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Growth through Simultaneous Alliances: Learning and Synergistic Effects

Abstract

Aim of the Paper: While the long-term benefits of either equity or non-equity alliances are well-defined by prior research, the synergistic benefits from simultaneously engaging in both modes of alliances remain unclear. By conceptualizing the firm's alliance-alliance synergies into balanced and combined dimensions, this paper investigates the synergies that firms obtain through simultaneous alliances. The paper also examines the individual temporal effect of equity and non-equity alliances on the short-term and long-term performance of the firm..

Study Design: The study relies on annual empirical archival data of strategic alliance activities, financial performance, characteristics of the top management team and board of directors for U.S. firms over 20 years.

Sample and Data: A panel data on 202 U.S. Fortune 500 firms that engaged in alliances from year 1995 through 2015 is used to test the hypotheses.

Results: Firms achieve a balanced effect when they maintain a relative balance in the number of the equity and non-equity alliances. In contrast, firms achieve a combined effect when they increase the combined magnitude of their alliances in both modes during a specific year. The findings strongly support the hypothesis that firms achieve learning and synergistic benefits from simultaneously engaging in less balanced alliance activities, while the benefits are larger for alliance portfolios with more combined effects. The study also shows that non-equity alliances generate immediate value within one year of the alliance's formation, while equity alliances create deferred benefits that are mostly allocated after the first year of the alliance.

Conclusion: Firms can achieve greater synergistic benefits through simultaneously combining and managing the balance of different alliance modes. Therefore, firms can support their competitive position through the effective management of their strategy alliance portfolio.

Keywords: Corporate Strategy, Organizational Growth, Strategic Alliances, Organizational Learning, Alliance Portfolio.

Introduction

As industries shift more toward knowledge-based competition, firms are increasingly developing inter-organizational relationships with capable partners and acquiring valuable knowledge through these relationships (Contractor & Reuer, 2014; Li, Eden, Hitt, Ireland, & Garrett, 2012; Lane & Lubatkin, 1998) to enhance the firm's long-term growth (Golonka & Latusek, 2016). Through strategic alliances, partners can leverage their resources and knowledge to create various synergies (Hitt, Dacin, Levitas, Arregle, & Borza, 2000). Furthermore, these alliances can serve as a mechanism that facilitates inter-organizational learning between firms, as these partners have a strong incentive to exchange and share their knowledge (Lane, Salk, & Lyles, 2001).

While the impact of a firm's alliance activities, both equity and non-equity, on long-term growth is now well established in the alliance literature (e.g. Lavie, 2007; Reuer & Ragozzino, 2006), the effects of simultaneously engaging in both modes of alliances remain underexplored. We attempt to address this gap using a portfolio-level of analysis (Wassmer, 2010) to uncover the consequences of holding a portfolio of alliances that consists of different alliance governance forms.

While prior research has focused on the individual effects of equity and non-equity alliances, understanding the synergies created by simultaneously engaging in both modes at the same time can complement our understanding of how strategic alliances create long-term value for firms. Therefore, this paper raises two research questions. Firstly, how can firms improve their long-term performance and growth by *simultaneously* engaging in equity and non-equity alliances? And secondly, how do the *balanced effect* and the *combined effect* of alliances impact a firm's long-term performance?

In this paper, we follow Cao, Gedajlovic and Zhang's (2009) conceptualization of balanced and combined effects, as they unpacked the organizational ambidexterity construct into two dimensions, a balanced dimension and a combined dimension of ambidexterity. In their paper, they conceptualized a balanced dimension that reflects a firm's balanced activities between exploration and exploitation and a combined dimension that reflects the multiplicative combined magnitude of the two types of activities. In this paper, we examine two dimensions of alliance portfolio configuration. The first is the balanced dimension of alliance governance configuration, which corresponds to a firm's orientation to maintain a

relative balance between equity and non-equity alliance formations. The second is the combined effect, which reflects the combined magnitude of equity and non-equity alliances. Herein, we argue that each of these dimensions will create added value that enhances the firm's performance. Using data from a sample of 202 U.S. public firms taken from 1995 through 2015, we offer strong evidence that supports our arguments.

This article makes three theoretical and empirical contributions. First, it contributes to the conversation on the dynamics of alliance portfolio by conceptualizing a synergistic effect that simultaneously pursues two modes of alliances, a focus overlooked in prior studies. Second, through empirically differentiating the value patterns between alliance governance modes, this research contributes to the empirical evidence on inter-organizational learning (Lane *et al.*, 2001) by emphasizing the synergies and trade-offs of knowledge acquisition found in the two modes of alliances. Finally, this paper contributes to the resource-based view (Barney, 1991; Penrose, 1959) by emphasizing the role of alliance synergies for enhancing a firm's resources, organizational capabilities, and potential for growth (Ahlstrom, 2010).

Literature Review

The resource-based view (RBV) and the organizational learning perspective emphasize the important role of alliances in enhancing a firm's capabilities and learning (Hitt *et al.*, 2000; Barney, 1991). Alliances are voluntary agreements between firms that involve exchange, sharing, and co-development of resources to achieve mutual objectives (Gulati, 1998). As an inter-organizational relationship, alliances take two organizational forms: equity and non-equity alliances (Gulati, 1995). Firms that engage in alliances can obtain additional financial, technical, and managerial capabilities that can be both rare and valuable (Makadok, 2001; Barney, 1991). As viewed by RBV scholars, alliances form a major vehicle for firms to acquire new resources and capabilities (Parmigiani & Rivera-Santos, 2011; Barney, 1991). Through leveraging their partners' capabilities, such firms build their resource endowments and enhance their competitive positions in certain markets. Further, these firms can collaborate with other firms to build still greater relationships and access still more domestic and foreign markets (Majocchi, Mayrhofer, & Camps, 2013; Wright & Dana, 2003; Khanna, Gulati, & Nohria, 1998).

To increase the benefits from these alliances, firms often select partners that create synergies with their own set of capabilities and knowledge (Hitt *et al.*, 2000). Work on alliances has increasingly acknowledged the role of alliances as platforms for organizational learning, providing both alliance partners with access to new knowledge through shared execution, joint problem solving, and vicarious learning from each other (Ahlstrom, Levitas, Hitt, Dacin, & Zhu, 2014; Inkpen & Tsang, 2007). March (1999) noted that alliances allow firms to interact and mutually learn from each other's knowledge, experience, processes, and routines. Das and Teng (2000b) emphasized that alliances are better alternatives to acquisitions because they enable the partners to share and exchange tacit knowledge most effectively. Also, alliances align the partners' incentives and encourage the partners to cooperate and share knowledge (Parkhe, 1993; Kogut, 1988).

Inter-organizational Learning and Alliance Mode

While the link between a firm's alliance activities, both equity and non-equity, and long-term growth is well reflected in the prior literature (e.g. Lavie, 2007; Reuer & Ragozzino, 2006), the unique effects of each alliance mode on performance remain unclear. Both the RBV and the organizational learning perspectives take into account the contributions of tangible and intangible resources on the alliance's combined capabilities (Hitt *et al.*, 2000; Barney, 1991); however, the combination of such resources can vary depending on the type of alliance mode. For example, a joint venture (JV) may combine the partners' tangible resources, such as facilities and equipment. In contrast, a franchising agreement combines the partners' intangible resources, such as reputation and foreign market knowledge. In each case, these firms can expect to develop a different set of capabilities and knowledge from their alliances.

