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Exploring Firm Characteristics that Differentiate Leaders from Followers in Industry Merger Waves: a Competitive Dynamics Perspective

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Abstract

Research in strategic management has shown that the timing of firm participation in a merger wave matters, as early movers have been shown to outperform later ones. However, while the consequences of the timing of action within a merger wave have been assessed, the causes that drive these timing effects remain unknown. We draw on the competitive dynamics perspective to investigate firm-level factors that influence the large-scale strategic behavior of leading or following within industry merger waves. We develop hypotheses based on the competitive dynamics argument that the awareness-motivation-capability of firms will influence the timing of competitive action. Consistent with this perspective, we show that a firm's strategic orientation, its structure, and its resource base influence the timing of firm entry in merger waves.

Introduction

Merger waves are periods of intense acquisition activity. Research from economics and finance shows that merger waves are triggered by buoyant stock prices reflected in high market-to-book ratios (Polonchek and Sushka, **1987**). They are also prompted by shocks, such as deregulation, financing innovations (e.g., Mitchell and Mulherin, **1996**), and technological innovations (e.g., Mulherin and Boone, **2000**), which are spurred on by high capital liquidity (e.g., Harford, **2005**). Hence, a substantial body of research has examined macroeconomic and industry-level factors that contribute to the emergence of merger waves. However, research in economics and finance has been largely silent on firm-level drivers of merger wave activity.

In the strategy field, research has begun to examine firm-level issues with merger waves but has focused on the consequences associated with merger wave activity. Drawing on first-mover advantage theory, research shows that the timing of participation in the wave matters, as early movers outperform later ones (Carow, Heron, and Saxton, **2004**; McNamara, Haleblan, and Dykes, **2008**). This work suggests that early movers have superior information to preempt their rivals in identifying the best acquisition targets and acquire firms that offer the greatest potential for synergies before the market accounts for the potential value associated with the merger wave. Yet, while this work points to the *consequences* of firm timing within a wave, no work has been conducted to determine the firm-level *causes* that drive the timing of a firm's action within a wave. Hence, while we know that early movers perform best, we do not know the characteristics that these firms possess that allow them to move earlier than their rivals. Thus, an important question relating to merger waves remains unanswered: 'what are the firm-level characteristics that impact when a firm enters an industry merger wave?'

To help answer this question, we draw on a competitive dynamics perspective. Broadly speaking, competitive dynamics focuses on the *causes* and *consequences* of the action and reaction of firms within industries (Smith, Ferrier, and Ndofor, **2001**). This perspective has shown that firm characteristics explain the timing of firm action as well as the response of rivals to competitive action (Smith *et al.*, **1991**, **2001**). Prior competitive dynamics research has identified three underlying drivers of rival behavior: the awareness of market opportunities and competitors' initiatives, the motivation to act (or respond), and the capability to do so (Smith *et al.*, **2001**). We develop hypotheses on the timing of action within merger waves, and argue that early movers within industry merger waves have characteristics that lead to greater awareness, motivation, and capability (AMC) (Chen, **1996**). In contrast, later movers have firm characteristics associated with lower levels of AMC, and respond to their rivals as 'competitive tension' increases (Chen, Su, and Tsai, **2007**).

Our study makes several contributions. First, we give new insight into the factors that influence the timing of action within merger waves. Prior research has demonstrated that waves are a common phenomenon and that the timing of actions within the wave has important strategic consequences (Stearns and Allan, **1996**; Carow *et al.*, **2004**). We begin to identify relevant firm factors, including strategic, structural, and resource characteristics, that influence whether firms lead or follow during merger waves. Second, we demonstrate the applicability of

the competitive dynamics perspective to explain merger and acquisition behavior. Prior competitive dynamics research has typically included a range of types of actions that include tactical actions, such as price changes, along with more strategic actions, such as the formation of strategic alliances. With our focus on a single type of major strategic action, we assess the ability of the competitive dynamics perspective to explain this type of strategic action. We show that firm characteristics resulting in greater AMC facilitate early action in undertaking acquisitions within waves, while low AMC firms only act after competitive tension builds (Chen *et al.*, **2007**). Third, we contribute to the competitive dynamics literature by examining the broad interdependence of firms across multiple markets. By examining all acquisitions undertaken by publicly traded firms, we demonstrate that the competitive tension that drives action by low AMC firms is not triggered just by actions by the most salient rivals or by a few firms in the market. In line with the core principles of the interdependent nature of competition as originally laid out by Schumpeter (**1934**) and emerging competitive dynamics work that discusses the role of the industry population in generating competitive tension (Hsieh and Chen, **2010**), we find evidence consistent with the argument that later movers are reacting to competitive tension built up by the collective action of a broad set of rivals.

Theory and Hypotheses

Merger waves are periods of intense merger and acquisition activity. The beginning of the wave is characterized by a dramatic increase in the number of executed acquisitions relative to the prior period. This intense period of activity often reaches a plateau, which can continue for a few years. Finally, there is a significant drop in the overall activity as the number of acquisitions returns back to pre-wave levels (e.g., Carow *et al.*, **2004**; McNamara *et al.*, **2008**). The observation that mergers often occur in waves is one of the 'most consistent empirical features of merger activity over the last century' (Andrade, Mitchell, and Stafford, **2001**: 104). Five major merger waves occurred during the last century (Stearns and Allan, **1996**; Martynova and Renneboog, **2008**). These waves were characterized by (1) horizontal mergers (1897–1903) (Banerjee and Eckard, **2001**), (2) vertical mergers (1920s) (Leeth and Borg, **2000**), (3) conglomerate mergers (1960s) (Matsusaka, **1993**), (4) increased specialization (1980s takeovers) (Shleifer and Vishny, **2003**), and (5) equity transactions (1998–2001) (Moeller, Schlingemann, and Stulz, **2005**).

