

# Do Major Customer Relationships Enhance the Performance of Strategic Alliances in High Tech Industries?

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**Abstract :** In this study, our primary focus is to examine the impact of major customer relationships on high-tech firms' financial performance over the period 1988 to 2004 given the firm alliance structure. We select all firms in designated high-tech industries and subdivide that sample into partnering and non-partnering firms based on whether the firm reports a major customer relationship in accordance with FAS 14 (superseded by FAS 131). Although major customer relationships sometimes evolve into or out of alliances, little is known about their impact on the firm's market and operating performance, despite required regulatory disclosure. We further subdivide the partnering firms sub-sample based on whether those firms also announced alliances. Both major customer relationships and alliances are thought to affect revenue and cost structures and therefore enhance firm performance. Yet, the presence of a major customer relationship may constrain firm performance and limit alliance benefits. While some past results show that investors respond positively to announcements of alliances (e.g. Gleason, Mathur, and Wiggins 2003, Woolridge and Snow 1990; McConell and Nantell 1985), very little is known about the combined impact of major customer relationships and alliances on firm performance. We find little evidence that either partnership arrangement improves operating performance, although before entering partnerships, partnering firms tend to perform better than non-partnering firms. When firms with major customer relationships discontinue those relationships, operating performance worsens regardless of alliance status.

**Keywords:** Alliance, firm performance, major customer relationship

## 1. INTRODUCTION

In this paper, we examine how the combination of both alliances and major customer relationships impact firm performance. We focus on the relationship between firm performance and organizational structure as a firm's structure and key relationships have a direct influence on firm performance. With a global economy, rapid product cycles, capital constraints and advances in technology, firms seldom possess all the capability necessary to maintain and grow market share. These factors lead firms to consider different forms of partnering arrangements, such as alliances, joint ventures, outsourcing, or strong relationships with one or more major customers. Such arrangements can enhance firm growth, reduce product development time, and reduce costs (PriceWaterhouseCoopers 2004).

Past results show that investors respond sharply to announcements of alliances (e.g. Gleason, Mathur, and Wiggins, 2003, Woolridge and Snow, 1990; McConell and Nantell, 1985), but other studies have found mixed results as the market seems to favor some types of transactions over others (Piachaud and Muresan, 2004; Chan et al, 1997; Koh and Venkatraman, 1991; Das, Sen, and Sengupta, 1998). Although major customer relationships sometimes evolve into or out of alliances, far less is known about their impact on the firm's market and operating performance.

When considering partnerships between firms, a continuum of possibilities exists. This continuum, as outlined by Chiesa and Manzini (1998), is specified by the extent of integration of a partner's activities and resources within the firms own activities and resources; thus, at one end are acquisitions and at the other, outsourcing. Other long-term relationships such as joint ventures and strategic alliances lie along that continuum. The

specific form of partnership often depends upon the specified goals. For example, a firm collaborating on a development project might elect to form a joint venture, rather than a simple alliance, to afford more legal protection for sensitive proprietary information.

One type of partnership between firms is the major customer relationship, which, under FAS 14 and 131, is defined as a customer that comprises 10 percent or more of the firm's reported revenues. Here, the customer is of material importance to the supplier, and is thus an integral part of the firm's operations. Conceivably, these major customer relationships could either involve only routine buyer/supplier transactions (thus lying on the outsourcing end of the above specified continuum), or they could evolve to something resembling a more formal strategic alliance (thereby moving in the direction of acquisition on the continuum). What we investigate here is the specific case where firms with major customer relationship are also involved (at some point) in a formalized strategic alliance. As in Baker et al. (2001), an alliance is defined as any governance structure to manage an incomplete contract between separate firms and in which each partner has limited control.

In this study, we examine the impact of major customer relationships and alliances (marketing and research) on the operating performance of high-tech firms over the period 1988 to 2003. We first select all firms in designated high-tech industries (as defined in Francis and Schipper 1999) and subdivide that sample into partnering and non-partnering firms based on whether the firm reports a major customer relationship in accordance with FAS 14 (superseded by FAS 131). We further subdivide the partnering firms sub-sample based on whether those firms also announced alliances. We find little evidence that either major customer relationships or alliances improve operating

performance in general, and we find that operating performance worsens when firms discontinue major customer relationships regardless of alliance status. However, among type of alliances (marketing versus research), marketing alliances appear to boost profitability and lower costs more than research alliances. We also note that while alliance announcements are generally met with positive market response, the status of the major customer relationship and the type of alliance both temper market reaction. Such an investigation incrementally adds to the body of knowledge both about strategic alliances and major customer relationships and allows us to determine under what circumstances (if any), the two types of relations, together, create added value for the firm.

## **2. THEORY AND BACKGROUND**

### *(i) Major customer relationship impact*

Although major customer relationships often take on the appearance of alliances or evolve into or out of alliance structures, this relationship has received little attention in the academic literature. In examining major retailing customers Gosman et al. (2004) found that major customer firms have significantly higher operating profitability than control firms and this difference was sustainable over a five-year window. They also found the market pricing of the major customer firms to be consistent with investors recognizing the level and duration of the enhanced profitability.

### *(ii) Alliance Impact*

The academic literature has paid more attention to alliances. According to the literature, alliance benefits come from two primary sources (Kogut, 1988), each of which,

as Berg et al. (1982) argue, will increase the profitability and market performance of firms participating in strategic alliances. First, by entering alliances, firms can achieve cost reduction through: (1) increased operational efficiency brought about by improved economies of scale and scope, cost/risk sharing, and access to greater resources and skills (Harrigan, 1986); and (2) improved bargaining power over suppliers through volume purchases of such items as materials, equipment, and parts (Porter, 1980). Second, through strategic alliances, firms can also strengthen their competitive position against rivals by increasing market power, introducing new products or services more rapidly, building entry barriers, and gaining access to new markets, (Eisenhardt and Schoonhoven, 1996). This enhanced competitive position should contribute to increased firm profitability and enhanced market performance (Dess and Davis 1984).

In general, prior results have shown that corporate partnerships, including strategic alliances and joint ventures, and similar strategic investment decisions tend to generate positive market reactions. Piachaud and Muresan (2004) find positive market reactions to the creation of joint ventures and strategic alliances for British firms. Gleason et al. (2003) report positive abnormal returns for financial service firms announcing joint ventures or strategic alliances, and these abnormal returns persist for up to 18 months.<sup>1</sup> Such results would seem to indicate that the market perceives positive long-term implications, such as improved operational efficiency, associated with alliance formation. However, in some cases, certain partnership structures drive differential market responses, as certain partnership forms (particularly joint ventures), offer greater protection for proprietary knowledge and skills (Piachaud and Muresan 2004), while

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<sup>1</sup> Other research reporting positive abnormal returns for alliance announcements include Koh and Venkatraman (1991), McConnell and Nantell (1985), Chan et al. (1997).

others, such as strategic alliances, are more flexible and entail lower transaction costs and are thus more desirable in certain environments (Hoffmann and Schaper-Rinkel, 2001).

Also, the purpose of the alliance seems to influence the market reaction. Koh and Venkatraman (1991) found that information technology joint ventures have a significant, positive effect if they strengthen existing operations (by expanding existing product-market segments or by developing new products in existing products), but create no significant increase in market value if they develop new customers or enter new, unrelated product-market segments. Das et al. (1998) found, however, that announcements of technological alliances experienced greater abnormal returns than marketing alliances, seemingly because the formation of a marketing alliance indicates that the product marketed is mature and/or declining. Similarly, Chan et al. (1997) found positive returns following the announcement of non-equity alliances, but those alliances involving a transfer or pooling of technical knowledge created greater value. From these results, it appears that investors reward firms for undertaking the development of new avenues for revenue expansion in areas with proven success, while assigning greater risk when firms form alliances that venture into entirely new areas.