The alliance mode affects the nature of the relationship between the alliance partners, and thus it may impact the partners' inter-organizational learning (Lane *et al.*, 2001; Gulati, 1995). Parkhe (1993) noted that the alliance governance mode determines the incentive alignment that occurs between the partners and also affects their willingness to cooperate. Further, the alliance mode can indicate how strategically important the alliance is to the partners, which in turn reflects the value that each partner holds for their collaboration as well as their commitment to that specific alliance (Baldwin & Henkel, 2015; Hess & Rothaermel, 2011; Harrigan, 1988). The alliance mode also indicates the expected duration of the

alliance, as longer-term alliances often involve initial irreversible investments (Das & Rahman, 2010; Das, 2006). Therefore, it can be expected that the type of alliance mode may determine the extent of inter-organizational learning that takes place between the partners (Hess & Rothaermel, 2011; Lane *et al.*, 2001).

Firms engage in equity alliances to minimize transaction costs whenever the hazards of opportunism are high (Colombo, 2003). These alliances include both JVs and minority equity investments. Because equity alliances require the partners to make irreversible investments, they tend to be more suitable for longer-term projects that will need the partners' commitment throughout the full alliance time horizon (Das & Rahman, 2010). Due to their protective attributes, equity alliances are often used in investments that create high strategic value for the partners and enhance their competitive position, such as joint R&D activities and new market entry, which justify their irreversible investment at the cost of flexibility (Baldwin & Henkel, 2015; Stern, Dukerich, & Zajac, 2014; Harrigan, 1988). As firms are usually involved in their equity alliances, through monitoring their direction these alliances tend to be rich ground for inter-organizational learning, particularly in high R&D industries (Li, Eden, & Josefy, 2017; Hess & Rothaermel, 2011).

Firms engage in non-equity alliances when the hazards from opportunism are low enough for these firms to economize on transaction costs (Colombo, 2003). While this alliance mode is less suitable for long-term alliances, it can provide such firms with the flexibility to renegotiate or even terminate the alliance whenever needed (Baldwin & Henkel, 2015; Ring & Van de Ven, 1994). Harrigan (1988) emphasized that non-equity alliances may be desirable for activities that create lower strategic importance for the partner, such as licensing. Compared to equity alliances, non-equity alliances have a narrow scope of collaboration that specifies the extent of knowledge sharing between the partners, and thus reduces the long-term value created from the alliance (Contractor & Reuer, 2014; Oxley & Sampson, 2004). However, research shows that non-equity alliances still allow the partners to capitalize on their established trust, which then allows them to interact efficiently (Gulati & Nickerson, 2008). Thus, non-equity alliances can create a basis for sound collaborative interaction between the partners and facilitate inter-organizational learning to enhance both of their capabilities over time. Examples of non-equity alliances include licensing, joint-production, and buyer-seller relationships (Das & Rahman, 2010; Oxley, 1997).

Prior research shows that firms that engage in strategic alliances with a broader network of partners have greater access to a more extensive pool of knowledge and capabilities that can enhance the firm's competitive position over time (Gulati,

1998). Through the accelerated inter-organizational learning (Lane *et al.*, 2001; Lane & Lubatkin, 1998), greater access to scarce resources (Hitt *et al.*, 2000), larger international business network (Dana, Etemad, & Wright, 2008; Etemad, Wright, & Dana, 2001), and new market access opportunities (Phelps, 2010), firms are expected to utilize their strategic alliance networks to bolster their innovation and financial performance (Golonka, 2015; Jiang & Li, 2008; Lavie, 2007).

Learning in Equity and Non-equity Alliances

Both equity and non-equity alliances can enhance a firm's capabilities and facilitate inter-organizational learning. However, each of these alliance modes creates long-term value for different patterns and times in the alliance time horizon (Das, 2006). Despite these clear differences between the two governance modes, prior research has not examined the synergistic effects that firms can generate from engaging in both modes of alliance simultaneously, neither in terms of magnitude nor in terms of the relative balance between the two activities. In this paper, we shed the light on the different attributes of these two alliance modes and underline the synergistic benefits that firms can create from effectively utilizing and managing both modes of alliances during a specific period of time.

Hypotheses Development

Equity Alliances

Kogut (1988) noted that equity alliances place the partners in a “mutual hostage” situation that ensures their cooperation through the full alliance time horizon. Partners in equity alliances have an incentive to work together and negotiate with each other whenever any instabilities arise (Das & Teng, 2000a). Therefore, partners in equity alliances are encouraged to interact and learn from the feedback and suggestions of the other party or parties to collaboratively enhance the performance of their alliance. Over time, these interactions will be reflected in each partner's capabilities and will facilitate their growth (Lane *et al.*, 2001).

Equity alliances create additional benefits by reducing the information asymmetry between the partners (Kogut, 1988). Further, partners in an equity alliance actively monitor the direction of the alliance through the alliance's board of directors, which are particularly prevalent in international joint ventures (Hoffmann, 2005; Dyer, Kale, & Singh, 2001; Inkpen & Beamish, 1997). This active partner involvement in building the alliance's processes and routines, through the board of directors or direct monitor, creates a prime learning ground

that is less constrained by contractual restrictions (Contractor & Reuer, 2014; Li *et al.*, 2012). For instance, such value can be seen in international joint ventures, particularly between partners from emerging and developed markets (Ahlstrom *et al.*, 2014; Hitt *et al.*, 2000).

While equity alliances provide a sound foundation for partners to interact with each other, the benefits of these interactions are expected to emerge only over an extended period (Das & Rahman, 2010). Just as this initial investment in equity alliances facilitates partner collaboration, it also can constrain the short-term resources of the individual firm that could have been allocated internally in other long-term investment alternatives. While Equity alliances enhance a firm's capabilities and learning over time, we expect their effects to emerge once the infrastructure for the alliances is fully established. Put differently, we expect the effects of equity alliances on the capabilities of the firm to diminish for a short period once the alliance's formation, which could extend to as long as a year, starts to increase as the firm begins to realize the value of the alliance. Therefore, we posit the following two hypotheses:

H (1a): *The number of a firm's Equity alliances will be positively associated with the long-term performance of that same firm.*

H (1b): *The positive association between the number of a firm's equity alliances and its long-term performance in H (1a) will be stronger one year after that alliance is initiated.*

Non-equity Alliances

Unlike equity alliances, non-equity alliances do not involve the establishment of an alliance entity that is managed directly by the partners. Instead, partners in non-equity alliances interact within the contexts of the contractual agreement that governs their relationship (Contractor & Reuer, 2014). The low irreversible costs of non-equity alliances may allow firms to engage in a higher number of non-equity alliances than will equity alliances, which can then expand their network and inter-organizational learning (Gulati, 1998). Especially prevalent in high-technology sectors, non-equity alliances represent a more flexible and evolution-oriented alliance mode (Baldwin & Henkel, 2015; Inkpen & Tsang, 2007).

Moreover, non-equity alliances have been shown to accelerate alliance learning and innovation to achieve strategic performance in non-equity partnerships (Gudergan, Devinney, Richter, & Ellis, 2012). While non-equity alliances are generally more in numbers, non-equity alliance as a research field remains

underdeveloped (Gudergan, Devinney, & Ellis, 2016). In an empirical setting of 108 global pharmaceutical firms over 30 years period, Hess and Rothaermel (2011) found that only 12% of all alliances formed by the firms in their sample were equity-based. Companies tend to use non-equity alliances to share a specific specialized technology, as opposed to an implicit technology and tacit knowledge (Lai & Chang, 2010; Tallman & Shenkar, 1990). Whereas the consensus confirms the positive relationship between equity-based governance structure of an alliance and knowledge transfer and creation (Meier, 2011; Jiang & Li, 2009), specific knowledge-related contracts in non-equity alliances are valuable to accelerate learning and knowledge transfer (Meier, 2011; Faems, Janssens, & Van Looy, 2007). The extent to which non-equity alliances accelerates learning and create synergies, however, depends on the levels of mutual trust, the degree to which the alliance relationships are driven by social attachment, and the extent of relational commitment by the non-equity alliance partners (Lavie, Haunschild, & Khanna, 2012). Therefore, we assert in our second baseline hypothesis that non-equity alliances have additive effects and that more non-equity alliances lead to improved long-term performance. While non-equity alliances create opportunities for the partners to learn from each other, particularly if they trust each other (Gulati & Nickerson, 2008), this mode may also impose certain limitations on how much knowledge is shared between the partners (Li *et al.*, 2017; Li *et al.*, 2012).