Prior work has assessed the causes of waves, which has isolated several key triggers. Merger waves are associated with elevated stock prices, as periods of high market-to-book ratios are associated with intense merger activity (Polonchek and Sushka, **1987**; Rhodes-Kropf, Robinson, and Viswanathan, **2005**). Industry shocks such as deregulation have also been closely linked to acquisition activity (Andrade *et al.*, **2001**; Mitchell and Mulherin, **1996**). More specifically, whether economic, regulatory, and technological shocks drive industry merger waves depends on whether there is sufficient overall capital liquidity (Harford, **2005**).

Prior work also shows that mergers occur because other mergers have already occurred (Qui and Zhou, **2007**; Stearns and Allan, **1996**), suggesting the interdependent nature of firms within merger waves. Hence, waves are a theoretically important context in which to study the interdependence among firms. This notion of interdependence is consistent with research in competitive dynamics that begins with the conviction that the performance effects of a firm's strategy (action) depend upon the competitive context in which the strategy is carried out. When a firm undertakes an action that may affect a rival's position, competitors will be motivated to respond (Schumpeter, **1942**).¹ Thus, firms are interdependent in that they feel the moves of one another and are prone to interact, and firm performance is understood relative to the strategies and actions of rivals. More specifically, innovative firms in pursuit of superior performance, move early and may enjoy short-lived advantages, while their actions elicit reactions from rival firms (Chen *et al.*, **2002**). Therefore, a firm's decision to make a competitive move—like entering into a merger wave—may be strongly influenced by concerns about rival firms' prior actions. A competitive dynamics perspective may be particularly useful in explaining the nature

of acquisition waves as pioneers and early adopters lead, while later movers perceive the moves of their competitors and react. There are likely a set of pioneers/early adopters that become aware of the same cues, and are first to take advantage of industry opportunities (e.g., regulatory shifts, easier access to capital, etc.). Their behavior is viewed by their rivals, which creates 'competitive tension' that triggers a response in later movers (Chen *et al.*, 2007).

Competitive dynamics research has shown that successful firms possess characteristics and resources that lead to innovative action; while rivals, with their own set of characteristics, then respond to leaders in hopes of eroding this advantage (Chen, 1996). There are three essential drivers that influence strategic action, collectively referred to as AMC (Chen, 1996). The awareness (A) of opportunities is when the firm is cognizant of its competitors, its industry, and its environment, which influences the degree to which a firm perceives emerging opportunities and understands the likely consequences of its action. Motivation (M) refers to the incentives that push a firm toward action as it assesses the perceived gains and losses from possible action choices. Finally, capability (C) encompasses the deployment of resources, and the decision-making processes that allow a firm to take action (Smith *et al.*, 2001).

Using an AMC perspective, we explore whether firm strategic orientation, structure, and resource endowments impact upon the timing of firm action within the wave. We focus on these three firm attributes since the strategy literature identifies the firm's strategic orientation, structure, and resource set as core strategic attributes of the firm (Porter, 1980; Chandler, 1962; and Barney, 1991). We develop arguments that a firm's strategic orientation (A) and structure (M) will incline certain types of firms to focus externally and lead in merger waves. We also postulate that firm resources will influence their capability (C), such that firms with greater resources will be able to enter waves earlier. However, we also posit that firms lower in AMC will have more inertial tendencies (Chen and MacMillan, 1992) and will tend to act only after they encounter significant 'competitive tension' (Chen *et al.*, 2007). We begin by discussing how a core element of a firm's strategic orientation, its level of technology and marketing intensity, influences its timing of action within the acquisition wave. We then discuss the influence of the firm's structure, measured with firm size and diversification level, on positioning within the wave. Finally, we examine the influence of firm resources on action within the wave.

Strategic orientation: technology and marketing intensity

The level of investment firms make in technology and marketing will influence their awareness to act early in waves. A decision maker's awareness is largely driven by the strategic investments of the firm because these investments influence the attentional focus of managers (Ocasio, 1997). Two core strategy attributes that are likely to influence the attention of managers are technology and marketing intensity (Mauri and Michaels, 1998). More specifically, we argue that investments in technology and marketing will amplify managerial awareness since both of these investments will increase the degree to which a firm has an external and forward-looking focus. Both technology and marketing investments influence the degree to which a firm is striving to differentiate itself (Miller, 1986, 1988; Spanos, Zaralis, and Lioukas, 2004). In striving for differentiation, these firms will need to be aware of the competitive actions and positioning of rivals as well as relevant market and technology trends. Thus, they are likely to become aware of triggers for acquisition waves earlier than their more inward-focused, efficiency oriented rivals. Additionally, firms that invest in technology and marketing are likely to strive to stake out leading positions. As Lieberman and Montgomery (1988: 49) argue, pioneering capabilities emerge from 'technological foresight, perceptive market research, or skillful product or process development.' Thus, investments in technology and marketing give insights that foster pioneering behavior. In our setting, this will relate to the firm's awareness of market and technology trends that will trigger acquisition waves. Consistent with this reasoning, prior research has found that firms taking a leadership or pioneer position in markets tended to be those with strong marketing and innovation capabilities (Smith and Grimm, 1987; Berry, 2006).

These investments are also likely to increase the motivation of firms to lead acquisition waves. Firms that act early in acquisition waves are striving to create early mover advantages (McNamara *et al.*, **2008**) and position themselves in a leading position relative to their competitors. Heavy investments in technology and marketing indicate that a firm is striving to differentiate itself from its competitors and take a market leadership position (Lieberman and Montgomery, **1988**; Zahra and Covin, **1993**). Moreover, internally, the culture of these organizations is likely to be one of aggressiveness and risk tolerance (Zahra and Covin, **1993**). Thus, these firms are motivated to take a pioneering position in their markets and also have the willingness to take on the significant risk associated with pioneering.

