WHAT DRIVES MERGER BEHAVIOR OF FIRMS? STRATEGIC MOMENTUM VERSUS BANDWAGONS

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ABSTRACT

Mergers represent a common means of restructuring assets. The existing literature on mergers, however, has a strong bias towards viewing firms’ decisions as outcomes of comprehensively rational processes. In this study, we propose two alternative explanations regarding mergers, namely strategic momentum and bandwagons. Both these explanations incorporate factors such as incomplete information, cognitive simplifications by managers and principal-agent issues. Bandwagon theories argue that firms will tend to imitate their close rivals regardless of whether such imitation is value-enhancing or not. Strategic momentum theory argues that firms tend to continue with strategies they have implemented in the past. Based on an exhaustive sample of acquisitions, domestic as well as international, undertaken by 43 large pharmaceutical firms based in the triad region over a period of 15 years, we find robust support for the bandwagons
explanation. We do not find unequivocal support for the strategic momentum explanation.

BACKGROUND

Mergers and acquisitions represent a common way of restructuring assets. Between 1965 and 1989, there were more than 75,000 mergers in the United States alone.\(^{(1)}\) With a few exceptions, the existing research on mergers, conceptual as well as empirical, has exhibited a strong bias towards viewing firms' decisions as outcomes of comprehensively rational processes.\(^{(2)}\) By assuming firms as unitary rational actors,\(^{(3)}\) these studies ignore many real-life aspects of decision making within firms.\(^{(4)}\) Possibly due to this reason, the findings of the empirical research regarding mergers have often been contradictory\(^{(5)}\) and the support for the theories on which this research is based can, at best, be viewed as partial.\(^{(6)}\)

In this study, we empirically test the validity of two theories, strategic momentum and bandwagons, for explaining horizontal merger activity by firms. Bandwagon theory has not been used for explaining mergers at all whereas one previous study has used the strategic momentum theory to explain a sample of horizontal and product extension mergers within the United States.\(^{(7)}\) A geographically restricted sample such as mergers within the US, however, raises issues of generalizability across different countries. There are substantial inter-country differences in accounting and tax treatment of mergers. Acceptability of mergers, especially unsolicited and hostile bids, also varies across countries.\(^{(8)}\) Hence a study based on a multi-country sample might be more generalizable.

Bandwagon theories argue that firms will tend to imitate their close rivals regardless of whether such imitation is value-enhancing
or not. Strategic momentum theory argues that firms would tend to continue with strategies that they have implemented in the past. In Trautwein’s categorization of different theories, strategic momentum can be classified under the process theory.\(^{(9)}\) Bandwagon theory, though, can be subsumed under two categories -- process theory and empire-building theory. After reviewing available empirical evidence, Trautwein concluded that the evidence collected regarding the empire building theory is favorable but limited.\(^{(10)}\) He also concluded that the evidence regarding the process theory is so scarce as to forbid any far-reaching inferences. Thus, there is a need for empirical testing of both the process as well as empire-building theories.

The strategic momentum and bandwagon theories also pose an interesting contrast in terms of their focus. The bandwagon theory’s focus is predominantly external; it is concerned with the relationship between the behavior of close rivals and the behavior of a focal firm. The strategic momentum theory’s focus, on the other hand, is the internal working of a firm -- how the development of routines influences its future behavior.

In summary, we are making three points. First, we believe that strategic momentum and bandwagon theories are potentially useful perspectives to explain merger activity by firms. Secondly, there is a need to empirically test the validity of these theories. Finally, we believe that the present study’s sample is sufficiently international in scope for the results to have a high degree of generalizability.

This paper is organized as follows. In the first section, we discuss the conceptual arguments of the bandwagon theory. In the second section, we review the main arguments of the strategic momentum theory. We discuss the various aspects of methodology including model specification, operational measures and statistical methods in the third section. The fourth section includes a
discussion regarding the results from the analysis of data. In the fifth and concluding section, we discuss the implications of the study, limitations of the study and identify directions for further research. Before we proceed, it is worth noting that this study focuses on horizontal mergers and acquisitions -- where both parties operate in the pharmaceutical industry. Throughout the paper, the word horizontal is implied but not mentioned explicitly to achieve simplicity of language. We also use the terms mergers and acquisitions interchangeably.