In non-equity alliances, a partner's opportunism is a serious hazard that may discourage the exchange, transfer, or sharing of knowledge between all the partners (Oxley, 1997; Williamson, 1991). Williamson (1975) defined opportunism as "a lack of candor or honesty in transactions, to include self-interest seeking with guile." Each partner's opportunism thus imposes two main limitations that can hinder the transfer of knowledge in non-equity alliances. Recent research examined how the hazards of opportunism may influence the choice of alliance governance modes undertaken by multinational firms. Using a sample of Italian firms, Majocchi, Mayrhofer, and Camps (2013) found that equity alliances were preferred over non-equity alliances in countries with weak legal protection and high probability of political hazards. The authors concluded that these institutional factors are sources of risks that substantiate the transaction costs associated with opportunism, which make equity alliances more feasible choices when there are serious hazards of a partner's opportunism.

Compared with equity alliances, non-equity alliances are expected to have different effects on the firm's performance due to inherent differences in their

governance modes. First, non-equity alliances discourage the partners from sharing high value-adding knowledge, such as multi-partner R&D alliances and foreign market entry (Contractor & Reuer, 2014; Li *et al.*, 2012). Oxley (1997) argued that non-equity alliances did not provide partners with protection against the leaking of knowledge or the appropriation of intellectual property. To avoid the hazard of knowledge appropriation, partners in the non-equity alliances tend to narrow the scope of their alliance which limits the extent of synergy that they can create from knowledge sharing (Contractor & Reuer, 2014; Oxley & Sampson, 2004). Thus, scholars recommended equity alliances as the appropriate mode of governance for knowledge-based alliances (Li *et al.*, 2017; Barbic, Hidalgo, & Cagliano, 2016; Li *et al.*, 2012).

Second, non-equity alliances expose these firms to threats of opportunistic termination by their partners (Das & Rahman, 2010). Because non-equity alliances enable partners to renegotiate or exit the alliance with low irreversible costs, the partners have the incentive to opportunistically exit the alliance when they obtain enough valuable knowledge from their partners. Therefore, firms may sometimes be hesitant to share valuable knowledge with their partners when they perceive the alliance to be only a temporary partnership. As a result, while non-equity alliances encourage firms to exchange knowledge with each other to a certain extent, that acquired knowledge may not be high value-adding knowledge that induces long-term growth (Baldwin & Henkel, 2015; Li *et al.*, 2012).

Like equity alliances, non-equity alliances impose restrictions that shape the relationship between the alliance partners and thus influence the transfer and exchange of knowledge in those alliances (Lane & Lubatkin, 1998). In non-equity alliances, firms have less of an incentive to share valuable knowledge due to the possible hazards of opportunism (Li *et al.*, 2012; Oxley, 1997). At the same time, non-equity alliances impose fewer restrictions on a firm's short-term resources and thus enable the partners to expand their network of alliances with fewer irreversible costs (Gulati, 1998). Further, low resource restrictions can accelerate the value created from non-equity alliances to grant the firm more immediate benefits for its performance. While we expect both equity and non-equity alliances to enhance a firm's capabilities and learning over time, we expect the effect of non-equity alliances to be more immediate, specifically during the first year of such an alliance. Thus, we posit the following hypotheses:

H (2a): *The number of a firm's non-equity alliances will be positively associated with the long-term performance of that same firm.*

H (2b): *The positive association between the number of a firm's non-equity alliances and its long-term performance in H(2a) will be stronger during the first year of an alliance.*

Simultaneous Effects of Equity and Non-equity Alliance

The extant literature has emphasized the relationship between a firm's alliance activities and its long-term growth (e.g. Lavie, 2007), and provided evidence of the learning and growth opportunities in each mode (e.g. Gulati, 1995; Kogut, 1988). However, prior studies have not examined the possible synergistic effects of simultaneously pursuing both modes of alliances. In the current sample, we find that most firms that engaged in one mode of alliance often engaged in another throughout the twenty-year period, and this finding highlights the importance of understanding the capabilities and learning that firms can achieve by combining their alliance activities. Multiple simultaneous alliances with different partners facilitate alliance management learning (Anand & Khanna, 2000) and the simultaneous access to valuable network resources to enhance a firm's resource stock (Ahuja, 2000). More important is the configuration of alliance portfolio which dictates the levels of costs and benefits associated with engaging in multiple alliances, such that the extent of these costs and benefits is primarily dependent upon the efficiency of the alliance portfolio arrangement (Wassmer, 2010). Differences in how a firm configures its alliance portfolio can result in very different quality, quantity, and diversity of information and resources shared between alliance partners (Hoffmann, 2007). Therefore, while engaging in simultaneous alliances yields additive benefits, how the firm shapes its alliance portfolio between equity and non-equity alliances can amplify or attenuate these benefits.

Taking into consideration the distinct nature of equity and non-equity alliances, we can expect that firms that are capable of engaging and managing both modes of alliances can reap unique learning opportunities (Lane & Lubatkin, 1998). On the one hand, equity alliances let firms acquire high value-adding knowledge that enhances the firm's competitive position, such as in high R&D industries (Stern *et al.*, 2014; Li *et al.*, 2012). Such investments demand long-term commitment from the partners involved, which can be achieved by using equity investment as a mechanism to encourage partner cooperation (Parkhe, 1993). On the other hand, non-equity alliances are suitable for investments that do not include the exchange of high-value knowledge that may suffer from the risk of

appropriation (Baldwin & Henkel, 2015; Oxley, 1997). Despite their lower protection attributes, non-equity alliances still provide the firm with the advantage of expanding the breadth of their alliance network with fewer irreversible costs and learn from a larger number of partners (Gulati, 1998). Non-equity alliances are particularly useful between partners that share a high level of trust (Gulati & Nickerson, 2008; Gulati, 1995).

In their paper on organizational ambidexterity, Cao *et al.* (2009) hypothesize that firms could achieve synergistic benefits by simultaneously engaging in both exploration and exploitation activities. The authors propose two key dimensions of synergy, namely a balanced dimension and a combined dimension. The balanced dimension of ambidexterity is achieved when firms maintain a close relative balance between exploration and exploitation. In contrast, the combined dimension of ambidexterity corresponds to the combined magnitude of these two activities.

This paper extends Cao *et al.*'s (2009) logic to a firm's alliance activities and posits that firms obtain synergy by engaging in both modes of alliances simultaneously. We argue that firms develop unique capabilities by managing both alliance modes, which makes them better able to create long-term value through such alliances. Firms that engage in both modes of alliances can extend their reach to a larger and more intense alliance network that accentuates the learning from existing and new partners (Lane & Lubatkin, 1998).

The Balanced Effect of Alliances

Firms achieve a *balanced effect of alliances* when they maintain a close relative balance in the number of equity and non-equity alliances that they engage in during a specific year. While firms obtain knowledge from both equity and non-equity alliances, the balance of that knowledge can influence a firm's long-term performance. Firms that emphasize non-equity alliances are more flexible in their alliance activities and develop greater alliance breadth (Gulati, Wohlgezogen, & Zhelyazkov, 2012; Ring & Van de Ven, 1994). In contrast, firms that take the direction of Equity alliances acquire knowledge and capabilities of high strategic value that bolster the firm's innovation and enhance its competitive position over an extended period (Li *et al.*, 2017; Lane *et al.*, 2001; Harrigan, 1988).

