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The Management of Resources: Temporal Effects of Different Types of Actions on Performance

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This article contributes to the understanding of competitive dynamics and resource management by studying empirically the element of time in the relationship between resource management actions and firm performance. It shows that four types of actions identified on the basis of the literature on competitive dynamics and resource management, namely, actions to structure, bundle, and leverage resources in product and regulatory arenas, differ in the time they take to positively affect firm performance, in the persistence of this positive impact, and in their total impact on performance over time. Better understanding of the temporal dimension of the action–performance relationship is important for theory and practice. On the theory side, time is a dimension of competitive strategy that has long been argued to be important but that is often neglected by researchers. In particular, existing theories in competitive strategy offer very few arguments that can be used to predict the timing of the impact of firm actions on performance. Regarding practice, managers need to know which actions can improve their firm performance in the short, medium, or long term and how sustainable the improvement is likely to be.

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It is through actions that firms disrupt the status quo in markets and engage in an incessant race to outperform each other (Kirzner, 1979; Schumpeter, 1942). The quest of the competitive dynamics stream (e.g., Ferrier, Smith, & Grimm, 1999; Smith, Grimm, & Gannon, 1992) to understand the relationship between a firm's actions and performance is thus highly relevant for managers who are responsible for the firm's financial health. Yet little is known about the precise ways firm actions affect performance over time because all of the competitive dynamics studies have examined the performance outcomes of actions in a given time period (usually the performance impact in the year the actions are taken). Moreover, competitive dynamics research has primarily focused on the performance effect of external market-based actions such as advertising and pricing moves and has largely ignored the performance impact of more internal resource-related actions. This article addresses both gaps by developing and testing theory regarding how different types of firm actions affect performance over time.

To explain how alternative types of resource-related actions affect performance over time, we integrate the competitive dynamics literature (Grimm, Lee, & Smith, 2006) with the literature on resource management (Hitt & Ireland, 2002; Sirmon, Gove, & Hitt, 2008; Sirmon & Hitt, 2003; Sirmon, Hitt, & Ireland, 2007). In line with the competitive dynamics literature, actions are defined as specific and observable moves or behaviors initiated by firms to enhance their performance (Smith, Ferrier, & Ndofor, 2001). This stream of literature has considered (a) firm actions that leverage resources in product markets (e.g., Chen & MacMillan, 1992; Chen & Miller, 1994; Ferrier, Mac Fhionnlaoich, Smith, & Grimm, 2002; Smith et al., 1992; Young, Smith, & Grimm, 1996) and (b) actions leveraging resources in the regulatory arena (e.g., Shaffer, Quasney, & Grimm, 2000). On the basis of the recent literature on resource management (e.g., Morrow, Sirmon, Hitt, & Holcomb, 2007; Sirmon et al., 2007; Sirmon et al., 2008), we identify and study the performance impact over time of two additional types of actions that relate to resources, namely, (c) actions structuring the resource portfolio and (d) actions bundling resources. While the resource-based view (RBV) has long recognized that resources are a main driver of firm performance (Barney, 1991; Peteraf, 1993; Rumelt, 1984; Wernerfelt, 1984), the resource management research stream has recently stressed that beyond acquiring or developing valuable, rare, costly to imitate, and non-substitutable resources, firms must structure, bundle, and leverage these resources to achieve high performance (Sirmon et al., 2007; Sirmon & Hitt, 2003).

We further combine the competitive dynamics and resource management perspectives to develop and test hypotheses regarding the performance dynamics of these four types of resource management actions. More specifically, we study the time the different types of actions taken to produce a positive effect on firm performance, the persistence of this positive effect, and their total impact on performance over time. We posit that the four types of actions will differ along these three dimensions: speed, persistence, and total impact. Gaining insights into the relationship between different types of actions and their performance consequences over time is important both managerially and theoretically.

From a managerial perspective, existing research on competitive dynamics implies that managers need to take actions to increase or maintain their firm's performance in the face of competition (e.g., Derfus, Maggitti, Grimm, & Smith, 2008; Ferrier et al., 1999; Young et al., 1996). It is thus important for managers to understand how firms can actively maneuver through a series of different actions to generate a steady stream of profits over time. Taking actions requires investments that might be better directed if we understood the time frame and persistence of the performance impact of different types of actions. This is especially relevant for firms active in an environment where the next disruptive action by a rival may limit the value of a specific position or bundle of resources (D'Aveni, Dagnino, & Smith, 2010; Grimm et al., 2006).

With regard to theory building, a complete understanding of the causal relationships among resources, actions, and performance necessitates considering how actions affect performance over time (George & Jones, 2000). Researchers have paid little attention to the temporal connection between the management of resources and value creation. For example, the RBV has largely neglected to examine when, where, and how resources may be useful (Miller & Shamsie, 1996; Priem & Butler, 2001). Yet incorporating the time dimension could become a distinctive contribution of the RBV to the strategy field (Priem & Butler, 2001).

Our work contributes to the competitive dynamics and RBV literatures by taking a first step in investigating the temporal effects of different types of resource management actions on performance. We study the performance dynamics associated with the four types of actions taken by U.S. airlines in the period 1997–2004. The U.S. airline industry is an appropriate setting in which to test our hypotheses because it is a mature industry where the major players have access to similar resources. In such a setting, resource management actions are more important to explain differences in firm performance across firms than resources themselves (Holcomb, Holmes, & Connelly, 2009; Sirmon et al., 2008). In the present study, our attention is focused on the performance dynamics of the four types of actions independently. Because our context is a mature industry, firms have in place a body of resources and resource management processes of the four types at the beginning of our observation period, which means that they can and do take actions of any of the four types at a given point in time. As a result, our research does not examine portfolios of actions of different types or the possible sequential relationship among different types of actions.

Theory and Hypotheses

Temporal Dimension of Resource Management Actions

A number of theories of competitive strategy contain arguments that relate to the timing of firm actions to explain interfirm performance differences. For instance, the RBV has widely adopted the idea of time compression diseconomies proposed by Dierickx and Cool (1989), which emphasizes timely investments to develop resources at a lower cost than competitors. Yet while Porter (1991) and many others have called for more dynamic views of strategy, current theories in competitive strategy do not offer easily testable predictions regarding the timing of the performance consequences of firm actions. Furthermore, empirical research

regarding the time dimension of firm actions is scarce and focused on specific aspects of strategy such as R&D expenditures (Mosakowski, 1993) or the issue of organizational change (Pettigrew, Woodman, & Cameron, 2001). Our attempts to build theory must acknowledge this limitation, and hence the following theorizing is a first effort within the competitive strategy field.

The time dimension is present to some extent in the competitive dynamics literature because of its roots in Austrian economics. In the Austrian out-of-equilibrium approach, time is an essential characteristic of firm performance: Competition is seen as a process of discovery that unfolds over time (Kirzner, 1981; Schumpeter, 1934). Firms that perceive opportunities, given the current situation versus what could possibly be done, take action to gain from these unexploited openings (Hayek, 1945; Kirzner, 1979). However, the profits gained through a specific action do not last indefinitely; they dissipate over time as actors who compete to create and appropriate value discover the knowledge needed to respond to the action and eliminate the advantage. Building on these insights from Austrian economics, the competitive dynamics research stream has demonstrated a relationship between a firm's product market actions and the timing of competitive responses (Smith, Grimm, Gannon, & Chen, 1991; Young et al., 1996) and has found that the speed with which actions and responses are implemented is an important determinant of the impact of competitive moves on firm performance (e.g., Chen & Hambrick, 1995; Chen & MacMillan, 1992; Derfus et al., 2008; Ferrier, 2001; Ferrier et al., 1999; Lee, Smith, Grimm, & Schomburg, 2000). Yet despite strong evidence of a link among firm actions, time, and performance, researchers in the competitive dynamics stream have not yet studied the connections between different types of firm actions and their consequences on performance over time.

We adopt the Austrian out-of-equilibrium approach and investigate the temporal impact on performance of different types of actions by focusing on three separate aspects: (a) the speed with which actions translate into a significant positive impact on performance, or *time to positive performance impact*; (b) the *persistence* of this significant positive impact over time; and (c) the *total impact of actions over time*. Different types of actions may or may not have an immediate positive effect on firm performance. In addition, they may differ regarding the duration of their positive impact on firm performance and regarding their total impact on performance over time. In the following sections, we identify a set of four resource management actions important to firm performance and explain why we expect the four types of actions to vary with respect to their performance dynamics.

Different Types of Actions to Manage Resources

Designing actions to manipulate resources is among the most important decisions for managers (Adner & Helfat, 2003; Castanias & Helfat, 1991, 2001; Hansen, Perry, & Reese, 2004; Holcomb et al., 2009; Kor & Mahoney, 2004; Mahoney, 1995; Majumdar, 1998; Sirmon et al., 2007). Resources themselves are not necessarily the key to effective operations as "exactly the same resource when used for different purposes or in different ways and in combination with different types or amounts of other resources provides a different service or set of services" (Penrose, 1959: 25). Hence, the actions that managers take to exploit and

manage resources can make an important difference for firm performance (Ndofor, Sirmon, & He, 2011; Penrose, 1959; Sirmon, Hitt, Ireland, & Gilbert, 2011).

In initiating different resource management actions to create value, managers face the daunting task of anticipating unknown futures, including overcoming organizational inertia and internal disputes to configure the firm's resource portfolio and bundles of services (Amit & Schoemaker, 1993). If we accept that the actions to manage resources efficiently are not self-evident (Barney & Arikan, 2001) and that managers are boundedly rational, then we should expect interfirm heterogeneity in firm actions taken to manage resources as noted by Sirmon et al. (2008) and Morrow et al. (2007). This heterogeneity in resource management actions spurs heterogeneity of products and services in the market and explains why we can observe firms with higher profits even in industries where competing firms have access to very similar resources (Sirmon et al., 2008).