These arguments are consistent with findings from the literature on new product development and entry. This research has found that firms investing more heavily in marketing activities (Schoenecker and Cooper, 1998) and technological development activities (Schoenecker and Cooper, 1998; Robinson and Chiang, 2002) tend to be market pioneers and early followers. Similarly, we expect to find firms that invest heavily in technology and marketing will tend to be leaders in acquisition waves, which results in our first hypothesis.

Hypothesis 1: The higher the technology and marketing intensity of the firm, the earlier it will act in an acquisition wave.

Structural factors: acquirer size

Firm size may influence the firm's *awareness* of opportunities. Prior work suggests that smaller firm size is linked with exploration (March, **1991**), which leads to actionable initiatives (Rothaermel and Deeds, **2004**). Firms may engage in either exploration of new opportunities or exploitation of existing ones (March, **1991**). Exploration includes search, experimentation, and innovation, while exploitation consists of efficiency, execution, and implementation. Firms more focused on exploitation tend to be more rigid and short-term focused and to engage less in experimentation. As firm size increases, exploration may decrease as firms become less adaptive, and as the routinized behavior of larger firms increases their inertial pressures, which often contributes to the exploitation of existing capabilities instead of the exploration of new opportunities (Levinthal and March, **1993**; March, **1991**). Thus, smaller firm size is associated with exploration and increased awareness, leading to earlier action within an acquisition wave.

Firm size also influences a firm's *motivation* to push for action. Due to complacency and inertia induced by their market power, managers of large firms may feel that they are powerful enough to ignore their weaker rivals (Miller and Chen, **1994**). Consistent with this notion, larger firms have been shown to be risk averse (Hitt, Hoskisson, and Ireland, **1990**). In contrast, small firms have been shown to be more active than larger ones in initiating competitive moves (Chen and Hambrick, **1995**). Moreover, smaller firms are more vulnerable and less insulated from the external environment, which likely motivates them to respond to both threats and opportunities in order to survive (Aldrich and Auster, **1986**). Thus, smaller firms have a greater need than their larger rivals to act aggressively in the market and to challenge the status quo by initiating competitive actions (Chen and Hambrick, **1995**). Finally, competitive dynamics researchers have shown that small firms relative to large ones are more motivated to initiate competitive action—which has been referred to as ‘action propensity’—and do so more quickly, resulting in greater ‘action execution speed’ (Smith *et al.*, **2001**: 327).

In line with this argument that smaller size is associated with greater awareness and motivation, we expect smaller firms to quickly respond to opportunities that present themselves early in merger waves. In contrast, although larger firms are more inertial, their increased size and stature allows them to wait and respond to competitive pressures rather than be the initiators of action (Chen and Hambrick, 1995). Hence, we propose that:

Hypothesis 2: The smaller the firm size, the earlier it will tend to act in an acquisition wave.

Structural factors: acquirer diversification

Firm diversification describes the diversity of business lines and/or product markets, with diversified firms having more complex structures than more focused firms. We posit that more focused firms—which are less complex and less bureaucratic than more diversified firms—will be more likely to move earlier within acquisition waves. More specifically, the level of diversification may influence the firm's *awareness* of opportunities. Diversification level, which is associated with bureaucracy (e.g., Donaldson, **2003**) impacts the broadness of a firm's search activity. Bureaucracy allows for increased reliability and consistency of behavior in organizations, which are accomplished through the creation of standard operating procedures, formalized actions, and rigid rules (Merton, **1957**). However, bureaucracy also fosters routines and rule-oriented behavior that lead to conservatism (Merton, **1968**). Bureaucratic routines appear not only to limit innovation (Adler and Borys, **1996**) but such routines also increase standard operation procedures and repetitive behavior, decrease the extent of a search for alternatives (Haveman, **1993b**), and encourage tunnel vision (Miller and Chen, **1996**). Such firms tend to be insular, slower to see emerging opportunities. Moreover, studies have shown that, as structural complexity—the number of levels and departments—increases so does the probability that the information being transmitted (e.g., from search) will be distorted as bureaucracy limits information-processing capacity (Galbraith, **1977**).

Diversification also influences *motivation*. Diversified firms tend to have a corporate layer, which serves as a buffer between organizational units and external stakeholders (Kraatz and Zajac, 2001). Structural complexity and bureaucracy of highly diversified firms often protect them from competition and promote insularity (March, 1981). Relatedly, managers in business units in diversified firms may not be motivated to aggressively pursue opportunities due to the problem of low power incentives (Williamson, 1996). Managers in large, diversified firms typically own little equity, but have large fixed claims in salary (Jensen and Murphy, 1990). Since their compensation is largely fixed (Bethel and Liebeskind, 1998), and they don't fully benefit from the value generated by their organizational unit, these diversified unit managers have little incentive to act aggressively and take on substantial risk. In addition, more diversified firms may be less motivated to act since a sizable, risky investment in any division may upset the political balance between divisions (Hoskisson, Hitt, and Hill, 1991). Moreover, in diversified firms there occurs a significant bargaining over resources within the corporate layer among business units, which may inhibit the speed to respond to competitive challenge (Liebeskind, 2000). Consistent with these findings, competitive dynamics research has shown that the greater the firm's structural complexity, the less motivated it is to respond to competitive challenges (i.e., response likelihood). In addition, single-business firms tend to make competitive moves in limited domains, which enhances their swiftness and allows for aggressive action (Chen and Hambrick, 1995). Finally, if structurally complex firms do respond, they are inclined to react *after* other responding firms ('response timing') (Smith *et al.*, 1991: 317). Thus, we predict that due to their bureaucratic rigidity, more diversified firms will be characterized by more limited awareness and decreased motivation than more focused firms. As a result, such firms will be slower to enter acquisition waves until significant competitive pressures overwhelm their bureaucratic rigidity. As a result, we expect:

Hypothesis 3: The less diversified the firm, the earlier it will act in an acquisition wave.