The balanced effect of alliances can thus be viewed as a trade-off between flexibility and strategic importance. A higher balanced effect indicates that a firm achieves a closer match between flexibility and strategic importance, while a lower

balanced effect indicates that a firm is leaning toward one spectrum rather than the other. However, the balanced effect does not capture the magnitude of using both types, which will be captured separately by the combined effect. For instance, a firm that has five non-equity and five equity alliances has the same balanced effect as a firm that has one non-equity and one equity alliances, but higher combined effect since the magnitude of the alliance portfolio is larger.

In general, firms are expected to engage in more non-equity than equity alliances because non-equity alliances are more accessible and less expensive. For instance, Colombo (2003) shows that 60% of all surveyed alliances take the non-equity form, while Duysters, Kok, and Vaandrager (1999) reveal that about 85% of all alliances are non-equity alliances. Our examination of Fortune 500 firms indicates that the average firm engages in 28 alliances from the year 1995 through 2015, of which 22 were non-equity alliances, and only 6 were equity alliances.

We expect a low balanced effect to be associated with an emphasis on nonequity alliance over equity alliances. In contrast, we expect firms that maintain a high balanced effect achieve that, not by increasing their equity alliances to match the number of their nonequity alliances, but the other way around. Our prediction takes into consideration the inherent differences between the two governance modes, particularly in terms of irreversible costs (Parkhe, 1993). Equity alliances require more resources to be invested as initial investments, which may hinder the firm's ability to engage in more equity alliances during one period (Gulati, 1998). In contrast, non-equity alliances are less expensive to initiate, which makes firms more able to increase the number of their nonequity alliances, even with the firm's competitors and suppliers (Ratzmann, Gudergan, & Bouncken, 2016; Lavie *et al.*, 2012).

In such cases, firms that pursue a more balanced alliance activity may have a lower number of strategic alliances which is driven mainly by a lower number of nonequity alliances. Therefore, we expect the balanced effect to reduce the sheer size of the firm's strategic alliance network and thus sacrifice valuable opportunities to acquire knowledge from their nonequity alliance partners, which exceeds the value that they would get from an equity-focused alliance portfolio. Thus, we suggest the following hypothesis:

H(3): *The Balanced effect of alliances will be negatively associated with the firm's long-term performance.*

The Combined Effect of Alliances

Firms can achieve a *combined effect of alliances* when they simultaneously increase the magnitude of equity and non-equity alliances activities during the year. The combined effect reflects the synergistic value created by having both alliance governance modes in the firm's portfolio. Unlike the balanced effect, the combined effect does not imply that a firm sacrifices its learning benefits through one mode to improve learning gained from the other. Instead, firms achieve this combined effect by synergistically engaging in more non-equity and equity alliances, regardless of the actual balance between the two modes. In other words, the combined effect does not indicate a trade-off between the flexibility of non-equity alliances and the strategic importance of equity alliances; rather, it demonstrates a combined effect of having both benefits.

Because the combined alliance effect does not come at the cost of a firm's non-equity alliance activities, firms that achieve a high combined alliance effect are more able to exploit unique investment synergies. First, these firms can freely leverage their equity alliance network to extend their non-equity alliance network. Gulati and Nickerson (2008) noted that inter-organizational trust with existing alliance partners could reduce the transaction costs of future alliances by making non-equity alliances less risky. Gulati (1995) further emphasized that mutual trust can also be achieved with prior or even current Equity alliance partners. Such networks facilitate the firm's expansion to new international markets (Phelps, 2010), especially when two markets have different cultures, weaker legal protection, and higher political hazards (Majocchi *et al.*, 2013; Lavie *et al.*, 2012). Thus, firms with an established larger network of alliance partners, both domestic and international, become exceedingly capable of utilizing their network and economizing on transaction costs and coordination in their subsequent alliances.

Second, firms that achieve a higher combined alliance effect are more able to allocate their resources, knowledge, and skills efficiently between different alliance alternatives (Lane *et al.*, 2001). Firms that achieve a high combined alliance effect are likely to leverage their established capabilities and knowledge effectively across their alliances. Because they engage in various modes of alliances, firms that achieve a high combined effect become more accustomed to the common instabilities associated with alliances (Das & Teng, 2000a) and manage their alliance resources and risks more efficiently. Therefore, they become more capable

of expanding their alliance networks into various types of alliances such as manufacturing, R&D, and marketing alliances (Teng & Das, 2008).

Third, firms that achieve a higher combined effect are more able to leverage their knowledge in different industries and markets. Firms that develop large alliance networks are also more able to diversify and expand into a wider array of investment opportunities (Gulati, 1998). Li *et al.* (2017) emphasize that equity alliances facilitate the cooperation when more than two partners are involved in the alliance (i.e., multi-partner alliances), which increases the variety of skills, knowledge and capabilities pooled in the alliance, and thus accentuates inter-organizational learning (Lane *et al.*, 2001; Lane & Lubatkin, 1998). Thus, firms that achieve a higher combined effect are more capable of expanding to new business segments and industries or new international emerging markets (Khanna *et al.*, 1998). So, we propose the following hypothesis:

H(4): *The Combined effect of alliances will be positively associated with the firm's long-term performance.*

The Interaction Effect

Building on our logic for a 'separate' balanced and combined effects of the firm's alliance activities, we also considered the possibility of an interaction effect between the two dimensions. In our argument for a balanced effect, we emphasized the added flexibility and the accessibility of non-equity alliances compared to equity alliances. Consequently, this implies that firms may be motivated to engage in more non-equity alliances and fewer equity alliances. Further, this also implies that firms that maintain an extremely unbalanced portfolio are at an advantage (i.e., all non-equity, no equity alliances); however, we argue that this may not be the case. Specifically, we expect the presence of an (un)balanced and combined effects, together not separately, to accentuate their positive implications for the firm's performance.

We propose that while a negative balanced dimension creates synergy due to the flexibility and the sheer large number of non-equity alliances that firms establish compared with equity alliances (Duysters *et al.*, 1999), a positive combined effect may accentuate this synergy by concurrently engaging in equity alliances which are suitable for strategic activities. In other words, we expect firms that achieve an (un)balanced alliance portfolio (i.e., low balanced effect) due to a higher number of non-equity alliances to achieve greater synergy if these firms also

simultaneously engaged in equity alliances (i.e., high combined effect). Thus, we submit:

H5: *The Balanced effect of alliances negatively moderates the positive relationship between the Combined effect of alliances and firm performance, such that the impact of the Combined effect on performance is weaker for highly balanced alliance portfolio.*

Table 1
The hypothesized effects (performance implications)

Governance mode	Hypothesis	Hypothesized Performance Implications
Equity alliances	H1 (a) & (b)	Enhances firm performance, but most of its effects are realized in the long-term.
<i>Non-equity alliances</i>	H2 (a) & (b)	Enhances firm performance, but most of its effects are realized in the short-term.
<i>Balanced effect</i>	H3	Reduces firm performance, because it reduces the number of non-equity alliances.
<i>Combined effect</i>	H4	Enhances firm performance as it accentuates synergy and accelerates learning.
<i>Balanced x Combined effects</i>	H5	Reduces firm performance, the balanced effect will reduce the value from the combined effect.

Methods

Sample and Data

We utilize panel data on 202 US *Fortune 500* firms that engaged in alliances from year 1995 through 2015. The list includes large-cap firms from multiple industries that are likely to engage in inter-firm alliances for a variety of motives, including R&D, manufacturing, and marketing. Initially, 264 focal firms were identified, but then reduced to 202, removing: (a) firms that were not listed on one or more US exchange markets throughout the study period, as several firms were acquired or merged with other firms throughout this 20-year period; (b) firms that did not engage in any alliances; and (c) firms that did not have available financial data.

We utilized SDC Joint ventures and alliances to collect data about the alliances undertaken either by the firms included in our sample or any of their subsidiaries. During the 20-year period, the firms on our list engaged into 5,542 strategic alliances, of which 1,132 (or 20%) were Equity alliances, and 4,410 (or 80%) were

non-equity alliances. On average, the firms in this sample engaged in 28 alliances during these 20 years, and of these, 22 were non-equity alliances, and 6 were Equity alliances. Tables 2 and 3 provide a breakdown of firms and alliances by industry, respectively. Figure 1 illustrates the breakdown of these alliances by year.