To identify the actions firms take to manage their resources, we draw from and integrate the competitive dynamics research with the emerging body of literature on resource management (e.g., Helfat et al., 2007; Hitt & Ireland, 2002; Holcomb et al., 2009; Kor & Leblebici, 2005; Morrow et al., 2007; Sirmon et al., 2007; Sirmon et al., 2008; Sirmon & Hitt, 2003, 2009). In particular, Sirmon and Hitt (2003) and Sirmon et al. (2007) proposed a resource management process model composed of three complementary types of resource management actions: actions that structure the firm's resource portfolio, actions that bundle resources, and actions that leverage resources to create value for customers and other stakeholders. This model of resource management suggests two types of resource-related actions that executives may take in pursuit of profits in addition to the two types of actions that have been investigated in the competitive dynamics literature.

Structuring actions. Structuring actions include all the actions taken to acquire, divest, and configure the firm's stock of resources (Sirmon et al., 2007). Making appropriate decisions about the acquisition, divestment, and configuration of resources over time is clearly a key dimension of strategy (Moliterno & Wiersema, 2007). Firms must manage their stocks of resources in a cost-effective manner. Moreover, while flows of resources may be adjusted quickly, stocks of resources cannot (Dierickx & Cool, 1989). This implies that in the short run the portfolio of resources a firm controls may establish the upper bound on the opportunities the firm can seize and the value it can create (Makadok, 2003).

Bundling actions. Bundling actions integrate resources so that they become productive (Sirmon et al., 2007; Sirmon et al., 2008). Conceptually, bundling resources can range from small combinations of resources to perform simple tasks to the integration of a complex set of resources from various units in the organization (Sirmon et al., 2007). Combining resources in new ways can enhance firm performance (Schumpeter, 1934). Effectively bundling resources requires managerial experience and firm-specific knowledge (Sirmon & Hitt, 2003).

Leveraging actions in product markets and institutional environments. Leveraging actions are externally oriented and aim to deploy and exploit the resources previously structured and bundled to take advantage of favorable market conditions (Ndofor et al.,

2011; Sirmon et al., 2007). On the basis of the competitive dynamics literature, we identify two arenas in which leveraging actions can occur: product markets and the institutional environment. Leveraging actions in product markets are actions in downstream markets that create additional value for customers (Sirmon et al., 2007) or enable firms to extract more value from their transactions with customers. In product markets, firms deploy resources to compete for customers using actions such as marketing campaigns, product line or service alterations, and changes to the scope of operations (Chen & MacMillan, 1992; Chen & Miller, 1994; Chen, Smith, & Grimm, 1992; Miller & Chen, 1996; Smith et al., 1992). Leveraging actions in product markets have been the key focus of the competitive dynamics stream of research.

Second, actions to leverage resources can also occur in the institutional environment. These actions are also called nonmarket actions (Shaffer, 1995). Specifically, we focus on actions to leverage resources in an attempt to influence regulators. A growing body of research examines the actions that firms may take in the political or regulatory arena to advantage themselves or disadvantage their rivals (e.g., Capron & Chatain, 2008; Shaffer et al., 2000). In general, leveraging actions in the regulatory arena are directed at shaping and changing the rules of the game in product or factor markets and can alter the institutional environments of all stakeholders (i.e., competitors, entrants, substitutes, customers, and suppliers) in a positive or negative direction (Baron, 1997; Shaffer, 1995). In product markets, the goal of regulatory action may be, for instance, to influence policies on competition in an effort to restrict the actions of competitors. A firm might claim that a competitor's pricing initiative is predatory to restrict its rival's aggressive pricing behavior. Firms can also appeal to the regulator to try to restrict competitors' access to scarce resources in factor markets. For example, airlines compete vigorously for landing slots at crowded airports, fighting hard to restrict rivals' landing rights and to extend their own access.

In sum, the resource management and competitive dynamics literature suggests examining the temporal impact of four types of resource management actions: structuring, bundling, leveraging in product markets, and leveraging in institutional environments. We next develop hypotheses comparing the time to positive performance, persistence of positive impact, and total impact over time of these four types of actions.

Timing of Positive Performance Effect

Our first hypothesis concerns differences in the speed with which the four types of resource management actions positively affect firm performance. Formally, we define the time to significant positive impact as the time lag between when the action is decided and when it has demonstrable positive effects on firm performance. We expect the four types of actions to differ with regard to their time to significant positive impact because this time lag depends on how long it takes for actions to be implemented and to translate into increased revenues and/or lower costs. In the competitive dynamics literature, implementation time of rivals' responses is one of the key explanations of the performance consequences of initial actions (Grimm et al., 2006). For example, comparing tactical and strategic actions, Chen et al. (1992) found that responses to strategic actions were slower than responses to tactical actions. They explained

this difference by arguing that responses to strategic actions require complex combinations of resources and skills that are difficult and thus slow to implement.

We propose that leveraging actions in the regulatory arena will be the slowest of the four types of resource management actions in positively influencing firm performance. These leveraging actions are employed in an attempt to change different components of a firm's environment, on both the factor and product market side. For instance, a firm may lobby for regulations that preclude competitors from using a resource or that make it more costly to use (Capron & Chatain, 2008; McWilliams, Van Fleet, & Cory, 2002). The process by which leveraging actions in the regulatory arena can influence revenues and costs is slow and indirect. Indeed, these actions often require that other actors, such as lobbying groups, legislators, regulators, and staff, intervene, leading to processes that are complex and bureaucratic. So organizing these interactions with external stakeholders increases implementation time (Chen et al., 1992). This concept of "regulatory lag" has long been established in the industrial organization and public policy literatures (Kahn, 1988; Walters, 1993). Furthermore, if a change in the rules of the game eventually does take effect, the impact on firm performance is not necessarily direct and often occurs in conjunction with changes in competition and competitive positions.

We predict that structuring actions will significantly and positively affect firm performance in the medium to long term. They will have a quicker positive impact on firm performance than leveraging actions in the regulatory arena because of a shorter implementation time. Structuring actions are likely to be implemented faster, on average, because they either are purely inward focused or involve coordination with only a few actors outside the firm, namely, suppliers of resources, who have an interest in a quick implementation of these actions. In contrast, a regulator does not benefit from reacting quickly to leveraging actions in the regulatory arena and has to give the other actors affected by the actions enough time to react. Structuring actions influence the costs of resources (Barney, 1986; Moliterno & Wiersema, 2007) and affect revenues by determining the opportunities that the firm can seize in product markets (Makadok, 2003). We expect structuring actions to have a relatively quick negative impact on firm performance, while their positive impact is delayed. In the case of resource acquisition and internal development, firms must support the costs to acquire or develop resources before these resources can be deployed. For example, new employees are unlikely to be fully productive on recruitment because they often need on-the-job training. Similarly, resource divestments do not usually improve firm performance quickly as they are often accompanied by short-term incremental costs, such as severance pay or breach of contract penalties. In fact, in the short term, managers may be unable to improve firm performance by restructuring the resource portfolio and may be constrained to rely on the rebundling and redeployment of the resources currently controlled by the firm (Sirmon et al., 2008).

We anticipate bundling actions to be quicker to positively affect firm performance than structuring actions and leveraging actions in the regulatory arena. On average, bundling actions are likely to have a shorter implementation time than the latter two types of actions because they are purely inward focused and do not require a search for third parties to transact with and coordination across the firm's boundaries. With regard to the time it takes for bundling actions to increase revenues or decrease costs, the literatures on resource management (Sirmon et al., 2007; Sirmon & Hitt, 2003) and capabilities (e.g., Helfat & Peteraf, 2003) suggest that

bundling actions will positively affect firm performance in the medium to long term. Actions that change how the services yielded by resources are configured will usually require unlearning existing habits and learning new ways of working, a process that disrupts firm performance, takes time, and often necessitates a trial-and-error learning process (Hannan & Freeman, 1984; March, 1981). "New combinations generally represent an immediate net drain on any system; only after the services they make possible are discovered, accepted as valuable, and routinely replicated does their creative potential begin to be realized and to compensate for the destruction that follows in the wake of this realization" (Moran & Ghoshal, 1999: 393). As a consequence, bundling actions are likely to include a period of transition that is characterized by higher costs while the organization develops the knowledge to work efficiently with the new bundle of services. On this basis, while we expect bundling actions to be quicker in positively affecting firm performance than structuring and leveraging actions in the regulatory arena, we expect a positive impact not in the short term but in the medium term.

Finally, leveraging actions in product markets will positively influence firm performance in the short term because, compared with the other three types of actions, their implementation time is short and their impact on the firm's revenues quick. Leveraging actions in product markets have, on average, a short implementation time for two reasons. First, firms are likely to develop standard procedures or routines to implement these actions, as they are often the most frequent type of action (Miller & Chen, 1994). Second, the implementation of leveraging actions in product markets requires less coordination across departments or across the firm's boundaries than the implementation of the other three types of actions. Leveraging actions in product markets aim to generate revenues by utilizing the firm's bundle of resources to create more value for customers (e.g., through service improvements), to attract more customers (e.g., through advertising campaigns and price cuts), or to appropriate more value from customers (e.g., through price increases). Leveraging actions in product markets should quickly increase revenues (relative to the other three types of resource management actions). Indeed, such actions signal customers about product or service quality or other desirable features, which directly affect customer perception of the firm's products or services (Smith et al., 1992).

The above arguments relative to implementation time and the time it takes for actions to increase revenues and/or decrease costs lead to the following expectations regarding the time to significant positive impact of the four types of resource management actions:

> *Hypothesis 1:* The time to significant positive impact on firm performance varies according to the type of resource management actions. Leveraging actions in product markets show the most immediate effect, followed by bundling actions, then structuring actions, with leveraging actions in the regulatory arena having the longest time to significant positive impact.