Resource foundations: firm slack

Slack resources represent liquid resources that the firm can leverage to fund competitive action. Slack resources, therefore, impact a firm's *capability* to deploy resources and make decisions that allow for action and quick response to environmental opportunities. Slack resources allow a firm to be opportunity focused and to take advantage of emergent opportunities (Cyert and March, **1963**). Firms with more resources have been shown to undertake more actions (Smith *et al.*, **1991**). For example, firms with higher slack have been shown to have a greater ability to carry out more competitive moves (Young, Smith, and Grimm, **1996**) and to be more able to initiate strategic change (Bourgeois, **1981**). Moreover, high levels of slack resources also increase a firm's ability

to initiate and sustain an aggressive pattern of competitive actions (Ferrier, 2001), and such firms are likely to respond faster and more effectively to environmental crises than organizations with limited resources (Meyer, 1982). In contrast, low levels of slack limit the firm's ability to generate needed resources, which constrains aggressiveness (Young *et al.*, 1996).

Slack also permits the firm the capability to experiment with innovation (Cyert and March, 1963). Empirical evidence shows that slack resources may facilitate experimenting with new markets because such resources buffer firms from downside risks, thereby lowering the likelihood of failure (Haveman, 1993a). Hence, slack causes a relaxation of controls and represents funds that may be used even given uncertainty, which allows the firm to act in order to exploit potential opportunities to improve margins and revenues that might be derived from such experimentation (Nohria and Gulati, 1996).

Finally, slack resources give the firm leeway in managing responses to competitive pressure. Firms with high levels of slack resources have the *capability* to mobilize resources necessary to respond quickly to competitive actions by rivals (Fombrun and Ginsberg, 1990; Pettigrew, 1992; Young, *et al.*, 1996). In contrast, low slack firms are likely to wait to imitate the actions of pioneers since following the actions of rivals is generally less costly than to pioneer a new action (Lieberman and Montgomery, 1988). Competitive dynamics research provides evidence that firms with lower slack are less capable to act independently and are more likely to copy rivals' actions than firms with greater slack (Smith *et al.*, 1991). Thus, when later movers with lower levels of slack move in acquisition waves, it is based more on a response to competitive pressures than on an independent willingness to pioneer.

Since higher slack gives a firm greater capability to act quickly in order to seize opportunities within acquisition waves, we hypothesize:

Hypothesis 4: The greater the firm's slack resources, the earlier it will act in the acquisition wave.

Resource foundations: firm performance

High performing firms likely have high levels of *capability* to act. There is uncertainty about the prospects of the wave when it is just starting—as it is not yet a 'legitimate' action. Strong firm performance and the resultant reputational strength benefits firms in several ways (Fombrun and Shanley, 1990). First, it aids in raising capital in the face of decision and environmental uncertainty. Strong performing firms will have an increased capability to act since their performance leads to positive credit ratings, reputation within the investment community, and ultimately easy access to capital and debt markets to raise the resources necessary to finance acquisitions early in waves. The strong reputation of the firm will also give it the confidence to take bold actions such as taking acquisition actions in response to market or regulatory changes before the legitimacy of such an action is established. Finally, reputation will provide the firm latitude with stakeholders to take bold action.

In contrast, firms with very low performance are likely to have reduced capability to take on the risky role of leading an acquisition wave since they will not have access to the resources necessary to finance these risky acquisitions. Resource availability is a critical determinant of a firm's ability to take on substantial risk (Audia and Greve, 2006). Poor performance reduces the availability of capital and debt financing for a firm because it leads to a lower credit rating and an inferior reputation with investors and other stakeholders. Thus, the legitimacy of high performing firms gives them the ability to take the risky action of entering waves early.

Hypothesis 5: The greater a firm's performance, the earlier it will move in an acquisition wave.

Methods

Sample and data

We assessed industry acquisition waves from 1984 through 2004 following methods consistent with prior research on acquisition waves (Carow *et al.*, 2004; Harford, 2005; McNamara *et al.*, 2008). Using Securities Data Corporation (SDC) data, we first calculated the number of completed acquisitions in each four-digit Standard Industrial Classification (SIC) code by year. We excluded financial service industries since they have different asset structures than other industries, and stock market reactions can differ for these industries. We then looked for relatively short periods—maximum six years—of intense acquisition activity. We used two screens to conclude whether or not this heightened period of activity was intense enough to meet the criteria of an acquisition wave. First, the acquisition activity in the peak year of the period had to be at least double both the first and the last year of the period. Second, we wanted to limit the chance that our wave periods were simply random occurrences (Harford, 2005). To check this, we first calculated the total number of acquisitions that occurred during each industry wave. We then simulated 100 distributions of acquisitions over the same length period, randomly assigning each of the acquisitions to one of the years in the wave period. Then we assessed the likelihood that the number of acquisitions in the peak year would have occurred by chance. In line with Harford's (2005) recommendation, each of our peak wave years exceeded the 95th percentile in the simulated distribution set. Thus, we concluded that none of our waves were likely simply random patterns of acquisitions.

We identified 12 acquisition waves in 12 four-digit SIC coded industries. We had complete firm and acquisition data for a total of 2,315 completed acquisitions. The waves we identified spanned a wide range of industry sectors, including manufacturing, logistics, communications, retailing, hospitality, and services. The acquirers also widely vary in size, with total assets ranging from \$ 10M to \$ 263B, and total revenue ranging from \$ 10M to \$ 160B.² The mean total assets and revenues in our sample are \$ 3.0B and 1.6B, respectively.³ The Tobin's q values of acquiring firms in our sample are fairly high, with a mean value of 2.87. This is not surprising since acquisition waves tend to occur during periods of high stock valuations (Rhodes-Kropf and Viswanathan, 2004), and acquiring firms tend to have high Tobin's q values and use their highly valued stock to acquire firms (Jovanovic and Rousseau, 2002). Our dataset includes completed acquisitions in which the acquiring firm was publicly traded and acquired a majority position in the target firm. We identify the industries and their wave periods in Table 1.