Finally, financial health has also been found to influence the magnitude of the market reaction. Mohanram and Nanda (1998) found that firms with high levels of free cash flow before joint ventures announcements experienced a negative market reaction. Similarly, Das et al. (1998) found abnormal returns to be negatively correlated with profitability and size. Thus, it seems as though investors tend to respond most favorably to the announcement of firm partnerships when they represent a substantial and much

needed opportunity for the firm, rather than when the alliance represents a purely ancillary effort.

*(iii) Alliances and major customer relationships combined*

Although some factors that impact the benefit of alliances are known, very little is known about major customer relationships, and essentially nothing is known about the combined impact of both alliances and major customer relationships. This study seeks to fill this gap by examining a group of high-tech firms that enter both major customer relationships and alliances during the period 1988 to 2003. The combined impact of major customers and alliances holds special importance for this group of firms, since these firms are, on average, small and less than financially strong. Further, in these high-tech industries, research and/or marketing alliances and major customer relationships often play a major role in the very survival and viability of these firms. If a firm has both constructive major customers and beneficial alliance relations, we expect the wealth effect to be greater than firms with either a major customer relationship alone.

To test whether partnering arrangements individually or collectively enhance firm performance, we compare firm performance in partnering arrangements against two benchmarks. First, we compare partnering firm performance against non-partnering firm performance within the same industries. Second, we compare partnering firm performance during partnerships to performance before those firms enter partnerships.

### **3. SAMPLE SELECTION AND DESCRIPTION**

The sample includes high-tech firms with both major customer relationships and alliances during the period 1988 to 2004. We used SIC codes from Francis and Schipper

(1999, Table 5) to determine high-tech industries.<sup>2</sup> Using information available from Compustat, we first identified all firms in those SIC categories. We eliminated firms with zero or missing values for total sales revenue. From that initial sample, we then further identified those firms that reported major customer relationships for any year during that period in accordance with Financial Accounting Standard (FAS) 14 (superseded by FAS 131 in 1997). FAS 14 and 131 require firms to disclose major customer revenues if “a single external customer amount to 10 percent or more of an enterprise’s revenues.” Table 1 summarizes the total number of firm-year observations, the number for firms that report major customer relationships, and the number for firms that also report alliances. Almost 76 percent of high-tech firms reported a major customer relationship sometime during the period 1988 to 2004.

For each firm reporting a major customer relationship, we then identified whether that firm participated in any alliance, e.g., joint venture, licensing agreement, during the period. We searched the *Wall Street Journal* for announcements of major alliances or acquisitions. Since firms use a variety of terms to describe alliances, we used the broadest possible search, starting with only each firm’s name. We then reviewed all available articles to find announcements of alliances. We identified 288 announcements as summarized in Table 2.<sup>3</sup> Of those announcements, 54% involved research alliances, where the purpose of the alliance was either basic research or product development. Approximately 26% involved marketing alliances, where companies agreed to

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<sup>2</sup> Chan et al. (1997) also examine alliances in high-tech industries, and they employ a classification scheme from Business Week magazine. This scheme is very similar to the one that we employ, except that ours excludes aerospace industry firms.

<sup>3</sup> The sample of 288 announcements is generally typical for alliance and joint venture research, e.g., Das et al. (1998) with 288, Chan et al. (1997) with 345, Lerner et al. (2003) with 200, Allen and Phillips (2000) with 407, Koh and Venkatraman (1991) with 239.

collaborate on the marketing of an existing product. The remainder of the alliances involved acquisitions, which we considered the ultimate partnership arrangement.

Table 3 presents financial characteristics of sample firms. Panel A breaks the sample down by alliance status (no alliance, pre-first alliance, during first alliance, and post-first alliance). We classified the status as "during alliance" for the three years following the first report of alliance formation for each firm.<sup>4</sup> In general, the firms that report alliances perform better than firms that do not report alliances, especially before and during the first reported alliance. Alliance firms have higher *operating ROA*, higher *current ratios*, and higher *net income*. Some performance characteristics, e.g., *operating ROA* and *free cash flow*, improve for the alliance firms after their first alliance report, but several other performance characteristics, e.g., *sales growth* and *current ratio*, do not improve.

Panel B of Table 3 further describes financial characteristics of sample firms by major customer relationship status. We classified observations for sample firms as 1) no major customer relationship, 2) pre-major customer relationship (before the first year the firm reports a major customer relationship), 3) during major customer relationship (between the first year and the last year that the firm reports a major customer relationship), and 4) post-major customer relationship (after the last year that the firm reports a major customer relationship). For the firms that report a major customer relationship, performance during the customer relationship is very similar to performance before the relationship. Performance falls, however, after the end of the customer relationship; average *operating ROA*, *operating margin*, *sales growth*, and *free cash flow*

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<sup>4</sup> Three years is arbitrary, but we expected any performance changes to be evident within 3 years. Few alliance announcements specified the duration of the alliance. We also examined results (not included) assuming alliance period to be 4 years and found little change.

decrease substantially. Firms that report major customer relationships on average perform better than firms that do not report such relationships until the relationship ends.

*Operating ROA, operating margins, and free cash flow* are substantially higher, but *sales growth* is lower. Firms that do not report major customer relationships are also significantly smaller (*size*) ( $p < 0.001$ , two-tailed *t*-test) than firms reporting relationships.

#### **4. PRELIMINARY ANALYSIS OF FIRM PERFORMANCE BY PARTNERING CATEGORY**

Arend and Amit (2005) note that firms engage in significant partnering activities, such as alliances and major customer relationships, based on their needs, opportunities, and incentives. Different firms face different potential benefits and costs from partnerships, and the success of some smaller firms can actually suffer from alliances with larger firms (Alvarez and Barney 2001). However, relatively little research has examined long-term differences in financial characteristics of firms that enter partnerships compared to those firms that do not.

We examine the financial characteristics that affect firms' propensity to enter partnerships before, during, and after those firms that do enter partnerships engage in major customer relationships. Contractor and Lorange (1988, 2004) argue that firms engage in partnerships to increase revenues or reduce costs. An increase in revenue or reduction in cost should produce higher return on assets, *ceteris paribus*. We therefore examine operating ROA as an overall measure of firm performance. Additionally, we specifically examine the effect of partnerships on firm costs. We measure cost as the ratio

of R&D expense to sales, since R&D expense is a major expense for most of the firms in our sample.

The descriptive data in Table 3 suggest that alliances do enhance some performance dimensions, but major customer relationships do not. Furthermore, performance suffers after firms end major customer relationships. The question is whether the combination of alliances and major customer relationships affects performance differently. To examine this question, we formed 10 categories to characterize every firm's partnering relationships as follows:

- 1) Firms that never report major customer relationships or alliances;
- 2) Firm-years before a reported customer relationship and before a reported alliance (*pre\_cust & pre\_alliance*)<sup>5</sup>;
- 3) Firm-years before a reported customer relationship and also during the first reported alliance (*pre\_cust & dur\_alliance*)<sup>6</sup>;
- 4) Firm-years before a reported customer relationship and also after the first reported alliance (*pre\_cust & post\_alliance*);
- 5) Firm-years during a reported customer relationship and before the first reported alliance (*dur\_cust & pre\_alliance*);
- 6) Firm-years during a reported customer relationship and during the first reported alliance (*dur\_cust & dur\_alliance*);
- 7) Firm-years during a reported customer relationship and after the first reported alliance (*dur\_cust & post\_alliance*);

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<sup>5</sup> To limit the number of categories, we categorized all firms reporting major customer relationships but not reporting alliances as before alliance (*pre\_alliance*).

