WHO'S ACQUIRING WHOM? EXPERIMENTAL EVIDENCE OF FIRM SIZE EFFECT ON MERGER OUTCOMES

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Abstract

A paradigm shift in global mergers and acquisitions (M&As) has been revealed in a recent research on global M&A. This study identifies this paradigm shift and call for greater scrutiny of more and diverse aspects of mergers, in particular cultural aspects of mergers and their role in determining the merger's outcomes. Using theory in organizational learning dynamics and resource-based theory, this study provides an explanation for the observed relationship between relative firm size and merger success. First, we use theory in organizational learning dynamics to form our first research hypothesis, that the efficiency of establishing a shared understanding is significantly different between equal and unequal sized mergers. We then draw upon resource-based theory to form our second research hypothesis, that the effectiveness of post-merger performance is significantly different between small and large target acquisitions. This study contributes to literature with the following new findings. First, cultural conflict in merger has a different level of impact on merger partners. Second, cultural conflict in mergers is only temporary. Third, in respective of their post-merger performance, unequal mergers and equal mergers are significantly different. Lastly, within the unequal mergers, there exists a dominance effect oriented from a firm size difference on merger performance.

Keywords: Merger; Cultural Conflict; Size Effect; Experiment.

Work-in-progress paper

INTRODUCTION

A paradigm shift in global mergers and acquisitions (M&As) has been revealed. According to A. T. Kearney's recent study of global M&As (2012), beginning in 2002 deals between developing and developed countries grew at annual rate of 19 percent, far exceeding the industry average and four time faster than deals conducted within either developing or developed countries alone, and in 2007 almost 20 percent of the 2,168 acquisitions were driven by companies from developing countries. Furthermore, this pattern is growing by 26 percent annually. In near term, thus, emerging competitors may present a potential threat to companies in developed countries. We identify this paradigm shift and call for greater scrutiny of more and diverse aspects of mergers, in particular cultural aspects of mergers and their role in determining the merger's outcomes.

Given the dearth of M&A research which explores the cultural aspects of the merger process, and criticisms of the ability to measure and test culture (Buono & Bowditch 1989; Cartwright & Cooper 1990, 1995; Clougherty & Duso 2009; Larsson & Finkelstein 1999; Napier 1988; Schweiger et al. 1987; Schweiger & DeNisi 1991; Vaara 2002; Weber & Camerer 2003), the work of Weber and Camerer (2003) is notable because it introduces a procedure for growing organizational culture in a laboratory environment. However, despite its significant contribution in providing experimental evidence of cultural conflict as a reason for merger failures, their experimental investigation only involved an equal number of employees from both acquiring and acquired firms in post-merged firms (i.e., a merger of equals) and fails to reflect diverse and different employee compositions in post-merger firms.

In reality, however, a merger of unequals is the more common phenomena (Smeets, Ierulli & Gibbs 2006). Moreover, in cross-border mergers and acquisitions by emerging market firms, it is often the case that the acquiring firm has a smaller presence than the target firm in the local market, regardless of its global presence (Aulakh, Kotabe & Teegen 2000; Cuervo-Cazurra, Maloney & Manrakhan 2007; Guillén 2002; Uhlenbruck et al. 2006; Vermeulen & Barkema 2001). Under this particular type of merger, success depends upon displacing the culture of the smaller partner (Pikula 1999). This has particular importance where the acquiring firm is smaller than the target firm, regardless of the superiority of the acquirer's practices or procedures as compared to the target firm. Our objective therefore is to examine whether the involvement of differing numbers of employees (either from acquiring firm or from acquired firm) may result in different findings from the experiment conducted by Weber and Camerer (2003).