Table 1. Description of wave industries

SIC code	Industry description	Wave date range	Total N	First year N	Peak year N	Last year N
3674	Semiconductor	1998–2001	308	40	125	61
4213	Trucking	1996–2000	101	9	36	6
4225	Warehouse and storage	1995–1999	81	3	31	5
4812	Wireless communications	1992–1997	322	29	81	39
4813	Telephone communications	1998–2002	676	89	227	86
4832	Radio broadcasting	1994–1999	550	63	145	71
5411	Grocery stores	1985–1990	103	10	30	14
5511	Motor vehicle dealers	1996–2000	159	9	47	21
6512	Real estate operators	1996–2000	1249	80	544	79
7011	Hotels	1995–1999	721	83	222	73
7374	Computer processing services	1996–2000	217	30	61	26
7375	Information retrieval services	1997–2001	1855	122	699	336

Data on acquisitions, their dates, and the form of payment came from the SDC database. Financial data were obtained from Compustat.

Dependent variable

Timing of action in the wave: To calculate the timing of firm action within an acquisition wave, we calculated the number of days that each acquisition announcement occurred after the first acquisition in the wave. We then divided this by the total number of days in the wave. Thus, the end score ranged from zero to one, with the first acquisition in the wave having the lowest value and the last acquisition in the wave having the highest value. If two or more acquisitions occurred on the same day, they carried the same timing value.

Independent variables

Acquirer technology and marketing intensity: Technology intensity is measured as the research and development (R&D) intensity (R&D/sales) of the firm one year prior to the acquisition announcement. Since the level of R&D intensity greatly varies across industries, we calculated and used an industry-adjusted R&D intensity measure by subtracting the industry average from the firm's R&D intensity, using the firm's four-digit SIC code. Marketing intensity is similarly measured using the industry-adjusted advertising intensity (advertising/sales) of the firm one year prior to the acquisition announcement. These two variables are very highly correlated, ($r = 0.82$). Thus, to avoid colinearity issues, we average the two values to get an overall technology and marketing-intensity variable.

Acquirer size: We measured firm size as the logarithm of total assets of the acquirer one year prior to the merger announcement.⁴

Acquirer diversification: We measured the organizational-level of diversification with the entropy index for the organization (Palepu, **1985**). The level of diversification is measured one year prior to the acquisition announcement.

Acquirer financial slack: Researchers have discussed both unabsorbed and absorbed slack and their influence on firm action (Singh, **1986**). Unabsorbed slack refers to excess, uncommitted, liquid resources in organizations, which impact the firm's ability to carry out actions (Smith *et al.*, **2001**). In contrast, absorbed slack reflects excess resources in the firm's cost structure (Singh, **1986**) and provides a buffer against environmental challenges. Since unabsorbed slack is more closely related to major strategic actions, such as mergers and acquisitions, than absorbed slack, we focus on the role of unabsorbed slack in leading to slack search that will result in taking a leadership position in the wave. Following Haunschild (**1993**), we measured unabsorbed acquirer financial slack in two ways. First, slack was operationalized as the debt-to-equity ratio—a conventional measure inversely related to slack (Bourgeois, **1981**). Second, we assessed the percentage of free cash flow, defined as (operating income—taxes—interest expense—depreciation—preferred dividend—common dividend)/equity. Both variables were measured at the end of the year before the acquisition year.

Acquiring firm prior performance: Prior firm performance was measured with the firm's return on assets (ROA) one year prior to the acquisition.⁵

Control variables

Since this is the first study to examine timing of action in merger waves, we were not able to draw upon prior work to generate control variables. However, we included a number of control variables to account for industry-specific factors as well as firm characteristics that may relate to merger behavior. First, we included industry dummy variables to control systematic differences across the industries explored in the study. Second, we drew upon work by Harford (**2005**) to identify factors that may trigger merger waves. We controlled for these same factors because they may relate not only to the incidence of merger waves but also to activity within merger waves. We used Tobin's q to control for the firm's relative market valuation since firms highly valued by the market may be more likely to use their inflated stock to finance acquisitions. We also included controls for both sales and employee growth since a firm's growth rate may influence its acquisition behavior. We used industry

adjusted values for sales growth since growth rates vary over time and across industry settings. We first calculated the mean value of sales growth for each industry in each year. We then calculated the difference between the firm's sales growth and the industry average sales growth value to measure the industry adjusted value. Following Harford (2005), we also controlled for the firm's asset turnover (sales/assets) and capital intensity (capital expenditures/sales). All of the firm-specific financial variables were measured in the year prior to the focal acquisition. In addition, we controlled for the number of acquisitions a firm undertakes in the wave because the degree to which a firm regularly undertakes acquisitions and is a serial acquirer may also influence its acquisition timing. Finally, we included a dummy variable indicating whether the acquirer and target were in the same four-digit SIC code—industry relatedness—since this may influence the acquirer's awareness of the wave opportunity.

Analysis

We used fixed-effects regression to test our hypotheses with industry fixed effects. This allowed us to control for idiosyncratic industry differences that were not accounted for by our control variables. We also analyzed the data using Tobit analysis because the dependent variable is censored at zero and one. Finally, we conducted an analysis where we only focused on the first acquisition of each firm. We present all three analyses in our results table, but since the three analyses provide consistent results, we focus our interpretation on the fixed-effects regression model results in which we included all observations.