<sup>6</sup> During alliance is again the three years following a firm's first alliance report.

- 8) Firm-years after a reported customer relationship and before the first reported alliance (*post\_cust & pre\_alliance*);
- 9) Firm-years after a reported customer relationship and during the first reported alliance (*post\_cust & dur\_alliance*); and
- 10) Firm-years after a reported customer relationship and after the first reported alliance (*post\_cust & post\_alliance*).

This scheme provides three different benchmarks against which to compare firm performance. Category 1 provides benchmark performance for non-partnering firms. Categories 2 through 4 (the *pre\_cust* categories) combined provide benchmark performance for firms that will enter major customer relationships but have not done so, yet. Categories 2, 5, and 8 (the *pre\_alliance* categories) combined provide benchmark performance for firms that will form alliances but have not done so, yet. To limit the number of categories, the three *pre\_alliance* categories include firms that reported major customer relationships but never reported alliances, for example the firms in the *pre\_cust & pre\_alliance* category includes all firms that report major customer relationships in the future but have not or will not report alliances.

Figure 1 and Figure 2 show median industry-adjusted performance for firms in each of these 10 categories further divided between research and marketing alliances.<sup>7</sup> We categorized firms as research alliance firms if they entered research alliances but not marketing alliances and vice versa.<sup>8</sup> Figure 1 examines *operating ROA*, operating income before depreciation divided by total assets. In general, it shows that marketing alliance firms have higher operating ROA than either research alliance or the firms that never

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<sup>7</sup> We adjusted for the annual industry (3 digit SIC) median performance.

<sup>8</sup> For this chart, we did not consider firms that reported both types of alliances, and we also eliminated firms that reported acquisitions.

report major customer relationships or alliances. Marketing alliance firm performance increases during major customer relationships and generally falls post major customer relationship. The notable exception is the *post\_cust & dur\_alliance* category where the median adjusted operating ROA approaches 24 percent. Thus, both customer relationships and alliances appear to affect the performance of marketing alliance firms.

For research alliance firms, median operating ROA exceeds the industry median in four categories: *pre\_cust & pre\_alliance*, *pre\_cust & post\_alliance*, *dur\_cust & pre\_alliance*, and *dur\_cust & post\_alliance*. Performance is generally higher during major customer relationships, and it drops post major customer relationship. Again, both major customer relationships and alliances appear to affect the performance of research alliance firms, although performance post customer relationship is consistently below industry medians.

Figure 2 examines R&D expense scaled by sales. For research alliance firms, R&D expense is typically the major single expense category. One often-stated reason for entering alliances is to reduce costs through cooperating efforts, but the research alliance firms show consistently higher R&D expense during and after alliances, compared to industry medians, marketing alliance firms, or to pre-alliance benchmarks (as shown in the 2<sup>nd</sup>, 5<sup>th</sup>, and 8<sup>th</sup> categories). Figure 2 provides little to suggest that major customer relationships or research alliances reduce costs for these firms. Marketing alliance firms, however, generally have R&D expenses below the industry median and those expenses drop further post alliance and post customer relationship. Marketing alliance firms do appear to benefit from partnering arrangements and costs continue to drop post customer relationship.

Table 4 tabulates performance information similar to that presented in Figures 1 and 2, although for Table 4 the data are not industry adjusted.<sup>9</sup> In this case, we compare reported performance against the benchmark performance of non-partnering firms. The table shows median performance by customer and alliance category and compares the performance for firms in categories 2 through 10 against performance for those firms that never report a major customer relationship or alliance. Comparing performance for category 2 (*pre\_cust & pre\_alliance*) against category 1 (*no cust rel or alliance*), shows that the firms that will report major customer relationships and alliances perform significantly better than the firms that will not; *operating ROA* is higher and *R&D expense/sales* is lower. Although the firms that enter alliances continue generating higher *operating ROA* than the firms in category 1, median performance levels seldom exceed the pre-customer relationship and pre-alliance levels. Similarly, median *R&D expense/sales* levels seldom drop below those initial category 1 levels. In summary, there are performance differences between the firms that enter partnering arrangements and those that do not, but those performance differences existed before the partnering arrangement. There is little to suggest that the partnering arrangements improved performance.

## 5. EMPIRICAL RESULTS

### (i) Performance Analysis

In Tables 5 and 6, we further examine changes in firm performance across the 10 categories. Table 5 presents a regression analysis of firms' *operating ROA* controlling for firm *size* (measured as the natural log of sales), industry median *operating ROA*, and

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<sup>9</sup> Inferences from industry median-adjusted performance are similar.

prior firm *operating ROA* (in the 2<sup>nd</sup> through 6 models). We use dummy variables to identify all combinations of major customer relationships and alliances, dropping the dummy variable for category 1 to avoid perfect multicollinearity. Thus, the coefficient for the regression constant reflects the mean performance for firms that never enter partnering arrangements, and the coefficients on the other dummy variables represent performance relative to the firms that do not participate in partnering arrangements. We can also test combinations of coefficients to determine whether changes in customer relationship status or alliance status affect performance. This specification allows us to compare performance across categories to examine the impact of major customer relationships in combination with alliances.

The first column in Table 5 examines the level of *operating ROA* without controlling for prior performance. Firms that enter partnering arrangements have higher *operating ROA* levels before they enter those relationships compared to firms that never enter either major customer relationships or alliances. Regardless of alliance status, firms perform significantly less well post customer relationship compared to either before or during major customer relationships. Firm performance during and after alliances is not significantly different from the performance of those firms that do not enter partnering arrangements.<sup>10</sup> Those same results also hold when controlling for prior performance as shown in the 2<sup>nd</sup> column of results.

For firms that engage in research alliances, performance also suffers post customer relationship. Performance pre-customer relationship is higher than either during or after customer relationships. Alliance participation also does not improve performance. Alliance firm performance is not significantly different from non-partnering firms’

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<sup>10</sup> Tests of coefficient combinations not shown but are available upon request.

performance either during or after the first alliance. The results are similar for those firms with at least 12 years of data.

For firms that engage in marketing alliances, performance again suffers post customer relationship but the difference from pre-customer relationship performance is not significant. Marketing alliance firm performance is not significantly greater than non-partnering firm performance either during or after the first alliance. For marketing alliance firms with at least 12 years of data, performance is higher before and after major customer relationships and also higher after the first alliance. These firms tend to be larger and their performance is more in line with overall industry performance.

Table 5 shows that, before entering partnering relationships, partnering firms perform better than non-partnering firms. However, performance does not increase during either major customer relationships or alliances (or both), and performance decreases post major customer relationship.

Table 6 examines whether partnering arrangements allow firms to reduce costs. Specifically, we examine R&D expense ratios, i.e., R&D expense scaled by sales, since R&D expense is their largest single cost item for most of the firms in this sample. Median R&D expense ranges from 8 percent of sales in SIC 36 (electronics firms) to 48 percent of sales in SIC 28 (pharmacy and biotech firms).