Table 2
Sample firms breakdown per industry

SIC	Industry	Count of Firms	Percentage of Firms
10 - 14	Mining	10	5%
15 - 17	Construction	3	1%
20 - 39	Manufacturing	83	41%
40 - 49	Transportation, Communications, Electric, Gas & Sanitary Services	34	17%
50 - 51	Wholesale Trade	10	5%
52 - 59	Retail Trade	23	11%
60 - 67	Finance, Insurance & Real Estate	25	12%
70 - 89	Services	14	7%
Total		202	100%

Table 3
Breakdown of alliance transactions by industry

SIC	Industry	Non-Equity		Equity		Total	
		Count	%	Count	%	Count	% of Total
10 - 14	Mining	48	49%	49	51%	97	2%
15 - 17	Construction	4	31%	9	69%	13	0%
20 - 39	Manufacturing	1955	81%	468	19%	2423	41%
40 - 49	Transportation, Communications, Electric, Gas & Sanitary Services	575	71%	235	29%	810	15%
50 - 51	Wholesale Trade	126	88%	17	12%	143	3%
52 - 59	Retail Trade	207	84%	38	16%	245	4%
60 - 67	Finance, Insurance & Real Estate	246	65%	135	35%	381	7%
70 - 89	Services	1249	87%	181	13%	1430	26%
Grand Total		4410	80%	1132	20%	5542	100%

* N = 5,542 strategic alliance transactions

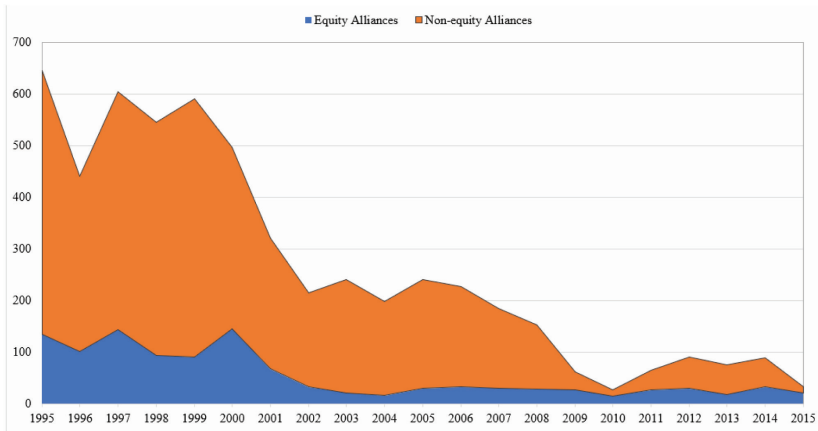


Figure 1. Strategic alliances by year

To collect firm-level data, financial and accounting data on the focal firms, i.e., total assets, capital structure, and their performance were collected from COMPUSTAT. We also collected data on the top management team (TMT) compensation data that came from EXECUCOMP. The TMT data included age and date of appointment, compensation, and other information. Furthermore, additional data was retrieved from Institutional Shareholders Services (ISS) about the firm's Board of Directors.

Measures

Dependent Variables

Prior research used accounting or market-based measures to capture the firm's long-term performance from acquisitions and other corporate strategies (Steinbach, Holcomb, Holmes, Devers, & Cannella, 2017). Following Huang, Zhu, and Brass (2017), we use a market-based measure of the firm's long-term performance to eliminate possible measurement inconsistencies that may arise due to changes in the accounting practices during 1995 through 2015. Following our theoretical framework, we created three dependent variables to capture the firm's long-term performance growth and patterns. First, we measured *Long-term performance* by calculating the difference in the firm's Tobin's Q three years after the alliance (Tobin's Q_{t+3}) in relation to one year prior (Tobin's Q_{t-1}) (Ellis, Reus, Lamont, & Ranft, 2011). Tobin's Q was calculated by adding the firm's market value and long-term debt, and dividing the result over total book assets (Kor & Mahoney, 2005).

Second, to test H (1b) we calculated the *after-formation performance*. This variable reflects the added value of Equity alliances to the firm starting one year

after the alliances are initiated. We calculated this measure as the difference in the firm's Tobin's Q three years after the alliance (Tobin's Q_{t+3}) in relation to one year after (Tobin's Q_{t+1}). Third, to test H (2b) we calculated the *first-year performance*. This variable measures the added value of Non-Equity alliances to the firm during the alliances' first year of operations (i.e., immediately after formation). We calculated this measure as the difference in the firm's Tobin's Q one year after the alliance (Tobin's Q_{t+1}) in relation to one year prior (Tobin's Q_{t-1}).

Independent Variables

Strategic Alliance Activities: We included two variables that reflect the firm's alliance activities each year from 1995 through 2015: (1) *Number of equity alliance* represents the number of Equity alliances conducted by the firm in a year, and (2) *Number of non-equity alliance* represents the number of non-equity alliances conducted by the firm in a year.

The Balanced effect of alliances: This variable reflects the match in the relative magnitude of the firm's equity and non-equity alliances in each year. Following Cao *et al.* (2009), we calculate the *balanced effect* as the absolute difference between the firm's engagement in each mode as follows:

$$\text{balanced effect} = | \text{Number of equity alliances} - \text{Number of non-equity alliances} |$$

For ease of interpretation, we reversed the measure by subtracting the score from 64, which is the largest difference between equity and non-equity alliances in our sample. Therefore, a high balanced effect will indicate more balanced alliance activities.

The Combined effect of alliances: This variable reflects the combined magnitude of equity and non-equity alliances in each. In other words, it reflects how the firm's investment in one mode of alliances complements, and thus amplifies the value created from the other mode. Therefore, following Cao *et al.* (2009), we operationalized the *combined effect of alliances* by multiplying the number of equity alliances and the number of non-equity alliances each year.

Control Variables

In addition to the independent variables, we controlled for several firm-level variables that may induce the firm's long-term performance. A larger firm may be more capable than a smaller firm of enhancing its long-term performance through various corporate strategies; thus, we controlled for *firm size* by using the natural log of total revenues. As the firm's capital structure may provide firms with excess

resources to pursue long-term investments, we controlled for capital structure using *Debt ratio*. Further, slack resources may boost or restrict a firm's ability to invest in opportunities that enhance long-term growth. For slack, we controlled for *current ratio*, *working-capital to sales*, and *equity to debt* as recommended by Chen (2008).

Several theories emphasized the role of the firm's top management team (TMT) and The Board of Directors (BOD) on long-term performance. Prior research various attributes of the BOD, such as board size and interlocks, facilitate alliance formation (Sullivan & Tang, 2013; Gulati & Westphal, 1999) and fosters value from the firm's established network (Howard, Withers, Carnes, & Hillman, 2016); thus, we controlled for the *BOD size*. Furthermore, the Upper echelon theory argues that the characteristics of the TMT members may affect the firm's decisions and influence firm performance (Hambrick & Mason, 1984); thus, we also controlled for *TMT size*. According to Matta and Beamish (2008), managers' career horizons may affect their investment decisions. Thus, we controlled for the *Average TMT career horizons* calculated as TMT age minus 65 years, the average across the TMT members.