Results

Table 2 presents the descriptive statistics and correlations for the variables in this study.⁶ The correlations between our IVs and positioning in the wave are in line with a number of our hypotheses. Also, the correlations between the independent variables are moderate to low, indicating that multicollinearity is not an issue.

Table 2. Summary statistics and correlation table

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Timing of action in the wave	0.50	0.22													
2. Industry relatedness	0.72	0.45	- 0.06												
3. Tobin's q	2.87	4.15	0.09	- 0.14											
4. Sales growth	0.00	1.01	- 0.00	0.01	0.08										
5. Employee growth	2.93	4.20	- 0.06	0.05	- 0.01	0.02									
6. Capital intensity	0.06	0.34	0.02	- 0.05	0.04	0.12	0.00								
7. Asset turnover	0.61	0.77	- 0.02	- 0.12	0.03	- 0.08	- 0.04	0.11							
8. Number of acquisitions	8.71	8.41	- 0.13	0.23	- 0.15	0.07	- 0.11	- 0.18	- 0.24						
9. Technology and marketing intensity	0.03	0.09	- 0.13	0.08	- 0.18	0.06	- 0.01	0.38	- 0.03	0.11					
10. Firm size	6.31	1.67	0.10	- 0.09	- 0.04	- 0.05	- 0.03	- 0.06	- 0.22	0.10	0.03				
11. Level of diversification	0.13	0.32	0.14	- 0.19	- 0.00	- 0.10	- 0.03	0.07	0.04	- 0.16	- 0.02	0.24			
12. Debt/Equity	0.86	2.69	0.09	0.06	- 0.08	- 0.06	- 0.14	- 0.06	- 0.05	0.07	0.03	0.07	- 0.00		
13. Free cash flow	- 0.06	1.43	- 0.08	0.02	0.01	- 0.02	0.15	- 0.02	0.04	- 0.01	0.01	0.03	0.01	- 0.32	
14. Prior firm performance	0.00	0.13	- 0.10	0.06	- 0.07	- 0.08	- 0.10	- 0.07	0.05	0.11	0.04	0.24	0.05	0.08	0.12

N = 2315, if $r \geq 0.06$ then $p < 0.01$, if $r \geq 0.04$ then $p < 0.05$, if $r \geq 0.03$ then $p < 0.10$.

Table 3 presents the fixed-effects regression results with timing of action in the wave as the dependent variable. We used a fixed-effects model so that we could control for differences in the constructs between the industries included in the study. For simplicity of presentation, we do not report the industry intercepts for any of the models. Looking at our control variables, as expected, there is some evidence that faster growing firms move earlier in the wave. We see a significant negative relationship in our full sample analysis between employee growth and position in the wave ($p < 0.05$). In the analysis focusing on first acquisitions only, there is a negative relationship between sales growth and position in the wave ($p < 0.05$). We also find that more efficient firms, those with faster asset turnover ratios, tend to move earlier in the wave ($p < 0.01$). Also as expected, firms that acquire more frequently tend to move earlier in the wave ($p < 0.01$). However, we were surprised to find that firms with high Tobin's q values tended to move later in the wave ($p < 0.01$). We now turn our attention to our hypothesized relationships.

Table 3. Drivers of the timing of firm action within the wave

Variable	Fixed-effects regression for all acquisitions of each firm		Tobit analysis		Fixed-effects regression for the first acquisition of each firm		Anticipated relationship
	β	se	β	se	β	se	
Control variables							
Industry relatedness	- 0.06	(0.11)	0.07	(0.10)	- 0.27†	(0.18)	
Tobin's q	0.55**	(0.22)	0.49*	(0.21)	0.83*	(0.45)	
Sales growth	0.01	(0.04)	0.31**	(0.04)	- 0.13*	(0.08)	
Employee growth	- 0.08*	(0.04)	- 0.08*	(0.04)	0.07	(0.08)	
Capital intensity	0.39**	(0.16)	0.24†	(0.15)	- 0.16	(0.32)	
Asset turnover	- 0.21**	(0.08)	- 0.04	(0.05)	- 0.19†	(0.12)	
Number of acquisitions in wave	- 0.03**	(0.01)	- 0.02**	(0.01)	- 0.12**	(0.02)	
Strategic orientation of the firm							
Technology and marketing intensity	- 1.86**	(0.36)	- 1.71**	(0.33)	- 3.90**	(0.80)	H1: Higher levels lead to earlier wave position.
Firm structural elements							
Firm size	0.34**	(0.06)	0.30**	(0.06)	0.16†	(0.11)	H2: Larger firms will act later in the wave.
Level of diversification	0.20**	(0.05)	0.22**	(0.04)	0.20**	(0.08)	H3: More diversified firms will act later in wave.
Firm resource endowments							
Debt/Equity (inverse of slack resources)	0.25**	(0.06)	0.27**	(0.06)	0.19*	(0.11)	H4: Higher D/E firms will act later in wave.
Free cash flow	- 0.52*	(0.27)	- 0.46*	(0.26)	- 0.55*	(0.28)	H4: Greater free cash flow leads to earlier action.
Prior firm performance	- 0.37**	(0.07)	- 0.31**	(0.06)	- 0.70**	(0.16)	H5: Higher performing firms act earlier in wave.
R ²	0.11				0.14		
F	542.11**				154.94**		
N	2315		2315		897		

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, one-tailed tests. For simplicity of presentation, we do not report the industry intercepts for any of the models.

Overall, the results show significant support for our hypotheses. First, a firm's strategic orientation appears to have a significant influence on its positioning within the acquisition wave. In line with Hypothesis 1, we find a negative relationship between technology and marketing intensity and temporal action within the wave ($p < 0.01$). This finding suggests that firms that invest heavily in R&D and advertising act earlier in the acquisition wave. Similarly, faster growing firms tend to move earlier in the wave.