Like Table 5, Table 6 again shows that, before they enter any customer relationship or alliance, partnering firms tend to perform better (have lower costs) than non-partnering firms. Not surprisingly, marketing alliance firms tend to have lower R&D expense ratios than research alliance firms. Marketing alliance firms remain significantly below non-partnering firms R&D ratio levels, regardless of major customer relationship

or alliance status. For research alliance firms, however, R&D expense ratios increase during customer relationships and remain high—and not significantly different from non-partnering firms ratios—after those relationships end. For research firms with at least 12 years data, R&D expense ratios increase during customer relationships but fall again post customer relationship. Overall, alliance status does not appear to affect R&D expense ratios for research alliance firms.

In summary, Tables 5 and 6 provide little evidence that partnering relationships improve performance. To the contrary, the partnering firms performed better before they entered either a major customer relationship or alliance. Discontinuing a major customer relationship almost always causes performance to suffer. These results seem counter to the previous research. Although few studies examine the effect of partnering on accounting performance, there is evidence that the market reacts positively to alliance announcements. Certainly, this suggests that investors expect alliances to improve performance.

*(ii) Market Reaction to Alliance Announcements*

For robustness, we test whether the market reaction to the alliance announcements in our sample is consistent with prior research that documented a positive market reaction to alliance announcements. For example, Anand and Khanna (2000) report cumulative abnormal returns (CAR) of 3.4 percent for drug companies and 3.8 percent for computer manufacturers. Gleason et al. (2003) found that 58 percent positive CARs in their sample of banking industry joint venture and alliance announcements. However, no previous study has tested whether a major customer relationship or other operational constraint affects the market's reaction to an alliance announcement.

We test the market reaction to the announcement of the alliances and acquisitions using event study methodology. Following Allen and Phillips (2000), we employed a 175-day estimation period from 200 days to 25 prior to the announcement date. Since the alliance announcements are often made well after the agreement itself, it is possible that the market reacts prior to the publication in the Wall Street Journal. Thus, we report cumulative abnormal returns and average abnormal returns over a 21-day (-10, +10) event window as well as over a shorter 4-day window (-2, +1).<sup>11</sup> We estimate abnormal returns as the ordinary least squares residuals from a single-factor market model using a value-weighted market portfolio. The reported significance tests are based on the standardized residuals method (Patell 1976) for the cumulative abnormal returns and standardized cross-sectional method (Boehmer et al. 1991) for the average abnormal returns.

Table 7 presents results from the event study using the approximately 80 percent (229 of 288) announcements that met our criteria for inclusion. The CARs for the total sample are 6 percent, significant at the 1 percent level, for both event windows. The abnormal returns are 0.3 percent for the longer window and 1.4 percent for the shorter window, again both significant at the 1 percent level. Approximately 64 percent of the CARs are positive in the shorter window, which is also significant at the 1 percent level.

We find some difference in abnormal returns among industries. Although the results for the pharmaceutical/biotech (SIC 28) and computer equipment industries (SIC 35) are similar, the abnormal returns are smaller for firms in the electronics industry (SIC 36). CARs and abnormal returns are significantly positive for SIC 28. CARs and

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<sup>11</sup> We expect that alliance information was likely publicly available in the day or two immediately prior to the actual date that the announcement was published in the Wall Street Journal.

abnormal returns are even higher in SIC 35, although the abnormal returns are not significantly different from zero over the longer event window. CARs and abnormal returns are lower for SIC 36 and generally not significant.

We also find some difference in abnormal returns depending on whether the alliance announcement occurs before, during, or after major customer relationships. Before and during the major customer relationships, the market reaction was significantly positive ( $p < 0.01$ ). After major customer relationships, however, the results are mixed; CARs are significant only over the longer window, and the average abnormal returns are positive for the longer window but negative for the shorter window. There are relatively few alliance announcements after firms end major customer relationships, however.

Comparing the market reaction to research versus marketing alliances, the abnormal returns are generally higher for research alliances, although CARs for both are significantly greater than zero. As expected, the market clearly reacts more strongly to acquisition announcements. The acquisition CARs are 13 percent for the longer window and 16% for the shorter window, both significant at the 1 percent level and substantially higher than the corresponding CARs for the alliances.<sup>12</sup>

We did note a stronger market reaction to research alliance announcements before major customer relationships and to marketing alliance announcements during major customer relationships. Firms generally have similar strategic motives for both major customer relationships and marketing alliances. Firms enter these ventures to expand their market and grow revenues. Thus, it is reasonable to expect the market to react more strongly to marketing alliances during major customer relationships. The strategic

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<sup>12</sup> We did not include acquisition firms when we examined performance for research and marketing alliance firms, but those firms were included in the total sample.

motives for research alliances and major customer relationships are somewhat different, however. Research alliances focus on innovation and new product development, and not the sales of existing products. Thus, it is also reasonable that the market reacts more strongly to research alliances before major customer relationships. For both research and marketing alliances, the market appears to view alliances after the end of a major customer relationship as less desirable, although the number of observations in these categories limits any inferences.

## 6. CONCLUSION

In this paper, we examined how the combination of both alliances and major customer relationships impact firm performance. Alliances offer an attractive alternative to traditional firm arrangements. With a global economy, rapid product cycles, capital constraints and advances in technology, firms seldom possess all the capability necessary to maintain and grow market share, and consequently, firms are relying on a variety of partnerships.

We first selected all firms in designated high-tech industries and subdivided that sample into partnering and non-partnering firms based on whether the firm reports a major customer relationship in accordance with FAS 14 (superseded by FAS 131). We then further subdivided the partnering firms sub-sample based on whether those firms also announced alliances. We compared firm performance in partnering arrangements against two benchmarks. First, we compared partnering firm performance against non-partnering firm performance within the same industries. Second, we compared partnering firm performance during partnerships to performance before those firms enter partnerships. We find little evidence that either partnership arrangement improves

operating performance, although before entering partnerships, partnering firms tend to perform better than non-partnering firms. When firms with major customer relationships discontinue those relationships, operating performance worsens regardless of alliance status. We further tested market reaction to alliance announcements. Our results indicate that while alliance announcements are generally met with positive market response, the status of the major customer relationship and the type of alliance both temper market reaction.

To our knowledge, this is the first study to examine the long term impact of alliances on firm performance and to consider alliance performance constrained by other partnering arrangements. We provide additional evidence in support to managers' opinions cited in a recent PriceWaterhouseCoopers (2004) survey that these collaborative ventures do not always achieve their stated objectives.