Persistence of Positive Performance Effect

We define the persistence of positive performance effect as the time interval between the point in time when significant positive impact on firm performance begins (i.e., the time to significant positive impact) and the time at which the significant positive impact ends. In

other words, persistence refers to the length of time the positive performance impact is maintained.

According to the Austrian view of competition (Kirzner, 1979; Schumpeter, 1934, 1942), the purpose of firm actions is to create a series of small, temporary advantages that keep other actors in the firm's environment, such as suppliers, labor unions, customers, and competitors, off balance and force them to respond. The time it takes for other market participants to respond to the initial action is important as it represents the period during which the focal firm reaps the economic benefits of the action (Chen & MacMillan, 1992): Once the other market participants have acquired a better understanding of the action taken by the focal firm and respond to this action, the initial advantage provided by the action erodes (Hayek, 1945).

It is well established in the competitive dynamics literature that time and likelihood of response depend on the characteristics of the firm action (Marcel, Barr, & Duhaime, 2010). For example, in a field study of high-technology electronic manufacturing firms, Smith, Grimm, Chen, and Gannon (1989) found that response time is influenced by both the perceived threat and radicality of the initial action. Utilizing a sample of actions and responses by U.S. airlines, Smith et al. (1991) showed that the action type, which they dichotomized as strategic versus tactical, affects response time. In relation to resource management actions, the RBV and competitive dynamics literatures allow us to identify several action characteristics that relate to how easy it is for other market participants to observe, interpret, and understand the information contained in these actions and, thus, to respond to them (Smith et al., 1991). These characteristics are visibility, causal ambiguity, complexity, and action frequency. As the four types of actions vary with regard to these characteristics, we can expect them to differ in terms of the time it takes for their positive impact on performance to dissipate.

Research shows that managers are more likely to notice and respond to actions that are inherently public or visible than to actions that are more subtle (Chen & Miller, 1994; MacMillan, McCaffrey, & van Wijk, 1985). For example, Chen and Miller (1994) found that the visibility of an action positively relates to the likelihood of response. Structuring and bundling actions are less visible than leveraging actions because the former types of actions are more internally focused while the latter are externally oriented toward product markets or the regulators. Leveraging actions in product markets are aimed externally, at specific customer segments. They are thus visible to the customers belonging to the targeted segments and are likely to be captured by the intelligence apparatus of competitors active in these market segments. Similarly, leveraging actions in the regulatory arena are visible to many actors in the firm environment as the regulator usually publicizes largely these actions and involves the stakeholders who might be affected by the regulator's decision taken in response to the firm action (e.g., representatives of competitors, customers, and communities). On average, bundling actions are likely to be less visible than structuring actions because bundling actions occur purely within the firm while the acquisition or divestment of resources involves outside parties.

The degree of causal ambiguity, that is, the level of uncertainty regarding the impact of actions on performance, also influences the speed of responses as it determines how quickly other actors in the environment may comprehend the connection of particular action to performance (Reed & Defillippi, 1990). We contend that the degree of difficulty in assessing the impact of actions on performance will vary with the type of action. It is relatively uncomplicated for actors in the firm's environment to observe leveraging actions in product

markets and understand the link between these actions and changes in firm performance. Indeed, as we have noted, leveraging actions in product markets may quickly increase revenues. In consequence, the performance consequences of, for example, a price cut are clearer than the consequences of the acquisition of a new resource or of a new way of combining resources. The relatively low causal ambiguity surrounding leveraging actions in product markets prompts competitors, suppliers, customers, labor unions, and other stakeholders to respond to these actions in ways that limit the persistence of the performance benefits of these actions.

By contrast, structuring and bundling actions are likely to be accompanied by greater causal ambiguity. Because what the firm does with its resources often matters as much for value creation as the resources themselves (Penrose, 1959), employees, suppliers, competitors, and others cannot easily ascertain the link among the acquisition, internal development, or divestment of resources and firm performance. Similarly, RBV researchers have long claimed that bundling actions, which take place entirely within organizations, can be sources of causal ambiguity for competitors (e.g., King & Zeithaml, 2001; Reed & Defillippi, 1990), a claim also supported by the resource management literature (Sirmon et al., 2007). The presence of causal ambiguity will decrease the ability and motivation of other actors to respond, thereby potentially slowing down the erosion of, or enhancing the persistence of, the benefits the firm has gained through structuring and bundling actions.

Leveraging actions in the regulatory arena are likely to be less causally ambiguous than structuring and bundling actions but more so than leveraging actions in product markets. Compared to structuring and bundling actions, leveraging actions in the regulatory arena can be observed more easily by other market participants. For instance, the possibility of a regulatory change prompted by a firm action is usually well publicized, and stakeholders have access to information and can take part in proceedings well before the regulator makes a decision. On the other hand, compared to leveraging actions in product markets, the link between leveraging actions in the regulatory arena and firm performance is likely to be more difficult to establish for the other actors in the firm's environment as the latter type of action relates less directly to value creation for customers and takes a longer time to positively affect firm performance.

Besides causal ambiguity, the speed of responses by other actors in the firm's environment also depends on the complexity of resource management actions. The more complex the action, the more difficult it is for rivals to identify its components and to understand their interactions, making response difficult, slow, and risky (Chen, 1996; Chen & Miller, 1994; Chen, Venkatraman, Black, & MacMillan, 2002). Ferrier et al. (1999) found that the level of complexity of the actions used by challengers delayed the response of industry leaders and increased the chances that they would be dethroned. We contend that leveraging actions in product markets and structuring actions are, relatively speaking, less complex. Leveraging actions in product markets such as advertising campaigns are processes that are more or less common or standard across firms. Structuring actions have a low level of complexity because they deal with acquisition or release of individual resources. In contrast, bundling actions are likely to be more difficult for other actors in the environment to interpret as they are often socially complex, that is, they imply the integration of services yielded by multiple resources within the firm and, as such, usually require coordination and cooperation among

multiple individuals and units (Penrose, 1959; Sirmon & Hitt, 2003). Similarly, other market participants will react more slowly to leveraging actions in the regulatory arena than to structuring and leveraging actions in product markets because leveraging actions in the regulatory arena require complex coordination with multiple actors outside the firm to be successful (Chen & Miller, 1994).

Finally, devising responses is easier for frequent than for rare actions because frequent occurrence enables managers to accumulate experience with the type of action and learn through trial and error (Smith et al., 1991; Zollo & Winter, 2002). On the basis of past experience, market participants are likely to develop standard procedures or routines to respond to frequent actions (Chen et al., 2002). The existing literature on firm actions (e.g., Miller & Chen, 1994) suggests and our data collection confirms that leveraging actions in product markets are the most frequent type of action; thus we expect competitors, suppliers, customers, labor unions, and other stakeholders to be more familiar with them and so to be more experienced in devising responses to these leveraging actions than to other types of resource management actions. In our sample, structuring and bundling actions are equally frequent, and the leveraging actions in the regulatory arena are the least frequent of the four types.

In light of these arguments concerning visibility, causal ambiguity, complexity, and frequency, we expect the performance benefits of leveraging actions in product markets to be of the shortest duration as these actions are characterized by high visibility, low causal ambiguity, low complexity, and high frequency. We predict bundling actions to have the highest persistence as they are less visible, less complex, highly causally ambiguous, and less frequent. Finally, we expect the positive impact of structuring actions to erode faster than that of leveraging actions in the regulatory arena because the former are less complex than the latter and other actors in the firm environment are more familiar with the former type of action. The following proposition summarizes these arguments:

Hypothesis 2: The persistence of significant positive impact on firm performance varies according to the type of resource management actions. Leveraging actions in product markets have the least enduring effect, followed by structuring actions, then leveraging actions in the regulatory arena, with bundling actions having the most enduring effect.

Total Impact of Actions on Performance

We investigate a third dimension of the temporal impact of actions on performance: the total impact over time. To fully understand the relation between actions and firm performance, it is important to examine not only the time to and duration of positive impact but also the total impact across time periods because a large positive impact at time $t + 2$ can be offset by an even larger loss at time $t + 3$, or vice versa, which suggests that exploring the total impact of actions over time can enrich our understanding of the temporal performance consequences of actions.

The total impact of actions over time depends, first, on the persistence of positive impact for each type of action and, second, on how much value the firm generates with the actions in terms of lower costs and/or higher revenues from customers. In first approximation, the

total impact of actions over time can be obtained by multiplying the number of lags with a significant positive impact and the effect on revenues and/or costs for these lags. We have already discussed the persistence of positive impact for each type of action in relation to Hypothesis 2. We now turn to the other determinant of total impact. The effect of actions on costs and/or revenues is directly related to the scope of the actions, which has been defined as the number of customers or markets affected by the actions (Chen et al., 1992).

Leveraging actions in the product market usually provide only a relatively small performance impact because they concern only a fraction of the firm's customers (Sirmon & Hitt, 2009). For instance, price changes or advertising campaigns are typically targeted at some specific customer segments. In contrast, leveraging actions in the regulatory arena have a very broad scope: They change the rules of the game for a group of competitors or a whole industry rather than influencing to a limited extent the position of the focal firm within the existing rules of the game, as leveraging actions in product markets do. Hence, we expect a larger effect on revenues or costs from leveraging actions in the regulatory arena than in product markets.

In terms of scope, structuring and bundling actions fall somewhere in between leveraging actions in product markets and leveraging actions in the regulatory arena. Structuring and bundling actions usually affect primarily the focal firm rather than specific customer segments of the focal firm (as leveraging actions in product markets do) or a group of competitors or the whole industry (as leveraging actions in the regulatory arena do). In general, bundling actions have a broader scope than structuring ones because they relate to a bundle of resources, while structuring actions concern individual resources (Sirmon et al., 2007).