CONCEPTUAL ARGUMENTS AND HYPOTHESES DEVELOPMENT

Bandwagon theories are grounded in institutional theory, managerial process theories of decision making and agency theory. Below, we will briefly discuss each of these theories. Institutional theory predicts similarities between organizations based on the desire to conform to norms and the quest for legitimacy.\(^{(11)}\) According to this perspective, firms deal with uncertainty by adopting the use of institutionalized standard response which allows managers to reduce their perceived uncertainty.\(^{(12)}\)

According to the managerial process theories, decision-makers have limited information and also limited ability to process information.\(^{(13)}\) Internal politics within an organization matters and many strategic decisions may be outcomes of political games played between an organization's subunits.\(^{(14)}\) Sometimes managers prefer simplicity as a strategy.\(^{(15)}\) Due to the high degree of specialization it (strategy based on simplicity) offers, these organizations may be able to achieve closely defined goals with a limited assortment of decisions.\(^{(16)}\)

The Agency perspective recognizes that there is divergence between the goals of the owners and the goals of the managers.
Managers might sometimes adopt strategies to expand the size of their empires by undertaking acquisitions, though these strategies do not enhance shareholder value.\(^{(17)}\)

**Antecedents of Bandwagon Pressure**

The term bandwagon pressure is used to denote a pressure to choose a certain course of action created by the sheer number of firms choosing a similar course of action.\(^{(18)}\) There are many reasons for the existence of bandwagon pressures, including: presence of ambiguity, stakeholder pressure, and the presence of organizational slack coupled with agency problems. Below, we will briefly discuss each of these factors.

Before proceeding to discuss the impact of ambiguity, let us state one of our key assumptions. We assume that managers are risk averse and avoid future worst-case scenarios even if they sacrifice the possibility of attaining the (future) best-case scenario in the process.\(^{(19)}\) To managers, performance below industry average can mean reduced pay, reduced resources for the organizational sub-unit and sometimes even loss of job as well as professional reputation.\(^{(20)}\) Hence, managers might try to avoid the risk of performing below industry average.\(^{(21)}\) The assumption is consistent with the work of March and Shapira\(^{(22)}\) who concluded that managerial judgements of risk appear to be focused on outcomes which entail a loss rather than positive outcomes which entail organizational gains.\(^{(23)}\)

In organization theory, ambiguity is one of the major factors moderating the impact of the number of adopters on the strength of bandwagon pressures.\(^{(24)}\) Ambiguity can be defined as the lack of clarity regarding a firm's assessment of the costs and benefits from adopting a particular course of action.\(^{(25)}\) Ambiguity could be of many different types but two are particularly relevant to bandwagon theories: ambiguity of means-ends relations and ambiguity of environments.\(^{(26)}\)
The greater the ambiguity, the lower the ability of firms to take a decision based on its (decision's) expected returns and hence the greater the pressure on firms to adopt courses of action that have been embraced by a large number of adopters. As the following hypothetical example will show, by jumping on bandwagons, firms can achieve average performance regardless of the relationship between means and ends as well as the realization of different states of the world. Imagine a situation where a firm is considering merging with a rival. Though there are potential synergies to be achieved by the combined firm, conflict between the different organizational cultures and/or the administrative problems due to the larger organizational size might reduce the magnitude of realized synergies, and sometimes lead to even negative synergies. Furthermore, there are alternative organizational forms (such as alliances) that could also help in bringing together the synergistic resources of the two firms. The firm is not clear regarding whether a merger or an alliance is the best means to achieve the synergies -- ambiguity of means-ends relationship. The firm is also not clear regarding whether the environmental trends on which the synergies are predicated, such as the continued escalation of economies of scale, will continue into the future -- ambiguity of environments. If a number of rivals have already consummated mergers, other firms might be tempted to jump on the bandwagon by undertaking mergers of their own. Whether the mergers are successful or not, the firms joining the bandwagon will not produce an inferior performance.

Bandwagon pressures may also be significant when late-movers could be pre-empted by the early movers from following a particular strategy. MacCrimmon and Wehrung argue that the lack of time to make the appropriate decisions is one of the factors that affects managers' perceived exposure to loss. Continuing with our example of a merger between two rivals, imagine a situation where there are few attractive target firms. Firms that move early can merge with the most attractive targets and the
available selection of targets will grow weaker with passing time. A firm that is sufficiently late may not be able to find a suitable target and thus be prevented from following the strategy of its rivals. In such a situation, rivals may be tempted to join bandwagons. Recently, news reports speculated that Worldcom’s bid for MCI would prompt AT&T and Sprint Corporation to move more quickly in pursuing acquisitions or alliances in the local telecommunications market.\(^{(32)}\)

Sometimes, stakeholder pressure could provide additional momentum to bandwagons. This phenomenon is termed as coercive isomorphism by DiMaggio and Powell.\(^{(33)}\) Firms that are struggling often have low bargaining power versus their stakeholders, but also depend on their stakeholders for additional resources and/or cooperation. Few categories of stakeholders, such as the investors, might buy into success recipes about which the managements are (justifiably or otherwise), skeptical. Stakeholder pressure may still force the managements to implement the success recipes. DiMaggio and Powell cite the example of a TV station’s restructuring, despite skepticism on the part of the management regarding the efficiency gains from the changeover.\(^{(34)}\) Managers hoped that underwriters and potential joint venture partners would view the reorganization as a sign that the station was becoming more business-minded. In another instance of stakeholder pressure influencing firm decision, Niven cited the adoption of Total Quality Management by a Germany-based chemical company in response to demands by its largest customer who was accounting for 35 percent of the chemical company’s sales.\(^{(35)}\)