Agency theory emphasizes that managers have the incentive to forgo long-term investments, particularly if their incentives are not linked to the long-term value of the firm (Jensen & Smith, 1985). To account for the incentive misalignment between the agents and the shareholders, we controlled for the *TMT long-term incentives* as the incentive-pay over total pay averaged across the firm's TMT members. Further, we controlled for the heterogeneity of incentives across TMT members using Steinbach et al.'s (2017) measure of *TMT incentives heterogeneity* (see Steinbach et al. (2017) for more details on this measure). *TMT incentives heterogeneity* is calculated using the Gini coefficient and ranges from 0 (complete agreement) to 1 (complete disparity). We also controlled for the *CEO's stock ownership* by dividing CEO equity holdings by total common stock outstanding. Agency theorists emphasize the role of the board of directors in monitoring CEO's investment decisions (Eisenhardt, 1989). Thus, we controlled for *CEO duality* (1 if the CEO is also the Chairman, or 0 otherwise) and *independent directors* (The ratio of BOD members who are not members of TMT).

Model Estimations and Procedures

We tested for multicollinearity by looking at the variance inflation factor (VIF). Across all tested models, none of the variables revealed a VIF higher than the threshold of 10, indicating no critical levels of multicollinearity. Further, we

used the Hausman (1978) test for evaluating the appropriate models to test our panel data. In all models, the Hausman test suggests that the independent variables were correlated with the fixed effects and, therefore, we concluded that a fixed-effects model is more appropriate for our study.

Results

Tables 4 and 5 report the descriptive statistics and correlations for the variables in the model. Tables 6 and 7 provide the results for the fixed-effects models for the dependent variables.

Table 4
Descriptive statistics

Variable		N	Mean	Std. Dev.
Dependent Variables				
1	Long-term performance (Tobin's Q t + 3 - Tobin's Q t-1)	3,623	-0.084	2.091
2	After-formation performance (Tobin's Q t + 3 - Tobin's Q t + 1)	3,825	-0.049	1.765
3	First-year performance (Tobin's Q t + 1 - Tobin's Q t-1)	4,027	-0.037	1.827
Independent Variables				
4	Number of Equity alliances	4,229	0.261	0.787
5	Number of Non-Equity alliances	4,229	1.050	3.893
6	Balanced Effect	4,229	62.986	3.557
7	Combined Effect	4,229	1.631	18.126
Control Variables				
8	Firm size	4,229	9.447	1.123
9	Current ratio	4,229	1.430	0.767
10	Working capital to sales	4,229	-0.023	1.099
11	Equity to debt	4,229	20.043	582.507
12	Debt ratio	4,229	0.215	0.145
13	TMT size	4,229	6.185	1.344
14	TMT average long-term incentives	4,228	0.807	0.120
15	TMT long-term incentives heterogeneity	4,229	0.321	0.110
16	TMT career horizons	4,229	10.338	4.340
17	Board size	4,229	11.353	2.321
18	Percentage of independent directors	4,229	0.838	0.081
19	CEO duality	4,229	0.733	0.442
20	CEO ownership	4,229	10.978	39.625

Table 5
Pairwise correlation matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Dependent Variables																				
1 Long-term performance	1.00																			
2 After-formation performance	0.40*	1.00																		
3 First-year performance	0.87*	-0.10*	1.00																	
Independent Variables																				
4 Number of Equity alliances	0.01	0.01	0.01	1.00																
5 Number of Non-Equity alliances	-0.02	-0.01	0.01	0.44*	1.00															
6 Balanced Effect	0.02	0.01	-0.01	-0.42*	-0.98*	1.00														
7 Combined Effect	0.01	0.01	0.01	0.54*	0.75*	-0.70*	1.00													
Control Variables																				
8 Firm size	0.04*	-0.08*	0.05*	0.11*	0.11*	-0.11*	0.05*	1.00												
9 Current ratio	-0.05*	-0.03	-0.03	-0.00	0.09*	-0.09*	0.04*	-0.08*	1.00											
10 Working capital to sales	-0.02	-0.01	-0.01	-0.01	0.05*	-0.04*	0.02	-0.07*	0.38*	1.00										
11 Equity to debt	-0.02	-0.02	-0.01	-0.01	0.04*	-0.05*	-0.00	0.02	0.03	0.01	1.00									
12 Debt ratio	0.00	0.04*	-0.02	-0.04*	-0.13*	0.12*	-0.06*	-0.17*	-0.12*	0.10*	-0.05*	1.00								
13 TMT size	-0.03	0.03*	-0.01	0.10*	0.09*	-0.08*	0.05*	-0.04*	-0.03	-0.02	-0.02	-0.00	1.00							
14 TMT average long-term incentives	-0.06*	-0.06*	-0.02	0.04*	0.05*	-0.05*	-0.00	0.36*	0.06*	-0.01	0.01	-0.12*	-0.06*	1.00						
15 TMT long-term incentives heterogeneity	-0.03*	-0.02	-0.03*	-0.01	0.02	-0.02	0.02	-0.11*	0.02	0.10*	-0.02	0.10*	0.08*	0.08*	1.00					
16 TMT career horizons	-0.07*	-0.07*	-0.07*	-0.02	0.07*	-0.07*	0.07*	-0.09*	0.07*	0.01	0.02	0.05*	-0.06*	0.01	0.06*	1.00				
17 Board size	0.02	0.02	0.02	0.09*	-0.02	0.02	-0.02	0.24*	-0.15*	-0.17*	-0.02	-0.09*	0.08*	0.10*	-0.16*	-0.18*	1.00			
18 Percentage of independent directors	0.02	0.00	0.01	-0.03	-0.03*	0.03*	0.00	0.14*	-0.04*	-0.06*	0.01	0.05*	-0.15*	0.11*	-0.04*	0.02	0.21*	1.00		
19 CEO duality	0.03*	-0.01	0.04*	0.04*	0.02	-0.02	0.02	0.00	-0.03*	0.01	-0.02	-0.00	0.02	0.02	-0.00	-0.21*	0.07*	0.03*	1.00	
20 CEO ownership	-0.18*	-0.04*	-0.15*	0.02	0.14*	-0.14*	0.09*	-0.17*	0.08*	0.08*	0.02	0.01	0.01	-0.03	0.08*	0.09*	-0.15*	-0.15*	0.02	1.00

Notes: N = 3,622; * correlation is significant at the 5% level.

Table 6
Results for Fixed-effects Regression on Performance (Long Term Performance)

	Model 1			Model 2			Model 3			Model 4		
	DV = Long-term Performance			DV = Long-term Performance			DV = Long-term Performance			DV = Long-term Performance		
	Coeff.	SE	p-value	Coeff.	SE	p-value	Coeff.	SE	p-value	Coeff.	SE	p-value
Constant	-0.990	0.85	0.24	-1.141	0.85	0.18	-1.215	0.85	0.16	-1.277	0.86	0.14
Control variables												
Firm size	0.316	0.07	0.00	**	0.332	0.07	**	0.336	0.07	**	0.343	0.07
Current ratio	-0.247	0.08	0.00	**	-0.247	0.08	**	-0.242	0.08	**	-0.243	0.08
Working Capital to sales	0.012	0.06	0.85		0.015	0.06	0.81	0.014	0.06	0.83	0.015	0.06
Equity to debt	0.000	0.00	0.28		0.000	0.00	0.03	*	0.000	0.00	0.000	0.00
Debt ratio	1.111	0.43	0.01	*	1.137	0.43	0.01	*	1.173	0.43	0.01	*
TMT Size	-0.030	0.03	0.31		-0.034	0.03	0.25		-0.037	0.03	-0.038	0.03
TMT average long-term incentives	-1.682	0.38	0.00	**	-1.665	0.38	0.00	**	-1.652	0.38	-1.645	0.38
TMT long-term incentives heterogeneity	0.130	0.36	0.72		0.121	0.36	0.74		0.118	0.36	0.114	0.36
TMT career horizons	-0.016	0.01	0.12		-0.016	0.01	0.11		-0.017	0.01	-0.017	0.01
Board size	-0.041	0.02	0.09	†	-0.043	0.02	0.08	†	-0.040	0.02	-0.041	0.02
Percentage of independent directors	0.094	0.54	0.86		0.107	0.54	0.84		0.106	0.54	0.112	0.54
CEO duality	0.275	0.10	0.01	*	0.274	0.10	0.01	*	0.271	0.10	0.271	0.10
CEO ownership	-0.010	0.00	0.00	**	-0.010	0.00	0.00	**	-0.010	0.00	-0.010	0.00
Main effects												
Number of Equity Alliances - H (1a)				0.089	0.05	0.09	†				0.052	0.06
Number of Non-Equity Alliances - H (2a)								0.032	0.01	0.01	**	0.028
Balanced Effect - H (3)											0.01	0.03
Combined Effect - H (4)												*
Balanced x Combined Effect - H (5)												