In light of these arguments concerning the scope of actions in combination with the effect of visibility, causal ambiguity, complexity, and frequency on the speed of the responses of other market participants as theorized in Hypothesis 2, we expect that leveraging actions in product markets will have the lowest total impact on performance as they are characterized by a narrow scope, high visibility, low causal ambiguity, low complexity, and high frequency. We predict bundling actions to have the largest total impact as they score low on visibility, high on causal ambiguity, and medium on complexity, frequency, and scope. Finally, we would expect the total impact of leveraging actions in the regulatory arena to be larger than that of structuring actions because the former are more complex, are less frequent, and have a larger scope than the latter. These arguments are summarized in the following hypothesis:

Hypothesis 3: The total impact on firm performance varies according to the type of resource management actions. Leveraging actions in product markets have the smallest total performance impact, followed by structuring actions, then leveraging actions in the regulatory arena, with bundling actions having the largest impact.

Method

Empirical Context and Sample

We examine our three hypotheses using data on the 9 largest U.S. airlines from 1997 to 2004. The U.S. airline industry provides a particularly good setting in which to investigate our research questions because of its competitive nature since deregulation. Furthermore, as almost all airlines are single- or dominant-business firms, the potential influence of a

corporate-business-level relationship on the four types of actions is low (Chen & MacMillan, 1992), which is important because our theoretical framework focuses on resource management actions at the business level. Finally, the U.S. airline industry is a mature industry in which the major players, the firms in our sample, have access to very similar resources. Sirmon et al.'s (2008) results suggest that such a setting is particularly well suited to investigate the impact of resource management actions on firm performance: When competing firms have similar resource endowments, as is often the case in more mature industries, resource management is more important than resources themselves in explaining firm performance.

Focusing on the passenger business of the U.S. domestic airline industry, we gathered quarterly data on resource management actions from the first quarter of 1997 to the first quarter of 2004 and on performance from the third quarter of 1999 to the second quarter of 2004. The time periods differ for the independent and dependent variables because of the time lags included in the model. We collected these data for the 10 U.S. airlines having more than a 1% domestic market share in the period 1997–2004, but we dropped Trans World Airlines from our sample because it was acquired by American Airlines in April 2001. There is reliable and comprehensive public information available on large U.S. airlines (Evans & Kessides, 1994; Smith et al., 1991), while data on actions are very limited for smaller regional and commuter airlines (Chen & Hambrick, 1995). The sample encompasses more than 85% of the total U.S. scheduled-service passenger revenues for each year in the period 1997–2004.

Data and Measures

Firm performance. Operating profit is used to measure firm financial performance. In contrast to net profit and return on assets, operating profit is a measure of airlines' profitability that is not sensitive to accounting and depreciation policies and nonrecurring incomes and expenses linked to assets (Antoniou, 1992; Chen & Miller, 1994; Miller & Chen, 1996). There are two reasons for choosing a measure of performance not directly linked to assets. First, we want to assess the impact of structuring actions, which include the acquisitions and sales of assets, on performance. Second, thanks to the sale of assets, some airlines posted positive net profit for some quarters in 2002 and 2003 while their operating profit was negative. Quarterly financial data on operating profit were obtained from the Department of Transportation (DOT) Air Carrier Financial Reports (Form 41 Financial Data/Schedule P-12). These data were adjusted for inflation.

Types of actions. Data on airlines' resource management actions were collected from *Aviation Daily*, published five days a week since 1939 and known throughout the industry as a reliable and comprehensive source of information (Chen & MacMillan, 1992; Chen & Miller, 1994) and a trusted resource for airlines (Chen & Hambrick, 1995). We identified actions by searching with LexisNexis for airline names in headlines, lead paragraphs, and terms and examining the 24,822 articles found by the search; the articles were 215 words on average. We coded all the actions related to the U.S. domestic markets; of these, 3,456 were classified into one of the four types of resource management actions described above. Similar data collection techniques have been used in several studies of competitive dynamics (e.g., Ferrier, 2001; Smith et al., 1991). Table 1 gives the total number of actions by type as well as examples of the resource management actions categorized into the four types.

Table 1
Number of Actions by Type

	Number	Actions in This Category
Structuring actions	802	Change to labor contract agreements (wage increase, wage cut, change in scope rules)
		Increase or decrease in the number of workers
		Cutting costs related to human resources
		Increase or decrease in the number of planes
		Expansion or divestment of infrastructure (e.g., building a lounge for first-class passengers, terminal, or hangar; acquiring self-service check-in kiosks)
		Development of website (e.g., adding online check-in feature)
		Feeder agreement
Bundling actions	809	Incentives to increase employees' motivation and productivity
		Change to operations (e.g., improving on-time performance by changing the sequence of flights; cutting aircraft turnaround times by implementing new group boarding procedures; increasing the number of daily flight banks to increase productivity)
		Change to the organizational structure (e.g., formation of a new e-Delta business unit that aims to "accelerate" the airline's business-to-consumer, business-to-business, and business-to-employee initiatives; turning the frequent flyer program into a business unit with its own profit-and-loss statement)
		Change in management and nomination of executive
		Change in strategy (e.g., setting new priorities; launching a low-cost subsidiary; changing the corporate culture)
Leveraging actions in product markets	1,522	Entering or exiting a new route
		Increasing or decreasing the capacity on a route (by changing the number of flights or the type of plane)
		Increasing or decreasing prices
		Increasing or decreasing the quality of the service provided to passengers (e.g., providing better meals; offering wireless Internet access in airport lounges)
		Promotion (e.g., launching an advertising campaign)
		Change in the use of distribution channels (e.g., cutting travel agent commissions; partnering with Internet ticket sellers)
Leveraging actions in regulatory arena	323	Lobbying regulatory authorities in favor or against more competition in product markets (e.g., opposing further regulation to force competition; lobbying against another airline's anticompetitive behavior by backing the adoption of relevant DOT guidelines)
		Lobbying regulatory authorities to increase or protect the airline's own resources (e.g., lobbying for slot exemption) or to deprive some competitors from resources (e.g., opposing a petition by a competitor for landing slots or slot exemptions)
		Lobbying regulatory authorities for changes that would benefit all airlines (e.g., opposing new taxes proposed by Congress; pressing for legislative changes to the system of airline labor negotiations)
Total	3,456	

We assessed the intercoder reliability of our classification of resource management actions in four types by asking a senior researcher in competitive strategy who was not involved with our project to recode a random and representative sample of 10% of the actions that were identified from *Aviation Daily*. The reliability of our classification process was tested using Perreault and Leigh's (1989) index of reliability; this yielded an index value of .967, indicating a high degree of reliability (Rust & Cooil, 1994).

The independent variables used to test our hypotheses are counts of the number of actions of each type (structuring, bundling, leveraging in product markets, and leveraging in regulatory arena) taken by a specific airline in a given quarter. These counts were standardized across all airlines and quarters for each type of action to be able to compare the total impacts of the four types of actions.

Control variables. Previous research argued that the relationship between firm actions and performance may be contingent on several external and internal factors (Ferrier et al., 1999; Ferrier et al., 2002; Ferrier & Lyon, 2004; Miller & Chen, 1996). Therefore, we included the following control variables in the analysis: industry growth, industry concentration, firm performance relative to firm's aspiration, and firm size.

We introduce industry growth and industry concentration in our analysis to control for the direct effect of these variables on firm performance that is well established by past research. As our data set is a panel that spans 20 time periods, industry growth and concentration vary despite the fact that we study a single industry. Industry growth is operationalized by the percentage change in the sum of the revenues of the airlines in our sample from that of the previous quarter. Airlines' quarterly revenues were obtained from the DOT Air Carrier Financial Reports (Form 41 Financial Data/Schedule P-12) and adjusted for inflation. Concentration is measured using a Herfindahl index calculated on the basis of the market shares of the airlines in our sample (which account for more than 85% of the market in the period 1997–2004), a common measure of industry concentration in the industrial organization literature (Scherer & Ross, 1990).

With regard to internal factors, we control for firm performance relative to historic aspiration level because researchers have repeatedly shown that past performance determines in part current firm behavior (e.g., Audia, Locke, & Smith, 2000; Greve, 2003; Lant, 1992; Miller & Chen, 1994). In particular, past research has established that firm actions at time t may be triggered by discrepancies between firm performance in $t - 1$ and the firm's historic aspiration level during that period (Moliterno & Wiersema, 2007). Following Moliterno and Wiersema (2007), firm i's performance relative to its historic aspiration level is calculated by subtracting firm i's historic aspiration level from achieved performance during period t, and firm i's historic aspiration level at time t is computed according to Levinthal and March's (1981) specification,

$$A_{it} = \alpha P_{i,\,t-1} + (1 - \alpha) A_{i,\,t-1},$$

where A_{it} is firm i's aspiration level at time t, P_i is firm i's performance, and α is a weighing coefficient indicating the degree to which aspiration in period t is updated in response to performance in $t - 1$. We modeled firm performance relative to historic aspiration level at

.25 increments of α (Moliterno & Wiersema, 2007). We used operating revenue as the measure of firm performance that influences airlines' behavior because regressing resource management actions on various airlines' performance measures indicated that operating revenue is the most strongly related to airlines' behavior. The best fitting models are obtained with an alpha level of .50. Accordingly, all the reported models have firm performance relative to historic aspiration level measured with an alpha of .50. Results are robust across levels of alpha.

Finally, following prior research, we control for the size of firms, which may influence competitive behavior (Chen & Hambrick, 1995) and flexibility (Young et al., 1996). Firm size is operationalized using the total number of domestic passengers. An airline's quarterly number of domestic passengers was computed by tallying the number of passengers per month per domestic route served by the airline as reported in DOT Air Carrier Statistics (Form 41 Traffic T-100 Domestic Market).