Organizational slack represents another factor that could provide momentum to bandwagons. Slack will allow the managements to indulge in empire building or pursue goals and objectives that are not necessarily in the best interests of the owners of the firm.\(^{(36)}\) Managers might sometimes undertake
mergers simply because it is fashionable to do, even though their own organizations lack the expertise required for one or more aspects of the acquisition process, including, choosing appropriate targets or integrating the targets into their own firms. There is substantial but indirect evidence regarding the discretion available to managers (slack) and empire-building efforts through mergers.\(^{(37)}\)

Many empirical studies have tested the validity of the bandwagon explanation. Flibstein found that the number of other firms in the industry adopting the multidivisional structure had a significant impact on adoption by the late-adopters, lending support to the bandwagon explanation.\(^{(38)}\) In another study, Palmer Jennings and Zhou examined the adoption of the multidivisional structure during the period 1962-68 -- about 4 decades after the pioneering of the multidivisional form.\(^{(39)}\) Their results lend strong support to the bandwagon explanation. In an event history of municipal reform, Knocke concluded that municipal reform differences could best be explained by imitation or contagion effects -- by the level of neighboring regional cities previously adopting reform government.\(^{(40)}\) Banta found that the widespread adoption of CAT scanners could not be explained with a rational model.\(^{(41)}\) Banta's results, though, are consistent with bandwagon theories.\(^{(42)}\) The preceding arguments can be summarized in the form of the following hypothesis:

**Hypothesis 1:** Bandwagon pressures, created due to a number of peer firms undertaking mergers, will increase the likelihood that rival firms will undertake mergers of their own.

**Strategic Momentum**

Strategic momentum can be defined as the tendency to maintain or expand the emphasis on prior strategic actions in current strategic behavior.\(^{(43)}\) Though previous literature identifies
three types of strategic momentum, repetitive, positional and contextual, throughout this paper, we focus on repetitive momentum. To achieve simplicity of language, we refer to repetitive strategic momentum as simply strategic momentum. The existence of strategic momentum can be attributed to two major factors: the development of routines and standard operating procedures by firms which influences future behavior and the external demands on the organization to be consistent. In the following discussion, we will address each of these factors briefly.

In Nelson and Winter’s evolutionary theory, routines play an important role. Routines specify what data managers must gather and attend to and guide how managers interpret that information. Routines foster habit and redundancy and are, therefore, the source of continuity in organizational behavior. They are more likely to lead to incremental improvements of existing practices rather than discovery of new practices. Organizations might also respond to new problems by using existing routines. Routines might play a particularly important role for large organizations that have to do the same tasks many times over. Routines, however, can create inertia, tunnel vision, and rigidity.

From the perspective of routines, when a firm engages in an acquisition, for whatever reason, it develops a competency in the process of making that type of acquisition. Each acquisition of the same type allows these competencies to be refined which increases the likelihood of even more acquisitions of the same type.

There is some anecdotal evidence that active acquirers use routines to manage a variety of aspects of the acquisition process. Hill argued that Hanson Trust PLC, a successful acquirer, had developed routines for selecting appropriate target firms that were often unrelated to its existing set of businesses. Another active
acquirer, Computer Associates, has a routine for post-acquisition integration.\(^{(51)}\)

Strategic momentum is also consistent with the pursuit of simplicity by organizations. Simplicity suggests a narrow focus based on a small set of constraints and closely defined goals that are consistent with a limited assortment of decisions.\(^{(52)}\) Under certain circumstances, firms following a simple strategy might derive a competitive advantage due to a combination of clear and simple goals, high degree of specialization and focus on a central tactic.\(^{(53)}\)

The structural inertia perspective argues that change in organizational direction or strategy is costly because of disruptions in organizational procedures to which members and external constituents must adjust.\(^{(54)}\) Frequent and rapid changes in strategic policies imply reduced reliability and accountability, leading to social sanctions and ultimately to increased likelihood of organizational failure.\(^{(55)}\)

Previous research has observed strategic momentum in a variety of organizational settings including, military decisions,\(^{(56)}\) government agency transitions\(^{(57)}\) and product extension and horizontal mergers.\(^{(58)}\) Hence,

**Hypothesis 2:** In any given time period, firms that have undertaken a greater number of mergers in the recent past are more likely to undertake further mergers.