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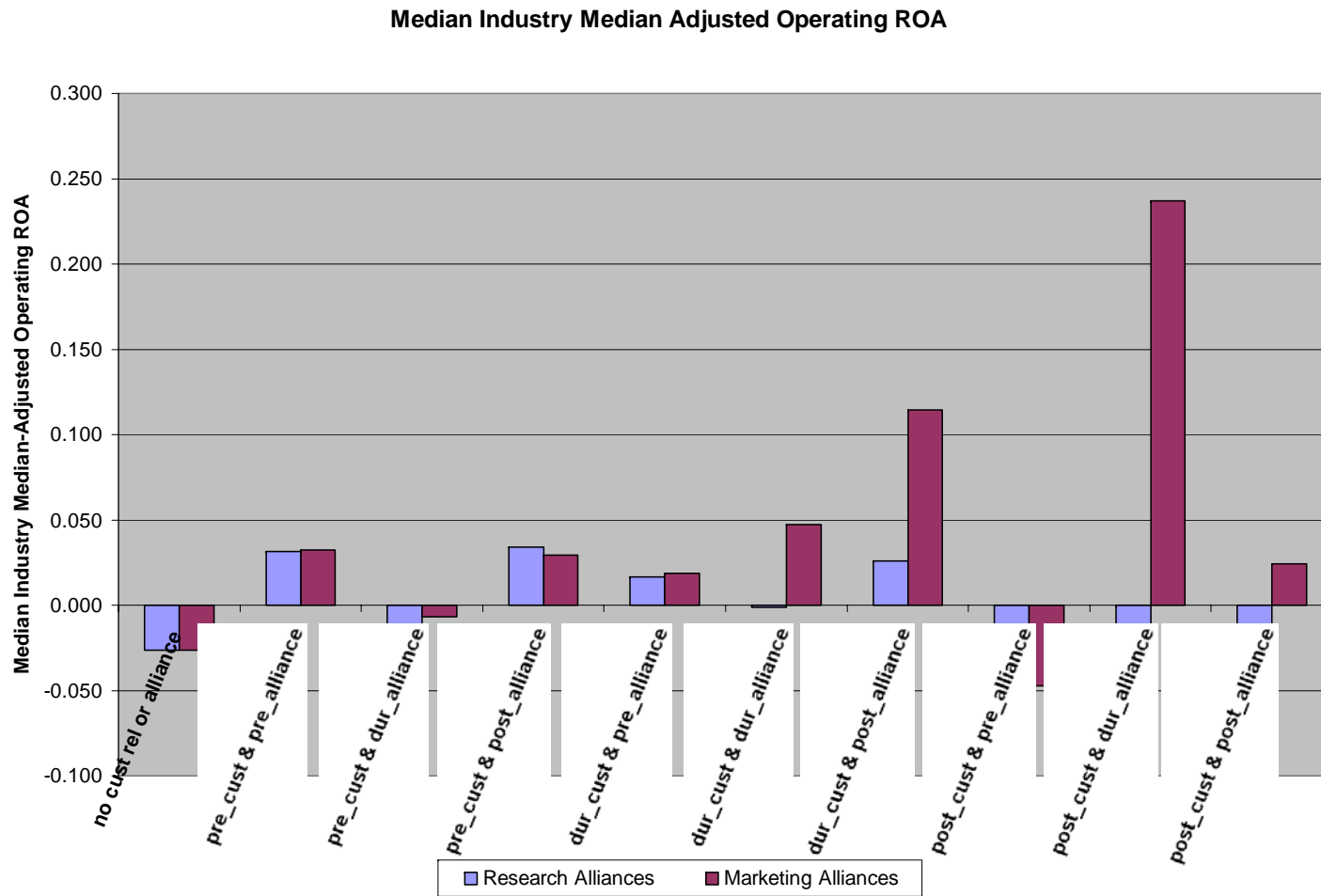
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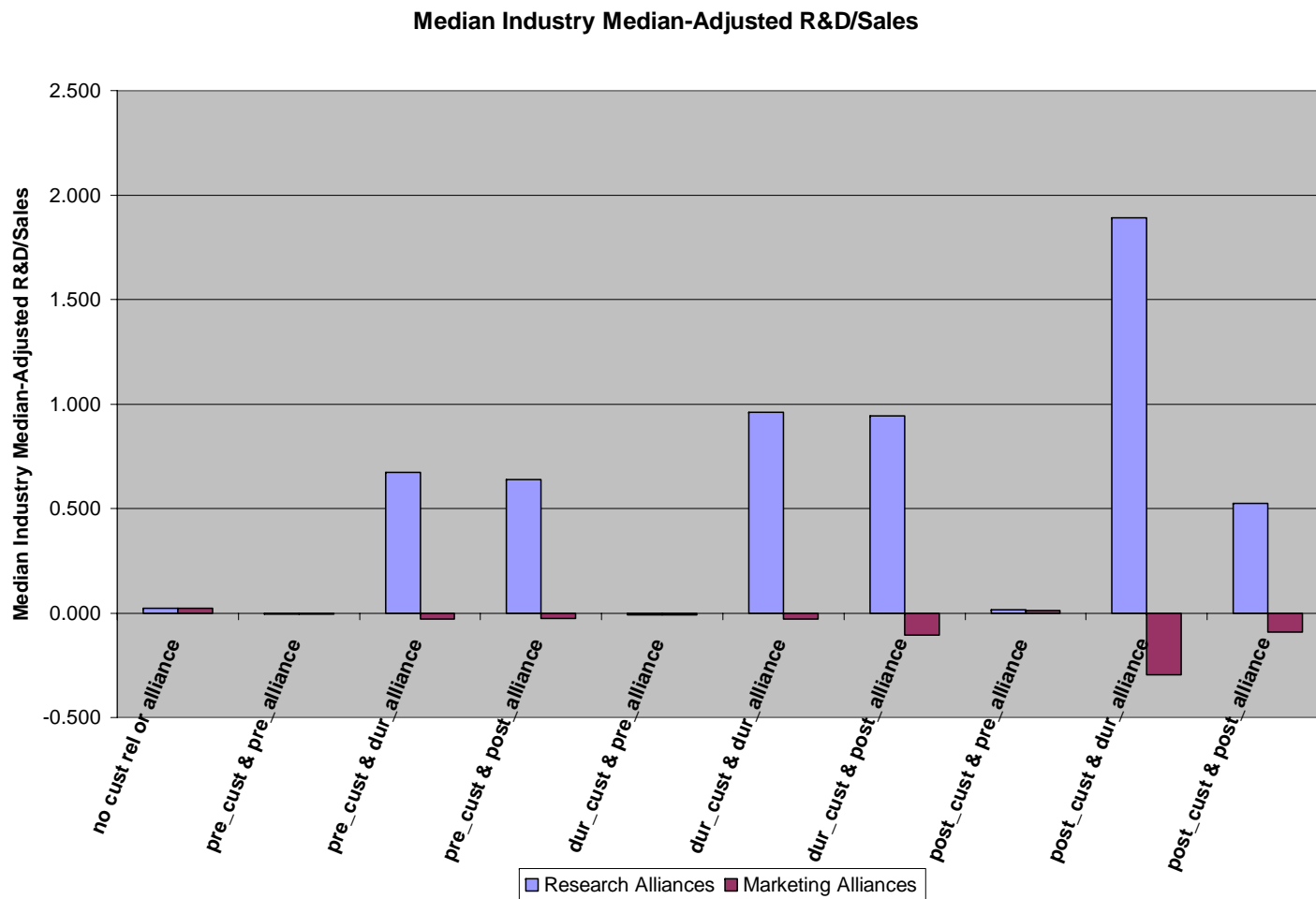
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**Figure 1**

Median Industry Median-Adjusted Operating ROA by Customer Relationship and Alliance Status for Types of Alliances (Research versus Marketing)



**Figure 2**  
 Median Industry-Median-Adjusted R&D Expense/Sales by Customer Relationship and Alliance Status for Types of Alliances  
 (Research versus Marketing)



**Table 2**  
**Sample Characteristics by High-Tech Industry**

	SIC				
	28	35	36	87	Total
<b>All Available Firm-Year Observations</b>	5,911	3,354	3,614	714	13,593
<b>Report Major Customers</b>	4,413	2,553	3,004	617	10,587
<b>Percent of All Available</b>	74.7%	76.1%	83.1%	86.4%	77.9%
<b>Report Alliance</b>	681	218	215	0	1,114
<b>Percent of Firms Reporting Major Customers</b>	15.4%	8.5%	7.2%	0.0%	10.5%

