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Article

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BANKING & FINANCE | RESEARCH ARTICLE

Alliances motive and the stock market response: A comparative analysis across industries

Manish Tewari^{1*}, Pradip Kumar Ramanlal², Rajesh Kumar³ and Soumendra De²

Abstract: We analyze the announcement-period returns of 4315 two-party, non-equity alliances undertaken by US-based firms between 1986 and 2015 in 11 industries and find positive returns for all of the 11 samples, with the Drug industry reporting the highest (2.69%) cumulative abnormal return (CARs) and Wholesale Trade for Non-Durable Goods industry the lowest (0.84%) around the five-day window surrounding the announcement of the alliances. Using proxy variables, we study whether the alliances in the specific industry are motivated by Exploration, Exploitation, or a combination of both Exploration and Exploitation motive. We find strong evidence that the alliances in the Business Services; Computer and Office Equipment; Electronic and Electrical Equipment; and Telecommunications industries are Exploration motivated. Alliances in the Investment & Commodity Firms, Dealers, and Exchanges; Measuring, Medical, Photo Equipment and Clocks; Prepackaged Software; and Wholesale Trade-Durable Goods industries are motivated by the Exploitation motive, whereas alliances in the Communications Equipment and Drugs industries are motivated by both Exploration and Exploitation (dual) motives. The average CAR (ACAR) for alliances in industries motivated by both Exploration

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Manish Tewari has an undergraduate degree in engineering from the Indian Institute of Technology, New Delhi and a Ph.D. in finance from the University of Central Florida. Tewari's major areas of research are in Corporate Bonds, Financial Derivatives, Corporate Social Responsibility, and Alliances & Joint Ventures. He has published papers on corporate bond provisions including publication in the top journal in finance, *Journal of Financial Economics*. His research in the field of corporate social responsibility has led to publication in the prestigious *Journal of Business Ethics*. Currently, he is pursuing studies exploring motivation for alliances and joint ventures at the industry level. This paper is a result of one such study which has opened other potential research avenues in the field.

Tewari has an extensive teaching experience in finance and has taught a wide variety of finance courses including Corporate Finance, Investments, Money and Banking, Financial modeling, and Student Investment Fund.

PUBLIC INTEREST STATEMENT

We analyze the announcement-period returns of 4315 two-party, non-equity alliances undertaken by U.S. based firms between 1986 and 2015 in 11 industries and find positive returns for all of the 11 industry samples. In aggregate, the returns are higher than reported in prior studies pertaining to alliances. Using proxy variables, we stratify the industry samples whether the alliances in the specific industry are motivated by Exploration, Exploitation, or a combination of both Exploration and Exploitation motive. We find strong evidence that the alliances motivated by the dual motive of both Exploitation and Exploration yield the highest returns, followed in declining order by alliances motivated by the Exploitation motive and the Exploration motive. Results emanating from our cross-sectional regressions can be utilized to design industry studies on alliances and confirm structural parameters of individual industries, especially as it pertains to the cost of capital of the alliance firms. Also, potential future research can explore long-run performance of the alliances.

and Exploitation motives is the highest at 2.2%—thereby, creating the most value—followed by Exploitation motivated at 1.58% and Exploration motivated at 1.23%.

Subjects: Economics; Finance; Business, Management and Accounting

Keywords: strategic alliance; performance; exploration; exploitation; inter-industry studies

JEL Classification: D34; D74; D78; G34; L22

1. Introduction

Strategic alliances serve as an important vehicle by which firms seek to strengthen their position in the global marketplace (Albers, Wohlegezogen, & Zajac, 2016; Kale & Singh, 2009; Kumar & Das, 2007; Lavie & Rosenkopf, 2006; Majchrzak, Jarvenpaa, & Bagherzadeh, 2015). Embedded between organic growth or outsourcing at one end and outright mergers and acquisitions at the other, alliances allow firms to reduce costs, enter new markets, lessen operational and strategic risks, and engage in innovation (Yoshino & Rangan, 1995). The fundamental idea underlying strategic alliances is that it allows the participating firms to create value, either through the realization of synergies (Das, Sen, & Sengupta, 1998) or through innovation (Hamel, 1991). The interfirm arrangements can take the form of either an equity partnership or a non-equity partnership in which the partners agree to a set of contractual arrangements. Although strategic alliances have become a popular organizational form, their failure rate is high (Das & Kumar, 2011; Kumar, 2014; Ring & Van de Ven, 1994). The high failure rate suggests that alliances often fail to create the desired value that the partners anticipated when they entered into an alliance.

Valuation implications of strategic alliances have become in recent years the object of empirical research in finance (Chan, Kensinger, Keown, & Martin, 1997; Chen, King, & Wen, 2013, 2015; Chou, Ou, & Tsai, 2014; Palia, David, & Reisel, 2008). On average, alliances yield positive gains to the partner firms. Strategic alliances can take the form of both contractual and non-contractual agreements, joint ventures (JVs) and mergers and acquisitions. The evidence in the context of returns to both stockholders and bondholders around the announcement of strategic alliances indicates that such alliances—different from JVs¹—result, on average, in positive gains for both stockholders (Chan et al., 1997; Chen et al., 2013) and bondholders (Chen et al., 2015; Chou et al., 2014). The gains have been attributed to transfer and pooling of technical knowledge (Gomes-Casseres, Hagedoorn, & Jaffe, 2006), operational synergy (Chiou & White, 2005) and lower cost of debt that result (Chou et al., 2014) when firms resort to strategic alliances.

Other factors such as, the types of assets invested in, the duration of alliances and the complexities in the contract provisions of alliances can also have a significant bearing on the relative successes of alliances (Reuer & Ariño, 2007). Robinson (2008) has shown that alliance intensity across industries is positively correlated with the difference in risk between the two industries; alliances are preferred over organic growth when the firm's desired activity differs markedly from its current operations. Ozmel, Robinson, and Stuart (2013) have demonstrated that a start-up firm's prior affiliation with a venture capital (VC) firm makes both future alliance and future VC activity more likely, whereas strategic alliances reduces likelihood of obtaining private capital through venture funding but enhances the probability of future alliances. Alliances thus have a sorting effect on raising funds in private capital markets. Lindsey (2008) shows that alliances are more frequent among companies which share a common VC firm, since the prospect of sharing common information provides lucrative exit strategies for the VC firms. In the syndicated loan market, alliances lead to a reinforcing effect as Champagne and Kryzanowski (2007) have shown, one alliance leading to higher probability of future alliances.

Evidently, cooperative arrangements between firms in alliances help them overcome competitive forces, improve operating efficiency and financial profitability, reduce overall risk of their enterprises, and manage resource-intensive projects better through the realization of synergistic

gains and the sharing of technical knowledge without having to make full-fledged investments in technology and market-share-enhancement efforts all on their own. Trust between partnering firms and the need to develop control mechanisms when information asymmetries prevail are important determinants in developing confidence in partner cooperation in alliances (Das & Teng, 1998). Alliances provide partner firms with valuable real options in investment decisions and need for real investor control diminishes when the target firm brings in more resources to the alliance contract (Dessein, 2005). Procedural fairness improves cooperation results and has a direct effect on operational outcome (Luo, 1998).

Clearly, the operational benefits of alliances have been explored under a wide array of circumstances. Although, the interface between the partners in alliances is an extremely important determinant of success, it must also be recognized that the environment within which alliance partners operate is equally crucial. Specifically, salient characteristics of industries in which alliances have undertaken will vary and the potential for gains from alliances across industries will differ as well. Industries differ at a fundamental level and their embedded characteristics are assuredly important determinants of whether an alliance in a specific industry is more likely to succeed than in another. The gains from strategic alliances are likely to be higher if they are managed over time to reflect the competitive strategy of the firm and the firm's industry is dynamic enough to permit the alliance management capabilities to flourish (Goeltz, 2014). Not only are the partnering firms required to be better positioned to realize higher gains, the industry itself would have to be predisposed to delivering such relatively higher gains to the firms participating in alliances.