Before proceeding further, we would like to establish the bounds of the study. This study aims to empirically test the relationship between bandwagon pressures and strategic momentum, on the one hand, and merger behavior on the other hand. The antecedents to bandwagons pressure and strategic momentum, such as ambiguity, stakeholder pressures, and organizational slack, are not included in the operational model.
However, our approach is not unique. Much of the research in
transaction cost analysis and into the market share and profitability
relationship examines whether the outcomes are those that would
be predicted from theory without actually measuring antecedents
such as opportunism or information impactedness\(^{59}\) or experience
curve benefits.\(^{60}\) The existing literature on the topics of
bandwagons and strategic momentum also adopts a similar
approach as ours.\(^{61}\)

**DATA AND METHODS**

The sample for this study consisted of 43 large firms in the
global pharmaceutical industry from Sweden Switzerland,
Germany, United Kingdom, Japan, France and the United States.
Data regarding the announcements of mergers and acquisitions was
obtained for each of these firms over the period 1975-1989. The
dataset included all reported horizontal mergers undertaken by
these firms, including international mergers. We collected
additional data regarding the corporate sales, the pharmaceutical
sales, and the overseas sales of these firms by studying the firms' 
Annual Reports. For testing the bandwagons hypothesis, we
needed to identify groups of firms. The bandwagons hypothesis
would predict that firms within a group might imitate each other
but there would be little, if any, imitation across different groups.

We grouped firms according to geographic regions, namely
US, Europe and Japan. Previous research has indicated that
georgraphic proximity is an important basis for the formation of
reference networks and cue taking.\(^{62}\) Knickerbocker found that
American firms in moderately oligopolistic industries followed
their rivals in investing abroad.\(^{63}\) Building on Knickerbocker's
work, Flowers\(^{64}\) and Graham\(^{65}\) also found that firms tend to
follow the strategies adopted by rivals based in the same
geographic region.
Geography-based grouping also offers the advantages of objectivity and replicability. These advantages are particularly salient compared to the alternative of creating strategic groups. Barney and Hoskisson\textsuperscript{66} have shown that starting with the same set of firms, one can arrive at very different strategic groups, depending on the variables selected for clustering, the clustering algorithm chosen and the number of clusters in the final solution.

It is also noteworthy that the four largest mergers in the global pharmaceutical industry over the period 1989-96, (Ciba Geigy and Sandoz, Glaxo and Wellcome, Bristol Myers and Squibb and American Home Products and American Cyanamid) have involved firms from the same country. Thus, despite having a global presence and a global scanning capability, these firms' core reference networks might consist of other firms based in their own country.

**Operational Measures**

The dependent variable should measure the likelihood of a firm undertaking a merger during a particular year. We operationalize it as a binary variable that assumes a value of 1 if a particular firm undertakes one or more mergers during time period \( t \) and 0 otherwise.

There are two major categories of covariates that are of interest here: measures proxying bandwagon pressure and measures proxying strategic momentum. Below, we will briefly discuss each of these categories.

Several previous studies that examined contagion effects (bandwagons, in other words) have used the cumulative level of adoption (percentage of adopters) as a proxy for the strength of
bandwagon pressures. This measure was appropriate for studying the adoption of multidivisional structure and municipal reforms for the following reasons. These events are infrequent and are usually not reversed over a substantial period of time and hence adoption by a rival, even though it occurred several years ago, might exert a mimetic force (bandwagon pressure) on the non-adopters. Mergers and acquisitions, on the other hand, are relatively more frequent events. In many cases, they are also reversed through divestment, spin-offs, outright closure etc. For these two reasons, it is unlikely that a merger or an acquisition undertaken by a firm several years ago will exert bandwagon pressure on its rivals. Since only mergers that are quite recent are likely to lead to bandwagon pressure, we operationalize bandwagon pressure as the number of mergers undertaken by peer firms during the previous year. We will also re-run the analysis with alternative lag structures such as 2 and 3 years.

Amburgey and Miner's study operationalized strategic momentum as the cumulative number of prior mergers of a given type. We believe that this measure is problematic for two reasons. First, there may be environmental changes that obsolete the routines developed a long time ago. For instance, over the last 15-20 years, there has been a general relaxation of anti-monopoly laws in the US as well as in many parts of the world. In the previous era, firms might have sought merger partners that would not invite regulatory scrutiny. In the new environment, on the other hand, firms might look for targets that provide the maximum synergistic benefits, thus requiring a completely different kind of routines. Secondly, factors such as employee turnover also point towards limited rather than long effective life of routines. Hence, it is unlikely that routines developed during the course of an acquisition that was undertaken several years ago will be helpful in the next acquisition. In essence, we are arguing that it is recent history, and not history per se, that matters.
We operationalize strategic momentum as the number of mergers undertaken over the past three years. The greater the number of acquisitions undertaken over the past few years, the more refined the routines for undertaking new acquisitions. It is necessary to cumulate the number of acquisitions over the previous few years since the half life of the organizational routines, once developed, is likely to be more than one year. That is routines learned over the past few (more than one) years may be useful for undertaking a transaction during time t. Thus our emphasis is on recency as well as the frequency of mergers and acquisitions. The choice of three years as the appropriate lag structure is quite arbitrary and we will test the sensitivity of results to this particular assumption.

