&A activity (Wasserstein, 1998). For example, in the late 1980s when the Reagan administration was nearing its end, there was a fear that his administration’s hands-off policy regarding M&A transactions would stop

[7] Premiums the last ten years have been around 40% (Mergerstat 1998).

(Server, 1988). This fear triggered a number of deals to be done before the presidential term was over.

Other examples of regulatory and policy reforms' effect on M&A activities has also been seen in the financial services industry[8], and in the trucking industries[9]. Deregulation in recent years triggered significant M&A movements in air transportation[10], broadcasting, entertainment, and the natural gas industries (Mitchell & Mulherin, 1996).

Today we see the same thing happening in the financial services industry due to the increased deregulation by the gradual abandonment of the Glass-Steagall Act. There will with all likelihood be transactions where the financially strong firms will acquire the weaker ones. There has also recently been an increase in activities in the health care and pharmaceutical industries due to the Clinton health-reform package (Marcial, 1993).

Technological Developments

M&A activities are dependent on the development of technological innovations. For example the discovery by Henry Bessemer and William Kelly in 1856 of a new more efficient way of ridding iron of its impurities triggered a whole industry to reorganize itself through M&As. Their discovery led to the development of a technology to produce an alloy of iron and carbon today known as steel which is much stronger than iron alone. Another advantage was that it was cheaper to produce. However the equipment needed to implement this new technology was much too expensive for most firms by themselves, thus they began to merge to reach the critical size where it would be possible to economically use this new method (Wasserstein, 1998).

[8] When the SEC, after the 1960s, forced the uncoupling of the fixed commission rates for non-members of the New York Stock Exchange that had previously been decided by stockbrokers who met under the buttonwood tree in 1792 to set this fixed commission. Soon hundreds of brokerage firms disappeared through M&A transactions, and the survivors were the organizations that had been well-capitalized like Merrill Lynch, Morgan Stanley, First Boston, Salomon Brothers, and Goldman Sachs (Shilling, 1997).

[9] A similar situation appeared in the trucking industry that had been very strictly regulated until 1978, then when the deregulation occurred, the financially drained unionized firms disappeared when the shipping rates fell and nonunion truckers took the lead.

[10] In 1978 the airline industry was also deregulated: small and weak firms disappeared since they were no longer supported by high, fixed rates and routes that were highly regulated.

The Level of Market Concentration

Fragmented industries tend to have a lot of M&A activity where the firms intend to create organizations with greater market shares (Helgesson, 1999). An example of this is the paper industry where the five largest firms have less than three percent market share each, which can be compared with many other industries where the top five firms have at least 10 percent market share.

Undervalued or Otherwise Weakened Firms

Undervaluation of firms' stock is another reason for a potential takeover (Server, 1988). For example, if the firms value in the stock market is lower than what its actual liquidation or breakup value is, it can trigger takeovers (Server, 1988). Buyout specialists, money managers, and arbitrageurs attempt to spot buyout candidates by looking at the firm's price/earnings multiple (Kichen, 1988). Those that have multiples that are lower than the market's are potential targets. But the P/Es are not the only things to consider. Other things to look for are firms that have a strong and steady cash flow since the common way to finance transactions, the LBOs (leveraged buyouts), require a stream of cash that is reliable in order to pay off the sometimes astronomical debt load taken on to purchase the company. However, considering this aspect of a firm requires careful analysis since it is the free cash flow that should be looked at which is usually defined as the earnings after interest payments, taxes, dividends, and essential capital expenditures, but with the part of earnings normally charged off as depreciation added back in. Doing this is fairly complicated since the firms often do advanced "things" with taxes, so this is done mostly by the pros (Server, 1988).

Activities such as lawsuits and counter suits that hamper a firms business and hurt its stock also make them more vulnerable for takeovers (Marcial, 1997). Another factor that increases the potential for a weak firm to be taken over is if it has brand names in their product lines since they can easily be sold in order to pay off the debt created by the takeover. (Server, 1988).

Firms Leverage Levels

Firms that have increased leverage are less likely to be taken over (Safieddine & Titman, 1999). The higher the leverage the more the target's manager is committed to make improvements that otherwise would have been implemented by a potential target (e.g. reduce their levels of capital expenditures, sell off assets, reduce employment, increase focus, and increase their operating cash flows).

It is safe to assume that the reverse is likely. Firms with small long-term debt (i.e. well below 50% of capitalization), and with a lot of cash are attractive. One way to look at this is to take the amount of cash on a firm's balance sheet and divide it by the number of outstanding shares, then compare it to the stock price. If the stock price is less than three times the cash per share, it is a potential target (Server, 1988). Takeover experts can then finance a deal by loading the firm with bank loans and junk bonds.

Development of Effective Tactics by Managers in Order to Avoid Unwanted Takeovers

Possible fundamental factors that may cause a decline in M&A activity might include the development of effective tactics by managers[11] in order to avoid unwanted takeovers, and improvements in corporate governance that better motivate managers to pursue the interest of stockholders (Mickkelson & Partch, 1997).

2.2. PREVIOUS STUDIES ON AGGREGATE M&A ACTIVITY

Numerous studies and articles have been written about the M&A topic. The following is a presentation and discussion of a representative part of the literature studying the changes in the level of M&A activities. The articles are discussed in a chronological order in order to create an appreciation for how the science on this topic has developed over time

2.2.1. Melicher, Ledolter, & D'Antonio, 1983

These researchers performed a time series analysis of aggregate merger activity based on quarterly data covering the time period 1947-1977. They performed a rather intricate cross correlation analysis and a multiple time series model and found substantial support for the conclusion that aggregate merger activity is a capital market conditions phenomenon. Specifically they claim that future levels of aggregate merger activity can be forecasted with changes in stock prices and bond yields.

[11] Poison Pills, Greenmail, White Nights, Pac Man Ddefenses, etc.

Another finding in their study was that there was a very weak relationship between merger activity and changes in the level of business failures and in the level of industrial production.

They also found that merger negotiations tend to begin about two quarters before consummation and that an increase in the M&A activity appears to indicate a belief that the future conditions in the capital markets will be more favorable due to lower interest rates and higher stock prices.

2.2.2. Palepu, 1986

Palepu's analysis investigates the reliability of several proposed statistical models intended to predict takeover targets. These models had been claimed to be more accurate than the stock market itself in their task of making predictions. It was the purpose of his study to use a methodological and empirical analysis to probe this issue further.

His study suggests that there are three main methodological deficiencies that makes the claimed accuracy of the predictions unsustainable. One of these weaknesses was in the way the models were initially estimated, he showed that non-random samples were, and if not corrected for would result in, biased estimates of the probability of acquisition. Thus any claim about the models' prediction accuracy were exaggerated. Another finding was that prediction tests that used non-random samples would lead to error rate estimates that do not at all represent the model's performance in the population. And a third discovery was that prediction tests that use cutoff probabilities that were arbitrary would make the computed error rates difficult to interpret.

After having identified these limitations, he attempted to design a model that used methodological modifications in order to adjust for them. Next he tested this model on a sample that closely mimicked the sample in a real life use of the model. The model was found to be statistically significant, however it was concluded that it had very small explanatory power. In fact the prediction accuracy was not better than the stock market, and the stock market is not able to predict future targets very long before the actual announcement. Thus, not even his model that implemented the modifications would be able to make predictions accurately.

2.2.3. Golbe & White, 1987

Their research concentrated on an primarily empirical investigation into those economic factors that are generally thought to explain the general pattern of aggregate M&A transactions in the U. S. economy. They performed this study on a 35 year time span prior to their study. They also gave a historical view of the pattern of M&As in the United States.

Their econometric study found that high securities prices stimulate high levels of M&A activity.

2.2.4. Berry & Pakes, 1993

These researchers describe a number of dynamic-equilibrium models (models that would take into account the long-run reactions of merging and non merging firms: e.g. changes in investment strategies, changes in entry and exit, and changes in the nature of competition) that could be used in the prediction of M&A activities in specific industries. They suggest that, in theory, one could create an estimate of all the appropriate parameters of a model that would fit the developments of a certain industry well. To their knowledge no such model has been estimated, and in fact they fear that the mathematical methods and speed of computers have not yet reached a state where this would be practically feasible.

They do suggest that one could come up with at least some of the parameters of a model of that kind by some type of method where it is not necessary to calculate the equilibrium value function.

2.2.5. Mitchell & Mulherin, 1996

This was a study of industry-level patterns in takeover and restructuring activity for the time period 1982-1989. One of their findings was that M&A activity in an industry appears to be concentrated in a tight range, at least during the time period that they studied. They observed that about 50% of the transactions occurred in just one quarter of the sample period, and came to the conclusion that this must be caused by common factors that affect M&A transactions occurring in a industry.

They also observed that there are significant differences in the level of M&A activity between industries and they show that this is directly related to the magnitude of specific economic shocks that occurred already in the late 1970s through the early 1980s. Based on that finding, they argue that an industry-wide phenomenon is the cause of takeover activity rather than solely due to unique parameters of the individual firms. Specific evidence was provided for certain shocks like deregulation and financing innovations.

2.3. RESEARCH ISSUES SUMMARIZED AND ASSESSED

There are several issues of the past research that have lead to this papers specific approach and contribution to science:

- M&A activity fluctuates over time.
- There are significant differences among the M&A activity in various industries, and a majority of all transactions appear to occur in just a few industries (Mitchell & Mulherin, 1996).
- There exist several plausible fundamental factors that influence the level of M&A activity.
- It is possible to forecast future levels of M&A activities in specific industries through the analyses of past data (Melicher et. al, 1983).
- Tailor-made M&A models could be used for predictions but past attempts to build such models contained several flaws, and an early effort to compensate for those weaknesses failed (Palepu, 1986).
- Several of the fundamental predictive factors are proposed to be able to be used in a tailor-made M&A model (Golbe & White, 1987).
- The current mathematical theory, and the computational power of today's computers needed for such a model's creation are insufficient (Berry & Pakes, 1993).

In consideration of these research issues while attempting to answer the research questions stated in section 1.2., it becomes clear that a tailor-made M&A model might not be the best approach. First, because of the large number of fundamental factors that affects the level of M&A activity. It would be beyond the time and budget-constraints of this thesis to collect that information for each industry. Second, even if it was attempted to collect all those fundamental data, current science appears inadequate to support the building of a reliable tailor-made model for the prediction of M&A activities. Third, even if it was possible to build such models it would have been necessary to build one unique model for each specific industry since different fundamental factors affect different industries differently, and that would also be beyond the budget and time constraints of this paper.

Since it clearly is not feasible to take a model building approach in order to answer the research question, a different approach needs to be taken. This paper will therefore search through already existing and proven empirical methods to find another set of tools that might be appropriate rather than attempting to build a tailor-made M&A model.

Thus, this paper is positioned differently than previous research in several ways:

- First, it uses already existing empirical forecasting methods in order to answer the research question instead of attempting to create a tailor-made model over M&A activity.

- Second, it seems that past studies in this area have been emphasized on the construction of an appropriate tailor-made M&A model, furthermore it appears that none has succeeded in developing one yet. Thus, they have not been able to make any forecasts either. This paper will actually attempt to make forecasts.

- Third, as will be apparent in next chapter, the forecast made with the empirical analysis will be complemented with a fundamental analysis. The result of the initial empirical methods are compared with an analysis of the fundamental factors in each industry. The rationale behind using a fundamental analysis is, in the end, that technical methods are only one piece of the puzzle and should not be seen as the complete solution. However they are good for finding suitable candidates (i.e. industries) for further research when one can examine those other variables (i.e. fundamental factors) that were not easily incorporated in our models (Kichen, 1988). Furthermore, it is at that point also more feasible to search for those factors which would have been if not impossible, but at the very least an extremely challenging task given the large number of industries covered in this paper. That way these factors can be used for the purpose of narrowing the selected firms even further, either by confirming the previous findings, or by rejecting them.