We also find strong evidence that the structural elements of the firm influence the timing of its involvement within an acquisition wave. Supporting Hypothesis 2, the positive and significant relationship ($p < 0.01$) between firm size and temporal action in the wave indicates that smaller firms tend to acquire earlier in the acquisition wave than larger firms. In line with Hypothesis 3, the positive and significant finding for the level of diversification ($p < 0.01$) indicates that more diversified firms act later in the acquisition wave. In a supplemental analysis, we found that the effect for level of diversification was only significant for related acquisitions. This is consistent with the idea that high levels of diversification reduce managers' awareness of and willingness to exploit opportunities within their existing markets.

Finally, the results support our contention that the resources of a firm influence its timing within acquisition waves. The results from Table 3 reveal a positive and significant relationship ($p < 0.01$) between a firm's debt/equity ratio and acquisition position within the merger wave, as well as a negative relationship between free cash flow and action timing ($p < 0.01$). This suggests that firms with higher levels of slack resources (those with low debt/equity ratios, and high free cash flow) tend to acquire firms earlier in the acquisition wave. Therefore, Hypothesis 4 was supported. Finally, we find a negative relationship between prior firm performance and action timing ($p < 0.01$), indicating that better performing firms tend to act earlier in the acquisition wave. This finding provides support for Hypothesis 5.⁷

Discussion and Conclusion

We explored firm-level factors associated with the timing of firm entry into merger waves. In contrast to prior strategic management work that has examined *consequences* of a firm's timing of action within a wave (e.g., Carow *et al.*, 2004), we focused on *causes* that influence the timing of firm entry into a merger wave. Drawing on a competitive dynamics framework, we argued that leaders within these waves will have different strategic orientations, structural characteristics, and resource endowments that lead to their early position and that separate them from later movers that respond to leaders (Chen, 1996). Our results provided considerable support for our hypotheses and are consistent with an AMC perspective in which early as compared to late movers in merger waves have greater *awareness* of their environment, increased *motivation* to act, and superior *capability* to take action.

We found that a firm's strategic orientation was related to position in a merger wave. Specifically, we found that early movers had higher R&D and advertising intensity, suggesting that a technology and marketing focus leads to early action. These results are consistent with the notion that a strategic focus on technology and marketing amplifies the degree to which a firm has an external focus, which increases the likelihood that a firm will act early in a merger wave. These results are also consistent with the idea that investments in technology and marketing motivate a firm to strive to differentiate itself from its competitors and take a market leadership position (Zahra and Covin, 1993). Such firms tend to have a risk-tolerant culture that makes it more likely that they will take aggressive action (Zahra and Covin, 1993).

A firm's structure was also shown to influence position within a wave. Specifically, early movers were found to be smaller, which suggests that they are more likely to explore (March, 1991). Smaller firms are also more vulnerable and less insulated from the external environment, and, hence, they may have a greater need than larger rivals to act aggressively in the market and to challenge the status quo by initiating competitive actions

(Chen and Hambrick, **1995**). In addition, such firms appear to be more motivated than large firms to initiate competitive moves (Chen and Hambrick, **1995**). Moreover, early movers were also less diversified. As a result, such firms likely search more for alternatives than more bureaucratic firms do. Based on a more complex structure, diversified firms with a corporate layer are protected from competition, and so would be more likely to move slower than more focused firms. Additionally, in diversified firms there occurs a significant bargaining over resources within the corporate layer among business units, which may inhibit the speed to respond to competitive challenge (Liebeskind, **2000**).

Finally, resources affect when firms enter merger waves. We found that firms with higher slack moved earlier in waves. This finding is consistent with the notion that firms with large pools of liquid resources deploy them in opportunity-focused investments, as it allows firms to take advantage of emergent opportunities (Cyert and March, **1963**). Consistent with our finding, slack has been associated with firms carrying out more competitive moves (Young *et al.*, **1996**), initiating strategic change (Bourgeois, **1981**), and following an aggressive pattern of competitive actions (Ferrier, **2001**). Early movers were also shown to have solid performance, which suggests these firms have a strong capability to act as their performance leads to strong credit ratings, reputation within the investment community, and easier access to capital and debt markets than weaker performers, which allows them to raise the resources necessary to finance acquisitions early in waves. Overall, then, this study provides greater understanding of strategic, structural, and resource determinants of firm actions in industry merger waves, as we elaborate upon firm-level factors that help predict the temporal action within acquisition waves.

We also contend that this study extends the competitive dynamics perspective by specifically relating it to the timing of discrete, large-scale strategic actions. Hence, we have applied competitive dynamics principles more directly to major strategic choices than in prior work. Moreover, although competitors attend and respond to one another's moves (e.g., Schumpeter, **1934**), much of competitive dynamics research has focused on the dyadic nature of interfirm rivalry (e.g., Ferrier, Smith, and Grimm, **1999**; Ferrier, **2001**). Our study refocuses competitive dynamics work back to its original conceptualization, as our view is consistent with the interdependent nature of competition found in the Austrian school (e.g., Schumpeter, **1934**) in which competitors become aware of one another's actions and react accordingly (Hsieh and Chen, **2010**). Emerging competitive dynamics research acknowledges the interdependent nature of the entire population of firms within industries and notes that as the actions from an increasing number of rivals' increase, remaining firms are compelled to take action in response to mounting competitive tension (Hsieh and Chen, **2010**). Thus, our findings, as well as this emerging work, suggest that competitive dynamics is an underutilized framework that can be applied beyond specific dyadic settings to broader industry settings to effectively explore multiple rival actions and firm responses, and we encourage future competitive dynamics work to continue to explore the aggregate impact of the actions of multiple rivals.