Model

Because our theory suggests that the impact of the four types of actions on performance is not limited to a single period of time but varies with time, we employed a distributed time lag model (Judge, Griffiths, Hill, Lutkepohl, & Lee, 1988). Using alternative lag time periods as covariates in our model allows us to evaluate the effects of changes in independent variables on the dependent variable over multiple periods of time (Ahuja, 2000; Geroski, Machin, & Van Reenen, 1993; Patterson, 2000). More specifically, our distributed time lag model includes the four types of resource management actions lagged by 1 to 10 quarters. Thus, in our model, Delta Air Lines's operating profit in the third quarter of 2003 is potentially influenced by the standardized numbers of the actions taken by Delta Air Lines in the second quarter of 2003, the first quarter of 2003, the fourth quarter of 2002, . . . the first quarter of 2001. Given how turbulent the airline industry was in the period 1997–2004, we think that 10 quarters can be termed "longer term." We check the sensitivity of the results to shorter and longer lag periods: Results are robust to changes in the number of lags included in the model.

To test Hypothesis 1, we look at the first quarter with a significant positive performance impact for each type of action. To test Hypothesis 2, we examine the number of quarters the significant performance impact is sustained. To test Hypothesis 3, we compute the total impact of different types of actions across time and compare them. Following Gujarati (1988) and Ahuja (2000), we sum the 10 regression coefficients associated with our distributed time lag model for each type of action. The sum for the 10 lags may be statistically significant, while the effect for each lag may be small and not significant, or a few lags may show a significant impact on performance, while the total impact over 10 lags is not significant (Ahuja, 2000; Ahuja & Katila, 2001). The sums of coefficients for the four action types can then be used to test for differences in the total impacts of different types of actions. For instance, to test whether leveraging actions in product markets have a smaller total impact than structuring actions, we compute the following Wald statistic and check whether it is statistically different from zero (Ahuja, 2000),

$$W = \left(\sum_{i=t-10}^{t-10} b_{i,s} - \sum_{i=t-1}^{t-10} b_{i,pm}\right) \Big/ variance\left(\sum_{i=t-10}^{t-10} b_{i,s} - \sum_{i=t-1}^{t-10} b_{i,pm}\right)$$

where *s* refers to structuring actions, *pm* refers to leveraging actions in product markets, and $W \sim \chi^2$ with 1 degree of freedom.

Our data set is a balanced panel: The data structure is pooled cross section and time series. We opt for fixed-effects models because Hausman specification tests indicate that random-effects models are not adequate to model our data (Greene, 1991). Fixed-effects models estimate only within-firm variation over time, assuming that the effects of the independent variables are the same across all firms, while allowing for variation in intercepts because of firm heterogeneity (Basdeo, Smith, Grimm, Rindova, & Derfus, 2006). With the variation in intercepts, fixed-effects models enable us to control to some extent for idiosyncratic effects associated with each airline as airlines' performance and resource management actions might be correlated with some unobserved firm-specific attributes such as resource endowments. We also introduce dummy variables for years and quarters to account for the sensibility of airlines' business to economic cycles and seasons. Our models can be written as follows,

$$\begin{aligned}\text{operating profit}_{it} = {} & \alpha + \beta_1 x_{i,t-1} + \beta_2 x_{i,t-2} + \ldots + \beta_{10} x_{i,t-10} + \gamma\ \text{ind\_concentration}_{t-1} + \delta\ \text{ind\_growth}_{t-1} + \zeta \\ & \text{size}_{i,t-1} + \text{performance\_relative\_to\_aspiration}_{i,t-1} + \eta\ \text{quarter} + \theta\ \text{year} + \upsilon_i + \varepsilon_{it}\end{aligned}$$

where *i* refers to airlines and *t* stands for time, $x_{i,t-1}$ is a vector of the standardized numbers of actions of the four types taken by airline *i* in quarter $t - 1$, industry $\text{concentration}_{t-1}$, industry growth_{t-1}, $\text{size}_{i,t-1}$, and firm performance relative to historic aspiration $\text{level}_{i,t-1}$ are the control variables lagged by 1 quarter with respect to *t*, year and quarter are time dummies, υ_i is the firm-specific residual, and ε_{it} is a residual that is independent and identically distributed with zero mean and variance σ^2.

Because of autocorrelation of the residuals ε_{it} in our models, we further select Prais–Winsten regression models (prais in Stata) with a Cochrane–Orcutt transformation to estimate rho, the correlation between error terms, and variance estimates robust to heteroscedasticity. These models use the generalized least squares method to estimate the parameters in linear regressions in which the errors are serially correlated. This procedure reduces the sample size by 9 observations because of the data transformation for each airline, which implies that this procedure in addition to introducing 10 lags leaves us with a sample size of 172 airline-quarter observations. After estimating the coefficients with our fixed-firm and time-effects model, correcting for the autocorrelation in residuals, the Durbin–Watson statistics indicated no presence of further serial correlation (the Durbin–Watson statistics are reported at the bottom of Table 3 below).

Table 2 provides descriptive statistics and Pearson correlation coefficients for the variables. Correlations among independent variables are low to moderate, and the variance inflation factors for the lags of resource management actions are all inferior to 3.7, values below the commonly accepted cutoff of 10. We also experimented with subsets of the independent variables to check the robustness of the results (Soh, Mahmood, & Mitchell, 2004). Overall results are robust to adding the independent variables incrementally.

Table 2
Descriptive Statistics and Correlations

Variable	*M*	*SD*	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
1. Operating profit[a]	−73684	267217	−1261512	548002																																												
2. Structuring $t-1$	0.04	0.42	−0.45	2.06	**−.30**																																											
3. Structuring $t-2$	0.04	0.42	−0.45	2.06	**−.27**	**.47**																																									
4. Structuring $t-3$	0.04	0.42	−0.45	2.06	**−.21**	**.29**	**.47**																																								
5. Structuring $t-4$	0.02	0.42	−0.45	2.06	**−.25**	**.24**	**.30**	**.49**																																							
6. Structuring $t-5$	0.01	0.41	−0.45	2.06	**−.17**	**.23**	**.25**	**.32**	**.47**																																						
7. Structuring $t-6$	−0.01	0.39	−0.45	2.06	−.08	**.16**	**.25**	**.28**	**.28**	**.42**																																					
8. Structuring $t-7$	−0.04	0.33	−0.45	2.06	−.09	.09	**.19**	**.31**	**.24**	**.20**	**.35**																																				
9. Structuring $t-8$	−0.07	0.29	−0.45	1.18	.02	.11	**.15**	**.25**	**.34**	**.23**	**.16**	**.20**																																			
10. Structuring $t-9$	−0.06	0.30	−0.45	1.18	−.03	.04	.11	.14	**.22**	**.33**	**.20**	**.16**	**.22**																																		
11. Structuring $t-10$	−0.07	0.29	−0.45	1.18	−.01	.05	.06	.10	.10	**.18**	**.31**	.13	**.19**	**.21**																																	
12. Bundling $t-1$	0.01	0.40	−0.41	1.94	**−.25**	**.44**	**.32**	**.25**	**.33**	**.34**	**.27**	**.30**	**.19**	**.17**	.14																																
13. Bundling $t-2$	0.00	0.39	−0.41	1.94	**−.18**	**.51**	**.46**	**.33**	**.24**	**.33**	**.32**	**.19**	**.25**	**.19**	**.17**	**.53**																																
14. Bundling $t-3$	0.00	0.39	−0.41	1.94	−.10	**.42**	**.51**	**.45**	**.30**	**.23**	**.32**	**.31**	**.23**	**.26**	**.16**	**.41**	**.53**																																
15. Bundling $t-4$	0.00	0.39	−0.41	1.94	−.08	**.28**	**.42**	**.51**	**.43**	**.29**	**.20**	**.30**	**.34**	**.23**	**.26**	**.40**	**.42**	**.53**																																
16. Bundling $t-5$	0.00	0.39	−0.41	1.94	−.07	**.21**	**.29**	**.43**	**.51**	**.43**	**.28**	**.21**	**.37**	**.31**	**.22**	**.38**	**.42**	**.40**	**.52**																															
17. Bundling $t-6$	−0.02	0.36	−0.41	1.53	−.08	.08	**.22**	**.32**	**.40**	**.45**	**.35**	**.19**	**.20**	**.40**	**.23**	**.31**	**.39**	**.39**	**.39**	**.52**																														
18. Bundling $t-7$	−0.04	0.34	−0.41	1.25	−.14	.10	.09	**.24**	**.29**	**.36**	**.41**	**.27**	**.19**	**.18**	**.33**	**.31**	**.29**	**.33**	**.36**	**.38**	**.44**																														
19. Bundling $t-8$	−0.05	0.32	−0.41	0.97	−.04	.08	.10	.10	**.18**	**.24**	**.28**	**.32**	**.24**	**.22**	.14	**.24**	**.27**	**.25**	**.31**	**.33**	**.32**	**.37**																												
20. Bundling $t-9$	−0.05	0.32	−0.41	0.97	−.04	.07	.09	.10	.05	.13	**.19**	**.20**	**.27**	**.28**	**.23**	**.26**	**.19**	**.27**	**.25**	**.28**	**.33**	**.27**	**.35**																										
21. Bundling $t-10$	−0.05	0.32	−0.41	0.97	**−.17**	.05	.06	.08	.06	.00	.10	.13	**.18**	**.26**	**.29**	**.16**	**.23**	**.20**	**.25**	**.23**	**.26**	**.29**	**.24**	**.33**																										
22. Lev. product markets $t-1$	−0.02	0.28	−0.47	1.07	**−.15**	**.41**	**.27**	**.36**	**.19**	**.28**	**.22**	**.31**	**.21**	**.28**	**.22**	**.35**	**.40**	**.35**	**.27**	**.24**	**.27**	**.20**	.14	**.27**	**.18**																								
23. Lev. product markets $t-2$	−0.02	0.28	−0.47	1.07	−.14	**.36**	**.40**	**.27**	**.33**	**.15**	**.25**	**.19**	**.34**	**.22**	**.27**	**.26**	**.34**	**.39**	**.34**	**.25**	**.21**	**.21**	**.16**	**.15**	**.27**	**.38**																							
24. Lev. product markets $t-3$	−0.01	0.28	−0.47	1.07	−.07	**.21**	**.36**	**.38**	**.28**	**.36**	**.17**	**.31**	**.24**	**.32**	**.23**	**.32**	**.30**	**.36**	**.40**	**.35**	**.29**	**.21**	**.24**	**.19**	**.16**	**.42**	**.38**																					
25. Lev. product markets $t-4$	−0.01	0.29	−0.47	1.07	−.12	.13	**.22**	**.36**	**.39**	**.31**	**.36**	**.18**	**.34**	**.22**	**.34**	**.30**	**.35**	**.29**	**.39**	**.41**	**.35**	**.31**	**.19**	**.23**	**.17**	**.40**	**.39**	**.40**																				
26. Lev. product markets $t-5$	−0.01	0.28	−0.47	1.07	−.02	**.15**	.11	**.22**	**.30**	**.37**	**.24**	**.27**	.14	**.37**	**.19**	**.31**	**.27**	**.32**	**.28**	**.36**	**.33**	**.26**	**.25**	**.20**	**.20**	**.43**	**.35**	**.44**	**.40**																		
27. Lev. product markets $t-6$	−0.02	0.28	−0.47	1.07	−.04	.14	**.17**	.12	**.20**	**.29**	**.36**	**.18**	**.23**	**.15**	**.37**	**.27**	**.29**	**.27**	**.31**	**.27**	**.33**	**.28**	**.22**	**.25**	**.20**	**.30**	**.43**	**.38**	**.43**	**.38**																	
28. Lev. product markets $t-7$	−0.02	0.28	−0.47	1.07	−.01	**.15**	.13	**.16**	.10	**.22**	**.32**	**.42**	**.22**	**.22**	**.20**	**.24**	**.28**	**.33**	**.27**	**.31**	**.31**	**.34**	**.29**	**.26**	**.28**	**.39**	**.31**	**.42**	**.36**	**.43**	**.41**															
29. Lev. product markets $t-8$	−0.01	0.28	−0.47	1.07	.03	.08	.13	.11	.10	.06	**.15**	**.21**	**.37**	**.25**	**.20**	**.15**	**.21**	**.27**	**.32**	**.24**	**.24**	**.19**	**.29**	**.30**	**.24**	**.37**	**.37**	**.36**	**.41**	**.36**	**.41**	**.43**													
30. Lev. product markets $t-9$	−0.01	0.29	−0.47	1.07	−.03	.01	.08	.13	.12	.12	.09	**.24**	**.27**	**.39**	**.28**	.12	**.15**	**.24**	**.28**	**.31**	**.31**	**.28**	**.23**	**.34**	**.34**	**.34**	**.39**	**.37**	**.33**	**.43**	**.38**	**.42**	**.46**											
31. Lev. product markets $t-10$	−0.01	0.29	−0.47	1.07	−.10	.07	.01	.07	.11	.11	.11	.06	**.24**	**.26**	**.36**	**.16**	.11	**.15**	**.23**	**.26**	**.29**	**.28**	**.28**	**.24**	**.34**	**.32**	**.33**	**.41**	**.36**	**.35**	**.43**	**.39**	**.43**	**.47**									
32. Lev. regulatory arena $t-1$	−0.06	0.54	−0.49	2.37	−.14	.13	.07	.09	.13	.03	.07	.02	.11	.06	.10	**.15**	.12	−.01	.03	.10	.01	**.17**	.12	.11	**.28**	**.15**	.10	.12	.12	.03	.14	.12	.10	.11	.10									
33. Lev. regulatory arena $t-2$	−0.04	0.57	−0.49	2.37	−.14	.14	.11	.06	.06	.13	.05	.05	.05	**.16**	.12	.02	.12	.09	.01	.00	.09	−.02	**.18**	**.15**	.09	**.20**	**.16**	.09	.11	.14	.06	.14	**.16**	.10	.12	**.19**								