3. METHODOLOGY AND DATA COLLECTION

In this chapter there are explicit deliberations on the methodological choices made, showing an appreciation of the possibilities of methods outside the groups of methods that have been chosen. Account is also given of the methods' weaknesses and strengths. There is also a thorough description of the data sources used, in particular which methods are being used for the collection of data, as well as a critical evaluation of the sources.

3.1. EMPIRICAL METHODS

Also, in order to find answers to the research question, we first need a good conceptual definition of the aspect to be measured. In this case variables that are chosen to be investigated are the ones that are traditionally being reported whenever there are discussion on the level of M&A activities. The first variable is the number of total transactions per year, the next variable is the total dollar size of those transactions. This is the standard way that M&A activity has been measured for over a century now. The Nelson series 1895-1920 (Nelson, 1959) measures the level of M&A activity in that way. This is also the case in the Thorp series 1919-1939 (Thorp, 1941), the Federal Trade Commission Series 1940-1971 (Federal Trade Commission, 1972), the Federal Trade Commission Overall Merger Series 1972-1979 (Federal Trade Commission, 1972), as well as in the two present time series: Mergerstat Review series 1963-present (Mergerstat Review, 1998), and Worldwide M&A series 1979-present (Securities Data Company, 1999). Next, we need a rule that specifies how to assign numbers to specific empirical properties, which is easy to do since the data is presented in the form of numbers by its very nature anyway, so we will simply use those.

As far as the sample is concerned, it is the largest 50 industries in the U.S. that are being investigated since they have the most active M&A activity, or at least have a potential for it.

3.1.1. Rationale Behind the Choice of Empirical Methods

This is a discussion leading to the empirical methods used, as well as the problems and limitations surrounding them.

The answer to the research question requires the prediction of a certain economic phenomenon, therefore the broad and diffuse area of economic forecasting needs to be considered.

Economics is a non experimental science which attempts to describe or sometimes predict an economic phenomenon using scientific techniques (Su, 1996). A variety of procedures, which vary from so called naive methods to econometric models, are used to make forecasts. Economic forecasting was improved tremendously in the 1960s and 1970s as computing facilities and the quality of macro economic data significantly improved.

A forecast, or prediction, is generally defined as stating an opinion concerning unknown future events (Makridakis, Wheelwright, & Hyndman, 1998). The accuracy of forecasts are related to how the forecasts are made. Scientific forecasts are made by applying logical inference to facts and past experiences under the assumption that the future tends to replicate the past. Economic phenomena, such as M&As, are usually measured in quantities, prices, percentages, or by indexes. Economic forecasting is therefore confined to quantitative predictions. Quantitative predictions are based on mathematical techniques or statistical inferences applied to numerical data.

Economic forecasting methods can be classified according to the different levels of comprehension of the real economy and the various degrees of sophistication of statistical and econometric methods involved. They are either of the classifications subjective, or objective (Nahmias, 1997). The decision on which one of those types of forecasting method to be used is greatly dependent on the objective of the forecast, the time and budget constraints, as well as on the availability of data, and computing facilities. Also the objective of the forecast and its limitations play an important role in the decision.

Subjective forecasting methods rely on human judgment and are based on surveys and interviews. However, the interviewees might refuse to cooperate due to fears that valuable strategic information could get into the wrong hands. In addition, investment bankers work an average of 90 hours per week in M&A departments, (Naficy 1997), and would likely not have the time available to be able to participate. Other disadvantages are the heavy time requirements placed on the researcher, and the large associated costs. Therefore it was decided that subjective forecasting methods were not feasible in this research.

Objective forecasting methods are based on the empirical analysis of data. They are further subdivided into casual, and time series models (Nahmias, 1997).

Casual models, often econometric, require the use of several variables to predict the outcome of another variable. However, the more variables you add, significantly more data is needed to preserve statistical relevance (Makridakis & Wheelwright, 1989), (Enders, 1995). Another limitation is that current research studies into the M&A subject suggest that there exists no such model that is reliable for the prediction of M&A activities (see this paper on the discussion of the Research Issues and Theoretical Framework).

Time series models are used when we have no structural knowledge about the real cause-effect relationship of the variables to be forecasted (as was shown by the literature study previously, there are no agreed upon useful model to use). Instead time series models rely solely upon the collection of past observations of the variable to be predicted. Therefore no other variables are needed, thus statistical relevance can be obtained with a relatively small number of observations. The analysis is based on the examination and discovery of patterns that most frequently appear in the data over time. Patterns that can occur in a time series are further classified into trend, seasonality, cycle, and randomness. Trend is a tendency to show a stable pattern of decline or growth, seasonality is a fixed interval repetition, cycles are apparent when the lengths and sizes of the intervals vary, and randomness means that there are no recognizable patterns to the data at all.

The underlying assumption behind time series methods is that some past tendency or trend in the time series under consideration, reflects what is going to happen (Su, 1996). Accordingly, an attempt is made to quantify this tendency or trend and to derive a forecast by extrapolating the series into the future. However, as previously mentioned, the economic relationship between the variable and its possible determinants is ignored.

3.1.2. Empirical Methods Used

A time series is a collection of observations of a single variable generated sequentially through time (Makridakis, Wheelwright, & McGee, 1983). Time series analysis is a statistical technique used to study the variation of the observations of a specific variable through time in the past. The purpose is to draw inferences about its movements in the future. It is a technique that examines the temporal structure, or dynamics, of a data series. The distinguishing feature of time series analysis is that the sequence of observations of a given data series is viewed as a realization of a jointly distributed random variable. The sequence of observations evolves through time according to a given probability density function. In a sense a time series models does not offer any structural explanation of the behavior of a variable in terms of other variables. It is a type of sophisticated extrapolation that replicates the past behavior of an economic variable in order to forecast its future behavior according to a probability density function.

However, there is a limitation to the use of time series models since the probability distribution function of the series is not completely identifiable (Makridakis & Wheelwright, 1989). We know only some of its statistical characteristics. Time series models are very different from conventional econometric models. Conventional econometric modeling emphasizes the theoretical structure of the economic phenomena studied and contemporaneous relationships between economic variables in a structural model equation are usually introduced to explain the influence of past habit, to derive adaptive expectations, or to modify an adjustment procedure. Predictive capabilities of econometric models rely more or less on the structural relationships in the system conformable to economic theories, and as long as the structure is stable, the model can make rather reasonable forecasts. The predictive power of the time series model, on the other hand, relies heavily on the probability distribution function of the variable. Unfortunately, the complete specification of the probability density function for a time series is almost impossible. We must construct a simplified model of the time series to explain its randomness. Therefore, a time series model will usually be chosen when little is known about the determinants of the variable to be forecast, such as in this case of the M&A phenomenon.

Because both structural and time series models use regression methods to estimate unknown parameters, they can both be considered regression models (Su, 1996). However, the explanatory variables included in the regression in each type of model are different. For example, in a single-equation structural model of the daily foreign exchange rate, the dependent variable is related to money supply, differential interest rates, and terms of trade. A time series model for the daily foreign exchange rate would relate that variable to its own past values and to variables that describe the random nature of its past behavior. Unlike most structural models, the parameters in a time series model are often in a nonlinear form, requiring therefore non linear estimation methods to estimate them.

Since a book titled *Time Series Analysis, Forecasting and Control* (Box & Jenkins, 1970) was published, the time series approach has become one of the most rapidly developing areas in economics. Conventional econometric method and time series techniques have been converging since that book was published (Pesaran & Potter, 1993). Econometric practitioners began progressively to use some of the basic elements of time series analysis in modeling and forecasting economic variables. These two approaches have gradually become supplementary. In recent years, time series models have been used by themselves but just as often in combination with other forms of forecasting, such as structural models, or simply by an analysis of the fundamental factors such as in this paper. Time series is also commonly used as an auxiliary method to forecast the future values of some exogenous variables in econometric models. Most econometricians are convinced that the time series approach can further reduce the unexplained residuals in structural equations.

At a first glance the Box-Jenkins iterative approach of building time series models for forecasting appears to be tempting, a model that has developed rapidly since the 1970s when they published their famous book. However, there is one significant disadvantage with that approach, and that is the fact that it requires 50 or more observations (Makridakis, Wheelwright, & Hyndman, 1998), and we do not have that many. Fortunately there are several other time series methods that can be used that require only 10-15 observations, namely the moving average time series models: single moving average, single exponential smoothing, double moving average, and double exponential smoothing.

The moving averages methods provide a more efficient mechanical projection, and they have the advantage of flexibility and of presenting a more realistic picture of long-run movements in variables (Su, 1996). In these methods, data are not forced into any particular pattern, because they only smooth over fluctuations in the data series. The greater the number of observations, the smoother the moving average, and the least the forecast is affected by random fluctuations of course. However, a high number of observations cause the forecasting model to react slowly to changes in the time series. The are several disadvantages with the moving average models, as with other time series models (and other forecasting models too for that matter). First, they tend to become less reliable as forecasting periods are extended into the future, in which case the regularity of the moving average pattern tends to become more questionable and the occurrence of unforeseen fundamental factors more likely (Pesaran & Potter, 1993). Second, they can not generate any significant cyclical patterns. The moving averages have the tendency to smooth out oscillatory elements in the variable. Yet another disadvantage with moving average models is that when they are used in the forecast of a growth variable they will have a tendency to under-predict the variable.

One of the assumptions that are being made when using these models is that the data series being projected is not stable. That assumption is made since most time series in real life are unstable. To compensate for the unstable feature of the time series, smoothing tools will be used. Although these smoothing approaches can remove random variations from the data by averaging the observations, they can not adjust for seasonality. However this is no obstacle if the data are on a yearly basis, since in that case there can be cycles, trends, and / or random patterns, but no seasonal patterns. The smoothing procedures will remove the irregular variation and forecast the series by identifying the underlying cycle or trend.

The time series used in this paper are based on yearly data, thus no seasonal time series methods are needed. Each one of the four moving average time series methods are tested on the individual time series of each one of the 50 industries. For each industry a suitability of fit evaluation will be made to determine which specific model fits that particular industry best, which of course depends on the unique characteristics of that data series. The fit is determined by an analysis of parameters and statistics associated with each model (Makridakis, Wheelwright, & Hyndman, 1998):

- **RMSE**
  Root mean squared error. This is an absolute error measure that squares the deviations to keep the positive and negative deviations from

cancelling each other out. This measure also tends to exaggerate large errors, which can help when comparing methods.

- **MAD**
  Mean absolute deviation. This is an error statistic that averages distance between each pair of actual and fitted data points.

- **MAPE**
  Mean absolute percentage error. This is a relative error measure that uses absolute values to keep the positive and negative errors from canceling each other out and uses relative errors to let you compare forecast accuracy between time series models.

For all of these measures of errors the smaller their value, the more appropriate the model. Thus, the RMSE of one method will be compared with the RMSE of another, and the method with the smallest measure is better than the other. The same comparison is made with the MAD, and the MAPE error measures. The time series method with the best fit for a certain industry (depending on the existence of a trend, cycle, or randomness) is then used in the forecast of the trend.

The Single Moving Average Method

This is a first order (a.k.a. simple) smoothing technique that averages a given number of observations and uses the result as the forecast for the next period. The objective is to remove the random variation in the data leaving only the underlying cycle or trend. Each observation in the SMA covers equal weight (Chatfield, 1984).