To the end, we conducted a laboratory experiment that not only replicates the experimental study by Weber and Camerer (2003), but extends it by examining unequal employee compositions in the post-merger firms. Using theory in organizational learning dynamics and resource-based theory, this study provides an explanation for the observed relationship between relative firm size and merger success. First, we use theory in organizational learning dynamics to form our first research hypothesis, that the efficiency of establishing a shared understanding is significantly different between equal and unequal sized mergers. We then draw upon resource-based theory to form our second research hypothesis, that the effectiveness of post-merger performance is significantly different between small and large target acquisitions.

Findings confirm the negative influence of cultural conflict on merger outcomes. In addition, this study contributes to literature with the following new findings. First, cultural conflict in merger has a different level of impact on merger partners. Acquired firms can be more negatively affected from a merger than the acquiring firms. Second, cultural conflict in mergers

is only temporary. The average completion time at the post-merger stage eventually decreased below the pre-merger level. Third, in respective of their post-merger performance, unequal mergers and equal mergers are significantly different. Lastly, within the unequal mergers, there exists a dominance effect oriented from a firm size difference on merger performance. That is, the post-merger performance of the smaller target acquisition was worse than the performance of the larger target acquisition.

INVESTIGATING CULTURAL CONFLICT AND MERGER PERFORMANCE

Shared Code and Cultural Conflict

Most practitioners find benefits from encouraging collaborative learning among their employees. But what do we mean by collaborative learning? Traditionally, cognitive theoretical approaches seek to understand the structures of cognitions in individuals. When applied to collectives, they focus on the shared interpretations that people have for message content (Monge & Contractor 2003). Establishing meaning entails interpretation (often linked to prior experience and expertise) and is context reliant. "Organizational learning, like individual learning, involves the development of new and diverse interpretations of events and situations. Unlike individual learning, however, collective learning also involves developing enough consensus around those diverse interpretations for organized action to result" (Fiol 1994, p. 404). As Fiol explains, despite potentially disagreeing about their interpretive pictures (or communication content), individuals may still converge around a broad framework that encompasses those differences. Establishing this consensus is one of the primary roles of communities of practice, as it offers a collective schema that unites such differences in individual understanding (Bechky 2003). Bechky in particular notes the localized context of much knowledge, and that the situated nature of this knowledge embeddedness means that understanding is situational, cultural, and contextual. She suggests that knowledge is shared through a process of transformation, not transfer. In other words, knowledge sharing is a sense-making process (Weick 1995).

Schweiger and Goulet (2005) found that deep-level cultural learning interventions develop constructive employee perceptions and attitudes that are believed to enhance performance in acquisitions that require human integration to achieve synergies. Feiler and Camerer (2010) also took a sense-making approach to knowledge sharing, and conducted an experiment that examines the conflict that can occur in a merger due to a firm's use of specialized language, or "code." This task creates simple "cultures" by requiring subjects to develop conversational norms to quickly refer to pictures (Weber & Camerer 2003; Camerer & Weber 2008). By focusing on cultural conflict as a learning process, characterized by the establishment of a shared "code" or understanding between team members, we support an understanding of knowledge and ideas as not things, but as emergent properties of collectives that do not need to be converted into tangible form to add value (Peters 2012). Knowledge can be traded for more knowledge, for another form of intangible value (e.g., a favor or benefit), or converted to a more tangible form and then traded (Allee 2008). Intangibles include those extras people do to help keep things running smoothly and build relationships (e.g., exchanges of strategic information, planning knowledge, process knowledge, technical know-how, collaborative design work, joint planning activities, and policy development) and so are important aspects of post-merger functionality.

It is well known that superior competitive knowledge can be a sustainable advantage for a firm (Grant 1996). However, in order for competitive advantage to be attained and sustained, it is necessary to collectively learn and develop new capabilities and adapt at an increasing speed

(Peters et al. 2010). While such knowledge can be developed from the learning dynamics of individual organizational members (Nonaka 1994), collaborative learning is a selective learning process where members share experiences and take on asymmetric roles (Mitnik et al. 2009) and is not necessarily present in every organization. Unlike individual or shared learning, collaborative learning involves the capitalization of one another's resources and skills (Chiu 2000) (Chiu 2008a) and refers to the methodologies and environments in which learners engage in a common task and where each individual depends on and is accountable to the others (Chiu 2008b). Within an environment where mutual dependency and accountability is not obvious, this selective and mutual learning process is not easily identified. Thus, organizational support to encourage learning dynamics can be a critical source for developing competitive knowledge within the organization because mutual dependence and accountability between the organizational members are the antecedents for collaborative learning (Rau & Heyl 1990).