The results of this study have obvious practical implications for managers seeking to exploit early mover advantages within acquisitions waves. We know from prior work, that early movers in acquisition waves outperform later movers (McNamara *et al.*, **2008**); hence, firm characteristics and resources that lead to early action within waves potentially have beneficial firm effects. We advise firms with superior AMC characteristics to attempt early movement in waves because they have more of the skills needed to carry out acquisitions early in waves when acquisition performance tends to be strongest. Our findings should encourage smaller, more nimble players with simpler structures that have invested in technological and market awareness to move early, especially when they have access to appropriate funding (i.e., slack). Conversely, we also advise firms without superior AMC characteristics either to develop such skills and motivation or simply to stay out of waves—as firms without strong AMC characteristics tend to act later in waves when performance turns negative. We realize that many of the firm characteristics we examined are difficult to change (e.g., strategy, structure), so even if firms want to increase their AMC, they may only be able to do so in limited ways (e.g., increase external

awareness with greater R&D intensity and advertising intensity, and move with sufficient slack resources). Still, given the high costs of failed acquisitions later in waves, it seems more prudent not to acquire rather than to acquire later in the waves.

Limitations and future directions

We see opportunities to further develop the lines of inquiry in understanding merger waves. While we examined early and late movers in waves, exploring the influences of capabilities and resources that distinguish participation and nonparticipation within merger waves also seems worthwhile. That is, while our results were consistent with the notion that high AMC firms tend to move earlier than low AMC firms in merger waves, our study does not clarify the characteristics of non-movers. Logically, we would assume that non-movers likely have less motivation to enter waves than wave participants; however, we do not know why they are less motivated. For example, as stated earlier, there are financial advantages in not moving late within waves, and if nonparticipants contemplated moving but were aware that remaining opportunities were potentially unfruitful, such an ability to assess a possible acquisition and resist the pressure to move within a wave would be a financially beneficial skill worth exploring both for strategy scholars and practitioners.

We should also note that although this was the first study to predict acquisition timing within a merger wave, we only predicted main effects. Future work would benefit by exploring more nuanced findings that could be provided by exploring interaction effects with our main effects variables. Additionally, although we did include various industry-, firm-, and acquisition-level control variables, it may be that we have not controlled for the broadest possible set of variables that could affect a firm's temporal positioning within the wave. For example, future research could examine whether and how the macroeconomic factors that contribute to the initiation of an acquisition wave moderate the factors that influence the timing of firm participation in the wave. Therefore, we encourage future research to look for additional variables that could influence the timing of firm action within waves.

In addition, we suggest that multiple methods be used to increase the insight into both leader and follower characteristics as well as to provide additional insight into industry merger wave patterns. We used a large, archival sample to examine our research question, which had the advantage of generating broadly generalizable results. However, we encourage the use of more fine-grained research methodologies, such as interviews and survey methodology that may make it possible to develop a more nuanced cognitive assessment of how and when leaders and followers gather (e.g., scanning, experimenting), process (e.g., adaptability and speed), filter, and apply information that helps them decide whether and when to move within merger waves. That is, while we speculate that our firm characteristics drive the awareness, motivation, and capabilities of firms that, in turn, influence firm timing within acquisition waves, using an archival approach, we are unable to directly measure awareness, motivation, or capability to take action. Similarly, we are unable to directly measure the 'competitive tension' firms' face. Hence, we encourage future work to use other approaches to directly examine AMC of firms as well as the perceptions in the firm regarding competitive tension within its markets. Thus, we see ample opportunity for future researchers to extend our understanding of the factors that influence participants in merger waves, the decision processes of leaders and followers within such waves, and post-merger wave activity such as divestitures that are a reaction to merger waves. Such work also has the potential to further develop theory on competitive dynamics.

Finally, our results lend further confidence to the competitive dynamics notion that firm characteristics and resources predict early mover actions and follower responses in the context of merger waves. Importantly, we believe the competitive dynamics predictions set forth in this paper will also apply to other contexts in which firms are interdependent. Since waves are periods of heightened activity that are triggered by the actions of early movers (which are often associated with innovation) and the imitative responses of later movers, we

expect to see this form of interdependence in many forms of strategically relevant actions. For example, we anticipate that waves occur in such contexts as management fads, technology trajectories, new product introductions, and compensation practices, which all appear to be characterized by early mover action, and later mover reaction. Therefore, waves appear to be prevalent but under-researched, and our findings should encourage other strategic management researchers to apply the competitive dynamics framework to other large-scale strategic events that take the form of waves in an attempt to more fully understand the interdependent nature of competition.

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Notes

- 1 Within the competitive-dynamics perspective, 'action' is a specific and detectable competitive move initiated by a firm to improve its relative competitive position, while a 'response' is a clear-cut and discernible counteraction taken by a competing firm with regard to one or more competitors to defend or improve its position (Smith *et al.*, 1991).
- 2 We limited our sample to firms with at least \$ 10M in both total assets and sales. This is consistent with prior research (e.g., McGahan and Porter, 1997) and is logical in this setting since actions by extremely small firms are unlikely to trigger a reaction by larger firms in the market.
- 3 We studied only firms that entered the acquisition wave. Non-acquirers were not studied.
- 4 To insure that our results were not driven by a small set of extremely large firms, we also conducted three additional analyses in which we removed firms that were above size cutoffs of \$ 25B, \$ 10B, and \$ 1B in sales. The results for firm size were consistent in these analyses with the one presented here.
- 5 As a robustness check, we also used an industry adjusted ROA value for prior firm performance. The results from that analysis are consistent with those reported here.
- 6 To ensure that our results were not being driven by outliers, we Winsorized our independent variables using a 99 percent Winsorization value.
- 7 We also conducted a supplemental analysis in which we used slack and performance measures from the year before the beginning of the acquisition wave. The results from that analysis are similar to those reported here and are available from the authors upon request.

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