However this method has several limitations. One of them is that it gives equal weight to each observation, it would have been better if more recent observation of a data series had commanded more weight than older values because they probably reflect the latest patterns in the data series (Nerlove, Grether, & Carvalho, 1998). Furthermore, this method seems to work best when there is a trend in the time series, and gives signals of less accuracy if the time series is not trending.

$$Y' = \frac{S_t + S_{t-1} + S_{t-2} + \cdots + S_{t-(N+1)}}{N}$$

Y' = Forecasted value of the next period

S_t = Current period

S_{t-1} = Actual value of the previous period

$S_{t-(N+1)}$ = Actual value of the period $(N+1)$ periods ago

N = Number of time periods included

The Single Exponential Smoothing Method

This method is similar to the SMA since it also smoothes the data by averaging the observations to remove random variations. But the SES also emphasizes the more recent data by giving it more weight than earlier data (i.e. the weights increase exponentially) since it is assumed that the mean of the observations moves slowly over time (Maverick, 1945). It also allows all observations to be used in the forecast whereas the SMA does not allow observation outside the SMA time frame to have any weight in the forecast (Makridakis, Wheelwright, & McGee, 1983). Effectively, SES is a weighted moving average system that is best suited to data that exhibits a flat trend

$$Y_{t+1} = aS_t + [(1-a)Y_t]$$

a = A smoothing constant with a value between 0 and 1

The Double Moving Average Method

The SMA and the SES work well only when the trend, cycle, or underlying pattern is stationary (i.e. horizontal) (Montgomery & Johnson, 1976). If the time series is trending up or down, both these methods produce less reliable results, this is where the double moving average comes in. The DMS creates a double line from the simple line, and then by adding the difference between the simple and double lines to the simple line (which is actually the SMA), and therefore the variance between the actual and the SMA forecast is reduced (Dhrymes, 1998). Thus the DMA method smoothes out past data by applying SMA twice, smoothing the already smoothed series.

$$Y''_t = \frac{Y' + Y'_{-1} + Y'_{-2} + \cdots + Y'_{-(N+1)}}{N}$$

Y''_t = The Double Moving Average value at time t

Y' = Forecasted value of the current period using Single Moving Average

Y' = Forecasted value of the previous period using Single Moving Average

$Y'_{-(N+1)}$ = Forecasted value of the period $(N+1)$ periods ago using Single Moving A

N = Number of time periods included

Then these two values DMA, and SMA are used to estimate two new variables.

$$a_t = 2Y'_t - Y''_t$$

$$b_t = \frac{2}{N-1}\left(Y'_t - Y''_t\right)$$

$$Y''_{t+1} = a_t + b_t$$

Y''_{t+1} = The forecasted Double Moving Average Value

The Double Exponential Smoothing Method

The DMA actually has the same limitations as the SMA (Moore, 1989). Furthermore the DMA needs twice as many observations as the SMA, and this limits the usefulness of the DMA relative to the SMA. Because of that, also in this case, exponential smoothing is preferred in a majority of the situations. The DES method (a.k.a. Brown's Linear Exponential Smoothing) is similar to the DMA since it also creates a double line in order to close the gap between the forecast and the actual data, thus it applies SES twice.

The formula for DES:

$$Y''_{t+n} = a_n + b_t(n)$$

But it requires the values a (the double exponential smoothing value) and b. The Y" and the Y' represent different values in the exponential formulas, here they represent not moving averages, but exponential smoothing values.

$$b = \frac{a}{1-a}\left(Y'_t - Y''_t\right)$$

These methods are comparatively very basic and straightforward. There have been numerous studies that have proven that those types of methods are often as accurate as extremely sophisticated and complex methods. In addition there would have been a disadvantage in using more complex models. Besides the time and effort wasted, there would also be the limitation that they require the estimation of a larger number of parameters from the data. Furthermore, if those parameters were estimated incorrectly, there would be greatly reduced accuracy (Makridakis & Wheelwright, 1989).

3.1.3. General Analytical Tools

The general methods described in this section are used for ensuring accuracy of the data, and to get an overall understanding of the data at hand.

Boxplot Analysis

One of the first steps of the empirical study in this paper is to scrutinize whether the data have any errors or outliers. An outlier was defined by D. M. Hawkins in 1980 on page one of his book *Identification of Outliers* as:

> *"..an observation which deviates so much from other observations as to arouse suspicion that it was generated by a different mechanism."*

There are several approaches that can be used in order to identify the outliers. One common method is to use the Boxplot method (Tukey, 1977). As part of his general approach to data analysis known as exploratory data analysis, he developed a variety of methods for displaying data in visually meaningful ways. One of these methods is known as the Boxplot, or sometimes it is called Box-and-Whisker plot. This is truly a very useful tool for screening data for errors and for bringing attention to possible problems before one actually performs further analysis on the data.

The analysis of outliers is very important since they could represent errors in measurements, data recording, or data entry, and which could therefore impact the end result terminally. On the other hand they could also be the result of correct values that just happen to be extreme. In this paper the Boxplot is used as a tool for measuring the accuracy of the data entry of the published figures in Mergerstat, and assume that if there is no error in the process of entering the data, then the numbers represent true although extreme values.

It is not the intention of this paper to describe the details on how a boxplot is presented, there are sufficient literature available that can do that (Howell, 1999). In this paper there will merely be a presentation of the results. Furthermore, Box plots give an idea of the distribution of the data especially in terms of symmetry and scale.

Certainly one could have used another popular method for discovering outliers like the the Stem-and-Leaf display (Tukey, 1977), however the Stem-and-Leaf display does not show the positions of the outliers as graphically as the Boxplot does. That's why the Boxplot was chosen.

Cluster Analysis

Cluster analysis is the identification of subgroups of data having similar multivariate profiles (Hamilton, 1992). The different methods of cluster analysis are valuable tools in exploratory data analysis. The basic purpose of this type of analysis is to determine whether the variables fall into distinct groups or clusters, and if so, to determine the number of groups and their membership. Most methods of cluster analysis involve large amounts of calculations and can sometimes be rather complex, but one simple yet very effective approach is to do a scatter plot of the data and then analyze directly with the bare eye.

The measure of central tendency that was selected in order to do the cluster analysis was the averages (i.e. the mean). Of course other measures for central tendency could have been used such as the mode (the most frequent score) or the median (the middle score if we arrange scores from lowest to highest). However the mean was chosen since there are certain advantages associated with its use compared to the mode and the median. One advantage is that it is more influenced by extreme scores, this is in most instances a disadvantage but not in this case since the data have a tendency to be skewed towards higher values in the later time periods of the data series (see the results on the boxplots in the next chapters). It is my firm conviction that it is of utmost importance that it actually does get affected by those extreme values in this case because the more recent the values, the more prediction power for the future.

3.2. DATA SOURCES

3.2.1. Rationale Behind the Choice of Data Source

First a historical perspective will be given to get an understanding of how the M&A data sources have evolved over time.

Through the course of my research I have found that there have been six collections of time series data that cover M&A transactions in the United States since 1895. The series covers time periods that are mainly non-overlapping. Unfortunately they can not readily be spliced together in order to create a uniform time series covering a long time period which I had initially aspired to do. The reason for this is that they are based on entirely different sources of information, they have different rules for the inclusion of data, and the measure of the sizes of firms are not the same. An attempt to splice them together would be beyond the scope and time constraints of this thesis.

The Nelson Series, 1895-1920. For the time period 1895-1914, Nelson used data from consolidations that were $1 million or larger, he also provides data on the number of firm disappearances due to consolidations. But then between 1915-1920 he changed the size of the consolidations to be included in his series to $2 million or larger (Nelson, 1959). He justified this change by the fact that prices had increased. If this data were to be spliced with data they way it is conventionally presented in M&A time series today, it would create a significant upward bias on the Nelson series. The reason for this is that Nelson defined the size of a M&A transaction (or in the case at those times: consolidations) as the authorized capitalization of the firm that is created by the firms that consolidated. Time series today define the size of a M&A transaction as the price offered to the acquired firms shareholders which is an entirely different measure. Furthermore his data only covers firms in the manufacturing or mining industries.

The Thorp Series, 1919-1939. There is an overlap of two years between the Nelson and the Thorp series. Comparing the data provided for those two years, one will soon discover that Thorp includes almost three times as many disappearances caused by consolidations, even thought they cover the same industries: manufacturing and mining. Further, there are no figures provided for the total amount in dollars, only for the number of disappearances (Thorp, 1941).

The Federal Trade Commission Series, 1940-1971. The data included in this series was limited to what was reported by the Moody's Investors Service, Inc., and the Standard and Poor's Corporation (Federal Trade Commission, 1972). FTC claims to have used similar inclusion criteria as had been used in the Thorp series (Weston, Chung, & Hoag, 1990).

The Federal Trade Commission Overall Merger Series, 1972-1979. This series was distinctly different from the previous series published. Here they collected information from more than just Moodys, and S&P. Another reason was that they now included data on M&A transactions involving firms not only from the manufacturing and mining sectors, but at the same time it did not include data from industries that were not under their jurisdiction such as communications, transportation, and banking sectors (Federal Trade Commission, 1972).

Today, one source of U.S. M&A data is the SEC (the Securities and Exchange Commission). Each public firm in the United States has to file various forms with the them if engaged in a M&A transaction. Most of the filings are of public nature, however in order to gain access to those documents of particular interest to a M&A researcher[12], one has to search through a fairly substantial number of unrelated forms. Adding to the difficulties is that many of the forms are not available in electronic formats so one would have to visit a special SEC repository to be able to view them. Putting the necessary expertise needed for the specific peculiarities with SEC's filing system aside, the time required to collect the desired data would be beyond the time constraints of this paper.

Fortunately for M&A researchers, there are two firms that have found a niche in the collection of data from SEC, as well as from other sources

[12] For example Form-13D, Form 13G, and Form S4.

deemed to be useful (Bell, 1997). These firms are the *SDC* (Securities Data Company), and *Mergerstat*[13]. For a comprehensive, although a bit dated, discussion on these organizations and on other sources of M&A related data please see the article by the two reference librarians at the Wharton school of business (Bell & Halperin, 1991). SDC's database called *Worldwide M&A* provides data on transactions involving U.S. companies, dating back to 1979, and with data covering non U.S. firms since 1985. Mergerstat is the new player since they introduced their database in September 1996, with transaction data that goes back to 1992. Unfortunately the cost of accessing these databases are beyond the budget constraints of this thesis[14].

However, the data collected by these firms are available in more affordable printed publications. SDC's data has been presented in the leading M&A publication *Mergers and Acquisitions: The Dealmaker's Journal*[15] each year since 1981. The disadvantage with that source is that they change the industry classifications fairly dramatically over time (Appendix D), but do not provide specific SIC codes or other means for how to trace the changes made, making it impossible for a researcher to compensate for the changes made. As far as has been found in this research, no other printed publication presents data from the SDC.

That leaves us with Mergerstat as the main source of M&A statistics.

3.2.2. Main Data Source

Mergerstat is the preeminent provider of printed material on M&A transactions with the prestigious annual publication called *Mergerstat Review*, which has been published since 1963.

This is an annual publication of about 300 pages in size that presents statistics on deals involving at least one U.S. parent company, including both publicly traded and privately held firms in 50 industry classifications. All

[13] Mergerstat is the research division of the investment banking firm Houlihan, Lokey, Howard & Zukin that specialize in M&A.
[14] The Mergerstat database for example, which is considered to be the least expensive one, charges $6,000 in yearly subscription for access through their distributor Data Downlink Corporation. In addition, there is a $35 charge per report that you create, plus an undisclosed setup fee, and then $0.50 per cell of information. (According to price information obtained form Mergerstat in November, 1999.)
[15] A bi-monthly publication published by Securities Data Publishing since 1965.

publicly announced deals of greater than $1 million are included, and also all formal transfers of ownership of at least 10 percent of a company's assets or equity, and where the offered price is least $500,000 are included as well. Information on unit divestitures, management buyouts, and certain other asset sales are also included. The data such as the number and size of transactions recorded are as they are announced, not as they are completed. This is true also for cancelled transactions.

The data published by Mergerstat is frequently used by investment banks and other firms for various internal studies. The data is also used by various trade publications.