For example, in some industries, alliances may be motivated to reduce the forces of immediate competition partner firms face, whereas in others firms may form cooperative arrangements only to approach jointly the overall uncertainties of the future. Furthermore, in some industries, alliances may be formed when it is possible to reduce the average cost of production by reducing the level of resources devoted by each of the firms to a function undertaken by both firms prior to the alliance, whereas in some industries, firms may form alliances to share in the high research and development expenditures related to an untried process or technology. In the former case, the alliances are presumed to be motivated by the exploitation objective wherein the gains are limited but are likely to occur fairly soon, and in the latter by the exploration motive wherein the potential gains could be notably higher (March, 1991) but over a longer time horizon. Viewed differently, in alliances based on the exploitation motive, the gains are targeted in the short run and in alliances based on the exploration motive, the gains are realized in the long run (Vagnani, 2015).

Also, the role of industry context in shaping the value creation potential of alliances with a multitude of motives has rarely, if ever, been considered explicitly in the alliance research to date. The one significant factor that seems to be missing from prior lines of inquiry into the success potential of alliances is the industry context under which alliances are formed. Not only do industries differ markedly in terms of the significant embedded characteristics, they also respond differently to market forces and conditions. One factor which significantly influences alliance success or failure in one industry might turn out to be an insignificant factor in another. The overall motives for the alliances—whether exploration, exploitation, or a combination of both exploration and exploitation (referred to as the dual motive hereafter)—could be a significant determinant as to which factors are particularly important in creating value gains in certain industries.

We explore which motive (exploration, exploitation, or dual) is present in alliances in each industry using pre-selected proxy variables that identify each motive. In addition, we examine which motive creates the highest value using average cumulative abnormal returns (ACARs) for each motive. To the best of our knowledge, our study is the first to empirically explore this issue. We find that the ACARs around the announcement of strategic alliances are positive and statistically significant for all the 11 industries we study in this paper, with Drugs posting the highest

return (2.69%) and Wholesale trade for non-durable goods the lowest (0.84%). We find strong evidence that the alliances in (a) the Business Services; Computer and Office Equipment; Electronic and Electrical Equipment; and Telecommunications industries are Exploration motivated; (b) the Investment & Commodity Firms; Dealers, and Exchanges; Measuring, Medical, Photo Equipment and Clocks; Prepackaged Software; and Wholesale Trade-Durable Goods industries are motivated by Exploitation motive; (c) the Communications Equipment and Drugs industries are motivated by both Exploration and Exploitation motives; and (d) the Wholesale Trade for Non-Durable goods industry, the motive is not clear. The ACAR for both Exploration and Exploitation (dual) motivated industries is the highest at 2.2%, thereby creating the most value, followed by the Exploitation motive at 1.58% and the Exploration motive at 1.23%.

The remainder of this paper is organized as follows. We begin by discussing the industry context and hypothesize how different aspects of the industry context might potentially influence the value creation potential of alliances formed within that industry in Section II. In this section, we also characterize the key differences between alliances motivated by the exploitation and the exploration objectives and how they relate to the short-term and long-run strategies of firms engaged in alliances. Section III presents the data, sample, and the methodology adopted in this study. Section IV presents the results and Section V discusses the findings and concludes.

2. The nature of the industry environment and its influence on alliances

Industries vary in terms of how profitable they are (Porter, 1985). The attractiveness or the profitability of a given industry is dependent on the industry's growth rate (Yamakawa, Yang, & Lin, 2011), the competitive dynamics in a given industry (Lavie, Stettner, & Tushman, 2010), and environmental dynamism (Lavie et al., 2010). If an industry is growing rapidly, it provides firms with new market opportunities and new technologies to explore (Yamakawa et al., 2011). If an industry faces challenges in terms of growth opportunities, firms will form alliances to reduce costs, expand market share, and make optimum use of jointly owned resources. Competitive dynamics in an industry depend on the bargaining power of buyers and suppliers, threat of substitutes, barriers to entry, and the extant inter-firm rivalry (Porter, 1985). Competition can be intense or it can be low. When the competition is intense, prices will be declining, margins will be lower, and organizational slack reduced (Lavie et al., 2010). Firms will form alliances to alleviate the pressures arising out of competition with the explicit goal of reducing average costs. The environmental dynamism of an industry refers to the degree to which an industry's environment changes unpredictably (Dess & Beard, 1984). In a dynamic environment, a firm's existing set of products and services no longer produce the requisite value (Sorenson & Stuart, 2000). There is the need to reinvigorate the firm's portfolio and firms have the choice of either going about alone in terms of generating new possibilities when the risks are manageable and project costs are feasible or forming alliances when the risks are high and the potential costs of spanning new opportunities are exorbitantly high.

2.1. Industry environment and the value creation potential of alliances: exploration, exploitation, and the dual motive for alliances

Organizations engage with their environment either through exploration, exploitation or both (March, 1991). March (1991) defines exploitation as "refinement, choice, production, efficiency, selection, implementation, and execution" whereas exploration is defined as involving "search, variation, risk taking, experimentation, play, flexibility, discovery, and innovation". Exploitation involves building on an organization's existing knowledge base, whereas exploration involves moving away from the firm's existing knowledge base (Lavie et al., 2010). Exploration also involves a longer time commitment (March, 2008). There is an inherent tradeoff between exploration and exploitation (Lavie et al., 2010). The tradeoff revolves around the choice between short-term productivity and long-term innovation, stability and adaptability, and short-term and long-term outcomes (Lavie et al., 2010). One of the fundamental differences between exploration and exploitation relates to the short-term and the long-term organizational performance. As Vagnani (2015) notes "The literature has emphasized that exploration-oriented activities tend to produce wild ideas and actions that lead to returns with large variances and relatively low means, especially in the short term". Consistent with this line of reasoning, Vagnani

(2015) has demonstrated that exploration is positively linked to long-run organizational performance, whereas exploitation purports to leverage gains in the short run. In sum, a balance between exploration and exploitation is necessary for optimum performance enhancement. However, the proper mix of exploration and exploitation is “contingent on a number of factors, including the strategy and the external environment” (Goeltz, 2014).

A basic premise in strategy is that a firm’s strategy should be consistent with the environment in which it is operating in (Lawrence & Lorsch, 1967). A key implication being that in some industry environments, exploration might be the preferred strategy, whereas in other environments, exploitation might be the strategy of choice. In dynamic environments, exploration is essential to survive and prosper because shifts in demand make a firm’s current portfolio of goods and services unattractive to the market (Lavie et al., 2010). In industries where competition is intense, exploitation once again becomes the preferred strategic option to exercise. As Lavie, Stettner, and Tushman, 2010 note “Intensifying competitive pressures call for exploration that can drive change and nurture new sources of competitive advantage”. It has also been maintained that in high-growth environments, exploration is also the preferred strategic posture as in these markets there is frequent emergence of new technological and market opportunities (Yamakawa et al., 2011).

Alliances based on exploitation and exploration motives differ markedly in terms of utilization of existing resources. Exploitation alliances leverage a firm’s existing capabilities, whereas exploration alliances are alliances in which a firm is engaged in the task of acquiring new skills and knowledge with the objective of enhancing long-run performance (Koza & Lewin, 1998; Smith, Callagher, & Huang, 2014; Yamakawa et al., 2011). Scholars have explored the linkages between alliance type (exploitation vs exploration) and firm performance. Some studies suggest that both types of alliances positively contribute to a firm’s performance (Durand, Bruyaka, & Mangematin, 2008; Lin, Yang, & Demirkan, 2007), whereas other studies suggest that there is a difference. Hoang and Rothaermel (2010) suggest that exploration alliances have a negative impact on performance, whereas exploitation alliances are positively linked to performance. Perhaps, the discrepancy can be bridged by recognizing that the differential performance may be a function of timing with exploitation alliances bringing in more immediate reward (Smith et al., 2014). As alliances based on the exploitation motive yield short-term benefits and alliances based on the exploration motive long term, firms may want to achieve a balance between the two and this is what actually has been observed in practice (Lavie & Rosenkopf, 2006). The performance in such alliances based on the dual motive has the potential to surpass the performance of alliances based solely on the exploitative motive or the explorative motive. We thus construct the following two hypotheses for the study.

2.2. Hypotheses for the study

Hypothesis 1A: Alliances in industries based on the exploitative motive will post higher average cumulative abnormal return (ACARs) around the announcement of alliances relative to alliances based on the exploration motive.