The learning process of individual team members is accumulated to shape individual knowledge, which is then articulated and amplified by the organization to construct organizational knowledge (Nonaka 1994). Organizational culture is a composite of organizational knowledge (Crossan, Lane & White 1999). Hence, firms that succeed in developing and promoting collaborative learning among their organizational members possess a sustainable advantage and can surpass others in the competitive arena. If organizational culture is distinct, and developed and sustained by the knowledge developed through organizational learning dynamics and embedded in the organizational members (Grant 1991, 1996), then post-merger organizational performance should be affected by the different compositions (equal vs. unequal) of employees in the post-merger firms. Hence, we test the following hypothesis:

H1: In respect of their post-merger performances, unequal mergers and equal mergers are significantly different in their efficiency in establishing a shared code.

Resource availability and merger performance

In empirical investigations of cultural conflict on merger outcomes, the difference in firm size has been found to be significant in its impact on organizational integration. For instance, Asquith, Bruner, and Mullins (1983) found that acquirers' abnormal returns are positively related to the relative size of the merger partners. Walsh (1989) found that target company top management turnover rates are increased with an increase in the size difference between the parent and target companies. Chatterjee et al. (1992) noted that (after controlling for the relative size of the merging firms) there is a strong inverse relationship between perceptions of cultural differences and shareholder gains. Moeller, Schlingemann, and Stulz (2002) found that larger firms are expected to take longer to complete an acquisition than smaller firms due to regulatory issues, as these are typically more important for large firms. We therefore find that the creation and evolution of knowledge within an organization, which is influenced by the relative size of those involved, is meaningful for developing sustainable organizational cultures.

Alternatively, while claiming that organizational integration is the single most important factor in explaining synergy realization in M&A, Larsson and Finkelstein (1999) failed to find a direct relationship between company size and organizational integration. Instead, they found that there is a positive relationship between target size and combination potential (i.e. synergy realization is a function of the similarity and complementarity of the two merging business), and claimed that bigger acquisitions do better because they offer greater synergy potential, not because managers pay more attention to the integration process when targets are large.

The Resource-Based View (RBV) of the firm proposes that the heterogeneous distribution of valuable resources among firms—such as human capital—explains performance differences. The introduction of RBT (Barney 1986; Lippman & Rumelt 1982) offered a theoretical explanation for why superior human capital might lead to sustainable performance advantages for firms. To support this claim empirically, Crook, Todd, Combs, Woehr, and Ketchen (2011) found that human capital strongly relates to performance. These authors note that human capital is unevenly distributed among firms and is often in short supply; therefore, it is difficult for competing firms to assess, copy, and/or acquire human capital. Accordingly, firms that possess superior human capital should outperform others (Crook et al. 2011).

Supporting this RBV, researchers have argued that the knowledge embedded within people is ultimately the only source of competitive advantage (Grant 1996). Therefore, organizational culture (which is the organization-level repository of knowledge: Crossan et al. 1999) can be the source of a firm's sustainable competitive advantages and is distinctive in nature (Barney 1986, 1991; Grant 1991; Lado & Wilson 1994; Oliver 1997; Rouse & Daellenbach 1999). It is, therefore, a natural expectation that the organizational ability to integrate different organizational cultures is negatively affected under mergers and acquisitions.