As previously mentioned, Mergerstat Review is published by the investment bank Houlihan Lokey. This firm bought it from Merril Lynch, who in turn had bought it from the original owner, W.T. Grimm, in 1987 and incorporated some changes. These shifts in ownership have since affected the data. For example the SIC codes used for industries have changed a bit throughout the years, thus caution should be used when interpreting data (Appendix E). However the changes made to the definition of the various industries has been very minute, and not at all as extreme as the changes made by an alternative source of data provided by *Mergers and Acquisitions: The Dealmaker's Journal* (Appendix D). I am convinced that the impact of the changes made by Mergerstat review in that regard on the end result of my research with the data will be only minor if any.

The data that Mergerstat collects are deal-based and contain such information about the deal as the type of deal, the price, the terms, etc. Large M&A transactions involving domestic public firms have to be registered with the Securities and Exchange Commission (SEC), and are thus covered well. However private transaction involving small M&A deals are not reported and therefore not included.

Prior to 1981 W.T. Grimm published quarterly reports in a newsletter format, and beginning in 1981, introduced the hardcover annual volume. The library system in Florida where I am doing most of my research acquired the annual issues soon thereafter in 1983 and thus I will use the data from 1983 and onward.

At first glance one might think that the size of the time series, 14 yearly observations from 1983-1997, is rather small. It is not, in fact there is no lower limit to the size of a sample that can be useful and a regression or time series analysis based upon 10-15 observations is in most cases very useful (Ghauri, Grønhaug, & Kristianslund, 1996). Also remember that in real life people routinely draw conclusions based on sample sizes of only one or two observations, which on the other hand is far to small to be statistically viable.

From the discussion that follows, it is clear that Mergerstat Review is the logical choice for M&A time series data to be used in this study.

3.3. EVALUATION

The results of the empirical tools will be used to narrow down the roughly fifty industries examined to those few that have great potential for having a great increase in overall M&A activity as well as a large overall size. That result will then be evaluated by a comparison with the current situation in the M&A field. Specifically those industries that are currently (the last five years) highly active that also show up on the list (that was created by the empirical analysis) will be removed. Those industries that we are left with will be used for further investigation, by researching industry reports, etc. and by searching for the absence or appearance of those fundamental factors that were identified in the chapter Research Issues and Theoretical Framework as being determinants of high and sustained future M&A activity.

Once all those industries selected havee been researched to find the fundamental factors, we can with more confidence and likely with more reliability suggest which industries will truly be the new hot ones in the future. We can do that since we will be able to reject those industries that were initially found to be good potential high activity ones if there is an absence of the fundamental factors needed, or confirm if several of the fundamental factors actually are apparent in the industries.

4. EMPIRICAL ANALYSIS AND FINDINGS

The analyses in this paper cover a large number of different industries, and in order to keep them organized in the analyses, each industry has been assigned a number (Appendix F). From now on each industry will be referred to by its designated number.

4.1. GENERAL ANALYSIS

To ensure accuracy, and to get a general feeling for the data there is a boxplot analysis, as well as a cluster analysis.

4.1.1. Boxplot to Discover Outliers

Boxplot Analysis on the Total Transaction Size per Industry

For each industry there is a box plot analysis on the yearly transaction size data (measured in the total amount of dollars) for the time series 1983-1997. Nineteen of the industries (industry 2, 7, 15, 18, 19, 22, 23, 24, 25, 27, 28, 29, 35, 37, 40, 43, 49, 50, and industry 51) showed extreme outliers (Appendix G). Therefore I proceeded to double-check my entries, and noticed that it had been entered correctly. One interesting observation is that 83% of the outliers[16] occurred in the last 3 years of the time series, which is yet another indication of how enormously active the M&A market currently is. Another interesting observation is that there are no outliers, not even close outliers, that are below the median figures, they are all above.

Boxplot Analysis on the Number of Transactions per Industry

I did the same analysis on the number of transactions, and the results were as follows. Out of the 50 industries, plus the average industry measure there were 15 with significant outliers (Appendix H). One very interesting observation in this data is that 100% of these occurred in the last two years of the time series, or a full 70% occurred in the last year.

[16] 19 out of 23 equals 82.61 percent, or 83 percent when rounded up.

I also checked this data for accuracy and noted that it had been entered correctly.

The result of this boxplot analysis can also be seen as yet another piece of support for the relevance of this topic, since we can see how astronomical the increase in M&A activity has been in the last few years.

4.1.2. Cluster Analysis

Cluster Analysis on the Total Dollar Amount

The results of the cluster analysis show that industry number 40 (Banking and Finance) has on average a much greater total offered price and is in a cluster by itself (Appendix I). Next, but much further down come the following industries in the following order (35, 36, 32, 39, 41, 14, 48), and then the rest.

Cluster Analysis on the Total Number of Transactions

Doing the same type of analysis but with the number of M&A transactions reveals the following. Again the industry #40 (Banking and Finance) is in the lead, then following far below is industries (49, 44, 38) (Appendix J).

4.2. TIME SERIES ANALYSIS

After having made sure the data was free from outliers, and after having looked at clusters to get a general understanding of the overall characteristics of the data, it was then finally time for the time series analysis in order to discover the underlying trend for each industry's data.

No inflation adjustments were made. The rationale behind this is that in this study we are interested only in the relative differences between the industries by identifying the general direction of the trend, and then ranking the industries. The ranking would be the same with or without inflation adjustment, thus no adjustments of inflation.

4.2.1. Time Series Analysis, Total Price

I took the 1983-1997 data for each industry and used the time series methods previously described (the single moving average, the single exponential smoothing, the double moving average, and the double exponential smoothing methods). Then the result of each of those methods prediction was evaluated on a number of statistical characteristics in order to determine which model fit the data best (Appendix K).

The next step once one of those four models had been found to best fit the data, that specific model was used for predicting the direction of the most likely future trend, within a 95% confidence interval (Appendix L).

This process was repeated for each industry, as well as for an industry average (called a BaseLine in this study). This BaseLine was created by adding the yearly data from all industries in a particular year, and then simply dividing the sum by the total number of industries.

Once all this had been done I calculated the level of increase for each industry's projected trend. For example the agricultural industry had a projected value of $2,139 for 1999, and an actual value of $1,768.1 in 1998, then $2,139 was divided by $1, 768.1, and then subtracted by 1 to create the percentage increase in the trend per year which in this case would be 21%.

The industries were then ranked in order of the highest predicted percentage increase through the lowest (Appendix M), and thus we had a great overview of which direction each industry is likely to be headed.

4.2.2. Time Series Analysis, Number of Transactions

The same set of procedures were run on the data on the total number of transactions per year to get predicted projections for that as well (Appendix N).

According to some M&A experts, as we have seen in the previous discussion, it is believed that the aggregate dollar size of the transactions in an industry is a leading indicator relative to the number of transactions, and might therefore be a better predictor. However the data available is a fairly low percentage of the total M&A transactions (Appendix O), therefore I believe that the number of transactions is a good complement and that is why I also use that data in this analysis.

The purpose of this thesis was to identify those industries that had a high potential growth in both the number of transactions as well as the total dollar amount. Therefore we will next compare the previous two end-results.

4.2.3. Results Analyzed in Combination With Each Other

Since we want to be in industries that have a high expected growth rate in both areas, we need to compare them (Appendix P).

Increasing Faster Than Average in Both Categories
What you see in these two tables are the relative rankings we came up with previously, the individual increases removed, since we are not interested in any point estimates anyway. Those firms that have above average (above the BaseLine) growth potential can now be picked out simply by starting with the first industry in the list. Let us look at the first one, which is industry 43, that one is at the top in both columns and is therefore the one with highest potential in both categories. The next one is 25, and the next 16, etc. until we have a ranked list: 43, 25, 16, 49, 35, 27, and 38.

These industries are the Brokerage, Investment & Mgmt. Consulting; Electrical Equipment; Plastics & Rubber; Miscellaneous Services; Communications; Electronics; and Wholesale & Distribution industries.

Increasing Faster Than Average in Price Only, However Not Much Slower Increase in the Number Transactions Compared to Average
Following the same rationale as previously, but this time picking those industries with faster than average in only one category namely the price, but still increasing in the number of transactions although below the average, we get:

42, 20, 1, 37
Real Estate; Industrial & Farm Equipment & Machinery; Agricultural Production; Electric, Gas, Water & Sanitary Services

The main purpose of this paper was to identify the up-and-coming. The data that has been revealed so far shows all the industries that are likely to have increased activity in the future. That means the up-and-coming as well as industries that are already established to have had high M&A activity lately. Now in order to identify those up-and-coming, we can compare the latest findings with an average of the activity level that each industry has seen the last few years. Comparing just the last year of the time series would not be advisable since the values tend to fluctuate a lot, a better way would be to use an average for say the last 5 years. 5 years is in my opinion a good time span, it is not too long and it is not too short. Not too long since it would be able to smooth out the fluctuations, yet still be able to reflect the latest trend (Appendix Q).

Then performing the same form of analysis, as on the previous data, will yield the following result:

Increasing Faster Than Average in Both Categories
Industries 40, 35, 36, 41, 43, 25, 44, 37, 48, 14, 39, 47, 49, and 38.

Increasing Faster Than Average in Price Only, However Not Much Slower Increase in the Number Transactions Compared to Average
Industries 12, 20, and 45.

Then by picking out those industries that appear only in our prediction, and not in the five year average, we are left with industries 16 (Plastics and Rubber) , and 27 (Electronics), and then 42 (Real Estate) and 1 (Agricultural Production) (Appendix R).

5. FUNDAMENTAL ANALYSIS AND FINDINGS

This is where the industries found by the empirical analysis to be the new up and coming ones(as far as the level of M&A activity is concerned) will be examined closer. Recall our previous discussion regarding the fact that empirical analysis is only one piece of the puzzle, and that it would be prudent to complement it with a fundamental analysis. In addition, an analysis of the fundamental factors associated with each industry will serve to provide us with a fuller understanding of what is really going on.

Recall also the study by Mitchell & Mulherin in 1996 where they provided evidence for the fact that fundamental factors occurring a full two decades ago still impact the level of M&A activities today. Thus we will not only look at the news today, but also from a slightly older perspective.

Once the industries selected have been investigated by the fundamental factors, we can with more confidence, and likely with more reliability, suggest which industries truly will be the new hot ones in the future. We can do that since we will be able to reject those industries that were initially found to be good potential high activity ones if there is an absence of the fundamental factors needed, or confirm them if several of the fundamental factors actually are apparent in the industries.

5.1. PLASTICS AND RUBBER[17]

In the plastics and rubber industry at least seven fundamental factors that are indicative of heightened levels of M&A activity are apparent:

[17] This industry is comprised of the following SICs (Standard Industrial Classification):
2822 - Synthetic Rubber
2823 - Cellulosic Manmade Fibers
3050 - Hose & Belting & Gaskets & Packing
3052 - Rubber & Plastics Hose & Belting
3053 - Gaskets, Packing & Sealing Devices
3060 - Fabricated Rubber Products Nec
3080 - Miscellaneous Plastics Products Nec (like plastic bottles, plates, pipes, plumbing)

- Rapidly expanding industry
- Declining and highly competitive
- Foreign competition
- Regulatory and other policy reforms
- Technological developments
- The level of market concentration
- Undervalued or otherwise weakened firms

It was significant competition and low prices that weakened plastics and rubber firms in the early 1990s. At the same time the output of all plastics products grew throughout the 1990s, and in some market segments prices actually rose three to five percent annually (GaleNet, 1999). Some sectors that have previously been depressed, such as high-tech engineering plastics, are now seeing increased sales.

Industry analysts predict that in the long run the use of plastics products will proliferate, but in order to survive, firms are forced to develop and implement improved processing techniques that reduce costs and improve quality. It is of utmost importance that U.S. firms develop such technological superiority in order to handle the increasing competition seen from foreign firms, in particular those producing commodity-like products.