Hypothesis 1B: Alliances in industries based on both exploration and exploitation motives (dual motive) will be awarded with the most value benefit measured by the ACARs over the announcement period due to the incremental short-term as well as the long-term benefits arising out of the alliances.

3. Data, sample and methodology

3.1. Data and sample

The SDC database² was utilized to identify strategic alliances undertaken by US-based firms and the announcements of these alliances were recorded during the time period 1980 to 2015.³ We focused on strategic alliances which can range from research and development agreements to

licensing and distribution arrangements. A strategic alliance is a collaborative agreement in which the partners retain their independence while simultaneously collaborating either through the development of a new entity (e.g., JV) or through a contractual, non-equity arrangement (Yoshino & Rangan, 1995). Our study considers the latter category exclusively.

The following criteria were applied to arrive at a sample of 4940 two-party strategic alliances between publicly traded firms: (a) the alliances had to be completed, (b) the alliances were restricted to only two party strategic alliance⁴, (c) both firms were publicly traded firms, (d) returns data and balance sheet and income statement data for the firms were, respectively, available on CRSP (Center for Research in Security Prices) and COMPUSTAT. The 4940 firms were drawn from 57 industries as per SDC classification. We further restricted the sample to include completed two-party strategic alliances by publicly traded firms only in those industries which had more than 100 alliances reported in the total sample of 4940 firms. This resulted in a final sample of 4315 completed two-party strategic alliances by publicly traded firms in 11 of the 57 industries included in the original sample of 4940 firms. The 11 industries included in our sample are: (i) business services; (ii) communications equipment; (iii) computer and office equipment; (iv) drugs; (v) electronic and electrical equipment; (vi) investment and commodity firms, dealers, exchanges; (vii) measuring, medical, photo equipment, clocks; (viii) prepackaged software; (ix) telecommunications; (x) wholesale trade durable goods; and (xi) wholesale trade non-durable goods.

It is worth mentioning that the 11 industries were not chosen according to any preconditioned criteria. Rather, the relative frequency of total number of alliances in each of the 57 industries that were represented in the aggregate data led to the inclusion of 11 industries in the study. Based on the number of alliances in each of the 57 industries over the time period for the study, we deemed that 100 alliances in any industry was an appropriate cut off for inclusion in the final sample.

Our final sample comprises 4315 two-party strategic alliances completed by public firms during the time period 1986 to 2015, and the final sample of alliances was drawn from only 11 of the 57 industries as they (the 11 industries) met our cut-off criteria that number of alliances within a given industry should be 100 or more. Since, the objective is to get insights into the motive of alliances within a specific industry which reported a significant number of alliances during the time period for the study, we omitted industries in which the number of alliances were fewer than 100.⁵

Table 1 shows the distribution of total number of 4940 alliances and 770 JVs across 57 industries as per the SDC classification. We show the number of JVs for demonstrative purposes only. We do not consider joint ventures in this study. Table 2 lists the distribution of the number of all completed two public firm alliances across the 11 industries that were selected by the criteria to be included in the sample (the industry would be required to have at least 100 two-party completed alliances) during the period 1986–2015, all completed two public firm joint ventures during the same period (1986–2015), and the number of sample alliance firms available on CRSP and COMPUSTAT during the 1986–2015 and 1986–2012 time periods. Table 3 lists, for demonstrative purposes only, the aggregate year-wise distribution of all completed two-party, alliances 1986 to 2015 we chose to study. Our final sample of number of alliances reduced to 4315 from 4940 when we considered only two-party, completed alliances in the 11 industries. In 4315 two firm alliances, the number of firms available on both CRSP & COMPUSTAT equals 5273 over the period 1986 to 2015 and 5197 over 1986 to 2012. The final sample consisting of 5197 firms over the period 1986 to 2012 was used for empirical analysis due to the presence of Incremental Cash Flows (ICCF) variable which is calculated over three-year window after the alliance announcement.

Of the 11 industries represented in the 4315 alliances included in our study, alliances in the Business Service industry reported the highest number of alliances (1335) and Measuring, Medical, Photo Equipment, Clocks the lowest (123). The aggregate number of alliances took off in the year 1990, rapidly increased until 1997, began to steadily decline until 2008 after which the number of

Table 1. Distribution of all two public firm Alliances by industry from 1986 to 2015 from the SDC platinum database

Industry	No. of Alliances
Advertising Services	16
Aerospace and Aircraft	11
Agriculture, Forestry, and Fishing	5
Air Transportation and Shipping	3
Amusement and Recreation Services	12
Business Services	1335
Chemicals and Allied Products	32
Commercial Banks, Bank Holding Companies	11
Communications Equipment	176
Computer and Office Equipment	152
Construction Firms	13
Credit Institutions	30
Drugs	307
Educational Services	4
Electric, Gas, and Water Distribution	17
Electronic and Electrical Equipment	240
Food and Kindred Products	19
Health Services	24
Hotels and Casinos	7
Insurance	23
Investment & Commodity Firms,Dealers,Exchanges	412
Leather and Leather Products	3
Legal Services	1
Machinery	28
Measuring, Medical, Photo Equipment, Clocks	123
Metal and Metal Products	13
Mining	8
Miscellaneous Manufacturing	31
Miscellaneous Retail Trade	32
Miscellaneous Services	2
Motion Picture Production and Distribution	18
Oil and Gas; Petroleum Refining	40
Other Financial	5
Paper and Allied Products	6
Personal Services	3
Prepackaged Software	863
Printing, Publishing, and Allied Services	14

(Continued)

Table 1. (Continued)

Industry	No. of Alliances
Public Administration	38
Radio and Television Broadcasting Stations	32
Real Estate; Mortgage Bankers and Brokers	11
Repair Services	5
Retail Trade-Eating and Drinking Places	7
Retail Trade-Food Stores	2
Retail Trade-General Merchandise and Apparel	9
Retail Trade-Home Furnishings	22
Rubber and Miscellaneous Plastic Products	5
Sanitary Services	1
Soaps, Cosmetics, and Personal-Care Products	7
Stone, Clay, Glass, and Concrete Products	3
Telecommunications	134
Textile and Apparel Products	18
Tobacco Products	1
Transportation and Shipping (except air)	10
Transportation Equipment	20
Wholesale Trade-Durable Goods	448
Wholesale Trade-Nondurable Goods	125
Wood Products, Furniture, and Fixtures	3
Total	4940

alliances declined more steeply until 2015 when there were only two alliances in all of the 11 industries considered in our study.

3.2. Methodology

We estimate the abnormal returns with a standard pre-event estimation window of (-255, -46) trading days prior to the event date. Equation 1 depicts the relationship between stock returns and market returns over the pre-event estimation window:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

where R_{it} = the daily return of the stock i on day t , R_{mt} = the return on the CRSP value-weighted index on day t .

Using the coefficient estimates from regression in Equation 1, the expected return (\hat{R}_{it}) for a stock i on day t is calculated by equation 2 below:

$$\hat{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt} + \hat{\varepsilon}_{it} \quad (2)$$

For each firm, the daily abnormal return (AR_{it}) and the CAR are calculated in the event window (-2, +2) for examining the extent to which the stocks respond to the event. The AR_{it} is calculated by equation 3 below:

$$AR_{it} = R_{it} - \hat{R}_{it} \quad (3)$$

Table 2. Distribution of Alliances by the industry for all industries with at least 100 completed two firm alliances. Number of completed alliances represents all completed alliances, completed two firm alliances, sample of alliance firms available on CRSP & COMPUSTAT (1986–2015), and final sample of alliances firms available on CRSP & COMPUSTAT (1986–2012)

Industry	No. of Completed Two Public Firm Alliances (1986–2015)	Sample Alliance Firms available on CRSP & COMPUSTAT (1986–2015)	Sample Alliance Firms available on CRSP & COMPUSTAT (1986–2012)
Business Services	1335	1565	1535
Communications Equipment	176	209	209
Computer and Office Equipment	152	189	182
Drugs	307	355	344
Electronic and Electrical Equipment	240	306	302
Investment & Commodity Firms, Dealers, Exchanges	412	508	507
Measuring, Medical, Photo Equipment, Clocks	123	153	148
Prepackaged Software	863	1125	1115
Telecommunications	134	152	151
Wholesale Trade-Durable Goods	448	566	563
Wholesale Trade-Nondurable Goods	125	145	141
Total	4315	5273	5197

The CAR is calculated using equation 4:

$$CAR_{(t2,t1)} = \sum_{t1}^{t2} AR_t \tag{4}$$

For each of the subsample of firms included in each of the 11 industries, we computed the ACARs for the five-day (-2, +2)⁶ window surrounding the announcement of the alliances utilizing an equally weighted market index within the market model framework. We found the ACARs for the two participating firms in the alliance for the five-day window surrounding the announcement of the alliances in each of the 11 industries. We then ran multiple regression analysis for each of the 11 industry subsamples with the CARs for the (-2, +2) window as the dependent variable and an array of explanatory and control variables. We list and elaborate on each of the explanatory and control variables below.