(continued)

Table 2 (continued)

Variable	*M*	*SD*	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
34. Lev. regulatory arena $t-3$	−0.04	0.57	−0.49	2.37	**−.19**	.12	.14	.11	.04	.05	.14	.06	.08	.03	**.16**	.06	.04	.14	.09	.01	−.03	.06	−.05	**.19**	**.16**	**.22**	**.19**	**.16**	.10	.10	**.15**	.07	.14	**.16**	.10	.11	**.18**											
35. Lev. regulatory arena $t-4$	−0.02	0.59	−0.49	2.37	−.09	.07	.12	.14	.13	.07	.08	**.17**	.09	.07	.07	.07	.08	.06	**.16**	.11	.03	−.02	.07	−.04	**.19**	**.20**	**.22**	**.21**	**.19**	.11	.13	**.15**	.11	.12	**.17**	.06	.10	**.20**										
36. Lev. regulatory arena $t-5$	0.00	0.61	−0.49	2.37	−.01	.05	.08	.10	.14	.14	.12	.15	**.23**	.10	.14	.10	.09	.13	.09	**.17**	**.18**	.05	.02	.12	.02	**.24**	**.24**	**.22**	**.20**	**.20**	**.15**	**.17**	**.21**	.12	.12	.04	.08	.13	**.21**									
37. Lev. regulatory arena $t-6$	0.00	0.61	−0.49	2.37	−.01	.03	.05	.09	.11	**.16**	**.16**	**.18**	**.20**	**.24**	.13	.03	.12	.10	.14	.10	**.20**	**.20**	.05	.07	.13	**.24**	**.26**	**.23**	**.20**	**.17**	**.21**	.14	**.16**	**.21**	.11	**.16**	.06	.08	.13	**.22**							
38. Lev. regulatory arena $t-7$	0.02	0.66	−0.49	3.19	.03	.04	.02	.01	.08	.11	**.19**	**.16**	.13	**.20**	**.30**	.06	.02	.14	.12	.13	**.18**	**.17**	**.23**	.13	.12	**.21**	**.29**	**.22**	**.16**	**.16**	**.17**	**.22**	**.19**	**.16**	**.19**	**.15**	**.22**	.08	.08	**.23**	**.22**						
39. Lev. regulatory arena $t-8$	0.01	0.66	−0.49	3.19	.02	−.05	.04	.02	−.01	.06	.11	**.20**	**.17**	.11	**.20**	.04	.07	.03	.13	.12	.11	.14	.14	**.25**	**.16**	**.16**	**.21**	**.30**	**.19**	.11	**.16**	**.19**	**.20**	**.21**	**.15**	.13	.13	**.23**	.10	.14	**.22**	**.24**						
40. Lev. regulatory arena $t-9$	0.00	0.65	−0.49	3.19	−.04	−.03	−.01	.04	−.01	−.03	.03	.09	**.17**	**.16**	.12	.07	.07	.11	.05	.14	.10	.07	.11	**.16**	**.29**	**.20**	**.16**	**.21**	**.29**	**.18**	.09	**.18**	**.18**	**.22**	**.18**	**.28**	.14	.14	**.27**	**.18**	.14	**.22**	**.25**					
41. Lev. regulatory arena $t-10$	0.02	0.69	−0.49	3.19	.06	.01	−.03	−.02	.01	−.01	−.01	.03	.10	**.17**	**.20**	.14	.09	.08	.13	.04	.14	.06	.05	**.16**	**.16**	**.25**	**.21**	.14	**.19**	**.27**	**.19**	.10	**.22**	**.16**	**.19**	.07	**.34**	.14	**.18**	**.33**	**.19**	**.23**	**.22**	**.22**				
42. Passengers $t-1$	12900000	6362161	2694437	27100000	−.03	**.20**	**.17**	**.18**	**.17**	**.19**	**.20**	**.21**	**.26**	**.29**	**.29**	**.20**	**.21**	**.24**	**.24**	**.24**	**.27**	**.22**	**.21**	**.25**	**.29**	**.54**	**.54**	**.54**	**.55**	**.57**	**.58**	**.59**	**.61**	**.63**	**.61**	**.25**	**.25**	**.21**	**.21**	**.25**	**.26**	**.23**	**.24**	**.26**	**.28**			
43. Industry concentration $t-1$	0.13	0.00	0.12	0.13	−.08	**.22**	**.28**	**.20**	.15	.13	**.15**	**.17**	.02	.02	−.02	**.20**	**.15**	.07	.07	−.10	.04	−.05	−.03	−.05	−.09	**.17**	**.16**	.12	.12	−.01	−.03	−.05	**−.17**	−.12	**−.17**	−.05	.03	.12	−.04	.10	.05	.03	.07	−.06	−.06	−.03	
44. Industry growth $t-1$	0.00	0.08	−0.17	0.13	**.29**	−.10	−.02	**.15**	.11	.03	.00	.03	.12	**.18**	.03	.11	.13	−.02	.03	.10	.07	−.13	−.04	**.16**	.03	.05	.05	.12	**.15**	.11	−.01	.04	.07	.05	−.08	.12	−.03	−.12	−.09	**.16**	.15	−.01	.07	.13	.06	.06	**.22**	
45. Op. rev. relative historic aspiration level $t-1$	−54733	284079	−1152942	389707	**.52**	**−.46**	**−.42**	**−.28**	**−.18**	−.11	−.08	−.09	−.04	.07	.07	**−.28**	**−.26**	**−.16**	−.10	−.03	−.05	−.10	**−.16**	−.12	−.14	**−.26**	**−.20**	−.08	−.03	.06	.02	.01	−.01	.00	−.04	−.09	−.07	−.04	−.08	−.01	−.01	.04	.10	.11	.06	.02	**−.21**	**.23**

Note: Correlations in bold are significant at the 5% level

[a]In thousands of dollars.