**Table 2**  
**Distribution and Reported Values of Alliance Announcements**

**Panel A: Number and Value of Firms with Alliance Announcements and Major Customer Relationships by Year**

Year	Number of alliance announcements	Value of announcements (\$ mm)	Value of acquisitions (\$mm)	Total Number of Firms <sup>a</sup>	Number of Firms w/Major Customer Relationship <sup>b</sup>	Proportion of Firms w/Major Customer
1988	4	\$49.0	\$0.0	583	386	66%
1989	9	\$0.0	\$0.0	581	399	69%
1990	14	\$192.8	\$0.0	607	424	70%
1991	18	\$1,696.5	\$520.0	649	458	71%
1992	24	\$840.0	\$810.0	719	505	70%
1993	28	\$787.4	\$450.0	777	545	70%
1994	37	\$830.9	\$539.6	831	592	71%
1995	30	\$9,972.6	\$9,603.6	942	662	70%
1996	31	\$7,534.8	\$6,800.5	982	689	70%
1997	19	\$2,610.5	\$1,886.0	980	696	71%
1998	18	\$1,747.5	\$1,053.0	1060	758	72%
1999	19	\$35,308.5	\$34,856.0	1048	751	72%
2000	17	\$2,035.5	\$1,282.5	1007	733	73%
2001	8	\$14,375.0	\$13,290.0	960	710	74%
2002	5	\$2,145.1	\$2,037.1	936	696	74%
2003	7	\$1,339.5	\$630.0	898	669	74%
Total sample	288	\$81,465.6	\$73,758.3	14346	10268	72%

**Panel B: Number and Value of Announcements by Alliance Type**

Type of Alliance	Number of announcements	Value of announcements (\$ mm)	Value of acquisitions (\$ mm)
Research alliance	155	\$4,719.2	\$0.0
Marketing alliance	76	\$2,328.1	\$0.0
Acquisition	57	\$74,418.3	\$73,758.3

*Notes:*

<sup>a</sup> Firms with sales data; represents maximum number of observations available each year.

<sup>b</sup> Represents firms that reported a major customer relationship at any time during the sample period.

**Table 3**  
**Summary of Financial Characteristics**

**Panel A: Characteristics by Alliance Status (No Alliance, Pre-Alliance, During Alliance, Post-Alliance)**

	Reported Alliance Status								Total	
	No Reported Alliance		Pre 1st Alliance		During 1st Alliance		Post 1st Alliance			
	mean	obs	mean	obs	mean	obs	mean	obs	mean	obs
operating_roa	-0.204	12487	-0.172	290	-0.157	336	-0.100	334	-0.200	13447
rd_sales	2.332	12586	3.552	290	2.376	337	2.654	335	2.367	13548
sales_growth	1.467	10890	1.692	212	1.705	319	1.261	335	1.472	11756
operating_margin	-3.754	12494	-4.793	290	-2.516	336	-2.922	334	-3.725	13454
current_ratio	4.305	12534	6.561	291	6.209	337	5.768	335	4.438	13497
financing_cash_flow	0.245	12289	0.323	279	0.247	337	0.165	334	0.245	13239
free_cash_flow	-0.233	12182	-0.237	279	-0.200	337	-0.129	333	-0.230	13131
debt_ratio	0.114	12580	0.098	291	0.086	335	0.140	324	0.114	13530
net_income	-0.185	10989	-0.049	248	-0.137	326	-0.124	333	-0.179	11896
size (\$MM)	3.074	12586	2.800	290	3.462	337	4.396	335	3.111	13548

*Notes:*

operating\_roa = operating income before depreciation (compustat item 13)/total assets (item 6);

rd\_share = firm r&d expense (item 46)/sum of industry r&d expense;

rd\_sales = r&d expense (item 46)/sales (item 12);

sales\_growth = sales (item 12)/previous sales;

operating\_margin = operating income before depreciation (item 13)/sales (item 12);

current\_ratio = current assets (item 4)/current liabilities (item 5);

financing\_cash\_flow = net cash flow financing (item 313)/total assets (item 6);

free\_cash\_flow = (net cash flow from operations (item 308) - capital expenditures (item 30))/total assets (item 6);

debt\_ratio = long term debt (item 9)/total assets (item 6);

net\_income = net income (item 172)/beginning of year market value (price (item 199) \* shares outstanding (item 25));

size = log of sales (in \$MM);

all variables except size winsorized 2%.

**Table 3 (continued)**  
**Summary of Financial Characteristics**

**Panel B: Characteristics by Major Customer Relationship Status (No Relationship, Pre-Relationship, During Relationship, Post-Relationship)**

	Major Customer Relationship Status									
	No Major Customer		Pre Customer Relation		During Customer Relation		Post Customer Relation		Total	
	mean	obs	mean	obs	mean	obs	mean	obs	mean	obs
operating_roa	-0.335	2944	-0.116	4886	-0.175	4744	-0.344	873	-0.200	13447
rd_sales	3.924	2989	2.067	4897	1.524	4765	3.293	897	2.367	13548
sales_growth	1.585	2404	1.502	4110	1.404	4366	1.361	876	1.472	11756
operating_margin	-6.805	2951	-3.026	4886	-2.093	4744	-6.091	873	-3.725	13454
current_ratio	4.394	2954	4.740	4889	4.207	4758	4.158	896	4.438	13497
financing_cash_flow	0.328	2853	0.226	4788	0.209	4728	0.271	870	0.245	13239
free_cash_flow	-0.333	2830	-0.181	4749	-0.200	4698	-0.321	854	-0.230	13131
debt_ratio	0.117	2983	0.109	4903	0.114	4753	0.122	891	0.114	13530
net_income	-0.214	2459	-0.088	4208	-0.220	4398	-0.323	831	-0.179	11896
size (\$MM)	2.481	2989	3.182	4897	3.500	4765	2.754	897	3.111	13548

*Notes:*

operating\_roa = operating income before depreciation (compustat item 13)/total assets (item 6);

rd\_share = firm r&d expense (item 46)/sum of industry r&d expense;

rd\_sales = r&d expense (item 46)/sales (item 12);

sales\_growth = sales (item 12)/previous sales;

operating\_margin = operating income before depreciation (item 13)/sales (item 12);

current\_ratio = current assets (item 4)/current liabilities (item 5);

financing\_cash\_flow = net cash flow financing (item 313)/total assets (item 6);

free\_cash\_flow = (net cash flow from operations (item 308) - capital expenditures (item 30))/total assets (item 6);

debt\_ratio = long term debt (item 9)/total assets (item 6);

net\_income = net income (item 172)/beginning of year market value (price (item 199) \* shares outstanding (item 25));

size = log of sales for previous year (in \$MM);

all variables except size winsorized 2%.