3.3. Explanatory variables

We propose in this paper four categories of explanatory variables which we hypothesize can contribute to the value of strategic alliances. They are related to (a) the growth options available to the participating firms, (b) sources of possible gains from synergy, (c) real options available to the participating firms to combat competition and alleviate financial constraints, (d) opportunities for cost and risk reduction available to the partnering firm. We surmise that growth options available to participating firms and gains from synergy are associated more with alliances initiated by exploratory motives, whereas real options to combat competition and alleviate financial

Table 3. Annual distribution of number of Alliances by the industry for all industries with at least 100 completed two firm alliances

Year	Business Services	Communications Equipment	Computer and Office Equipment	Drugs	Electronic and Electrical Equipment	Investment & Commodity Firms, Dealers, Exchanges
1986	1	0	0	0	0	0
1987	0	0	0	3	0	0
1988	1	0	0	1	1	0
1989	0	0	0	1	0	0
1990	42	2	2	4	5	33
1991	74	11	12	11	8	51
1992	43	16	25	43	33	1
1993	41	28	19	37	33	2
1994	22	29	18	46	38	0
1995	42	22	16	27	26	7
1996	46	18	15	27	18	8
1997	77	23	18	48	26	15
1998	93	6	12	14	9	86
1999	198	10	8	11	11	56
2000	123	1	1	3	4	12
2001	57	0	0	1	2	13
2002	41	1	0	3	3	5
2003	55	0	2	2	1	22
2004	43	0	0	1	2	14
2005	66	1	0	0	2	27

(Continued)

Table 3. (Continued)

2006	81	2	0	2	2	22
2007	85	3	0	0	2	24
2008	66	1	0	0	7	12
2009	4	0	0	0	0	0
2010	1	0	0	0	0	0
2011	5	0	0	3	0	0
2012	7	1	0	8	2	1
2013	6	1	0	6	0	0
2014	15	0	4	5	4	1
2015	0	0	0	0	1	0
Total	1335	176	152	307	240	412
Year	Measuring, Medical, Photo Equipment; Clocks	Prepackaged Software	Telecommunications	Wholesale Trade-Durable Goods	Wholesale Trade-Nondurable Goods	Total
1986	0	0	0	0	0	1
1987	0	0	0	0	0	3
1988	0	0	0	0	0	3
1989	0	0	0	0	0	1
1990	3	20	0	1	0	112
1991	3	43	1	12	3	229
1992	15	52	7	84	18	337
1993	15	55	10	89	13	342
1994	16	74	10	48	22	323

(Continued)

Table 3. (Continued)

1995	15	101	12	38	15	321
1996	8	96	8	46	7	297
1997	16	144	11	19	14	411
1998	10	47	17	12	5	311
1999	9	63	19	17	7	409
2000	1	43	20	4	1	213
2001	1	21	3	5	2	105
2002	2	20	1	3	1	80
2003	1	12	2	11	6	114
2004	1	10	1	7	2	81
2005	0	9	4	14	0	123
2006	1	18	3	12	2	145
2007	1	8	1	15	2	141
2008	0	7	0	7	1	101
2009	0	3	1	1	0	9
2010	0	1	0	0	0	2
2011	0	1	0	1	1	11
2012	2	5	2	0	1	29
2013	2	9	0	2	0	26
2014	0	1	1	0	2	33
2015	1	0	0	0	0	2
Total	123	863	134	448	125	4315

constraints and opportunity for cost and risk reduction are associated more with alliances initiated by exploitative motives. We assume that gains to explorative alliances will be better explained by the growth options and synergistic benefits variables, and gains to exploitative alliances would correspondingly be better explained by factors representing opportunities for alleviating financial constraints, reducing costs and risks through alliances. We will now briefly describe the variables under each of the four categories.

3.3.1. Growth options

To assess the impact of growth options available to the participating firms on the gains from alliances, we consider two variables, market to book value (M/B) of the firms and annual sales growth ($SALESG\%$). Firms with high M/B values and higher $SALESG\%$ are doing well as independent firms and will presumably engage in explorative alliances to further their gains. Such alliances are more likely to post gains arising from such cooperative arrangements. If the $CARs$ of one industry is explained by this variable, we assume that the alliances in this industry are likely to be motivated by the exploration motive. We are drawing inference about the motives of alliances across industries from the statistically significant effects of proxy variables we have chosen to depict exploration and exploitative motives on the respective announcement period $CARs$ in specific industries.

3.3.2. Synergy

To account for the impact of synergy on the value creation from alliances, we consider two variables, ratio of research and development ($R\&D$) expenses to sales ($R\&D/SALES$) and the ratio of incremental cash flows ($ICCF$) over a three-year period after a cooperative activity is announced (as defined in Chen et al., 2015) to market capitalization ($ICCF/MKTCAP$). $R\&D$ expenses serves as a proxy for potential gains to participating firms, especially in the context of non-equity, explorative alliances, wherein large outlays in terms of $R\&D$ expenses is necessary for long-term gains and the partner firms would prefer to share the expenses. Whereas $ICCF$ gauges the extent to which the alliance lead to gains for the participating firms after the alliance, especially in the context of alliances undertaken with an exploitation motive, wherein the pressures to realize monetary gains is more intense and thus the immediate cash flows will have to be larger after the alliance is formed. Alliances undertaken with exploration motives are characterized by greater uncertainty and can take longer time to realize gain,s whereas alliances undertaken with the exploitation motive purports to gain the benefits sooner with minimal risks. Thus, exploration-based alliances are expected to reap larger gains on account of the larger $R\&D$ expense measure but unlikely to show immediate gains in cash flow immediately after the alliance, whereas alliances based on the exploitative motive would post higher gains when the $ICCF/MKTCAP$ measure is larger. In regression analysis, the $R\&D/SALES$ variable will post a positive sign for explorative alliances and the $ICCF/MKTCAP$ will post a positive sign for alliances motivated by the exploitative motive.

3.3.3. Competition and financial constraints

Cooperative activities give the participating firms the option to engage in investment opportunities without being committed to them during the signing of the alliances. Such investments can be directed toward combating product market competition or undertaking steps to obviate financial constraints. Alliances influenced by these industry circumstances are more likely to be based on the exploitation motive; such alliances will purport to overcome current problems for short-run gains. Motivated by Chou et al. 2014, we include two firm-specific dummy variables to incorporate the effects of competition and financial constraint encountered by the firms. We construct a competition dummy, $COMP$, that takes the value of 1 if the firm's excess profit-cost margin is negative and 0 otherwise (Gasper & Massa, 2006). Excess profit-cost margin is the difference between the firms' operating profit margin (ratio of operating profit to sales) and the average industry profit margin. Firms which are able to surpass the industry average in terms of profit margin are deemed as more able to combat competition. Thus, a value of 1 for the $COMP$ variable will indicate that the firm is facing greater competition and is unable to post positive excess profit-cost margin.

To capture the extent of financial constraint experienced by firms, we construct a dummy variable Kaplan Zingales (KZ) Index that takes on a value of 1 if the firm places above the median as ranked by the KZIndex⁷ and 0 otherwise (Kaplan & Zingales, 1997). Companies with higher KZ values are more likely to experience difficulties when financing conditions tightens. We expect a higher KZ value to be associated with alliances undertaken to meet competitive pressures in the industry.