In the early 1990s, firms in the plastics and rubber industry responded to increased competition by acquiring or merging with competitors to reduce R&D costs, pool capital investment funds for costly new equipment, and to establish a global presence (U.S. Department of Commerce, 1995). This development is likely to continue. Despite industry consolidation throughout the 1980s and 1990s, the plastics and rubber products industry remained relatively fragmented.

Although exports and imports have traditionally played a relatively small role in the plastics products industry, imports (excluding bottles and plumbing) into the United States increased tremendously in importance the latest two decades. Chinese manufacturers will likely become strong competitors in the future export market, specifically in the fast growing East Asian markets with predicted growth rates of around 10 percent (GaleNet, 1999). This rapid increase in plastic consumption has caused U.S. firms to contemplate developing local production plants, or alternatively to get involved in M&As to get their hands on already established plants, thus avoiding the lengthy process of setting up greenfield operations.

Imports may also rise because of the North American Free Trade Agreement, since U.S. manufacturers move production facilities south of the border to take advantage of inexpensive labor and reduced environmental restrictions (U.S. Department of Commerce, 1997). After Canada, Mexico was the second largest exporter of plastic goods into the United States during the late 1990s. Mexican export to the U.S. should rise rapidly over the next 5 to 10 years as Asian producers enter the Mexican market to meet NAFTA requirements that 6 percent of a duty-free product's components be made in North America. The General Agreement of Tariffs and Trade (GATT) treaty has limited international import duties on resins to 6.5 percent by the year 2000, down from an average of 12.5 percent. The impact of the new tariffs on the market structure is sill uncertain, although most predictions lean toward further increases in international trade.

Going into the early 2000s, major technological trends in the plastics products industry include development of recyclable products and faster concept-to-production cycles. Today many companies are furiously attempting to develop flexible processing, extrusion, and molding techniques that will give them the ability to design and quickly manufacture new products (Darnay, 1996). One of the most important recycling tactics is "design-for-recycling," where plastic products and devices are created in such a way that they can be efficiently ground, melted, and reused. For example, glue and adhesives that can contaminate reground materials are being eliminated from manufactured plastic goods.

5.2. ELECTRONICS[18]

In this industry there is evidence of six fundamental factors that can trigger M&A activity:

- Rapidly expanding industry
- Declining and highly competitive
- Foreign competition
- Changes in the input factors
- Regulatory and other policy reforms
- Technological developments

General definition of the industry: the electronics industry in this study is defined as being comprised of firms engaged in producing electronic components and semiconductor manufacturing equipment. More specifically it is comprised of semiconductors and related devices; passive components and electron tubes; semiconductor manufacturing equipment; and printed circuit boards.

There is a worldwide increase in the demand for electronic products due to an increasing use of computers, telecommunications equipment, instrumentation, medical devices, audio and video equipment, and other electronic products and systems. Further the scope of products that use electronic components is increasing fast. And the value of electronic parts is also growing. A good example of this is the value of components that are

[18] This industry is comprised of the following SIC classifications:
3670 - Electronic Components & Accessories
3671 - Electron Tubes
3672 - Printed Circuit Boards
3674 - Semiconductors & Related Devices
3675 - Electronic Capacitors
3676 - Electronic Resistors
3677 - Electronic Coils & Transformers
3678 - Electronic Connectors
3679 - Electronic Components Nec

electrical in the automobile, twenty years ago that value was just 1 percent, nowadays the value is about 8-15 percent, in the near future analysts predict that that figure could be closer to 25% when intelligent highway systems and electronic navigation systems are implemented.

Manufacturers of electronic components have an immense pressure on them to bring cutting-edge products to the market ahead of the competition. Being first is of great importance since they then can collect high profit margins, and they are absolutely necessary in order to fund the R&D needed to bring the next generation of products to the market, and also for the acquisition of equipment and tools that are needed for the production of that next generation.

There are increasing globalization pressures. One of these is caused by the fact that certain electronic components are so specialized that only a very small market for them exists, and in order to capitalize on that market the firm has to chase its customers worldwide since there are not a lot of them around domestically. Another pressure for internationalization is the fact that certain products have such a small profit margin that one must be able to distribute it through a worldwide network in order to generate the profits necessary for remaining in business. A third pressure for globalization is that the cheapest labor is available only outside of the U. S. borders, but at the same time the most qualified engineers are available domestically.

An agreement by nations worldwide to implement the Information Technology Agreement (ITA) has started to result in the elimination of import duties on information technology products, and that includes electronics. Multilateral negotiations attempt to expand the scope of goods covered by the ITA, and to expand the number of participants. Already major information technology markets have cut tariffs, for example South Korea, and the European Union have both cut tariffs by as much as 50%.

The U. S. electronics industry will be affected in a negative but not catastrophic way by the Asian financial crisis. According to predictions for that region, sales would see little if any growth in the near future and that could result in producers in that region increasing their exports in order to compensate for lost sales. If that were to happen, it would be partly advantageous, and partly disadvantageous for U.S. producers. Advantageous since any components or parts imported would likely be at reduced prices which would lead to reduced production costs of end products.

Disadvantageous since end products imported will be less expensive and thus compete with the domestic production.

Shipments by the U.S. electronic industry are expected to grow at an average of 9 percent annually, thus the long-term outlook is favorable.

5.3. REAL ESTATE[19]

Evidence of at least seven fundamental factors can be seen in this industry:

- Rapidly expanding industry
- Declining and highly competitive
- Potential rewards of certain organizational forms
- Foreign competition
- Fluctuations in the financial markets
- Regulatory and other policy reforms
- Technological developments

The real estate industry is comprised of a wide range of businesses involved in the development, transfer, and management of real property (Mote &

[19] This industry is comprised of the following SIC classifications:
6500 - Real Estate
6510 - Real Estate Operators & Lessors
6512 - Nonresidential Building Operators
6513 - Apartment Building Operators
6514 - Dwelling Operators Except Apartments
6515 - Mobile Home Site Operators
6517 - Railroad Property Lessors
6519 - Real Property Lessors Nec
6530 - Real Estate Agents & Managers
6540 - Title Abstract Offices
6550 - Subdividers & Developers
6552 - Subdividers & Developers Nec
6553 - Cemetery Subdividers & Developers

Azzata, 1999). Major segments include developers, property managers, and real estate agents and brokers.

Many countries had recovered from the previous worldwide recession by the mid- to late 1990s. Now real estate developers and investors established REITs (Real Estate Investment Trusts), which enable them to diversify risks. These REITs grow quickly through aggressive acquisitions of smaller competitors, and are predicted to continue to see high M&A activity (Mote & Kleiman, 1999). They also developed new properties first after having tenants signed, furthermore the vacancy levels fell in several markets. This was in sharp contrast to the construction frenzy of the late 1980s which left many properties unleashed or unsold.

The real estate industry has been globalizing over the last decades and it is continuing to do so during the mid to late 1990s and is expected to do so for quite some time (Mote & Azzata, 1999). There are several explanations for this. First it is the technological advances in communications through multiple listing services and the formation of new joint-venture partnerships that have made the search for tenants and owners more international. Second, as U.S. firms expand into foreign markets they send their executives out to live abroad, which has resulted in a multinational trend in real estate. Third, new trade alliances such as NAFTA (the North American Free Trade Agreement), and EU (the European Union) have resulted in international and internal political change which in turn has provided opportunities for companies to enter new markets, not least in the real estate markets.

A specific segment of the Real Estate industry that has seen a large number of M&A transactions and is likely to continue to do so is the segment covering cemeteries and funeral homes (Schneider, 1999). A small but growing percentage of cemeteries are now being run by large, publicly traded firms which have operations in many states and several countries. These firms benefit from the economies of scale resulting from owning several funeral homes and cemeteries in a single area. For example a central embalming location, a limousine motor pool, and a team of personnel that can serve facilities in a given region.

Changes in the central banks' policies led to lower interest rates, which caused developers to start constructing again in the late 1990s.

Some industry analysts predict that the commercial real estate segment will decline in value and in demand as a response to the combination of people being busy with the time saving opportunities created by telecommuting and teleshopping.

Internationally one market that is receiving more attention is Asia. There a growing middle-income population has resulted in an increasing demand for residential properties. This is the effect of the rapidly expanding economies of China, Indonesia, Malaysia, and Thailand, which has resulted in an increase in the spending power of the populations in those areas. In addition the traditional two-generation households are decreasing which results in an increase in the number of households.

Many apartment managers and owners are planning to create brand identity in this segment similar to the brand identity of hotels, where hotel chains have benefited from strong customer loyalty. There is potential for success in this effort since there has been a huge increase in that segment of the population around 50 years old in some countries like the United States which are a significant part of that type of housing market.

5.4. AGRICULTURAL PRODUCTS[20]

At least the following five fundamental factors can be observed in this industry:

- Declining and highly competitive
- Advantages of vertical integration
- Foreign competition
- Regulatory and other policy reforms
- Technological developments

The agricultural products industry is comprised of a large number of firms involved in a multitude of different businesses. However, this diverse industry can very roughly be grouped into two main segments: agricultural

[20] This industry is comprised of the following SIC classifications:
0100 - Agricultural Production (Crops)
0110 - Cash Grains; 0111 - Wheat; 0112 - Rice; 0115 - Corn; 0116 - Soybeans; 0119 - Cash Grains Nec; 0130 - Field Crops Except Cash Grains; 0131 - Cotton; 0132 - Tobacco; 0133 - Sugarcane & Sugar Beets; 0134 - Irish Potatoes; 0139 - Field Crops Except Cash Grains Nec; 0160 - Vegetables & Melons; 0170 - Fruits & Tree Nuts; 0171 - Berry Crops; 0172 - Grapes; 0173 -Tree Nuts; 0174 - Citrus Fruits; 0175 - Deciduous Tree Fruits; 0179 - Fruits & Tree Nuts Nec; 0180 -Horticultural Specialties; 0181 - Ornamental Nursery Products; 0182 - Food Crops Grown Under Cover; 0190 - General Farms (Primarily Crop)
0200 - Agricultural Production (Livestock)
0210 - Livestock Except Dairy & Poultry; 0240 - Dairy Farms; 0250 - Poultry & Eggs; 0270 - Animal Specialties; 0290 - General Farms (Primarily Animal)
0700 - Agricultural Services
0710 - Soil Preparation Services; 0720 - Crop Services; 0740 - Veterinary Services; 0750 - Animal Services Except Veterinary; 0760 - Farm Labor & Management Services; 0780 - Landscape & Horticultural Services
0900 - Fishing, Hunting & Trapping
0910 - Commercial Fishing; 0920 - Fish Hatcheries & Preserves; 0970 - Hunting, Trapping & Game Propagation
2100 - Tobacco Products
2110 - Cigarettes; 2120 - Cigars; 2130 - Chewing & Smoking Tobacco; 2140 - Tobacco Stemming & Re-drying

production of crops, and agricultural production of livestock, which in turn can be further divided into a number of different sub segments.

Agricultural Production of Crops

The agricultural production of crops is responsible for providing the bulk of human nourishment, and is generally divided into production of grains, general field crops, vegetables, fruits, and aquaculture.

GATT (the General Agreement on Tariffs and Trade) and other trade covenants introduced in the 1980s and 1990s have resulted in increased trade liberalization, to make the crop producers more attentive to the markets requirements (U.S. Department of Agriculture, 1998). The GATT has led to privatization of the agricultural industry, and the elimination of government supports and planting restrictions. This was seen in the mid to late 1990s when large agricultural producers such as the U.S., E.U., China, and Japan began implementing programs to eliminate and reduce many crop subsidies. Other countries such as New Zealand, Sweden, and Australia privatized their agricultural industries back in the 1980s and boasted of success already in the 1990s. The farming conditions have improved tremendously in the late 1990s due to those factors that are expected to have effects well into the next century when the deregulation continues.

In the mid 1990s, crops globally covered about 114 million hectares, which is the equivalent of less than one percent of the lands on earth (U.S. Department of Agriculture, 1997). This leaves about 92 percent of the earth's arable land unused. Thus there is a tremendous potential for growth.