**Table 4**  
**Summary of Median Operating Return on Assets Performance and R&D Expense**  
**According to both Customer Relationship and Alliance Status**

<i>Customer &amp; Alliance Category</i>	Operating ROA				
	All	Alliance = Research	Alliance = Marketing	Alliance = Research, firms w/at least 12 years data	Alliance = Marketing, firms w/at least 12 years data
1. no cust rel or alliance	-0.075	-0.075	-0.075	-0.030	-0.030
2. pre_cust & pre_alliance	0.061***	0.061***	0.064***	0.082***	0.084***
3. pre_cust & dur_alliance	-0.058	-0.219	0.027	-0.218	0.020
4. pre_cust & post_alliance	0.002***	-0.153***	0.000	-0.162	0.000
5. dur_cust & pre_alliance	-0.017	-0.019	-0.015***	0.035	0.036
6. dur_cust & dur_alliance	-0.134*	-0.180	0.020	-0.170**	-0.113**
7. dur_cust & post_alliance	0.003**	-0.163*	0.092*	-0.125	0.061
8. post_cust & pre_alliance	-0.114	-0.117**	-0.113**	0.038***	0.038***
9. post_cust & dur_alliance	-0.133	-0.289	0.083	-0.391	n/a
10. post_cust & post_alliance	-0.112	-0.285	-0.079	-0.709	0.120
Total	-0.007	-0.012	0.001	0.052	0.058
N	13,447	12,945	12,747	6,309	6,282

<i>Customer &amp; Alliance Category</i>	R&D Expense / Sales				
	All	Alliance = Research	Alliance = Marketing	Alliance = Research, firms w/at least 12 years data	Alliance = Marketing, firms w/at least 12 years data
1. no cust rel or alliance	0.182	0.182	0.182	0.153	0.153
2. pre_cust & pre_alliance	0.128***	0.128***	0.126***	0.112**	0.111**
3. pre_cust & dur_alliance	0.266	1.480	0.091	0.872	0.091
4. pre_cust & post_alliance	0.146	1.404	0.117	1.380	0.117
5. dur_cust & pre_alliance	0.156***	0.157***	0.155***	0.129	0.129
6. dur_cust & dur_alliance	0.711***	1.512**	0.166***	0.789***	0.451***
7. dur_cust & post_alliance	0.170	1.634	0.119	0.586	0.122
8. post_cust & pre_alliance	0.198	0.199	0.198	0.145*	0.145*
9. post_cust & dur_alliance	0.325*	2.498*	0.108*	3.345***	n/a
10. post_cust & post_alliance	0.205	1.387	0.099	3.144	0.099
Total	0.153	0.154	0.148	0.123	0.120
N	12,515	12,035	11,822	5,900	5,850

*Notes:*

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1% compared to firms that never participated in a major customer relations or alliance, based on a nonparametric chi-squared test of equality of medians;

Operating ROA = operating income before depreciation (Compustat item 13) divided by total assets (item 6);  
R&D Expense / Sales = R&D expense (item 46) divided by total sales (item 12);  
pre\_cust & pre\_alliance = before major customer relationship and before first alliance;  
pre\_cust & dur\_alliance = before major customer relationship and during first alliance;  
pre\_cust & post\_alliance = before major customer relationship and at least 4 years after first alliance reported;  
dur\_cust & pre\_alliance = during major customer relationship and before first alliance;  
dur\_cust & dur\_alliance = during major customer relationship and during first alliance;  
dur\_cust & post\_alliance = during major customer relationship and at least 4 years after first alliance reported;  
post\_cust & pre\_alliance = after major customer relationship and before first alliance;  
post\_cust & dur\_alliance = after major customer relationship and during first alliance;  
post\_cust & post\_alliance = after major customer relationship and at least 4 years after first alliance reported;  
all continuous variables except size winsorized 2%.

**Table 5**  
**Regression Estimates of Operating ROA Performance Before, During, and After**  
**Major Customer Relationships and Alliances**

	Operating ROA <sub>it</sub>					
	All	All	Alliance = Research	Alliance = Marketing	Alliance = Research, firms w/at least 12 years data	Alliance = Marketing, firms w/at least 12 years data
<i>Controls</i>						
size <sub>it</sub>	0.103 (45.89)***	0.037 (18.95)***	0.037 (18.72)***	0.037 (18.49)***	0.031 (12.96)***	0.030 (12.91)***
op_roa <sub>it-1</sub>		0.577 (29.11)***	0.576 (28.73)***	0.581 (28.97)***	0.587 (18.24)***	0.588 (18.39)***
industry_median_op_roa <sub>it</sub>	0.403 (12.90)***	0.192 (7.40)***	0.204 (7.64)***	0.193 (7.18)***	0.257 (8.28)***	0.247 (7.94)***
<i>Customer &amp; Alliance Status</i>						
pre_cust & pre_alliance	0.125 (9.39)***	0.064 (5.82)***	0.063 (5.71)***	0.062 (5.64)***	0.055 (3.22)***	0.056 (3.26)***
pre_cust & dur_alliance	0.090 (3.04)***	0.036 (1.46)	0.072 (2.73)***	0.032 (0.67)	0.043 (1.22)	0.020 (0.39)
pre_cust & post_alliance	0.023 (0.82)	0.027 (1.10)	0.059 (1.93)*	0.056 (1.79)*	0.052 (1.39)	0.057 (1.68)*
dur_cust & pre_alliance	0.031 (2.31)**	0.023 (2.09)**	0.023 (2.05)**	0.022 (1.99)**	0.031 (1.73)*	0.032 (1.75)*
dur_cust & dur_alliance	0.095 (4.09)***	0.049 (2.44)**	0.045 (1.63)	0.041 (1.20)	0.066 (1.91)*	0.052 (0.74)
dur_cust & post_alliance	0.026 (1.25)	0.026 (1.56)	0.028 (1.47)	0.030 (0.98)	0.024 (0.92)	0.045 (1.46)
post_cust & pre_alliance	-0.072 (3.02)***	-0.038 (1.87)*	-0.039 (1.87)*	-0.038 (1.87)*	-0.007 (0.26)	-0.007 (0.25)
post_cust & dur_alliance	-0.163 (2.18)**	-0.078 (1.62)	-0.071 (1.18)	0.038 (1.24)	-0.136 (7.80)***	
post_cust & post_alliance	0.059 (0.96)	0.026 (0.58)	0.057 (0.75)	0.026 (0.38)	-0.125 (0.89)	0.128 (3.02)***
Constant	-0.518 (33.14)***	-0.203 (16.54)***	-0.203 (16.42)***	-0.201 (16.29)***	-0.174 (9.46)***	-0.173 (9.45)***
Observations	11669	11641	11183	11013	5779	5754
Adj R-sq	0.30	0.53	0.53	0.53	0.53	0.52

*Notes:*

Absolute robust z statistics in parentheses;

F-tests of parameter combinations;

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%;

size = log of sales (compustat item 12) for previous year;

op\_roa = operating income (compustat 13) divided by total assets (compustat 6);

industry\_median\_op\_roa computed by year for 3-digit SIC;

pre\_cust & pre\_alliance = before major customer relationship and before first alliance;

pre\_cust & dur\_alliance = before major customer relationship and during first alliance;

pre\_cust & post\_alliance = before major customer relationship and at least 4 years after first alliance reported;

dur\_cust & pre\_alliance = during major customer relationship and before first alliance;  
dur\_cust & dur\_alliance = during major customer relationship and during first alliance;  
dur\_cust & post\_alliance = during major customer relationship and at least 4 years after first alliance reported;  
post\_cust & pre\_alliance = after major customer relationship and before first alliance;  
post\_cust & dur\_alliance = after major customer relationship and during first alliance;  
post\_cust & post\_alliance = after major customer relationship and at least 4 years after first alliance reported;  
all continuous variables except size winsorized 2%.