At least one issue, relating to the size of the acquisition, also needs to be addressed. It is obvious that different-sized acquisitions have different implications in terms of the increase in the size of the combined organization and the complexity of the integration task. The implications are more ambiguous for the present study, though! It is not clear that a larger acquisition by a firm will lead to either better routines (from a strategic momentum perspective) or greater bandwagon pressure on its rivals (from a bandwagons prespective). Consideration of size also raises several empirical issues. In many cases, the size of the acquisition may be difficult to find out since one of the companies may be privately held and the details regarding the purchase terms may not be disclosed. The problem is particularly acute in the present study since our sample is international and the reporting norms and requirements vary substantially across countries. In view of these difficulties, we decided to focus on simple counts of the number of acquisitions. We use firm size as a control variable. Previous research suggests that larger firms are more likely to undertake mergers, primarily due to easier access to capital.⁷¹ We measure size as the logarithm of a firm’s sales in millions of dollars. The logarithmic transformation is used to normalize the variable.
We also use dependence on the pharmaceutical industry as another control variable. If bandwagons are considered as risk-minimizing behavior (avoiding a situation of competitive disadvantage), higher dependence on the pharmaceutical industry might increase the temptation to jump on the bandwagons. If the dependence on pharmaceutical industry is low, firms can afford to ignore bandwagon pressures. Even if the pharmaceutical line of business faces a competitive disadvantage in the future, there are other businesses to sustain the corporation.

From a strategic momentum perspective also, it is important to control for the dependence on the pharmaceutical industry. It is noteworthy that firms might develop specific routines for consummating one kind of mergers, say horizontal mergers.\(^{(72)}\) From a purely probabilistic viewpoint, the lower the dependence of a firm on the pharmaceutical industry, the lower the probability that the firm will utilize its routines in undertaking a merger within the pharmaceutical industry itself (horizontal merger). It may be worthwhile to reiterate that our sample consists of only horizontal mergers. We measure dependence on the pharmaceutical industry as the percentage of total sales derived from the pharmaceutical industry.

While testing for the presence of strategic momentum and bandwagon pressure, it is important to control for the impact of environmental factors that might encourage or discourage the formation of mergers. Merger waves may coincide with "economic disturbances" such as business cycles or movements in exchange rates.\(^{(73)}\) In addition, relaxation of anti-trust rules\(^{(74)}\) and stock market trends might also have an impact on mergers.\(^{(75)}\) Industry specific factors such as an increase in economies of scale might also promote consolidation through mergers.\(^{(76)}\) The sheer diversity of environmental factors makes it difficult, if not impossible, to control for these trends. Broad economic indicators such as stock market indices are inappropriate since the firms in
our sample come from many countries and the conditions could differ substantially across countries.

However, during the time period covered by the study, several fundamental changes occurred in the economics of the pharmaceutical industry that made it less benevolent for the participating firms. This conclusion was true in almost all the triad countries to which the sample firms belong. Specifically, there was a significant escalation in product development costs\(^{(77)}\) coupled with a decline in the effective patent lives (windows for profitable exploitation of new products) of new drugs\(^{(78)}\) and escalation of marketing costs. The changes in the environment prompted a merger flurry even between some of the larger firms in the industry. According to the Chief Financial Officer of SmithKline, a leading worldwide producer of pharmaceuticals, its merger with Beecham of UK would enable the firm to attain critical mass, suggesting that the economies of scale within the industry had become substantial.\(^{(79)}\) In 1989 alone, several large mergers including the one between SmithKline and Beecham, were consummated. A manager at a European pharmaceutical firm predicted in 1989 that, by the year 2000, the global pharmaceutical industry would be dominated by 5 or 6 giant firms, each of which would be much bigger than the current leaders.\(^{(80)}\)

To account for this trend of increasing consolidation, we introduce the calendar year as an independent variable. As we will discuss later, the number of acquisitions undertaken by our sample of firms have almost monotonically increased over the time period covered by the study. We are implicitly assuming that the number of aggregate acquisitions undertaken by a diverse sample of firms is due to some fundamental shifts in industry conditions.

We also included a dummy variable for each firm (except one) in the models. By introducing the firm level dummies and the calendar year variable, we are removing time trends as well as
firm-level idiosyncrasies so that we can estimate the true impact of strategic momentum and bandwagon pressure on the likelihood of mergers. There is a danger, however, that the inclusion of the firm-level dummy variables will reduce the significance of the strategic momentum variable. To address this possible concern, we will run the regressions with and without the firm-level dummies.