Our second objective is to determine whether or not different employee compositions within mergers involving large vs. small target firms have any significant influence on the post-merger firm performance. Weber and Camerer (2003, p. 410) concluded that the difference in pre- and post-merger performance in their experimentally manipulated mergers was unlikely to be due purely to a group-size effect. However, we claim that the success of post-merger integration and the eventual success of the M&A may well be dependent upon the size difference of the firms involved. This may be the case particularly when both the acquiring and target firms are in the same markets or countries. We expect that the post-merger performance deterioration due to cultural conflict is greater in acquisitions involving larger target firms than in acquisitions of smaller target firms. This expectation is based on research examining merger dominance, which may occur when one of the firms involved in the merger is smaller (Cartwright & Coopers 1993; Dackert et al. 2003). This expectation of dominance after the merger by one or the other firm is culturally oriented (Dackert et al. 2003). If the expectation of dominance is related to firm size difference, then we would expect that a smaller acquired firm will adopt the changes introduced by the larger acquiring firm (Cartwright & Coopers 1993) and that the success of this particular merger will depend upon the larger firm displacing the culture of the smaller partner (Pikula 1999).

Therefore, we claim that because of the possible presence of merger dominance, acquiring either a large target firm or a smaller target firm may delay post-merger integration and eventually lead to lower post-merger firm performance when compared with that of a smaller target acquisition. We note that the earlier experiment by Weber and Camerer (2003) did not investigate performance differences in post-merger groups of differing size. In our experiment, therefore, three different types of post-merger groups are established and examined to determine if the average completion time of the acquisition of larger target firms is worse than that of the acquisition of smaller target firms. Hence, we test the following hypothesis:

H2: The effectiveness of post-merger performance for larger target acquisitions is less than that of smaller target acquisitions.

METHODS

In our experiment, we replicate the experimental design of Weber and Camerer (2003), but with two important differences. First, we employed three subjects (one manager and two employees) for each pre-merger group instead of the two subjects in the original experiment by Weber and Camerer (2003). This different composition of subjects is to create a situation where a presence of merger dominance within a post-merger firm can be assured while requiring that all subjects build their own culture in pre-merger firms. The subjects need to develop tacit shared knowledge (see Nonaka 1994) creating a common code to quickly perform the task and thus independently develop cultures within their pre-merger group. Then, the groups are merged to create post-merger groups. Second, we extended the original experimental design to include an examination of potential size effects. To do this we created three post-merger groups with differing relative sizes of the firms merging (i.e., *merged firm 1 (MF1)* – larger acquirer; *merged firm 2 (MF2)* – equal merger; *merged firm 3 (MF3)* – smaller acquirer). These were then examined for their performance differences. We expected that within the post-merger firm, when the presence of one firm is relatively either weaker or stronger than the other firm (i.e., the number of employees of one firm is smaller (or larger) than the number of employees of the other firm), then a size effect (i.e. the larger firm dominates the smaller firm) will take place and will significantly affect overall post-merger performance.

The experimental task is based on studies by Clark and Wilkes-Gibbs (1986) and Schober and Clark (1989) which address how shared meaning (i.e. culture) arises in language. Weber and Camerer (2003) used this same task in their experiment to examine the negative influence of cultural conflict on post-merger firm performance. While we increased both the number of subjects in each firm and the number of the rounds that the subjects go through in performing the task, we used the same pictures that were used for the earlier experiment conducted by Weber and Camerer (2003).

Subject Recruitment

The current experiment used a group of student volunteers (120 subjects) who undertake a role-play as either a manager or an employee of the firm. We randomly selected undergraduate classes within a university located in southeastern part of the United States and asked class instructors for student volunteers.

Stage Design

There were four 3-subject groups in stage 1 (40 groups) and three 4-subject groups in stage 2 (30 groups; see Figure 1). The subjects went through 30 rounds of tasks in stage 1 and 20 rounds of tasks in stage 2, and changed their roles in each round. The increase in the number of rounds was to ensure that every subject was able to experience both roles so that any idiosyncratic effects of a particular manager who might be worse at developing a language code are minimized (see Weber & Camerer 2003 p. 406).