Because of GATT, NAFTA (North America Free Trade Agreement), and other trade agreements, crop producers have had greater access to world markets in the late 1990s. On the technological front, new solutions for storing, transporting, and producing crops have also enhanced the trade and production potential of agricultural businesses around the world, and this trend is expected to continue. However, the Asian financial crisis in the late 1990s has hampered that development temporarily.

One specific area that is seeing an increase in M&A activities is the cigarette manufacturing segment. As legislation and taxation affecting the cigarette industry in the United States have become more commonplace, leading companies have increasingly turned to global opportunities, and are entering overseas markets often by acquiring already existing operations (Covell &

Hunt, 1999). Already over 60 percent of Philip Morris's sales come from outside the U.S., and it is aiming to increase this figure. Philip Morris's and related firms efforts to expand into international markets is expected to be an expensive one since establishment of facilities in target countries is expensive and a slow process. One solution is to purchase already established operations through M&A processes.

Research into crop production aims to improve the yield. There are continuous discoveries of newly developed plant varieties, which are more suited to diverse growing conditions or ones that have natural resistance to pests and diseases. Past successes in this are for example (U.S. Department of Agriculture, 1998): First, the improvement in maize through cross breeding which has resulted in a sixfold increase in its yield. Second, the reduction in the length of the rice growing season allowing three rice crops annually rather than the usual two. Third, the development of disease resistant potatoes requiring no expensive pesticides allowed potato yields to increase by four to six times in several developing countries.

Agricultural Production of Livestock

Can further be subdivided into commercial farms, ranches, dairies, hatcheries, and other organizations involved in the raising or tending of animals.

The agricultural production of livestock is a significant part of the global economy. The largest market for livestock agriculture is the global meat supply, and in 1997 it was valued at $500 billion (U.S. Department of Agriculture, December 1997). China, the U.S., the European Union, Australia, New Zealand, Brazil, and Canada are the leading livestock producing countries. They all have sophisticated regulatory agencies, and high-technology meat industries.

Lately there have been several international trade agreements and organizations that have influenced this industry. GATT (The General Agreement on Tariffs and Trade) is the key trade agreement governing international trade of livestock-related commodities. The main purpose with GATT is the reduction and elimination of tariffs designed to hinder and control foreign competition in favor of domestic businesses. A secondary purpose is also the establishment of a formal organization for the implementation of systematic global trade policies WTO (the World Trade Organization). NAFTA (the North American Free Trade Agreement) removes trade barriers between Canada, Mexico, and the U.S. APEC (the Asia-Pacific Economic Cooperation) is headquartered in Singapore and oversees and assists economic development in the Pacific region. This will lead to more competition by eliminating farm subsidies, price supports, and trade restrictions.

One specific segment in the agricultural production of livestock where we will likely see a significant increase of M&A activity is in pork production (GaleNet, 1999). Traditionally this area has been highly segmented with different farms and firms performing separate functions (raising hogs, slaughtering, processing, and retailing). However the successes of a previous consolidation wave in the poultry segment has influenced the development in pork production. There has been an increase in particular in the effort to consolidate functions and vertically integrate them into a smaller number of large firms (Pits & Heil, 1999). Hog farming is also becoming more industrialized with a large number of hogs fed and housed in confinement rather than roaming free outside. Similar to the development of the broiler chicken industry, many pork companies controlled all phases of the production process, from birth to grocery store sales. These changes allow pork producers to buy feed in larger quantities and spread costs over more hogs, thereby creating a more efficient pork production process

The overall food demand per capita in the world is considered to be relatively fixed. However the purchasing power determines which foods are consumed and in which quantity. Thus, it is often the case that the livestock industry tends to be highly correlated with the general economy. The USDA's ERS (Economic Research Service) is expecting to see moderate world growth rates in gross domestic product, averaging 3 percent through 2005 (U.S. Department of Agriculture, February 1997). The continued liberalization of global trade also will spur further growth in both production and cross-border trade.

6. CONCLUSION

6.1. SUMMARY

The objective of this paper was to predict which specific industries in the United States will have a strong increase in the number and total dollar size of M&As, and which have not already had an increase in those two areas the last five years, and are therefore likely to be overlooked by others.

The usefulness of this knowledge is that those that possess it can potentially reap monetary rewards from it. In the case of the business person he can do so by preparing himself by increasing his / her knowledge and expertise into the identified industries ahead of the competition and thereby be able to better capitalize on the coming opportunities associated with heightened M&A activity. For the general public this knowledge can be potentially lucrative as well. For example, the public can steer some of their retirement funds or other investments towards potential takeover targets into those industries, and thus be able to benefit from the large premiums that are customarily paid. One convenient way to do this that requires a relatively small commitment of funds is to invest in those mutual funds that specialize in M&A arbitrage and specifically within those industries that have been identified.

Current research into this subject suggests that today there exists no reliable model that can be used in conjunction with those specific factors that have been identified by other researchers to be good predictors of future M&A activities. Fortunately a number of proven standard empirical tools can be used on the time series itself and thereby give a prediction of the future trends.

The industries that are being identified by the empirical analysis in this study are the following, in order of decreasing attractiveness:

- Plastics and Rubber
- Electronics
- Real Estate

- Agricultural Production

However, it is important to be aware of the fact that empirical research is only one piece of the puzzle, and should only be seen as a tool for finding good candidates for further research (Kichen, 1988). One way to improve the accuracy is to complement the technical analysis with a careful consideration of the fundamental factors identified by other researchers to be predictors of future M&A activities, but that are not available in a good prediction model. Therefore the next step in this research was to perform a search for the appearance of those factors in the industries suggested by the previous empirical analyses.

Although no reliable models exist that can be used to incorporate those fundamental factors into a model to predict M&A activity, the mere appearance or absence of them in a industry can serve as a good indicator of whether the previous time series analysis has provided reliable results or not. Since survey of the industries in this paper all revealed several of those factors it would be safe to conclude that plastics and rubber, electronics, real estate, and agricultural production truly are industries that likely will be the new up and coming hotspots in the M&A arena.

One can never claim that one has found all the answers. The analysis done in this paper, however, has followed all the principles suggested for a careful empirical analysis and a thorough industry analysis to avoid any potential biases or desires influencing the final findings. Further, no matter how careful an analysis to predict the future in any area, one should never forget that there will always appear unforeseen factors in the future that might affect the relevance of the results. It is my firm belief though, that the findings of this paper are excellent suggestions of which industries will see a strong increase in M&A activities in the coming years, and that has likely been overlooked since they have not increased dramatically the last few years.

6.2. RECOMMENDATIONS

Based on my findings and conclusions after having spent some time on this research topic, I have come to be painfully aware of areas that are in desperate need of further research. Therefore I make the following suggestions for future studies:

1) Science would greatly benefit from a careful attempt to splice past time series of data with those short ones we use today. That might lead our being able to create longer time series of data to be used in empirical studies such as this one, and thereby be able to increase statistical accuracy and use tools that we can't use today since the time series are too short. I believe that can be done by taking those time series provided in the past, and then adding to them those categories of data that we are using today. For example, in the cases where data is provided for some, but not all, of the industries that we routinely follow today, data could be found from other sources and then be added to it. That will of course be extremely time consuming, but it would definitely be invaluable to future scientific studies of the M&A phenomena.

2) Research attempting to create a reliable model that can be used for prediction efforts of future M&A activities. It appears that today, no such model exist.

3) The industries suggested by this paper should be researched further from a much deeper micro economic perspective than is possible in this thesis given the time and budget constraints. The findings on such a study could either serve to support or dispute the claims in this paper.

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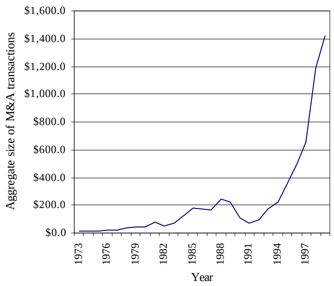
APPENDIX A

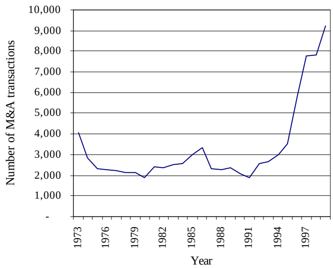
M&A ACTIVITY OVER TIME (BILLION DOLLARS)



Source: Mergerstat Review 1998, and updated with data published on www.mergerstat.com on 1/4/00.

APPENDIX B

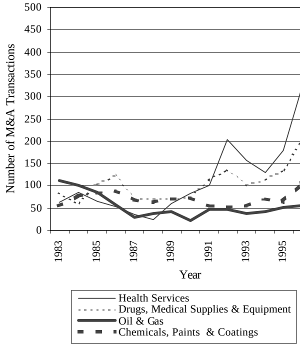
M&A ACTIVITY OVER TIME (NUMBER OF ANNOUNCEMENTS)



Source: Mergerstat Review 1998, and updated with data published on www.mergerstat.com on 1/4/00.

APPENDIX C

VARIATIONS IN M&A FREQUENCY



Source: Mergerstat Review, 1983-1997.

APPENDIX D

CHANGES IN INDUSTRY CLASSIFICATIONS OF TARGET COMPANIES OVER TIME

1981 -1988	1989-1991	1992-present
Agriculture, Forestry, Fishing	Apparel & Footwear	Aerospace & Aircraft
Metal Mining	Banking	Agriculture, Forestry & Fishing
Coal Mining	Building Materials	Chemicals
Oil and Gas Extraction	Business, Professional & Social Services	Communications Equipment
Nonmetallic Minerals Mining	Chemicals	Computer & Office Equipment
Construction	Communications	Computer Software
Food & Kindred Products	Computer & Data Processing Services	Construction
Tobacco Products	Computer & Office Equipment	Drugs
Textile Mill Products	Construction & Real Estate	Electric, Gas & Water Utilities
Apparel and other Finished Fabric Products	Consumer Products	Electronic & Electrical Equipment
Lumber and Wood Products	Electrical & Electronic Equipment	Entertainment
Furniture and Fixtures	Energy	Amusement & Recreation
Paper and Allied Products	Entertainment	Eating & Drinking Places
Printing and Publishing	Fabricated Metals	Hotels & Casinos
Chemicals and Allied Products	Food & Tobacco	Motion Pictures
Petroleum Refining	Health Care	Printing & Publishing
Rubber and Plastic Products	Pharmaceuticals	Radio & Television
Leather and Leather Products	Equipment	Financial
Stone, Clay, Glass & Concrete Products	Services	Commercial Banks
Primary Metals Industries	Hotels & Restaurants	Credit Institutions
Fabricated Metal Products	Household Products & Furniture	Insurance
Industrial Machinery, Computer Equipment	Insurance	Investment & Commodity Firms
Electrical and Electronic Equipment	Leather Goods	Miscellaneous
Transportation Equipment	Lumber & Wood Products	Real Estate; Mortgage Bankers & Brokers
Photo, Medical & Optical Instruments	Machinery	Savings & Loans
Miscellaneous Manufacturing	Measuring & Analyzing Equipment	Food
Railroad Transportation	Media	Holding Companies (except banks)
Local and Intercity Passenger Transit	Printing & Publishing	Leather & Leather Products
Motor Freight Transportation	Radio & TV Broadcasting	Machinery
Water Transportation	Nonbank Financial	Measuring, Medical & Photo Equipment
Air Transportation	Nonclassifiable	Metal & Metal Products
Pipelines, Except Natural Gas	Paper & Packaging	Mining
Transportation Services	Personal Services	Miscellaneous Manufacturing
Communications (Telephone, Radio, TV)	Primary Metals & Metals Mining	Oil & Gas; Petroleum Refining
Electric, Gas, Water, and Sanitary Services	Repair & Maintenance	Paper & Paper Products
Wholesale Trade	Retailing	Public Administration
Building Materials, Garden Supply	Hardware Stores	Retail
General Merchandise Stores	General Merchandise Stores	Food Stores
Food Stores	Food Stores	General Merchandise & Apparel
Automotive Dealers and Service Stations	Automotive Dealers & Service Stations	Home Furnishing Stores
Apparel and Accessory Stores	Apparel & Accessory Stores	Miscellaneous
Home Furniture, Furnishing Stores	Home Furnishing Stores	Rubber & Plastic Products
Eating and Drinking Places	Miscellaneous Retail	Services

Continued on next page.