The third variable we include under this category is a measure that purports to gauge the extent of funds flow deficit (DEF) experienced by firms and the measure is defined as the ratio of DEF to sales (DEF/SALES), where DEF is calculated as per Frank and Goyal (2003).⁸ We hypothesize that alliances based on the exploitation motive will reap higher benefits on account of higher values for all of these variables. That is, firms engaging in alliances motivated by the exploitative motive will post positive signs for the independent variables COMP, KZ and the DEF/SALES variables in regression analysis. On average, the coefficients of these variables will be higher for alliances motivated by exploitation rather than for exploration motive.

3.3.4. Opportunity for cost reduction

Alliances are often undertaken to reduce costs experienced by the participants prior to the alliances. To capture the effects of cost reduction, we incorporate the variable operating cost to sales (OPCOST/SALES). Alliances geared toward exploitation motives will tend to benefit when the ratio of operating cost to sales is high as the alliance would be sought only to reduce such costs. Such alliances will be formed to jointly reduce costs when they are high prior to the alliance.

To summarize, the three variables, M/B, SALES%, and R&D/SALES, would be expected to influence alliances motivated by the explorative motive, whereas the five variables, ICCF/MKTCAP, COMP, DEF/SALES, KZ, and OPCOST/SALES, would be expected to influence alliances motivated by the exploitative motive.

3.4. Control variables

We include in the multiple regression model a control variable for the type of alliance⁹—either licensing arrangement motivated (LIC) or research and development motivated (RD)—and five other firm-specific control variables: (a) Total Assets (TA); (b) Leverage ratio (LEV); (c) Return on Assets (ROA); (d) Capital Intensity (CAPINT); (e) Cash and Cash Equivalents to Total Assets (CA&EQ/TA); and (f) Altman Z-score (ALTZ). The Altman Z-score is the output of a credit-strength test that gauges a publicly traded company's likelihood of bankruptcy. The Altman Z-score is based on five financial ratios that can be calculated from data found on a company's annual 10K report.¹⁰ Low scores portend higher bankruptcy likelihood, whereas higher scores reflect financial soundness. Firms with higher likelihood of bankruptcy (lower Altman Z-score) are expected to post gains from cooperative arrangements—exploitation or exploration based—and we expect the sign of this independent variable to be negative in regression analysis. That is, firms will form alliances when the risk of bankruptcy is high. The variables and their definition is summarized in Appendix A.

3.5. Empirical regression model

We employ the following regression model to empirically test Hypotheses 1A and 1B:

$$\begin{aligned} CAR_i &= \text{Constant} + \beta_1 LIC_i + \beta_2 RD_i + \beta_3 \ln TA_i + \beta_4 LEV_i + \beta_5 ROA_i + \beta_6 CAPINT_i + \beta_7 (CA\&EQ/TA)_i \\ &+ \beta_8 ALTZ_i + \beta_9 (M/B)_i + \beta_{10} (SALES\%)_i + \beta_{11} (R\&D/SALES)_i + \beta_{12} (ICCF/MKTCAP)_i + \beta_{13} COMP_i \\ &+ \beta_{14} (DEF/SALES)_i + \\ &\beta_{15} KZ_i + \beta_{16} (OPCOST/SALES)_i + \text{YearFixedEffects}_i + \varepsilon_i \end{aligned} \tag{5}$$

4. Empirical results

4.1. Cumulative abnormal returns

Table 4 presents the five-day (-2, +2) ACARs for the participating firms around the announcement of alliances for the 11 industries included in the study. All ACARs are positive and statistically

Table 4. Cumulative Abnormal Returns (CARs) by the industry for all industries with at least 100 completed two firm alliances. The final sample consists of 5197 alliance firms. The CAR is observed over the (-2, +2) window around the announcement date

Industry	Mean CAR	Precision Weighted CAR	Positive:Negative	Patell Z	Generalized Sign Z
Business Services	1.16%	0.64%	826:709□	4.511***	4.774***
Communications Equipment	1.70%	0.98%	117:92>	2.484**	2.022*
Computer and Office Equipment	1.38%	0.81%	97:85)	1.934*	1.352\$
Drugs	2.69%	1.52%	208:136□	5.157***	4.572***
Electronic and Electrical Equipment	0.86%	0.78%	167:135□	2.881**	2.414**
Investment & Commodity Firms, Dealers, Exchanges	2.00%	1.15%	276:231□	4.712***	3.225***
Measuring, Medical, Photo Equipment, Clocks	1.72%	0.75%	77:71>	1.690*	1.754*
Prepackaged Software	1.18%	0.74%	596:519□	4.005***	3.845***
Telecommunications	1.52%	1.10%	90:61□	2.480**	3.120***
Wholesale Trade-Durable Goods	1.41%	0.51%	299:264□	2.753**	2.450**
Wholesale Trade-Nondurable Goods	0.84%	0.41%	79:62>	1.621\$	2.159*

*** denotes significance at 1%, ** denotes significance at 5% level and * denotes significance at 10% level.

significant with Drugs posting the highest return (2.69%) and Wholesale trade for non-durable goods the lowest (0.84%). Ranked by ACAR, Wholesale Trade for Durable Goods lie at the midpoint, with Drugs, Investment & Commodity Firms, Dealers Exchanges, Measuring, Medical, Photo Equipment Clocks, Communication Equipment, and Telecommunications above the midpoint and Computer and Office Equipment, Prepackaged Software, Business Services, Electronic and Electrical Equipment and Wholesale Trade Nondurable Goods below the midpoint. The results are comparatively higher than those reported by Chan et al. 1997.

Drugs, Communication Equipment, and Telecommunications are industries which rely on research and development and technology sharing for their competitive edge. Intellectual property protection plays an important role in the pharmaceutical industry (Mergent, 2016). In recent years, the biotechnology sector has fueled the growth of this industry. The USA leads in global biopharmaceutical R&D (Webreports.mergent.com., 2016). The development of a new drug is both costly as well as time-consuming. It can take about 10–15 years to develop a new drug. Companies are constantly engaged in a battle to increase their market share (Johnson, 2014). But, in view of the high costs of bringing new technology to fruition, strategic alliances are very common in this industry. Manufacturers seek to differentiate their product and this suggests a heightened importance of R&D.

The telecommunications industry is also extremely competitive with service providers under pressure to enhance their networks with the objective of increasing the transmission speed (Johnson, 2014); strategic alliances are also very common in this industry. Likewise, Communications Equipment, Investment, Commodity Firms, Exchanges and Measuring Instruments industries are capital intensive industries requiring harnessing novel technologies and ideas. Despite the intensity of competition faced by the participating companies, the uncertainty of efforts to generate new products and technology encourages strategic alliances.

On the other hand, Computer and Office Equipment, Electronic and Electrical Equipment, Prepackaged software, Business services, Wholesale Trade for both Durable and Nondurable goods are highly competitive industries with intense pressures for patent protection and cost containment. Alliances in these industries are not uncommon but they are motivated more by tactical concerns than strategic.

We perform cross-sectional regressions using the proxy variables to identify and test our hypotheses of exploration, exploitation, or combination of both exploration and exploitation motive for alliances in each industry.

4.2. Regression analysis

In this section, we examine the CARs for the firms in each of the 11 industries and explore which of the factors we have included in our study contribute significantly to the gains recorded for the firms in each industry around the announcement of the alliances.

Table 5 provides the descriptive statistics for each of the independent and control variables we have included in this study for the alliance firms in 11 industries from which our sample has been drawn. We provide the mean and median of each variable listed in Table 5.

Table 6, Panels A, B, and C reports the coefficient estimates and t-Stats for each of the alliance control variables, firm control variables, and the four sets of explanatory variables separately for the alliance firms in each industry from the regression analysis (equation 5) undertaken for each of the 11 industries. All variables have been calculated utilizing data pertaining to the year-end immediately preceding the announcement of the alliances.