Role Description and Performance Measurement

A student subject is randomly selected to take on the role of manager within the group, and gives instructions to his/her colleagues who are assigned as employees in the same group. The student subjects who are randomly assigned with an employee role listen very carefully to the manager and then perform the task given. Employees in the same team are allowed to talk to each other and to the manager. The time in completing the task was measured and rewarded. The reward was calculated based on the time taken to complete the task. The completion time was

measured up to the nearest 10 seconds, and the subjects earned $1 minus the completion time divided by 300. Managers were paid for the average completion time of their team. This reward scheme is the same as the one used in Weber and Camerer study (2003). Subjects were paid after completion of experiment.

Design of Stages in the Experiment

Stage 1 denotes the pre-merger condition, where the subjects independently perform tasks while developing their own culture within their groups. All pre-merger groups have three members: one manager and two employees. After a series of tasks, the groups are merged in stage 2. In the merged groups, there are four members: one manager and three employees. Therefore, all the subjects in stage 1 remain in the experiment at stage 2. The post-merger groups perform the same task that they performed in the pre-merger stage (stage 1).

The objective of stage one is to allow subjects to build their own cultures within their group, which is analogous to a firm in the real world. We took the same sixteen pictures depicting office environments used in the original experiment by Weber and Camerer (2003) and presented them to each subject in the beginning of stage 1. While the pictures share common elements – people, furniture, room characteristics, and so forth – each picture is unique and varies in the number of people, their characteristics (gender, clothing, ethnicity), the physical aspects of the room (high ceilings, objects on walls, furniture), and the actions of the people (conversing with others in the picture, talking on the telephone, working at a computer).

In each round of the experiment, the experimenter indicates 8 out of the 16 pictures to the manager in the group in a particular order, without showing them to the employees. The manager then describes each specific picture in his/her own way to the two employees in the particular order given by the experimenter, and the employees must pick the correct pictures in the correct sequence from the managers' description. This task creates simple "cultures" by requiring subjects to develop conversational norms to quickly refer to pictures (Weber & Camerer 2003; Camerer & Weber 2008). With this task, we also see how the subjects develop a common "homemade" language to refer to the pictures (Clark & Wilkes-Gibbs 1986, Schober & Clark 1989).

The time that it takes for the employees to pick the correct picture in the order given by the manager is measured. Then, the round ends. After each round, subjects switch roles (the experimenter randomly appoints the next manager from the two employee subjects) so that they will experience both roles. All of the subjects in this stage do not know about the future merger or about their firm's position (i.e., either acquirer or target). These three-person groups perform the task for 30 rounds.

After stage one, any two of the subject groups are merged as in the earlier study. One firm is randomly selected to take over the other. In the post-merger firm, we deviated from the experimental design of Weber and Camerer (2003) with the intention of discovering potential size effects. Three types of post-merger groups were arranged: two groups which are unequal (i.e., MF1 and MF3) and one group of equal size (i.e., MF2). The new post-merger groups have four subjects.

As in stage 1, one manager is randomly designated by the experimenter in each post-merger group and describes the pictures to the three employees in the order determined by the experimenter. Because this manager previously participated with only a subset (or none) of the three employees, we expect that the conflict in homemade languages (i.e., culture) will make it difficult for the manager to help the employees perform the task and will thus slow down the

group's performance when the average completion times are measured. Each manager conducts another 20 rounds with the 3 employees. All of the subjects in a team are in the same space, as was the case in the previous study, so that the three employees can hear everything that the manager says, and the manager is allowed to speak freely (i.e., the manager could choose to address only one employee although the other two would overhear) and the employees will complete their tasks and be measured individually.

RESULTS

Stage 1 (pre-merger)

As evidenced in the decreasing pattern of the task completion times, the task promotes organizational learning and creates a simple "culture" by requiring subjects to develop conversational norms (or a "homemade" language) to quickly refer to pictures (Weber & Camerer 2003; Camerer & Weber 2008).