**Statistical Methods**

The models took the form \( \text{Ln } P_i / (1-P_i) = \text{Sum } B_j X_{ij} \) where \( P_i \) is the probability that firm \( i \) will undertake an acquisition during time period \( t \). The log odds of this event are held to be linearly affected by a vector of covariates \( X_{ij} \) with coefficient vector \( B_j \). The SAS statistical package was used to estimate the maximum likelihood models.

Logistic regression techniques were used. One problem, however, is that logistic regression assumes that each case is independent, which is not true for our sample of observations. The number of observations we have actually corresponds to firm-years. As discussed earlier, we have introduced calendar year and firm-level dummy variables in the regression models. By accounting for at least some firm-specific and time-related variation, these variables will reduce the potential problems of autocorrelation as well as heteroscedasticity. In the process, the residuals for the individual observations might also become independent of each other. A major concern here is whether the logistics regression procedure will overstate the significance of the coefficients as compared to alternative methods such as event history analysis. Teachman, Tedrow and Hill show that the discrete time logistic regression estimator does not downardly bias standard errors (or does not overstate the significance of the coefficients) when compared to continuous time models and that
spell-splitting does not lead to unobserved correlation across records. (81)

Alternatively, we could have used event history analysis for testing the hypotheses. Several constraints prevented us from using this methodology. First, our sample, which begins in 1975 and ends in 1989, is right and left censored. The left censoring is particularly problematic from the point of view of the event history methodology. Many pharmaceutical firms have long histories (e.g., Hoechst and ICI, two firms included in our sample, are more than 100 years old) and so do mergers as a strategic alternative. In terms of resource requirements to undertake the research project, identifying the first merger in the industry and building a merger history for each firm over a long time period poses a massive challenge. There is also another difficulty. We do not know the exact dates of the mergers but only know the year in which mergers occurred. Thus we will not be able to determine the exact interval between successive events, precluding the use of event history analysis. However, we believe that, in the present case, logistics regression provides us an excellent alternative methodology to test the hypotheses.

RESULTS AND DISCUSSION

Our sample of firms included 20 firms from the US, 9 firms from Japan, 4 firms from Germany, 4 firms from the United Kingdom, 3 firms from Switzerland, 2 firms from France and 1 Swedish firm. Below, we will discuss some trends regarding the pattern of acquisitions. The average number of acquisitions per firm increases over the time period of the study. The standard deviation of the number of acquisitions is often larger than average, which is expected since, during any given year, there may be some firms that undertake acquisitions but several others that don't. With the exception of a couple of active acquirers, the
average number of acquisitions for individual firms is less than 1. Here again the standard deviation is larger than the average value indicating the sporadic nature of the acquisition activity.

To get a better feel for the data, we examined the frequency distribution of the strategic momentum and bandwagon pressure variables. In as many as 58% of the cases, the strategic momentum variable assumes a value of 0 and the value is less than 3 for 94 percent of the cases. The bandwagon pressure variable, on the other hand, is more widely dispersed. It assumes a value below 5 in only 12.5 percent of the cases but for 40 percent of the cases, it assumes a value between 6 and 8.

Table 1 shows the correlation matrix for the dependent and independent variables used in the regression analysis. It is clear that, other than two variables—the bandwagon pressure and the calendar year variables, there is no problem of multicollinearity.

Before performing the logistics regression analysis, we examined each of the independent variables for normality of distribution. Since the strategic momentum variable and the dependence on the pharmaceutical industry variable were not normally distributed, we carried out logarithmic transformations of these variables and used the transformed variables in further analysis. Table 2 shows the logistic regression results for five alternative model structures. The first and the second regression models include the bandwagon pressure variable and the strategic momentum variable respectively, but not both. The third model includes the bandwagon pressure variable as well as the strategic momentum variable. The fourth model includes two interaction variables in place of the dependence on the pharmaceutical industry variable. The fifth model is similar to the fourth model except for the omission of the firm-level dummy variables.
### TABLE 1

**Correlation Matrix**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
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<tbody>
<tr>
<td>Likelihood of acquisition in year t (1) N=607</td>
<td>.21 (.41)</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Strategic momentum (2)</td>
<td>.94</td>
<td>.33</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Normalized variable N=493</td>
<td>.44 (.60)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Bandwagon pressure (3) N=606</td>
<td>9.14 (4.10)</td>
<td>.24</td>
<td>.13</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of firm (4) N=607</td>
<td>7.49 (1.16)</td>
<td>.18</td>
<td>.21</td>
<td>.32</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependence on the pharmaceutical industry (5)</td>
<td>.61 (.27)</td>
<td>-.13</td>
<td>-.15</td>
<td>.02</td>
<td>-.72</td>
<td>1.0</td>
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<tr>
<td>Normalized variable N=544</td>
<td>-.65 (.65)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calendar Year (6) N=607</td>
<td>8.03 (4.24)</td>
<td>.21</td>
<td>.18</td>
<td>.80</td>
<td>.38</td>
<td>-.02</td>
<td>1.0</td>
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<tr>
<td>Normalized variable N=607</td>
<td>1.87 (.74)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### TABLE 2