The LIC alliance control variable is statistically significant and negative for the Communications Equipment industry and statistically significant and positive for the Computer and Office Equipment industry. Thus, licensing-based alliances is viewed positively in the Computer and Office Equipment

Table 5. Descriptive statistics of the variables used in the empirical analysis by the industry for all the industries with at least 100 completed two firm alliances. The final sample consists of 5197 alliance firms

Variables	Business Services		Communications Equipment		Computer and Office Equipment		Drugs		Electronic and Electrical Equipment	
	Mean/Sum	Median	Mean/Sum	Median	Mean/Sum	Median	Mean/Sum	Median	Mean/Sum	Median
LIC	452.00		130.00		121.00		235.00		200.00	
RD	546.00		142.00		121.00		279.00		196.00	
TA	19256.68	1208.20	13436.82	2151.09	13909.58	1842.94	6474.66	341.12	12141.07	1115.92
LEV	0.17	0.11	0.15	0.12	0.15	0.12	0.15	0.10	0.16	0.15
ROA	0.97	0.16	-0.02	0.19	-0.41	0.16	0.39	-0.02	0.29	0.23
CAPINT	0.37	0.27	0.49	0.37	0.43	0.35	0.40	0.37	0.58	0.56
CA&EQ/TA	0.30	0.23	0.24	0.17	0.21	0.14	0.39	0.31	0.23	0.18
ALTZ	12.61	4.46	10.49	4.07	8.17	3.87	11.35	5.82	9.35	3.95
M/B	6.20	2.01	3.23	1.61	3.08	1.21	3.42	2.79	42.84	1.43
SALESG%	22.79%	10.15%	20.21%	12.13%	16.35%	11.56%	23.67%	13.13%	19.29%	13.35%
R&D/SALES	0.92	0.10	0.11	0.09	0.12	0.08	1.94	0.18	0.20	0.10
ICCF/ MKTCAP	2.04	0.10	13.12	0.25	1.71	0.24	0.37	0.10	0.61	0.22
*COMP	82.00		8.00		6.00		17.00		14.00	
DEF/SALES	0.61	0.07	0.17	0.06	0.12	0.03	0.15	0.09	0.03	0.05
OPCOST/SALES	2.23	0.86	0.87	0.84	0.89	0.86	3.01	0.88	1.12	0.85

(Continued)

Table 5. (Continued)

Variables	Investment & Commodity Firms, Dealers, Exchanges		Measuring, Medical, Photo Equipment, Clocks		Prepackaged Software		Telecommunications		Wholesale Trade-Durable Goods			Wholesale Trade-Nondurable Goods	
	Mean/Sum	Median	Mean/Sum	Median	Mean/Sum	Median	Mean/Sum	Median	Mean/Sum	Median	Mean/Sum	Median	
LIC	486.00		78.00		680.00		61.00		243.00		85.00		
RD	130.00		84.00		574.00		39.00		219.00		43.00		
InTA	26129.35	939.04	8463.71	323.18	12316.25	940.53	16196.91	6155.98	13299.30	680.78	6467.53	774.46	
LEV	0.17	0.14	0.17	0.11	0.12	0.04	0.25	0.24	0.16	0.11	0.22	0.19	
ROA	0.71	0.16	3.82	0.13	0.18	0.21	-4.34	0.06	4.09	0.15	6.65	0.21	
CAP/INT	0.35	0.28	0.47	0.39	0.34	0.27	0.66	0.51	0.40	0.30	0.48	0.45	
C&EQ/TA	0.31	0.25	0.25	0.14	0.32	0.28	0.21	0.09	0.22	0.12	0.21	0.10	
ALTZ	8.63	4.41	10.27	4.69	10.86	5.52	22.93	3.10	10.38	4.47	9.48	4.64	
M/B	4.09	1.85	3.50	2.07	4.78	2.03	144.57	1.67	3.60	1.44	3.53	2.24	
SALESG%	19.84%	10.78%	23.99%	10.38%	18.70%	13.61%	20.78%	12.84%	17.67%	12.04%	19.62%	9.35%	
R&D/SALES	1.70	0.11	0.67	0.08	0.18	0.12	0.20	0.01	0.15	0.08	0.64	0.05	
ICCF/MKTCAP	1.95	0.12	0.60	0.12	1.14	0.04	0.79	0.56	0.81	0.12	2.21	0.15	
COMP	175.00		5.00		9.00		10.00		32.00		24.00		
DEF/SALES	-0.40	0.05	-0.84	0.03	0.21	0.07	0.69	0.07	0.11	0.04	0.21	0.05	
OPCOST/SALES	2.93	0.85	2.91	0.88	1.05	0.84	1.37	0.81	1.03	0.86	1.86	0.85	

*COMP is a binary variable.

Table 6. Multivariate regression analysis with CAR as the dependent variable for each industry. The final sample consists of 5197 alliance firms in the industries with at least 100 completed two firm alliances

Independent Variables	Business Services		Communications Equipment		Computer and Office Equipment		Drugs	
	Coeff	T-Stat	Coeff	T-Stat	Coeff	T-Stat	Coeff	T-Stat
Constant	6.475***	3.44	-11.540*	-1.66	-8.129	-1.22	-2.579	-0.47
LIC	0.188	0.30	-3.872**	-2.42	2.750*	1.84	1.154	0.62
RD	0.677	1.11	0.137	0.10	0.122	0.09	1.587	0.70
InTA	-0.539***	-3.21	0.603	1.50	-0.911**	-2.35	-0.244	-0.66
LEV	-2.606	-1.48	-16.620**	-2.08	10.648	1.57	5.762	1.09
ROA	-1.350	-1.06	6.332	0.65	9.702	1.19	-8.504***	-2.80
CAPINT	-1.285	-1.43	3.112	1.54	2.458	1.30	3.927	1.34
CA&EQ/TA	-2.443	-1.23	-11.058	-1.49	6.841	1.16	4.895	1.05
ALTZ	-0.025**	-2.26	0.018	0.50	-0.156**	-2.21	-0.038**	-2.10
M/B	0.001	0.66	-0.028	-0.38	0.032***	3.49	-0.050	-0.31
SALESG%	0.105**	2.18	3.207	0.95	2.944	1.01	0.258**	1.99
R&D/SALES	0.220*	1.64	24.311*	1.66	7.026	0.79	0.132**	1.97
ICCF/MKTCAP	0.003**	2.38	0.000	-0.34	0.035	0.89	-0.240	-0.87
COMP	1.718	0.54	-10.344	-1.23	-1.982	-0.43	2.396	0.50
DEF/SALES	-0.006	-0.11	-1.039	-0.69	5.413	1.36	0.467***	4.41
KZ	1.016	1.57	3.371*	1.77	1.738	0.95	-0.730	-0.44
OPCOST/SALES	-0.275***	-2.63	11.457**	2.55	10.520*	1.87	1.512	0.86
Year Dummy	Yes		Yes		Yes		Yes	
Adj R-Sq	0.042		0.166		0.227		0.226	

(Continued)

Table 6. (Continued)

Independent Variables	Electronic and Electrical Equipment		Investment & Commodity Firms, Dealers, Exchanges		Measuring, Medical, Photo Equipment, Clocks		Prepackaged Software	
	Coeff	T-Stat	Coeff	T-Stat	Coeff	T-Stat	Coeff	T-Stat
Constant	-2.596	-0.83	1.089	0.32	3.184	1.05	1.536	0.80
LIC	-1.100	-1.18	0.236	0.08	0.805	0.60	0.995	0.94
RD	-2.438***	-2.46	-1.733	-1.51	0.226	0.17	0.074	0.09
InTA	0.090	0.49	-0.119	-0.61	-0.278	-0.89	-0.166	-0.97
LEV	6.160	1.34	-4.488	-1.20	-3.161	-0.65	-5.551	-1.28
ROA	5.026	0.97	-4.676	-1.01	-5.486	-1.61	-8.269	-0.89
CAP/INT	0.921	0.64	1.664	0.92	-2.340	-1.21	-0.467	-0.29
CA&EQ/TA	1.662	0.39	5.171	1.25	-0.791	-0.15	1.389	0.53
ALTZ	0.113*	1.72	-0.037	-0.84	-0.013	-0.19	-0.009	-0.43
M/B	0.004*	1.75	-0.055	-1.61	-0.097	-1.59	-0.008	-0.45
SALESG%	2.612*	1.77	-0.755	-0.56	-0.865	-1.03	-0.788	-0.30
R&D/SALES	-7.569	-0.85	0.249	0.50	-1.852**	-2.40	1.684	0.75
ICCF/MKTCAP	0.057	0.49	0.033***	7.43	-0.022	-0.25	0.007	0.61
COMP	1.287	0.18	4.570***	3.13	-0.416	-0.15	-11.624	-0.37
DEF/SALES	-2.533***	-7.60	-0.116	-1.05	-0.397	-1.02	1.663*	1.94
KZ	-1.308	-1.33	0.449	0.43	2.892**	2.18	1.656**	2.49
OPCOST/SALES	4.178	1.52	-0.319	-0.81	0.505*	1.82	0.542	0.61
Year Dummy	Yes		Yes		Yes		Yes	
Adj R-Sq	0.166		0.122		0.336		0.058	