As the rounds progress, the subjects begin to use "key words," such as "pine tree," "headset," or "lonely lady," as a concise methods for describing the pictures and to improve their performance as they work on the task together. While the task is initially difficult because the groups lack a common method for referring to the pictures, they become much quicker once they develop a shared language. As a result, the completion times are initially high but decrease as the groups develop concise, effective and efficient ways to refer to the pictures (Argote 1996). By the 10th round the average completion time is 32.8% of the completion time for the initial rounds.

Stage 2 (post-merger)

As observed in the Weber and Camerer's (2003) study, the average completion time increased once the groups are merged. This study employs four different time periods in comparing the average completion times. In the first time period (T_1), the average completion time of the first round at the post-merger stage increased to 76.37 seconds from 33.24 seconds. This mean change of 43.13 seconds in completion times is significantly different from 0 at $p < 0.01$ ($t_{36} = 9.6602$). The average 5-round completion time of the post-merger groups (30 groups) for the second time period (T_2) is 57.04 seconds, which increased from 36.35 seconds for the last 5 rounds of the pre-merger groups (40 groups) in the pre-merger. The mean change in the average completion times of 20.69 seconds is also significantly different from 0 at $p < 0.05$ ($t_8 = 4.0627$). In addition, this study compares the average completion times of the last 5 rounds of the pre-merger stage with the time period covered in rounds 6-10 in post-merger stage (T_3) and also found that the mean difference of 6.38 seconds (= 42.73 sec. – 36.35 sec.) is significantly different from 0 at $p < 0.01$ ($t_8 = 3.2943$). Lastly, this study compares the average completion times of the last 5 rounds of the pre-merger stage with the time period covered in rounds 11-15 in post-merger stage (T_4) and found that the mean difference of 1.16 seconds (= 37.51 sec. – 36.35 sec.) is not significantly different from 0 at $P < 0.05$ ($t_8 = 0.8849$).

FINDINGS AND HYPOTHESIS TESTING

Cultural Conflict in Mergers is Temporary

As expected, a negative effect of cultural conflict on post-merger performance was observed. However, the results of last comparison case (i.e., T_4) show that the negative affect of cultural conflict does not persist throughout the entire post-merger session. This result is different from the earlier finding in Weber and Camerer's (2003) study. A possible explanation

for this discrepancy in the result is that more subjects (3 subjects vs. 2 subjects) were involved in the task, and the use of more pre-merger sessions (30 rounds vs. 20 rounds). This may account for the faster task completion times in stage 1 and more particularly in stage 2 than observed in the original experiment by Weber and Camerer. In particular, a 50% increase in the number of rounds (i.e., 30 rounds in stage 1) may have promoted a greater sense of mutual dependence towards the task objective and greater accountability between the subjects within a team. This allows team members to develop diverse ways in which they may shorten the completion times. In this regard, we suggest that the earlier contention on the persistent negative effect of cultural conflict in post-merger performance needs to be revisited.

Acquiring vs. Acquired Firm

Results show that average task completion time of the acquiring firm is faster than the average completion time of the acquired firm when the last 5-round completion times of the two firms in pre-merger stage are compared. The difference (4.38 seconds = 38.54 seconds – 34.16 seconds; t_8=3.4184) is significant at $p < .01$ level. The results also show that after the merger, the average task completion times of the two firms increased significantly, indicating that both firms experienced significant performance deterioration with the merger. The increase of the average completion times of the two firms (22.60 seconds (=56.76 seconds – 34.16 seconds) for the acquiring firm and 18.78 seconds (=57.32 seconds – 38.54 seconds) for the acquired firm) are also significantly different at $p < .01$ level (t_8=4.4126, t_8=3.6734, respectively) when the first 5-round average task completion times are compared. Thus, these results show that the post-merger performance of acquiring firm was more deteriorated than that of acquired firm and indicate that cultural conflict in merger may have a different level of impact on merger partners.