Table 6 (Cont.)
Results for Fixed-effects Regression on Performance (Long Term Performance)

Firm Fixed-effects	Yes	Yes	Yes
Year Fixed-effects	Yes	Yes	Yes
R2 (Within)	0.03	0.03	0.03
R2 (Between)	0.15	0.14	0.13
R2 (Overall)	0.03	0.03	0.03
F	8.35 **	7.96 **	8.23 **
Observations	3,622	3,622	3,622

** $p < 0.01$, * $p < 0.05$, † $p < 0.10$

Table 6
Continued - Results for Fixed-effects Regression on Performance (Long Term Performance)

	Model 5 DV = Long-term Per- formance			Model 6 DV = Long-term Per- formance			Model 7 DV = Long-term Per- formance		
	Coeff.	SE	p-value	Coeff.	SE	p-value	Coeff.	SE	p-value
Constant	0.901	1.15	0.00	**	-1.156	0.86	0.18	-0.722	1.32
Control variables									
Firm size	0.334	0.07	0.00	**	0.333	0.07	0.00	**	0.320
Current ratio	-0.242	0.08	0.32		-0.248	0.08	0.00	**	-0.249
Working Capital to sales	0.014	0.06	0.44		0.013	0.06	0.83		0.013
Equity to debt	0.000	0.00	0.67		0.000	0.00	0.47		0.000
Debt ratio	1.156	0.43	0.00	**	1.187	0.43	0.01	*	1.158
TMT Size	-0.036	0.03	0.02	*	-0.036	0.03	0.22		-0.031

Table 6 (Cont.)
Continued - Results for Fixed-effects Regression on Performance (Long Term Performance)

	Model 5 DV = Long-term Per- formance			Model 6 DV = Long-term Per- formance			Model 7 DV = Long-term Per- formance					
	Coeff.	SE	p-value	Coeff.	SE	p-value	Coeff.	SE	p-value			
<i>Constant</i>	0.901	1.15	0.00	**	-1.156	0.86	0.18	-0.722	1.32	0.58		
TMT average long-term incentives	-1.656	0.38	0.00	**	-1.627	0.38	0.00	**	-1.597	0.38	0.00	**
TMT long-term incentives heterogeneity	0.115	0.36	0.52		0.128	0.36	0.72		0.150	0.36	0.68	
TMT career horizons	-0.017	0.01	0.03	*	-0.018	0.01	0.08	†	-0.019	0.01	0.07	†
Board size	-0.040	0.02	0.27		-0.038	0.02	0.12		-0.039	0.20	0.11	†
Percentage of independent directors	0.103	0.54	0.59		0.060	0.54	0.91		0.026	0.54	0.96	
CEO duality	0.271	0.10	0.00	**	0.269	0.10	0.01	*	0.264	0.11	0.01	*
CEO ownership	-0.010	0.00	0.00	**	-0.010	0.00	0.00	**	-0.011	0.00	0.00	**
Main effects												
Number of Equity Alliances - H (1a)					0.004	0.06	0.95					
Number of Non-Equity Alliances - H (2a)					0.005	0.02	0.76					
Balanced Effect - H (3)	-0.033	0.01	0.02	*					-0.005	0.02	0.77	
Combined Effect - H (4)					0.009	0.00	0.04	*	0.014	0.00	0.00	**
Balanced x Combined Effect - H (5)									-0.0003	0.00	0.02	*
Firm Fixed-effects												
Year Fixed-effects												
R2 (Within)	0.03				0.03				0.04			
R2 (Between)	0.13				0.14				0.15			
R2 (Overall)	0.03				0.03				0.04			
F	8.19	**			7.52	**			7.88	**		
Observations	3,622				3,622				3,622			

** $p < 0.01$, * $p < 0.05$, † $p < 0.10$

Table 7
Results of Fixed-effects Regression on Performance (Pre and Post First Year)

	Model A1			Model B1			Model C1					
	DV = First Year Performance			DV = First Year Performance			DV = First Year Performance					
	Coeff.	SE	p-value	Coeff.	SE	p-value	Coeff.	SE	p-value			
<i>Constant</i>	-1.861	0.72	0.01	*	-1.981	0.72	0.01	**	-2.008	0.72	0.01	**
Control variables												
Firm size	0.314	0.06	0.00	**	0.322	0.06	0.00	**	0.325	0.06	0.00	**
Current ratio	-0.145	0.06	0.03	*	-0.141	0.06	0.03	*	-0.141	0.06	0.03	*
Working Capital to sales	0.016	0.05	0.75		0.016	0.05	0.75		0.016	0.05	0.74	
Equity to debt	0.000	0.00	0.54		0.000	0.00	0.63		0.000	0.00	0.64	
Debt ratio	0.042	0.35	0.90		0.097	0.35	0.78		0.100	0.35	0.77	
TMT Size	-0.003	0.03	0.91		-0.008	0.03	0.76		-0.008	0.03	0.74	
TMT average long-term incentives	-0.565	0.33	0.08	†	-0.540	0.33	0.10	†	-0.537	0.33	0.10	
TMT long-term incentives heterogeneity	-0.090	0.31	0.77		-0.107	0.31	0.73		-0.108	0.31	0.73	
TMT career horizons	-0.017	0.01	0.06	†	-0.017	0.01	0.06	†	-0.017	0.01	0.06	†
Board size	-0.031	0.02	0.13		-0.029	0.02	0.15		-0.030	0.02	0.15	
Percentage of independent directors	-0.107	0.46	0.82		-0.101	0.46	0.83		-0.098	0.46	0.83	
CEO duality	0.305	0.09	0.00	**	0.303	0.09	0.00	**	0.304	0.09	0.00	**
CEO ownership	-0.007	0.00	0.00	**	-0.007	0.00	0.00	**	-0.007	0.00	0.00	**
Main effects												
Number of Equity Alliances - H (1b)	0.065	0.05	0.16						0.026	0.05	0.60	
Number of Non-Equity Alliances - H (2b)					0.032	0.01	0.00	**	0.030	0.01	0.01	**
Firm Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2 (Within)	0.02				0.02				0.02			
R2 (Between)	0.12				0.11				0.11			
R2 (Overall)	0.02				0.02				0.02			
F	3.26	**			7.64	**			6.31	**		
Observations	4,026				4,026				4,026			

** $p < 0.01$, * $p < 0.05$, † $p < 0.10$

Table 7 (Cont.)
Results of Fixed-effects Regression on Performance (Pre and Post First Year)