(Continued)

Table 6. (Continued)

Independent Variables	Telecommunications		Wholesale Trade-Durable Goods		Wholesale Trade-Nondurable Goods	
	Coeff	T-Stat	Coeff	T-Stat	Coeff	T-Stat
Constant	5.412	0.83	2.127	0.88	-5.986	-1.56
LIC	-0.350	-0.19	-1.993	-0.83	2.233	1.61
RD	-3.803*	-1.88	1.626	0.80	0.191	0.16
InTA	0.208	0.37	0.061	0.22	-0.167	-0.48
LEV	-6.459	-0.85	-5.408	-1.45	0.165	0.03
ROA	-14.550	-1.54	2.279	0.55	-0.904	-0.23
CAPINT	-0.090	-0.04	-2.004	-1.21	4.297	1.31
CA&EQ/TA	4.856	0.74	-1.964	-0.54	8.935	1.47
ALTZ	-0.082	-0.94	-0.013**	-2.20	-0.007	-0.19
M/B	0.043	1.08	0.000	-0.71	-0.010**	-2.41
SALESG%	4.843**	2.20	10.892***	2.32	3.607***	2.78
R&D/SALES	-11.162	-0.93	-12.254***	-3.48	-5.466**	-2.49
ICCF/IMKT CAP	-0.007	-0.08	0.022	0.36	-0.027	-0.76
COMP	1.092	0.13	12.721**	2.47	-3.364	-0.93
DEF/SALES	-0.223	-0.45	-0.240	-0.20	-0.571**	-2.53
KZ	-3.128	-1.53	0.174	0.20	-0.675	-0.54
OPCOST/SALES	-1.989	-0.53	0.168	0.09	3.767	2.19
Year Dummy	Yes		Yes		Yes	
Adj R-Sq	0.178		0.108		0.251	

All coefficient and t-stat are robust estimates using White's method, White (1980). *** denotes significance at 1%, ** denotes significance at 5% level and * denotes significance at 10% level.

industry, whereas in the Communications Equipment Industry, they are viewed negatively. The *RD* alliance control variable is statistically significant and negative for the Electronic and Electrical Equipment industry and the Telecommunications industry, implying that alliances motivated by sharing of research and development potentials by the participants in these two industries results in loss of value for such alliances. That is, for these two industries, greater reliance on R&D results in lower gains. We predicted a positive sign for the Telecommunications Industry.

The firm control variable *lnTA* is statistically significant and negative for Business Service industry and Computer and Office Equipment industry, implying smaller firms which benefit from alliances in these two industries. *LEV* is statistically significant and negative only for the Communications Equipment industry, which, as is commonly known, is relatively more leveraged than other industries. Higher *LEV* in the firms entering into alliance in Communications Equipment industry results in lower returns. *ROA* is statistically significant and negative only for the Drugs industry. Alliance Firms with higher *ROA* in Drug industry post lower returns likely due to the fact that the firms with higher *ROA* prior to alliance in the drug industry are not viewed favorably after the alliance. Neither *CAPINT* nor *CA&EQ/TA* is statistically significant in any industry. *ALTZ* is negative and significant for alliances in the Business Services, Computer and Office Equipment, Drug, and Wholesale Trade-Durable Goods industry suggesting that the firms in financial distress in these industries are likely to benefit from alliances. *ALTZ* is positive and significant for alliances in the Electronic and Electrical Equipment industry suggesting that the lower distress firms benefit from the alliances in this industry.

4.3. Identification of alliance motives

Using the results depicted in Table 6, Panels A, B, and C, we identify which motive is predominant in each of the 11 industries we have examined in this study. Based on the sign of the coefficients and statistical significance of the proxy variables selected to represent the exploitative, explorative or the dual motive for alliances in these industries, we group each of these 11 industries into respective categories by the motives.

Alliances in Business Services industry exhibit strong evidence of Exploration motive since *SALESG%* and *R&D/SALES* are positive and significant. The *OPCOST/SALES* is negative and significant, which suggests the motive is not likely to be Exploitative.

Alliances in the Communications Equipment industry exhibit both Exploration and Exploitation motive since *R&D/SALES*, *KZ*, and *OPCOST/SALES* are all positive and significant.

Alliances in the Computer and Office Equipment industry exhibit presence of Exploration motive since *M/B* is highly significant. The *OPCOST/SALES* is only marginally significant.

Alliances in the Drug industry exhibit both Exploration and Exploitation motive since *SALESG%*, *R&D/SALES*, *DEF/SALES* are all positive and significant.

Alliances in Electronic and Electrical Equipment industry exhibit strong evidence of Exploration motive since *M/B* and *SALESG%* are positively significant. *DEF/SALES* is negative and significant providing strong evidence that the motive is not likely to be Exploitative.

Alliance in the Investment & Commodity Firms, Dealers, Exchanges industry exhibit strong evidence of Exploitation motive since both *ICCF/MKTCAP* and *COMP* are positive and significant.

Alliances in Measuring, Medical, Photo Equipment, Clocks industry exhibit strong evidence of Exploitation motive since both *KZ* and *OPCOST/SALES* are positive and significant. Negative and significant *R&D/SALES* suggests the motive is not likely to be Explorative.

Alliances in Prepackaged Software industry exhibit strong evidence of Exploitation motive since both *DEF/SALES* and *KZ* are positive and significant.

Alliances in the Telecommunications industry exhibits strong evidence of Exploration motive since the *SALESG%* is positive and significant.

Alliances in the Wholesale Trade-Durable Goods industry exhibit strong evidence of Exploitation motive since *COMP* is positive and highly significant. Results for Exploration motive are mixed since the *SALESG%* is positive and significant while the *R&D/SALES* is negative and significant.

There is no clear motive for Wholesale Trade-Nondurable Goods industry since *M/B* are negative and significant while the *SALESG%* is positive and significant suggesting mixed results for Exploration motive. A negative and significant *DEF/SALES* provides evidence that Exploitation is not likely to be a motive.

4.4. Average cumulative abnormal returns for each of the four categories of alliances

In Table 7, we summarize the placement of 11 industries into four categories by motives: dual, exploitative, explorative, and unclear motives. Table 7 also provides the ACARs for each group. Alliances in the dual motive industries have the highest (2.20%) ACARs, followed 1.58% in exploitative motive industries, 1.23% in explorative motive industries and 0.84% in the group which does not portray a clear motive. Therefore, we find strong evidence in support of our hypothesis that the alliances based on the exploitative motive will yield higher ACARs (positive market reaction) for the partners than when they (alliances) are based on the explorative motive, but when alliances are

Table 7. Cumulative abnormal returns in each of the eleven industries and the average cumulative abnormal returns for each of the four groups of industries identified in accordance with their motive for alliance

Motive for Alliance	Industry	Mean CAR
<i>Exploration Motive Industries:</i>		
	Business Services	1.16%
	Computer and Office Equipment	1.38%
	Electronic and Electrical Equipment	0.86%
	Telecommunications	1.52%
	AVERAGE MEAN CAR	1.23%
<i>Exploitation Motive Industries:</i>		
	Investment & Commodity Firms, Dealers, Exchanges	2.00%
	Measuring, Medical, Photo Equipment, Clocks	1.72%
	Prepackaged Software	1.18%
	Wholesale Trade-Durable Goods	1.41%
	AVERAGE MEAN CAR	1.58%
<i>Dual Motive Industries:</i>		
	Communications Equipment	1.70%
	Drugs	2.69%
	AVERAGE MEAN CAR	2.20%
<i>No Clear Motive Industries:</i>		
	Wholesale Trade-Nondurable Goods	0.84%
	AVERAGE MEAN CAR	0.84%

based on both the exploitative and explorative motives, the results surpass those for the individual motives.