Results

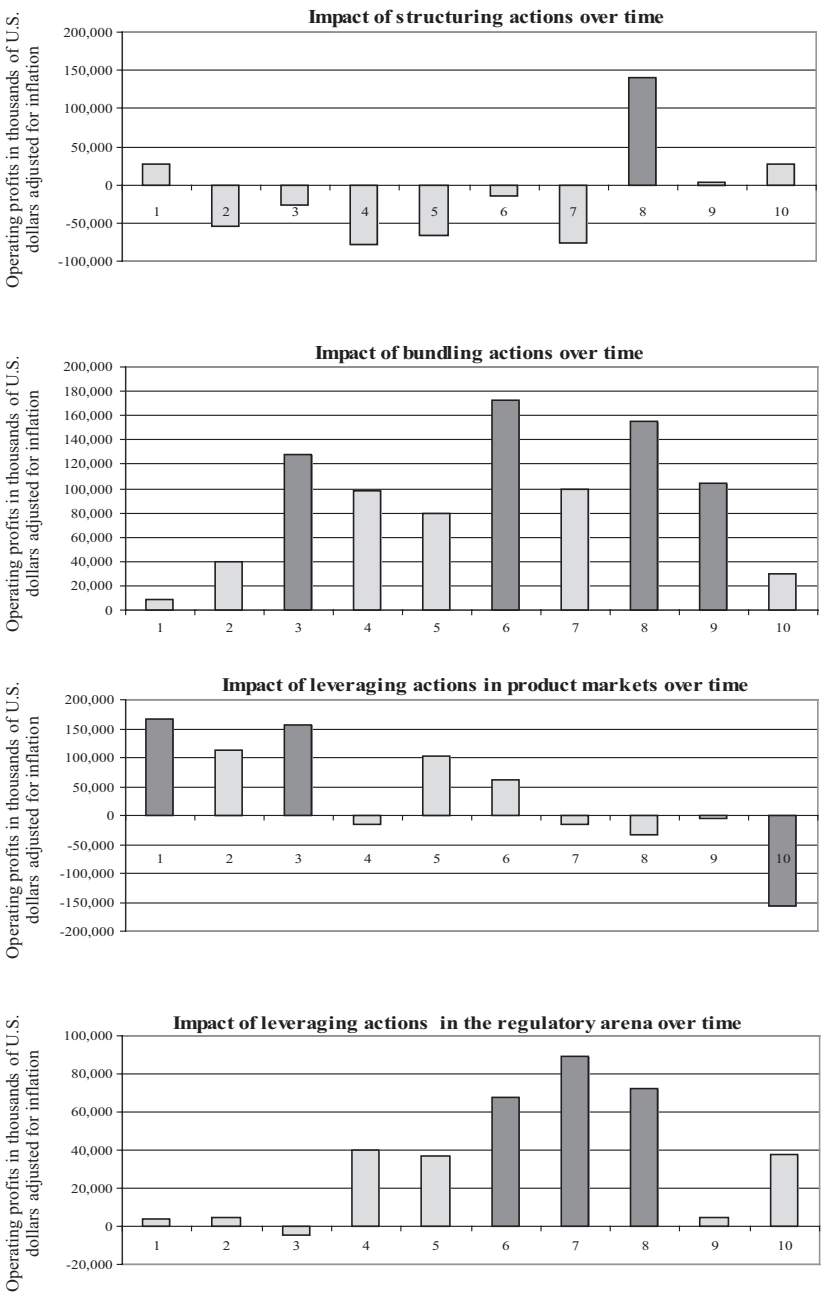
Figure 1 illustrates that the total impact of actions on performance is distributed over time (the lags that are statistically significant are shown in darker gray). The results of the analyses are shown in Table 3.[1]

Figure 1 illustrates that the total impact of actions on performance is distributed over time (the lags that are statistically significant are shown in darker gray). As predicted by Hypothesis 1, Model 2 reveals that the time to positive impact varies across types of actions. Results indicate that the time to first significant positive impact for leveraging actions in product markets is very short: The standardized number of leveraging actions in product markets has a significant positive relationship with operating profit for a lag of one quarter. In contrast, the three other types of actions take longer to have a significant positive effect on operating profit. The first significant positive effect is Lag 3 for bundling actions, Lag 6 for leveraging actions in the regulatory arena, and Lag 8 for structuring actions. Hypothesis 1 states that the time to positive impact is, from shortest to longest, (a) leveraging actions in product markets, (b) bundling actions, (c) structuring actions, and (d) leveraging actions in the regulatory arena. Our results support the proposed order but for the fact that leveraging actions in the regulatory arena have a quicker positive impact than structuring actions. It is also interesting to note that leveraging actions in product markets have a significant negative impact in the longer term (Lag 10).

Hypothesis 2 is partially supported. Contrary to our expectation of a short persistence of the impact of leveraging actions in product markets compared to the other three types of actions, results indicate that leveraging actions in product markets have a longer impact on profit than structuring actions and a persistence similar to the one of leveraging actions in the regulatory arena. For leveraging actions in product markets Lags 1 and 3 are significant and positive, while only Lag 8 is significant and positive for structuring actions and Lags 6, 7, and 8 exhibit significant positive coefficients for leveraging actions in the regulatory arena. In line with Hypothesis 2, leveraging actions in the regulatory arena have a higher persistence than structuring actions. Finally, as predicted in Hypothesis 2, results suggest that bundling actions have the longest-lived positive impact on profit: Lags 3, 6, 8, and 9 are significant for bundling actions.

As noted, we followed the procedure explained in Ahuja (2000) to test Hypothesis 3, which compares the total impact of the different types of actions. Table 4 reports the sum of the regression coefficients over the 10 quarters for each type of action. First, Wald statistics for the total impact of each type of action reveal that the total impact of leveraging actions in product markets and structuring actions is not statistically different from 0, whereas it is for the two other types of actions. Second, the sums of significant coefficients suggest that the total impact of bundling actions is almost three times as large as that of leveraging actions in the regulatory arena actions. Computing the Wald statistic for the difference between the total impacts of these two types of actions shows that this difference is statistically significant at the 10% level. To sum up, while the total impact of leveraging actions in product markets is not statistically different from the total impact of structuring actions and these two types of actions have a total impact over 10 quarters that is not significantly different from 0, bundling action have the largest total impact, followed by leveraging actions in the regulatory arena. Hypothesis 3 is thus partially supported.

Figure 1
Impact of Resource Management Actions on Operating Profit Over 10 Quarters



Note: Statistically significant lags are shown in darker gray.

Table 3
Impact of Resource Management Action Type on Operating Profit

	Model 1	Model 2
Structuring $t-1$	27435.39	(39833)
Structuring $t-2$	−54360.4	(46545.89)
Structuring $t-3$	−26698.1	(53248.3)
Structuring $t-4$	−78488.8	(59634.29)
Structuring $t-5$	−66608.3	(46799.75)
Structuring $t-6$	−13925.7	(48691.75)
Structuring $t-7$	−76759.5	(43229.42)
Structuring $t-8$	139649.9*	(59434.23)
Structuring $t-9$	2604.928	(58228.55)
Structuring $t-10$	27040.22	(43492.44)
Bundling $t-1$	8100.957	(45126.42)
Bundling $t-2$	39361.67	(52137.63)
Bundling $t-3$	128040.1*	(63886.76)
Bundling $t-4$	98738.22	(69087.28)
Bundling $t-5$	79480.86	(64135.48)
Bundling $t-6$	173064*	(76310.55)
Bundling $t-7$	99416.63	(68612.01)
Bundling $t-8$	155140.8*	(65761.36)
Bundling $t-9$	104667.1*	(52113.92)
Bundling $t-10$	30304.78	(52666.66)
Lev. product markets $t-1$	167407.7*	(81977.88)
Lev. product markets $t-2$	112883.2	(71541.75)
Lev. product markets $t-3$	157566.7*	(73751.44)
Lev. product markets $t-4$	−16545	(74422.92)
Lev. product markets $t-5$	102487.8	(79517.53)
Lev. product markets $t-6$	61611.09	(80628.66)
Lev. product markets $t-7$	−16270.4	(90724.43
Lev. product markets $t-8$	−32057.1	(83706.66)
Lev. product markets $t-9$	−4530.23	(80401.96)
Lev. product markets $t-10$	−156420*	(76889.37)
Lev. regulatory arena $t-1$	3802.577	(40812.53)
Lev. regulatory arena $t-2$	4785.193	(45247.76)
Lev. regulatory arena $t-3$	−4289.12	(40212.48)
Lev. regulatory arena $t-4$	40349.93	(34347.2)
Lev. regulatory arena $t-5$	36970.08	(34168.02)
Lev. regulatory arena $t-6$	67632.41*	(33054.84)
Lev. regulatory arena $t-7$	89378.57*	(35374.02)

(continued)

Table 3 (continued)

	Model 1		Model 2	
Lev. regulatory arena $t-8$			72081.73*	(33307.01)
Lev. regulatory arena $t-9$			4502.841	(30122.17)
Lev. regulatory arena $t-10$			37439.23	(24167.96)
Industry concentration $t-1$	–6811198	(8180377)	–9447274	(7682792)
Industry growth $t-1$	175660.9	(237566.2)	271413	(344467.2)
Op. rev. relative to historic aspiration level $t-1$	0.058093	(0.133395)	–0.1088	(0.155856)
Passengers $t-1$	0.013574	(0.025865)	0.018285	(0.020017)
AS	542082.9	(404289.1)	1155955*	(444003.2)
CO	382361.6	(271111.5)	903304**	(309882.8)
DL	218776.2	(185447.2)	75447.19	(151524.6)
HP	503072.7	(361335.8)	927609.4*	(368706.7)
NW	436031.1*	(212253.1)	687309.5**	(233132.7)
UA	101437.6	(169290.4)	–215902**	(188112.4)
US	318465.9	(197398)	615547.5***	(220387.6)
WN	487415.9***	(139593.5)	1031609***	(273187.4)
Year 2000	–20870.8	(61232.7)	–65347.4*	(92226.42)
Year 2001	–244828	(77620.52)	–223928	(111676.7)
Year 2002	–187211**	(83916.99)	–270923*	(124774.8)
Year 2003	–177804*	(87734.56)	–275324*	(126335.2)
Year 2004	–213790*	(100350.7)	–388577*	(134506.7)
Quarter 2	93947.68*	(34690.44)	63526.77**	(43733.16)
Quarter 3	–34550.2**	(65637.97)	–65230.9	(64377.16)
Quarter 4	–60611.4	(36469.76)	–123442	(44877.3)
Intercept	441738	(985721.3)	619614.6**	(1039742)
R^2	.37		.61	
F	5.75		2.98	
Durbin–Watson statistic	2.13		1.98	