1981 -1988	1989-1991	1992-present
Miscellanuous Retail	Rubber & Plastic Products	Advertising
Depository Institutions	Security & Commodity Brokers	Business
Nondepositiory Credit Institutions	Transportation	Education
Security & Commodity Brokers, Dealers	Transportation Equipment	Health
Insurance	Utilities	Legal
Real Estate	Wholesale Trade	Miscellaneous
Holding and Other Investment Offices		Personal
Hotels and Other Lodging Places		Repair
Personal Services		Sanitary
Business Services		Social
Computer and Data Processing Services		Soaps, Cosmetics & Personal Care Products
Automotive Services		Stone, Clay, Glass & Concrete Products
Miscellanuous Repair Services		Telecommunications
Motion Pictures		Textile & Apparel Product s
Amusement and Recreation Services		Tobacco Products
Health Services		Transportation & Shipping
Legal Services		Air
Educational Services		Land & Water
Social Services		Transportation & Equipment
Museums, Art Galleries, and Gardens		Wholesale
Membership Organizations		Durable Goods
Engineering, Accounting, Management		Nondurable Goods
Miscellaneous Services		Wood Products, Furniture & Fixtures
Nonclassifiable Establishments		Unclassifiable

Source: Mergers and Acquisitions: The Dealmaker's Journal, Securities Data Publishing, 1965-1999.

APPENDIX E

CHANGES IN MERGERSTAT REVIEW'S INDUSTRY CLASSIFICATIONS

	1983-91	1992-98	
INDUSTRY*	**SICs Covered**	**SICs Added**	**SICs Removed**
Agricultural Production	0111-0783, 0900s, 2100s		
Food Processing	2011-2079, 2087-2094, 2095, 2096-2099		2095
Beverages	2082-2086,	2095	
Apparel	2311-2389, 3021, 3131-3172		
Textiles	2211-2299, 2393, 2395, 2397, 2399	2394	
Timber & Forest Products	0800s, 2421-2431, 2435-2439, 2491, 2492	2411-2420, 2493-2499	
Paper	2611-2649	2671-2675, 2677-2679	
Packaging & Containers	2441, 2448, 2449, 2651-2655, 3221, 3411	2656	
Furniture	2434, 2500s		
Building Products & Materials	2451, 2452, 2661, 3442, 3446, 3448, 3996		2661
Household Goods	2391, 2392, 2841, 2842, 3261-3263, 3421, 3631-3636, 3639, 3651, 3914	3637-3638	
Printing & Publishing	2700s		
Chemicals, Paints & Coatings	2812-2821, 2824, 2843, 2851-2899		
Drugs, Medical Supplies & Equipment	2830s, 3693, 3841-3851		
Toiletries & Cosmetics	2844	2676	
Plastics & Rubber	2822, 2823, 3031-3079	3088-3089	
Stone, Clay & Glass	1422-1423, 1429, 1442, 1446, 3211, 3229-3259, 3269-3299	1411-1421, 1424-1428, 1430-1441, 1443-1445	
Primary Metal Processing	3300s		
Fabricated Metal Products	3412, 3423-3441, 3443, 3444, 3449-3463, 3466-3493, 3495-3499		

Continued on the next page.

	1983-91	1992-98	
INDUSTRY*	**SICs Covered**	**SICs Added**	**SICs Removed**
Industrial & Farm Equipment & Machinery	3511, 3519, 3523-3524, 3534-3559, 3562-3569, 3581-3585, 3589, 3599	3512-3518, 3520-3522, 3596	
Construction, Mining & Oil Equip. & Mach.	3531-3533		
Valves, Pumps & Hydraulics	3494, 3561, 3586	3593-3594	
Autos & Trucks	3711, 3713, 3715	3716	
Automotive Products & Accessories	2396, 3011, 3465, 3592, 3714		
Electrical Equipment	3264, 3612-3629, 3641-3648, 3661-3662, 3691-3692, 3694, 3699	3663-3669, 3695	
Office Equipment & Computer Hardware	3570s		
Electronics	3671-3679		
Aerospace, Aircraft & Defense	3721-3728, 3761-3769	3795	
Instruments & Photographic Equipment	3811-3829, 3861	3873	
Toys & Recreational Products	3652, 3732, 3751, 3792, 3931-3949		
Miscellaneous Manufacturing	3911, 3915, 3951-3995, 3999	3111, 3199, 3731, 3743, 3799	
Oil & Gas	1311, 1321, 2911, 2992, 2999, 4612, 4613, 4619	2951-2991, 2993-2998	
Mining & Minerals	1011-1213,1452-1499	1214-1241	
Transportation	4011-4214, 4411-4583, 4712	4215	
Communications	4811, 4821, 4899	4812-4813, 4822	
Broadcasting	4832, 4833	4841	
Electric, Gas, Water & Sanitary Services	4900s		
Wholesale & Distribution	5000s, 5100s		
Retail	5200s, 5300s, 5400s, 5500s, 5600s, 5700s, 5900s		
Banking & Finance	6000s, 6100s		
Insurance	6300s, 6411		
Real Estate	6500s		
Brokerage, Investment & Mgmt. Consulting	6200s, 6700s, 7392, 8931	8741, 8742	

Continued on the next page.

	1983-91	1992-98	
INDUSTRY*	**SICs Covered**	**SICs Added**	**SICs Removed**
Computer Software, Supplies & Services	7372, 7374, 7379	7371, 7373, 7375	
Construction Contractors & Eng. Svcs.	1500s, 1600s, 1700s, 2411, 8911	8711-8713, 8744-8748	
Energy Services	1381, 1382, 1389		
Health Services	8000s		
Leisure & Entertainment	5812, 5813, 7000s, 7313, 7800s, 7900s		
Miscellaneous Services	7200s, 7311, 7312, 7319, 7321-7369, 7391, 7393-7399, 7500s, 7600s	4221-4311, 4724-4759, 7376-7378, 7380-7390, 8111, 8200s, 8300s, 8400s, 8600s, 8721-8734, 8743, 8811, 8922	7393-7399
Conglomerate	Diversified in three or more areas.		

* Classified as the industry of the seller.

Source: Mergerstat Review, 1983-1998.

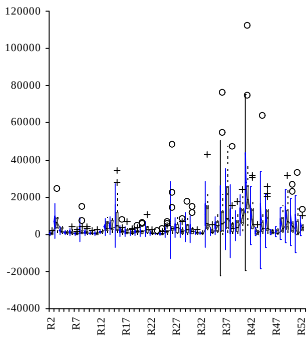
APPENDIX F

IDENTIFICATION NUMBERS ASSIGNED TO EACH INDUSTRY

1	Agricultural Production	26	Office Equipment & Computer Hardware
2	Food Processing	27	Electronics
3	Beverages	28	Aerospace, Aircraft & Defense
4	Apparel	29	Instruments & Photographic Equipment
5	Textiles	30	Toys & Recreational Products
6	Timber & Forest Products	31	Miscellaneous Manufacturing
7	Paper	32	Oil & Gas
8	Packaging & Containers	33	Mining & Minerals
9	Furniture	34	Transportation
10	Building Products & Materials	35	Communications
11	Household Goods	36	Broadcasting
12	Printing & Publishing	37	Electric, Gas, Water & Sanitary Services
13	Chemicals, Paints & Coatings	38	Wholesale & Distribution
14	Drugs, Medical Supplies & Equipment	39	Retail
15	Toiletries & Cosmetics	40	Banking & Finance
16	Plastics & Rubber	41	Insurance
17	Stone, Clay & Glass	42	Real Estate
18	Primary Metal Processing	43	Brokerage, Investment & Mgmt. Consulting
19	Fabricated Metal Products	44	Computer Software, Supplies & Services
20	Industrial & Farm Equipment & Machinery	45	Construction Contractors & Eng. Svcs.
21	Construction, Mining & Oil Equip. & Mach.	46	Energy Services
22	Valves, Pumps & Hydraulics	47	Health Services
23	Autos & Trucks	48	Leisure & Entertainment
24	Automotive Products & Accessories	49	Miscellaneous Services
25	Electrical Equipment	50	Conglomerate

APPENDIX G

BOXPLOT ANALYSIS ON TRANSACTION SIZE FOR EACH INDUSTRY



X-axis: Each industry is designated by its unique number (Appendix F).

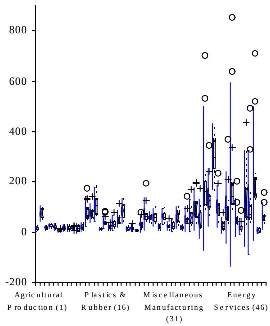
Y-axis: The total transaction size in millions of dollars.

O: Represents extreme outliers.

X: Represents less extreme outliers.

APPENDIX H

BOXPLOT ANALYSIS ON THE NUMBER OF M&A TRANSACTIONS PER INDUSTRY



X-axis: Each industry is represented by its unique number (Appendix F).

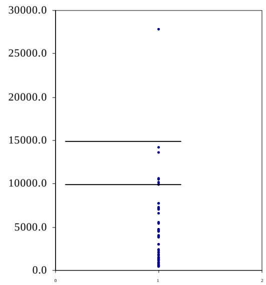
Y-axis: The total number of M&A transactions.

O: Represents extreme outliers.

X: Represents less extreme outliers.

APPENDIX I

CLUSTER ANALYSIS ON THE TOTAL SIZE OF M&A TRANSACTIONS



X-axis: All industries are placed on the same spot on the x-axis in order to discover values outside of the cluster.

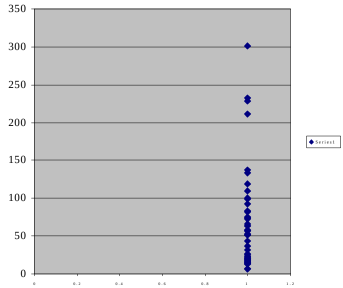
Y-axis: The total transaction size in millions of dollars.

The dot above the 1.5 billion dollars mark represents industry 40.

The dots between the 1.5 billion dollars mark and the 1.0 billion dollars mark represent industries 35, 36, 32, 39, 41, 14, and 48.

APPENDIX J

CLUSTER ANALYSIS ON THE TOTAL NUMBER OF M&A TRANSACTIONS



X-axis: All industries are placed on the same spot on the x-axis in order to discover values outside of the cluster.

Y-axis: The number of M&A transactions.

The dot above the 300 mark represents industry 40.

The dots between the 300 mark and the 200 mark represent industries 49, 44, and 38.