Results of Logistic Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2.93</td>
<td>-3.70</td>
<td>3.64</td>
<td>3.00</td>
<td>-2.54</td>
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<td></td>
<td>(4.59)</td>
<td>(5.00)</td>
<td>(5.41)</td>
<td>(5.36)</td>
<td>(1.26)</td>
</tr>
<tr>
<td>Strategic momentum(^1)</td>
<td>-</td>
<td>-.22</td>
<td>-.27</td>
<td>-.32</td>
<td>1.39**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.28)</td>
<td>(.29)</td>
<td>(.44)</td>
<td>(.28)</td>
</tr>
<tr>
<td>Bandwagon pressure</td>
<td>.21**</td>
<td>--</td>
<td>.21**</td>
<td>.17**</td>
<td>.12**</td>
</tr>
<tr>
<td></td>
<td>(.05)</td>
<td></td>
<td>(.05)</td>
<td>(.06)</td>
<td>(.04)</td>
</tr>
<tr>
<td>Size(^1)</td>
<td>-0.98</td>
<td>-.01</td>
<td>-1.11</td>
<td>-1.04</td>
<td>-.08</td>
</tr>
<tr>
<td></td>
<td>(0.69)</td>
<td>(.80)</td>
<td>(.86)</td>
<td>(.82)</td>
<td>(.19)</td>
</tr>
<tr>
<td>Dependence on the pharmaceutical industry(^1)</td>
<td>-.43</td>
<td>-.57</td>
<td>-.01</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(.95)</td>
<td>(1.08)</td>
<td>(1.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependence * Strategic momentum (Interaction)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>-.06</td>
<td>.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.44)</td>
<td>(.29)</td>
</tr>
<tr>
<td>Dependence * Bandwagon pressure (Interaction)</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>-.06</td>
<td>-.05*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.05)</td>
<td>(.02)</td>
</tr>
<tr>
<td>Year(^1)</td>
<td>.33</td>
<td>.1.16</td>
<td>.71</td>
<td>.77</td>
<td>-.12</td>
</tr>
<tr>
<td></td>
<td>(.49)</td>
<td>(.78)</td>
<td>(.80)</td>
<td>(.74)</td>
<td>(.46)</td>
</tr>
<tr>
<td>Number of observations(^2)</td>
<td>543</td>
<td>455</td>
<td>455</td>
<td>455</td>
<td>455</td>
</tr>
<tr>
<td>Chi-square for covariates</td>
<td>156.9**</td>
<td>133.7**</td>
<td>152.8**</td>
<td>154.7**</td>
<td>76.8**</td>
</tr>
<tr>
<td></td>
<td>(46)</td>
<td>(46)</td>
<td>(47)</td>
<td>(48)</td>
<td>(6)</td>
</tr>
<tr>
<td>Correct classification rate (%)</td>
<td>85.1</td>
<td>83.1</td>
<td>85.3</td>
<td>85.8</td>
<td>76.6</td>
</tr>
</tbody>
</table>

Notes:
1. Variables undergoing a logarithmic transformation for normalizing.
2. The number of observations differs across regressions because of missing values, mainly due to lagging.
3. * significant at 5 percent level; ** Significant at 1 percent level or better.
In the logistic regression analysis, we find that the coefficient for the bandwagon pressure variable is positive and significant in all the regressions where it is included. The result regarding the bandwagon pressure variable is hardly surprising. Many previous studies have found that contagion effects are powerful predictors of firm behavior. Contagion effects may be particularly important in uncertain environments. It is also noteworthy that over the time period covered by the study, the environment of the pharmaceutical firms became significantly more uncertain. Below, we will identify a few sources of this uncertainty. In countries such as Japan, Germany, UK and France where the government was the largest customer of the industry, there were cutbacks in government expenditure. In the United States, Health Maintenance Organizations (HMOs) emerged as a new type of healthcare provider in addition to the traditional fee for service providers. HMOs had a reputation as tough negotiators with all their suppliers, including pharmaceutical firms. Their large purchasing volume also provided them the necessary leverage over the suppliers. While the overall trend regarding increasing buyer power was clear, there was considerable uncertainty regarding the implications for individual firms. A firm with a portfolio of innovative drugs, that essentially were without substitutes, would be less affected than another firm that did not have a similar portfolio. There was also uncertainty regarding whether the pricing squeeze from the buyers was a one-time phenomenon or the beginning of a trend. The period between 1980 and 1989 also witnessed a rapid growth in the related field of biotechnology which was threatening to replace the traditional (trial and error) method of drug discovery and design. The emergence of biotechnology had several implications. It would erode the advantages to large firms in the drug discovery and approval process. In fact, the large pharmaceutical firms would have to acquire new skills in biotechnology through alliances or acquisitions. Roche’s acquisition of Genentech, which was the largest biotechnology company at the time, is an example in this
regard. As with any emerging scientific discipline, the future development of biotechnology itself was fraught with uncertainty. The significant uncertainty within the industry might have been one of the causes behind the industry-wide consolidation mentioned earlier.