Note: Figures are in thousands of U.S. dollars adjusted for inflation. Unstandardized regression coefficients are shown with robust standard errors in parentheses (based on a Huber–White sandwich estimator to take into account that the observations within the firms may not be independent). AS = Alaska Airlines; CO = Continental Airlines; DL = Delta Air Lines; HP = America West Airlines; NW = Northwest Airlines; UA = United Airlines; US = US Airways; WN = Southwest Airlines.
*$p < .05$, two-tailed. **$p < .01$, two-tailed. ***$p < .001$, two-tailed.

Discussion and Conclusion

Integrating the competitive dynamics' focus on actions and the recent insights into resource management has enabled us to identify four types of resource management actions and to study the temporal connection between these four types of actions and firm performance. We contribute to the literature on competitive dynamics by studying structuring and bundling actions, in addition to leveraging actions. Resource management researchers have shown that structuring and bundling processes matter for firm performance, but the competitive dynamics stream has neglected these actions and their impact on performance. Our study is the first empirical work that measures the four types of resource management actions directly and examines all three components of resource management identified by Sirmon

Table 4
Total Impact of Resource Management Actions in U.S. Dollars

Type of Action	Total Impact	Wald Statistic for Significance of Total Impact	Wald Statistic for Difference between Total Impacts
Structuring	–120,110,242	0.21	
Lev. product markets	376,134,285	0.80	
Lev. regulatory arena	352,653,445	2.54†	2.70†
Bundling	916,315,117	5.67*	

†$p < .10$, two-tailed. *$p < .05$, two-tailed.

et al. (2007). Comparing and contrasting structuring, bundling, and leveraging actions allows for a more comprehensive view of the firm's activities.

In addition, we contribute to both the competitive dynamics and resource management literatures by studying the performance dynamics of the different types of actions that are used to manage resources. Time is a dimension of competitive strategy that has long been argued to be important but that is often neglected by researchers. In particular, strategy theories offer very few arguments that can be used to predict the timing of the impact of firm actions on performance. In the absence of theoretical arguments, the choice of the time lag between actions and performance in empirical research is typically coarsely grained (usually 1, 2, and/or 3 years). Ours is the first study of the temporal aspect of firm actions. Our findings provide a more fine-grained (by quarter) understanding of the performance dynamics of different types of actions that can inform further theoretical developments around the issues of time, timing, and persistence. We find support for the premise that how the impact of resource management actions on firm performance unfolds over time varies across action types. Structuring, bundling, and leveraging actions differ with regard to the length of time they take to positively affect firm performance, the persistence of this positive impact, and their total performance impact over time.

More specifically, our empirical analysis shows that in the airline industry leveraging actions in product markets have the most immediate effect on firm performance but that their total impact over time is not significant. Leveraging actions in product markets have a significant positive effect with Lags 1 and 3 (Lags 2, 5, and 6 also have positive coefficients, but these coefficients are not statistically different from zero). These results indicate that the positive impact of leveraging actions in product markets that has repeatedly been found in the competitive dynamics research may be a short-term phenomenon, at least in mature industries such as the airline industry. In contrast, leveraging actions in product markets have a significant negative effect on operating profit in the longer term (Lag 10 has a negative coefficient that is statistically different from zero, and coefficients for Lags 7, 8, and 9 are negative but not statistically significant). This negative effect on firm performance in the longer term is interesting and may be the result of the reactions to these actions. As explained previously, we expect leveraging actions in the product markets to provoke quick responses from other market participants because these actions are characterized by high visibility, low causal ambiguity, low complexity, and high frequency. For research, these findings mean that studying the performance effect of managerial actions at a specific point in time may be

misleading if one wishes to understand the total impact of managerial actions over time. For managers, our findings point to the potential drawback of a short-term focus on leveraging actions in product markets. From our findings, it appears that the choice of resource management actions exhibits important trade-offs with regard to short-term versus long-term performance.

This trade-off is also apparent with leveraging actions in the regulatory area. Namely, our results also show that leveraging actions in the regulatory arena improve airlines' performance in the medium to long term of our study period. Leveraging actions in the regulatory arena improve performance with Lags 6, 7, and 8. Furthermore, this type of resource management action has a relatively longer-lasting and positive total impact on firm performance. These findings indicate the importance of lobbying institutional authorities in an industry where regulation still plays a significant role. From our reading of *Aviation Daily*, it appears that airlines' CEOs value going to Washington to plead their cases, a rational behavior given our results.

The results for structuring actions diverge substantially from our expectations: we found a slower positive impact for structuring actions than for leveraging actions in the regulatory arena (contrary to Hypothesis 1), and we did not find a significant total positive impact (contrary to Hypothesis 3). These results seem in line with the RBV argument that individual resources that are not difficult to replicate and obtain are unlikely sources of enduring performance differences. Examples of airline structuring actions include changes in the fleet, employees, and infrastructure, such as the number of gates or self-service check-in kiosks. These actions typically involve tangible assets that did not seem to be in short supply during the 1997–2004 period covered by our analysis. Another reason for our results could be that many of the structuring actions in our sample were actions related to divestments of resources. Divesting resources contributes to profitability in the longer term only to the extent that it reduces the firm's costs without jeopardizing revenues (Sirmon et al., 2007). Effectively divesting resources requires managers to thoroughly understand resources' current and future contributions to profitability, the latter being extremely difficult to evaluate under conditions of high uncertainty (Sirmon et al., 2007) such as the ones created by the terrorist attacks of 9/11.

Finally, bundling actions take some time to positively affect firm performance, but their positive impact appears to be more long lasting (Lags 3, 6, 8, and 9 are significant). This hints at a longer duration of the positive performance impact of bundling actions. Results also suggest that bundling actions have the largest total impact on firm performance in a mature industry where competitors have access to very similar resources. Our finding that bundling actions are key to firm performance is consistent with arguments in the resource management literature that speak to the value of combining resources (Sirmon et al., 2007).

While the present research makes an important contribution to the study of temporal consequences of firm actions on performance, its limitations provide opportunities for future research. First, our sample is limited to resource management actions taken by major U.S. airlines between 1997 and 2004. Care is called for when generalizing the results beyond a single industry and time period. It might prove particularly interesting to complement the present findings with data from industries that are more innovative or less competitive than the U.S. airline industry.

Second, as a first step toward understanding performance dynamics, we studied the performance impact over time of each resource management action type separately. This makes sense given our sample and data collection technique. Our sample consists of mature firms, which implies that at the beginning of our observation period these firms have in place resource management processes of the four types. Furthermore, the actions we capture with our data collection technique are actions that deviate from the actions that constitute the "business as usual" of these mature firms; otherwise these actions would not be reported in *Aviation Daily*. This means, on one hand, that these resource management actions are of some strategic importance, which makes them interesting to study in relation to firm performance but, on the other hand, that we are unlikely to observe sequences of actions of different types among the actions we have collected. Yet it would also be interesting to explore the performance impact of portfolios of actions of different types or of sequences of actions. Sirmon and Hitt's (2009) results suggest that matching actions across different types increases performance. Future research could investigate whether matching is indeed better for firm performance over time or if in the longer term it is better to specialize and learn skills in taking certain types of actions. In addition, future research, for example, with start-up firms that are studied at an early point without resources in place, should be conducted to examine sequences of structuring, bundling, and leveraging actions along with performance implications. A recent article by Ndofor et al. (2011) takes a step in this direction by investigating how competitive actions mediate the relationship between resources and performance.

Finally, researchers could further investigate the internal and external context of firm actions. To be able to compare the dynamics of the performance impacts of different types of actions, we picked a mature industry and controlled for the firm's internal and external context by using time dummies and firm fixed effects in our empirical analysis. Yet Sirmon et al.'s (2008) results suggest that when competitors' resource endowments are dissimilar, the interactions between resource endowment and resource management may also lead to performance differences because not all resources are equally manageable. Similarly, firms may differ with regard to their capabilities to transform actions into performance because managerial capabilities and cognition affect the efficacy of resource management. In consequence, some firms may be more effective than others at carrying out a specific type of action. Thus, subsequent research could explore the contingency relationships among characteristics of the organizational and economic contexts, resource management actions of the four types, and the timing of performance outcomes. We would expect some actions to have a quicker or longer-lasting positive impact depending on a firm's initial resource endowment, the firm's effectiveness of resource management, and the nature of the firm's environment.

In conclusion, we have studied the temporal performance consequences of four types of actions related to the management of resources. We show that alternative types of actions vary in terms of time to significant positive performance impact. We also find that different types of resource management actions vary in terms of the persistence of this positive effect and total impact over time. We hope that this work will inspire more research on the time dimension of firm actions.

Note

1. The four types of actions were entered together in Model 2. However, we also experimented with subsets of the independent variables to check the robustness of the results (Soh, Mahmood, & Mitchell, 2004). The results are substantively similar when adding the independent variables incrementally and when each type of action is regressed separately.

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