APPENDIX K

EVALUATION OF EACH TIME SERIES METHODS FIT WITH THE DATA

Method Errors:

	Method	RMSE	MAD	MAPE
Best:	Double Exponential Smoothing	1207.9	1050.2	34.93%
2nd:	Double Moving Average	1611.1	1343.9	42.54%
3rd:	Single Exponential Smoothing	1629.2	1290.7	31.11%
4th:	Single Moving Average	1685.4	1382.3	33.32%

Method Statistics:

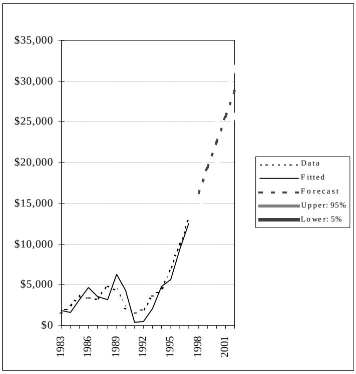
	Method	Durbin-Watson	Theil's U
Best:	Double Exponential Smoothing	1.839	1.061
2nd:	Double Moving Average	1.412	1.539
3rd:	Single Exponential Smoothing	0.553	1
4th:	Single Moving Average	0.529	1

Method Parameters:

	Method	Parameter	Value
Best:	Double Exponential Smoothing	Alpha	0.999
		Beta	0.791
2nd:	Double Moving Average	Periods	2
3rd:	Single Exponential Smoothing	Alpha	0.999
4th:	Single Moving Average	Periods	1

APPENDIX L

DIRECTION OF THE PREDICTED TREND



APPENDIX M

RANKING OF INDUSTRIES BASED ON PREDICTED GROWTH IN THE TOTAL DOLLAR AMOUNT

Rank	Industry	Predicted Growth
1	Brokerage, Investment & Mgmt. Consulting (43)	45.17%
2	Electrical Equipment (25)	32.39%
3	Plastics & Rubber (16)	31.87%
4	Real Estate (42)	31.60%
5	Industrial & Farm Equipment & Machinery (20)	30.87%
6	Miscellaneous Services (49)	28.80%
7	Communications (35)	26.27%
8	Banking & Finance (40)	24.54%
9	Electronics (27)	23.84%
10	Wholesale & Distribution (38)	22.39%
11	Agricultural Production (1)	20.98%
12	Electric, Gas, Water & Sanitary Services (37)	20.82%
13	**BASELINE**	**19.20%**
14	Chemicals, Paints & Coatings (13)	16.86%
15	Health Services (47)	16.77%
16	Oil & Gas (32)	16.11%
17	Insurance (41)	15.68%
18	Timber & Forest Products (6)	14.13%
19	Conglomerate (50)	11.76%
20	Computer Software, Supplies & Services (44)	8.86%
21	Automotive Products & Accessories (24)	8.12%
22	Leisure & Entertainment (48)	5.65%
23	Valves, Pumps & Hydraulics (22)	5.04%
24	Paper (7)	4.91%
25	Instruments & Photographic Equipment (29)	3.81%
26	Primary Metal Processing (18)	1.77%
27	Food Processing (2)	0.00%
27	Beverages (3)	0.00%
27	Apparel (4)	0.00%
27	Textiles (5)	0.00%
27	Packaging & Containers (8)	0.00%
27	Furniture (9)	0.00%
27	Building Products & Materials (10)	0.00%
27	Household Goods (11)	0.00%
27	Printing & Publishing (12)	0.00%

Continued on the next page.

Rank	Industry	Predicted Growth
27	Drugs, Medical Supplies & Equipment (14)	0.00%
27	Toiletries & Cosmetics (15)	0.00%
27	Stone, Clay & Glass (17)	0.00%
27	Fabricated Metal Products (19)	0.00%
27	Construction, Mining & Oil Equip. & Mach. (21)	0.00%
27	Autos & Trucks (23)	0.00%
27	Office Equipment & Computer Hardware (26)	0.00%
27	Aerospace, Aircraft & Defense (28)	0.00%
27	Toys & Recreational Products (30)	0.00%
27	Miscellaneous Manufacturing (31)	0.00%
27	Mining & Minerals (33)	0.00%
27	Transportation (34)	0.00%
27	Broadcasting (36)	0.00%
27	Retail (39)	0.00%
27	Construction Contractors & Eng. Svcs. (45)	0.00%
27	Energy Services (46)	0.00%

APPENDIX N

RANKING OF INDUSTRIES BASED ON PREDICTED GROWTH IN THE NUMBER OF TRANSACTIONS

Rank	Industry	Predicted Growth
1	Brokerage, Investment & Mgmt. Consulting (43)	29.96%
2	Construction Contractors & Eng. Svcs. (45)	29.68%
3	Miscellaneous Services (49)	25.55%
4	Leisure & Entertainment (48)	24.30%
5	Electrical Equipment (25)	24.12%
6	Retail (39)	23.60%
7	Electronics (27)	23.47%
8	Packaging & Containers (8)	23.33%
9	Energy Services (46)	22.73%
10	Toys & Recreational Products (30)	21.67%
11	Automotive Products & Accessories (24)	21.57%
12	Primary Metal Processing (18)	21.05%
13	Computer Software, Supplies & Services (44)	21.02%
14	Transportation (34)	19.77%
15	Communications (35)	19.59%
16	Wholesale & Distribution (38)	19.24%
17	Plastics & Rubber (16)	18.18%
18	Household Goods (11)	14.71%
19	**BASELINE**	**17.66%**
20	Fabricated Metal Products (19)	17.21%
21	Chemicals, Paints & Coatings (13)	16.47%
22	Real Estate (42)	16.06%
23	Agricultural Production (1)	15.63%
24	Electric, Gas, Water & Sanitary Services (37)	15.63%
25	Health Services (47)	14.81%
26	Building Products & Materials (10)	14.29%
27	Broadcasting (36)	14.05%
28	Industrial & Farm Equipment & Machinery (20)	13.66%

Continued on the next page.

Rank	Industry	Predicted Growth
29	Drugs, Medical Supplies & Equipment (14)	12.63%
30	Construction, Mining & Oil Equip. & Mach. (21)	12.50%
31	Insurance (41)	12.11%
32	Stone, Clay & Glass (17)	11.54%
33	Timber & Forest Products (6)	7.46%
34	Apparel (4)	3.23%
35	Paper (7)	3.17%
36	Food Processing (2)	1.98%
37	Beverages (3)	0.00%
37	Textiles (5)	0.00%
37	Furniture (9)	0.00%
37	Printing & Publishing (12)	0.00%
37	Toiletries & Cosmetics (15)	0.00%
37	Valves, Pumps & Hydraulics (22)	0.00%
37	Autos & Trucks (23)	0.00%
37	Office Equipment & Computer Hardware (26)	0.00%
37	Aerospace, Aircraft & Defense (28)	0.00%
37	Instruments & Photographic Equipment (29)	0.00%
37	Miscellaneous Manufacturing (31)	0.00%
37	Oil & Gas (32)	0.00%
37	Banking & Finance (40)	0.00%
37	Conglomerate (50)	0.00%
37	Mining & Minerals (33)	0.00%

APPENDIX O

THE PERCENTAGE OF RESPONDENTS IN EACH INDUSTRY

	1997		
INDUSTRY CODE	**Transactions**	**Respondents**	**%**
Agricultural Production (1)	26	11	42%
Food Processing (2)	103	44	43%
Beverages (3)	27	14	52%
Apparel (4)	27	12	44%
Textiles (5)	33	17	52%
Timber & Forest Products (6)	12	4	33%
Paper (7)	32	15	47%
Packaging & Containers (8)	29	7	24%
Furniture (9)	24	10	42%
Building Products & Materials (10)	20	11	55%
Household Goods (11)	29	8	28%
Printing & Publishing (12)	175	47	27%
Chemicals, Paints & Coatings (13)	142	40	28%
Drugs, Medical Supplies & Equipment (14)	182	95	52%
Toiletries & Cosmetics (15)	18	9	50%
Plastics & Rubber (16)	83	21	25%
Stone, Clay & Glass (17)	32	13	41%
Primary Metal Processing (18)	77	33	43%
Fabricated Metal Products (19)	112	39	35%
Industrial & Farm Equipment & Machinery (20)	145	58	40%
Construction, Mining & Oil Equip. & Mach. (21)	29	10	34%
Valves, Pumps & Hydraulics (22)	34	14	41%
Autos & Trucks (23)	10	4	40%
Automotive Products & Accessories (24)	79	30	38%
Electrical Equipment (25)	195	73	37%
Office Equipment & Computer Hardware (26)	78	40	51%
Electronics (27)	102	52	51%
Aerospace, Aircraft & Defense (28)	30	14	47%
Instruments & Photographic Equipment (29)	100	45	45%
Toys & Recreational Products (30)	53	16	30%
Miscellaneous Manufacturing (31)	49	20	41%

Continued on the next page.

INDUSTRY CODE	Transactions	Respondents	%
Oil & Gas (32)	85	53	62%
Mining & Minerals (33)	19	8	42%
Transportation (34)	143	38	27%
Communications (35)	168	83	49%
Broadcasting (36)	195	115	59%
Electric, Gas, Water & Sanitary Services (37)	175	77	44%
Wholesale & Distribution (38)	701	167	24%
Retail (39)	346	115	33%
Banking & Finance (40)	429	264	62%
Insurance (41)	232	97	42%
Real Estate (42)	79	36	46%
Brokerage, Investment & Mgmt. Consulting (43)	367	136	37%
Computer Software, Supplies & Services (44)	854	317	37%
Construction Contractors & Eng. Svcs. (45)	201	62	31%
Energy Services (46)	85	48	56%
Health Services (47)	437	114	26%
Leisure & Entertainment (48)	489	262	54%
Miscellaneous Services (49)	708	195	28%
Conglomerate (50)	0	0	-

APPENDIX P

RESULTS ANALYZED IN COMBINATION WITH EACH OTHER

Predicted increase in dollar amount		**Predicted increase in the number of transactions**	
Rank	Industry	Rank	Industry
1	**43**	1	**43**
2	**25**	2	45
3	**16**	3	**49**
4	42	4	48
5	20	5	**25**
6	**49**	6	39
7	**35**	7	**27**
8	40	8	8
9	**27**	9	46
10	38	10	30
11	1	11	24
12	37	12	18
13	**Baseline**	13	44
14	13	14	34
15	47	15	**35**
16	32	16	**38**
17	41	17	**16**
18	6	18	11
19	50	**19**	**Baseline**

Industries with above average (i.e. above baseline) predicted increase in both categories are picked out, see the arrows. Thus industries 43, 25, 16, 49, 35, 27, and 38 have all above average predicted increase in both categories.

L

APPENDIX Q

ACTUAL OBSERVATIONS OF INCREASES IN M&A ACTIVITIES

Actual increase in the dollar amount the last 5 years			**Actual increase in the number of transactions the last 5 years**		
5yr average	Rank	Industry	5yr average	Rank	Industry
$55,202	1	40	439	1	44
$33,815	2	35	376	2	38
$29,049	3	36	356	3	40
$20,398	4	41	347	4	49
$19,167	5	43	245	5	47
$18,209	6	25	236	6	48
$16,915	7	44	187	7	39
$16,365	8	37	178	8	43
$16,014	9	48	149	9	41
$15,246	10	14	147	10	14
$12,868	11	39	140	11	36
$11,962	12	47	109	12	25
$11,935	13	49	108	13	35
$10,056	14	38	104	14	37
$7,644	**15**	**Baseline**	98	15	12
$7,296	16	32	97	16	45
$6,616	17	2	96	17	20
$6,568	18	34	**91**	**18**	**Baseline**
$6,480	19	29	88	19	13
$6,289	20	28	79	20	2
$5,610	21	13	76	21	34
$5,563	22	26	70	22	29
$4,901	23	12	69	23	26
$4,422	24	20	61	24	19
$4,210	25	7	60	25	27
$3,407	26	24	58	26	16
$3,011	27	27	55		32

APPENDIX R

IDENTIFICATION OF LIKELY OVERLOOKED INDUSTRIES WITH PREDICTED HIGH LEVELS OF M&A ACTIVITIES

Predicted	Observed the last 5 years
~~43~~	40
~~25~~	~~35~~
16	36
~~49~~	41
~~35~~	~~43~~
27	~~25~~
~~38~~	44
42	~~37~~
~~20~~	48
1	14
~~37~~	39
	47
	~~49~~
	~~38~~
	12
	~~20~~
	45

In this side-by-side comparison we remove those industries that appears in both columns, and are then left with industries 16, 27, 42, and 1. Thus, these are the industries that are predicted to have significant increase in M&A activity the next few years, and that have likely been overlooked by others since they have not yet been observed to have significant M&A activity.