The different level of impact on merger partners can also be observed in the Weber and Camerer study (2003). Unlike our result, however, both acquired and acquiring firms do not show a significant difference in completion times when they reached at the final round of the stage 1. Moreover, the completion times of the both firms are significantly different when the firms are merged and acquired firm is more negatively affected from the merger while the effect is temporary. Thus, it is clear that cultural conflict in merger may have a different level of impact on merger partners.

Post-merger Performance of Merged Firms

Another, but more important, expectation of the study was the presence of size effect in the integration process. We found that the merged firms showed a different trend in post-merger performance. When we compared the last 5-round of post-merger average task completion time, MF1 is significantly different from MF2 and MF3, but MF3 is not significantly different from MF2. These results indicate that there exists possible size effect on the post-merger performance difference. As a first step to verify the presence of size effect, we tested whether there is a significant difference in completion times in the pre-merger stage when considering different employee compositions for the post-merger firm. And, we found that their pre-merger performance showed no significant difference in completion times (F-value: 1.9878 ($F_{2, 27 @ alpha=.05}$ = 3.3541)), suggesting that these groups were initially not different. Next we tested if there is any significant difference in their performance right after the merger and found that there is no significant difference. Therefore, there results indicate that unequal mergers (MF1 and MF3) may be different from equal mergers (MF2) and even within the unequal mergers, there exists a potential dominance effect oriented from a firm size difference on merger performance.

However, it is not certain that if the firm size effect is really present or if we can claim that unequal mergers are different from equal mergers yet because of potential issues in selection and omitted variable bias (Abadie 2005). Thus, to find a presence of the firm size effect, we further measured difference-in-differences (DID). DID is to measure the change induced by a particular treatment or event. And, it is a good method for impact evaluation if assumption that trends in treatment would have been the same is true (Abadie 2005). For DID measurement, control group and treatment groups are set to reflect the changes in the post-merger firm structure and any potential influence of the merger on the post-merger firm performance. Therefore, we set MF2 (equal mergers) as a control group and MF1 and MF3 as treatment groups and compared the performance difference based on the time, *T*, and state, *S*, where *T*=0, 1 and *S*=0, 1. *T*=0 stands for the initial round after the merger and *T*=1 stands for the last round in the post-merger. *S*=0 stands for the control group and *S*=1 stands for the treatment group. Because this study is to find if there is any significant difference in performance between a control group (MF2) and two treatment groups (MF1: treatment group 1 and MF3: treatment group 2), we measured two DIDs.

With the DID measurement, we find that there is difference in completion times between the control group and the treatment groups and the difference is more obvious when the treatment group 2 (MF3) was compared with the control group (MF2) in terms of their post-merger performance (i.e., 1.09 vs. 5.37). These indicate the presence of firm size effect on post-merger performance. We therefore conclude that an unequal structure creates cultural dominance in the post-merger firm, and causes a performance difference between the groups. This then supports our Hypothesis 1.

To test hypothesis 2, we compared the average completion times between the larger target acquisition and the smaller target acquisitions (i.e., MF1 vs. MF3) to find which has a significantly longer average completion time in the post-merger sessions. Longer average completion time in post-merger session indicates worse post-merger performance. From the comparison we found that the average completion times of MF1 and MF3 are not significantly different from each other before and immediately after the merger. However, as the round proceeds, the average completion time of MF3 becomes faster than the average completion time of MF1. And, we found that the difference is significantly different at $p < .05$ level (4.41 sec. = 36.35 – 31.90, $t_8 = 2.0720$) when the last 5-round average completion times of the two firms are compared. This result indicates that the post-merger performance of larger target acquisition (MF3) is not worse than that of smaller target acquisition (MF1) and, therefore, our second hypothesis is not supported. Instead, the result indicates that different employee compositions within mergers involving large vs. small target firms have a significant influence on the post-merger firm performance and thus supports our claim that a firm size effect is present in the integration process.

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