The coefficient for the strategic momentum variable is not significant in three out the four regressions. The results were quite robust for alternative lag structures of 2, 4, and 5 years. It is noteworthy that the removal of firm-level dummy variables makes the strategic momentum variable significant. Thus the dummy variables appear to be capturing some of the impact of the strategic momentum variable. Given the nature of our data, it is difficult to disentangle the impacts of the firm-level dummies and the strategic momentum variables. Hence, we need to be circumspect regarding the results for the strategic momentum variable.

With the exception of the interaction variable between bandwagon pressure and dependence on the pharmaceutical industry, none of the other variables included in the regression analysis are significant. Thus size of an organization does not affect the likelihood of undertaking an acquisition. The dependence on the pharmaceutical industry, by itself, does not have an impact on the likelihood of undertaking an acquisition. However, as noted above, its interaction with bandwagon pressure variable exhibits a negative and significant coefficient in one out of the two regressions where it is included, a somewhat perplexing result since we had predicted a positive and significant coefficient for the variable.

Some firm-level dummy variables had significant coefficients. Since the regression models include 42 such dummy variables and the significance of these variables does not add to the discussion of the results in the present context, the coefficients for these variables are not reported in Table 2.
Two of the independent variables in our model, the bandwagon pressure variable and the calendar year variable, were highly correlated with each other. To see if this collinearity had any impact on the results, we tried two alternative procedures. First, we deleted the calendar year variable. All the results regarding the significance of the coefficients remained the same. We also tried standardizing the bandwagon pressure variable to reduce its collinearity with the calendar year variable. The results regarding the significance of coefficients remained the same.

The explanatory power of the models was reasonable with a correct classification rate in excess of 85 percent. The Chi-squared for covariates statistic was also highly significant.

CONCLUDING REMARKS

In this study, we empirically tested the validity of the bandwagons and the strategic momentum theories for explaining mergers by large pharmaceutical firms. We obtained strong results regarding the impact of bandwagon pressure on the likelihood of acquisitions by a firm. The result regarding the bandwagon pressure variable was quite robust for alternative lag structures.

It is noteworthy that we have not made any normative judgements regarding whether joining bandwagons is desirable or not. Joining bandwagons may be a legitimate response in an uncertain environment.\(^{87}\) Sometimes, bandwagons may have a positive impact if the collective pressure forces multiple organizations to overcome inertia and experiment with new but potentially useful strategies.\(^{88}\) If, however, managers join bandwagons purely to avoid a future situation of competitive disadvantage, designing appropriate incentive systems to align the incentives of the managers with the principals (owners of the firm) may be necessary. If bandwagon effects are extremely powerful
for a group of firms, they might inhibit strategic innovation, which also calls for incentive systems that discourage managers from following the often-travelled paths and encourage experimentation.

We did not receive unequivocal empirical support for the strategic momentum theory. Due to data limitations, we found it difficult to disentangle the impact of this variable from other variables.

Limitations

There are several caveats to the results and conclusions of the present study. The study is restricted to the pharmaceutical industry and particularly to the merger behavior of large pharmaceutical firms. The time period covered by the study was also characterized by significant environmental changes such as escalating product development costs and significant pricing pressure among other issues, which might confound the relationship between the independent and dependent variables. While we introduced a broad proxy, calendar year, as a control for environmental trends within the industry, there could certainly be better proxies to control for other potential explanations for mergers. With a broad range of available theories for mergers though, controlling for the alternative explanations becomes an extremely difficult task.(89)

Further research

While this study did not find unequivocal support for the strategic momentum theory, the theory needs to be tested in multiple industry settings. More fine-grained data regarding the type of merger (e.g., hostile versus friendly, single-bidder versus multiple-bidder, domestic versus foreign) would enable us to undertake a more rigorous test of the strategic momentum theory.
It is noteworthy that each of these situations might enable firms to develop different kinds of routines.

The bandwagon theory needs to be tested in a variety of empirical settings. Bandwagon pressures may be particularly high for decisions and situations that exhibit high path dependency -- where today's actions impact competitive position in the future. Further research could test this tentative assertion. Further research could also test whether bandwagons are more likely to roll forward in industries with oligopolistic structures. In these industries, interdependence across firms is recognized more readily.

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