5. Conclusions and directions for future research

We explore in this paper the announcement-period CARs of a sample of two-party alliances undertaken during the 1986–2015 period by firms in 11 industries. In aggregate, the returns are higher than reported in prior studies pertaining to alliances. We do not consider JVs in our study.

Ranking the announcement period ACARs around the announcement of alliances for each of the 11 industries and then analyzing the reported operating characteristics of each of the 11 industries in published media reports, we provisionally hypothesize that the ACARs in industries in which the alliances are motivated presumably by the exploitative motive are likely be higher around the announcement of alliances, as compared to the industries where the alliances are motivated by the explorative motive. Univariate analysis did not align the industries in accordance with our expectations.

To gain additional insight into the average announcement period returns reported by the firms in 11 industries, we ran cross-sectional regressions for each of the 11 industries with the (–2, +2) window ACAR as the dependent variable and eight independent variables under four categories—growth options, synergy, competition and financial constraints, and opportunity for cost and risk reduction—along with select firm-level and alliance-type control variables. Each of the eight independent variables has been adopted as an explanatory variable in prior studies. We use these eight independent variables to measure whether the alliances in the industries are motivated by exploitative, explorative or both exploitative and explorative (dual) motives.

Once we group the industries in accordance with the predominant motive(s), our empirical results do confirm our hypothesis that alliances undertaken by the exploitative motive results on average in higher announcement period returns than those undertaken for the explorative motive but it is in the industries which exhibit both explorative and exploitative alliance motives that post the highest returns. Thus, even though the individual industries do not align themselves in accordance with our provisional hypothesis that alliances motivated by the exploitative motive will yield higher CARs than those undertaken for the explorative motive, the grouping of industries based on the results of cross-sectional regressions provide strong evidence in support of the hypotheses of the study.

With regard to the influence of other control variables, licensing-based alliances is viewed positively in the Computer and Office Equipment industry and negatively in the Communications Equipment Industry. Alliances motivated by sharing of research and development potentials by the participants result in loss of value for alliances in the Electronic and Electrical Equipment and the Telecommunications industries.

As far as size of the participating firms is concerned, it is the smaller firms in the Business Service and Computer and Office Equipment industries that benefit from alliances. Higher *LEV* in the firms entering into alliance in Communications Equipment industry results in lower returns.

Return on Assets (*ROA*) is statistically significant and negative only for the Drugs industry. Alliance firms with higher *ROA* in the Drug industry post lower returns indicating that firms with higher *ROA* prior to alliance in the drug industry are not viewed favorably after the alliance. Neither Capital Intensity nor Cash & Equivalents to Total Assets is statistically significant in any industry.

Our study explores only alliances, concentrates on the announcement-period returns, and is predicated on the critical assumption that investors are able to assess the long-term potential gains to alliances based on the exploration motive around the announcement of alliances. A potential future research can explore long-run performance of the alliances. Yet, we have provided in this paper important results pertaining to the announcement period returns of alliances in major industries. In particular we have demonstrated that it is the alliances based on both

the explorative and exploitative motives (dual motive) that are viewed most positively by the markets as measured by the ACARs around the announcement period. Results emanating from our cross-sectional regressions can be utilized to design industry studies (Schmalensee, 1987) on alliances and confirm structural parameters of individual industries. Finally, we report in our paper the distribution of alliances undertaken by firms in different industries.

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Notes

1. There have been several studies documenting the valuation effects of joint ventures between non-financial firms (McConnell and Nantell (1985); Crutchley, Gou, and Hansen (1991); and Chan et al. (1997)) and financial firms (Gleason, Mathur, and Wiggins (2003); Chiou and White (2005); Marciukaityte, Roskelley, and Wang (2009); and Amici, Fiordelisi, Masala, Ricci, and Sist (2013)). All report positive abnormal returns around the announcement of alliances and/or joint ventures.
2. The SDC database relies on information from US Securities and Exchange Commission, industry publications, and/or other news sources. The data have information on joint ventures and strategic alliances encompassing research and development agreements, marketing and manufacturing agreements, supply agreements and licensing and distribution arrangements (Schilling, 2009).
3. The first reported alliance in the SDC database is in the year 1986.
4. The data downloaded from SDC listed both strategic alliances and joint ventures. We have restricted our study to only strategic alliances.
5. The lowest number of alliances within any industry that was omitted was 1 and the highest 40.
6. We analyzed the whole sample over (-3, +3) and (-1, +1) windows to test the robustness of the analysis. The results are essentially the same.
7. The KZ index is defined in Appendix A, Variable definitions.
8. The funds flow deficit is equal to dividends paid in year t+ Investments in year t + Change in working capital in year t current portion of long-term debt in year t-cash flow after interest and taxes in year t.
9. The SDC database flags for the kind of alliance.
10. The Altman Z-score is defined in Appendix A, Variable definitions. A score below 1.8 means the company is probably headed for bankruptcy, while companies with scores above 3.0 are not likely to go bankrupt. The lower/higher the score, the higher/lower the likelihood of bankruptcy.

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Appendix A. Variable definitions

Variable names	Variable definition
<i>Independent variables</i>	
<i>M/B</i>	The ratio of the sum of the market value of equity and the book value of debt to the book value of assets
<i>SALESG%</i>	Annualized sales growth
<i>R&D/SALES</i>	Ratio of the annual research and development expense to sales for the Year
<i>ICCF/MKTCAP</i>	Ratio of incremental cash flows (ICCF) over a three year period after an alliance is announced to market capitalization. $ICCF_t$ is the difference between capital cash flow at time t (CCF_t) and time 0 (CCF_0), where time 0 refers to announcement year of alliance activity (Chen et al., 2015)
<i>COMP</i>	A dummy variable for product market competition which is equal to 1 for firms facing a high degree of market competition (i.e., firms with a negative EPCM) and 0 for firms facing low market competition. The EPCM is the difference between the firm's operating profit margin and the average profit margin of its two digit SIC code industry. The operating profit margin is defined as operating profit over sales and operating profit is = sales—cost of goods sold—general and administrative expenses. (Chou et al., 2014)
<i>KZ</i>	A dummy variable that takes on a value of 1 if the firm places above the median as ranked by the Kaplan Zingales Index and 0 otherwise. The KZ index is based on the ordered logit regression and is calculated according to the equation $KZ = -1.002 * (\text{Cash Flow}/\text{Net plant property and equipment}) + 0.283 * (\text{Market to Book ratio}) + 3.139 * (\text{Debt}/\text{Total Capital}) - 39.368 * (\text{Total Dividend}/\text{Net plant property and equipment}) - 1.315 * (\text{Cash}/\text{Net plant property and equipment})$. (Kaplan & Zingales, 1997)
<i>DEF/SALES</i>	The ratio of funds flow deficit (DEF) to sales where DEF is calculated as per Frank and Goyal (2003). Funds flow deficit is defined as $(\text{dividends} + \text{investment} + \text{net change in working capital})_t - (\text{cash flow after interest and taxes})_t$
<i>OPCOST/SALES</i>	The ratio of operating costs to sales
<i>Control Variables</i>	
<i>LIC</i>	A dummy variable that equals 1 if the alliance was based on a licensing arrangement, 0 otherwise. The SDC data base flags for the kind of alliance
<i>RD</i>	A dummy variable that equals 1 if the alliance was motivated on sharing of research and development expenses, 0 otherwise. The SDC data base flags for the kind of alliance
<i>TA</i>	Book value of participating firm assets
<i>LEV</i>	Total book value of debt divided by the sum of book value of debt and the market value of equity
<i>ROA</i>	Net income before extraordinary items divided by total assets

(Continued)

(Continued)	
Variable names	Variable definition
CAPINT	Plant plus property plus equipment divided by total assets
CA&EQ/TA	Cash plus cash equivalents divided by total assets
Alt Z	The Altman Z-score is the output of a credit-strength test that gauges a publicly traded company's likelihood of bankruptcy. The Altman Z-score, is based on five financial ratios that can be calculated from data found on a company's annual 10K report.
	The Altman Z-score is calculated from the formula: Z-Score = 1.2A + 1.4B + 3.3C + 0.6D + 1.0E Where: A = Working Capital/Total Assets; B = Retained Earnings/Total Assets; C = Earnings Before Interest & Tax/Total Assets; D = Market Value of Equity/Total Liabilities; E = Sales/Total Assets.



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