**Table 6**  
**Regression Estimates of R&D Expense Performance Before, During, and After**  
**Major Customer Relationships and Alliances**

	R&D/Sales <sub>it</sub>					
	All	All	Alliance = Research	Alliance = Marketing	Alliance = Research, firms w/at least 12 years data	Alliance = Marketing, firms w/at least 12 years data
<i>Controls</i>						
size <sub>it</sub>	-0.877 (24.38)***	-0.271 (12.65)***	-0.272 (12.37)***	-0.255 (11.80)***	-0.248 (10.02)***	-0.239 (9.82)***
r&d/sales <sub>it-1</sub>		0.522 (21.60)***	0.519 (21.39)***	0.520 (20.87)***	0.527 (13.57)***	0.528 (13.20)***
industry_median_r&d/sales <sub>it</sub>	3.583 (19.55)***	1.847 (11.57)***	1.916 (11.58)***	1.849 (11.24)***	1.642 (7.96)***	1.563 (7.73)***
<i>Customer &amp; Alliance Status</i>						
pre_cust & pre_alliance	-0.872 (4.34)***	-0.451 (2.68)***	-0.458 (2.72)***	-0.484 (2.88)***	-0.272 (0.98)	-0.289 (1.04)
pre_cust & dur_alliance	-1.473 (4.94)***	-1.047 (3.18)***	-1.490 (2.36)**	-0.798 (1.91)*	-0.530 (0.74)	-0.685 (1.44)
pre_cust & post_alliance	-1.163 (2.72)***	-0.875 (2.02)**	-1.560 (3.97)***	-0.990 (4.53)***	-1.539 (3.24)***	-0.919 (3.15)***
dur_cust & pre_alliance	-1.281 (7.01)***	-0.732 (4.68)***	-0.737 (4.71)***	-0.790 (5.07)***	-0.841 (3.17)***	-0.852 (3.21)***
dur_cust & dur_alliance	-0.266 (0.47)	-0.132 (0.23)	0.309 (0.32)	-0.840 (3.49)***	-0.250 (0.34)	-0.902 (1.23)
dur_cust & post_alliance	0.693 (1.22)	0.513 (1.01)	2.753 (2.26)**	-0.872 (4.62)***	2.141 (1.71)*	-0.771 (2.74)***
post_cust & pre_alliance	-0.339 (1.01)	-0.079 (0.27)	-0.080 (0.28)	-0.078 (0.27)	0.372 (0.73)	0.362 (0.71)
post_cust & dur_alliance	0.447 (0.49)	-0.008 (0.01)	0.246 (0.20)	-0.706 (2.54)**	-0.960 (3.07)***	
post_cust & post_alliance	1.904 (0.96)	1.535 (1.02)	3.715 (1.32)	-1.254 (3.18)***	11.174 (1.77)*	-1.345 (2.96)***
Constant	4.175 (18.21)***	1.462 (8.66)***	1.447 (8.49)***	1.426 (8.43)***	1.389 (5.16)***	1.398 (5.21)***
Observations	11753	11753	11294	11123	5819	5794
Adj R-sq	0.17	0.39	0.39	0.39	0.37	0.36

*Notes:*

Absolute robust z statistics in parentheses;

F-tests of parameter combinations;

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%;

size = log of sales (compustat item 12) for previous year;

adj\_r&d/sales = industry median-adjusted R&D expense (compustat 46) divided by sales<sub>it</sub> (compustat 12);

industry median computed by year for 3-digit SIC;

pre\_cust & pre\_alliance = before major customer relationship and before first alliance;

pre\_cust & dur\_alliance = before major customer relationship and during first alliance;

pre\_cust & post\_alliance = before major customer relationship and at least 4 years after first alliance reported;  
dur\_cust & pre\_alliance = during major customer relationship and before first alliance;  
dur\_cust & dur\_alliance = during major customer relationship and during first alliance;  
dur\_cust & post\_alliance = during major customer relationship and at least 4 years after first alliance reported;  
post\_cust & pre\_alliance = after major customer relationship and before first alliance;  
post\_cust & dur\_alliance = after major customer relationship and during first alliance;  
post\_cust & post\_alliance = after major customer relationship and at least 4 years after first alliance reported;  
all continuous variables except size winsorized 2%.

**Table 7**  
**Cumulative and Mean Abnormal Returns by Industry, Major Customer Relationship Status, and Alliance Type**

	No.	CAR Event Windows		Mean AR Event Windows		+/-
		(-10, + 10)	(-2, 1)	(-10, + 10)	(-2, 1)	
<b>Total sample</b>						
Total sample	229	0.06(4.64)***	0.06(3.98)***	0.003(2.59)***	0.014(2.55)***	147/82***
<b>By Industry classification</b>						
Pharmaceuticals/Biotech (28)	164	0.07(4.37)***	0.06(2.01)**	0.003(2.30)**	0.011(1.60)*	107/57***
Computer equipment (35)	34	0.07(2.37)***	0.09(4.40)***	0.004(1.06)	0.023(1.64)*	21/13*
Electronics (36)	31	-0.01(-0.08)	0.05(1.59)*	0.000(0.07)	0.008(0.97)	19/12
<b>By major customer relationship</b>						
Pre-major customer relation	116	0.05(3.53)***	0.05(3.57)***	0.002(1.87)**	0.013(2.10)**	75/41***
During major customer relation	92	0.07(2.68)***	0.09(2.54)***	0.004(1.57)*	0.016(1.64)*	58/34***
Post-major customer relation	20	0.06(1.47)*	0.04(0.59)	0.003(0.81)	-0.001(-0.49)	13/7*
<b>By type of alliance/acquisition</b>						
Research alliance	122	0.05(3.03)***	0.04(1.74)**	0.002(1.77)**	0.008(1.13)	71/51**
Marketing alliance	62	0.03(1.78)**	0.03(2.96)***	0.001(1.16)	0.014(1.77)**	43/19***
Acquisition	45	0.13(3.37)***	0.16(2.62)***	0.022(1.39)*	0.014(1.63)*	33/12***
<b>By type of alliance and customer status</b>						
Research alliance pre-major customer relation	74	0.08(3.63)***	0.06(2.49)***	0.004(1.61)*	0.014(1.44)*	46/28**
Research alliance during major customer relation	40	0.01(0.18)	0.04(0.51)	0.000(0.16)	0.008(0.35)	22/18
Research alliance post-major customer relation	8	-0.02(-0.39)	-0.05(-1.90)**	-0.001(0.30)	-0.036(-0.88)	3/5
Marketing alliance pre-major customer relation	40	0.00(0.95)	0.03(2.26)**	0.000(0.69)	0.009(1.40)*	28/12**
Marketing alliance during major customer relation	14	0.10(1.61)*	0.07(2.37)**	0.005(0.68)	0.025(1.00)	8/6
Marketing alliance post-major customer relation	7	0.06(0.84)	-0.02(-0.07)	0.003(0.47)	0.003(0.15)	6/1

*Notes:*

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%;

Sample consists of 104 firms in the sample that participated in 229 alliance or acquisition announcements.

Abnormal returns are calculated using the market model with CRSP value-weighted returns estimated over the period from 200 days to 25 days prior to the announcement.

z statistics for CAR in parentheses are calculated from the standardized abnormal returns following Patell (1976).

t-statistics for mean AR in parentheses are based on the standardized cross-sectional method.

The number of positive and negative CAR values during the (-2, 1) window are presented in the last column with significance determined by the generalized sign test.