	Model A2 DV = Performance after year 1			Model B2 DV = Performance after year 1			Model C2 DV = Performance after year 1					
	Coeff.	SE	p-value	Coeff.	SE	p-value	Coeff.	SE	p-value			
<i>Constant</i>	-4.190	0.64	0.00	**	-4.127	0.64	0.00	**	-4.215	0.64	0.00	**
Control variables												
Firm size	0.574	0.05	0.00	**	0.567	0.05	0.00	**	0.576	0.05	0.00	**
Current ratio	-0.062	0.06	0.32		-0.061	0.06	0.32		-0.061	0.06	0.32	
Working Capital to sales	0.041	0.05	0.42		0.039	0.05	0.44		0.041	0.05	0.42	
Equity to debt	0.000	0.00	0.67		0.000	0.00	0.67		0.000	0.00	0.70	
Debt ratio	2.269	0.34	0.00	**	2.261	0.34	0.00	**	2.279	0.34	0.00	**
TMT Size	0.055	0.02	0.02	*	0.056	0.02	0.02	*	0.054	0.02	0.02	*
TMT average long-term incentives	-1.607	0.29	0.00	**	-1.611	0.29	0.00	**	-1.603	0.29	0.00	**
TMT long-term incentives heterogeneity	0.183	0.29	0.53		0.184	0.29	0.52		0.180	0.29	0.53	
TMT career horizons	-0.018	0.01	0.03	*	-0.018	0.01	0.03	*	-0.018	0.01	0.03	*
Board size	-0.024	0.02	0.24		-0.022	0.02	0.27		-0.024	0.02	0.24	
Percentage of independent directors	-0.219	0.42	0.61		-0.229	0.42	0.59		-0.222	0.42	0.60	
CEO duality	-0.356	0.08	0.00	**	-0.360	0.08	0.00	**	-0.357	0.08	0.00	**
CEO ownership	0.011	0.00	0.00	**	0.011	0.00	0.00	**	0.011	0.00	0.00	**
Main effects												
Number of Equity Alliances - H (1b)	0.083	0.04	0.03	*					0.074	0.04	0.08	
Number of Non-Equity Alliances - H (2b)					0.013	0.01	0.18		0.006	0.01	0.53	
Firm Fixed-effects	Yes			Yes			Yes		Yes			
Year Fixed-effects	Yes			Yes			Yes		Yes			
R2 (Within)	0.07			0.07			0.07		0.07			
R2 (Between)	0.08			0.08			0.08		0.08			
R2 (Overall)	0.01			0.01			0.01		0.01			
F	18.47	**		18.53	**		17.52	**	17.52	**		
Observations	3,824			3,824			3,824		3,824			

** $p < 0.01$, * $p < 0.05$, † $p < 0.10$

From table 5, we observe that the *balanced effect* is highly correlated with *the number of non-equity alliances* ($\rho = -0.98$). Because most alliances are non-equity, the negative correlation indicates that the more non-equity alliances the firm is involved in, the less balanced is its alliance portfolio. To avoid the multicollinearity between the two independent variables, we tested for their individual effects using separate models. Unsurprisingly, we observe a significant correlation between the *number of equity and non-equity alliances* and the *combined effect* ($\rho = 0.54$ and $p = 0.75$, respectively), such that more alliances in general raise the size of the *combined effect*. An interesting observation is that larger firms are more likely to form equity and non-equity alliances ($\rho = 0.11$), but less likely to have a balanced alliance portfolio ($\rho = -0.11$). Table 6 illustrates the 7-stage model building approach used to test the research hypotheses, except for H(1b) and H(2b), which were tested using the models in table 7.

In table 6, model 1 shows that *firm size* has a significant effect on the firm's *long-term performance* ($\beta = 0.316$, $p < 0.01$). This indicates that larger firms are more capable of enhancing their long-term capabilities. Further, both *debt ratio* ($\beta = 1.111$, $p < 0.01$) and *current ratio* ($\beta = -0.247$, $p < 0.01$) have significant but opposite effects on the firm's long-term performance. These findings support the predictions that firms which acquire more resources through debt financing achieve higher long-term performance, while firms that accumulate slack resources eventually diminish their long-term capabilities. Certain variables from the upper echelon and agency theory show an interesting result. *TMT average long-term incentives* ($\beta = -1.682$, $p < 0.01$) shows a significant negative effect on Long-term performance. This surprising finding may support the ongoing debate in the executive compensation literature about the negative implications of certain types of variable pay, such as stock options, on strategic managerial choices, and long-term performance (e.g. Sanders & Hambrick, 2007; Wiseman & Gomez-Mejia, 1998).

Model 2 and B1 examine H (1a) and H (1b), respectively. H (1a) predicts that the number of equity alliances is positively associated with the firm's long-term performance, whereas H (1b) states that this association is stronger one year after that alliance is initiated. Model 2 shows that the *number of equity alliances* ($\beta = 0.09$, $p < 0.1$) has a marginally significant positive effect on the firm's long-term growth and performance; thus, H (1a) is partially supported. This indicates that,

on average, an increase of one *Equity alliance* conducted by the firm in a specific year is associated with a 0.09 increase in the firm's Tobin's Q three years later. Further, Models A1 and B1 indicate that the *Number of Equity alliances* starts to have a significant positive effect on the firm's performance starting *one year after the alliance is formed* ($\beta = 0.08$, $p < 0.05$), but not during the *first year of the alliance* ($\beta = 0.06$, $p = \text{n.s.}$). This indicates that the benefits achieved through Equity alliances take more time to materialize as most of the value achieved is deferred (in t_2 and t_3). Hence, firms investing in Equity alliances start to gain long-term capabilities one year after their alliance is formed, supporting H (1b). It also needs to be noted that such effect maintains its significance, albeit marginally, after adding the *number of non-equity alliances* to the model.

Model 3 and A2 examine H (2a) and H (2b), respectively. According to H (2a), the number of non-equity alliances is positively associated with the long-term performance of the firm, whereas H (2b) predicts that this association is stronger during the first year of an alliance. Model 3 shows that the *number of non-equity alliances* ($\beta = 0.032$, $p < 0.05$) has a significant positive effect on the firm's long-term growth and performance. This indicates that, on average, an increase of one *non-equity alliance* conducted by the firm in a specific year is associated with a 0.03 increase in the firm's Tobin's Q three years later; thus, H (2a) is supported. Further, Models A2 and B2 indicate that the *number of non-equity alliances* has a significant positive effect on performance during the *first year of the alliance* ($\beta = 0.032$, $p < 0.01$), but not after that period ($\beta = 0.013$, $p = \text{n.s.}$). Accordingly, the benefits from Non-Equity alliances are mostly achieved during *the first year of the alliance (in t_1)*, but not after. This provides support to the hypothesis that Non-Equity alliances provide the firm with mostly quicker returns and excess flexibility. It is also important to note that this variable maintains its significance even after adding the *number of equity alliances* to the model. Therefore, H (2b) is supported.

In Model 4, we include both the *number of equity alliances* and the *number of non-equity alliances*. While *Number of non-equity alliances* ($\beta = 0.028$, $p < 0.05$) maintains a significant positive effect on long-term performance, *number of equity alliances* loses its significant effect ($\beta = 0.052$, $p = \text{n.s.}$). This may indicate that the *number of non-equity alliances* has a stronger effect on long-term performance, particularly since firms engage in more non-equity alliances in a year than equity alliances. This suggests that we take our conclusion about H (1a) with caution.

In Model 5, we examine the *balanced effect of alliances* hypothesized in H (3) to be negatively associated with the firm's long-term performance. As noted above, we examine the effect of *balanced effect* including the *number of non-equity alliances* or the *number of equity alliances* in the model to eliminate any potential bias that may occur due to multicollinearity. Model 5 shows that the *balanced effect of alliances* ($\beta = -0.033$, $p < 0.05$) has a significant negative effect on the firm's long-term performance. This indicates that, on average, an increase of one unit in the firm's *balanced effect of alliances* (i.e., the firm's alliance activities become more balanced) is associated with a 0.033 decrease in the firm's Tobin's Q three years later. These results support our hypothesis that firms pursuing balanced alliances activities are likely to sacrifice potential value from non-equity alliances. Interestingly, firms that maintain an unbalanced alliances activity appear to increase their value from non-equity alliances to an extent that justifies the lost value that could have been achieved through equity alliances. Therefore, H (3) is supported.

Model 6 examines H (4) and tests the full model with the exception of *balanced effect*. H (4) suggests that the combined effect of alliances will be positively associated with the firm's long-term performance. Model 6 shows that the *combined effect of alliances* ($\beta = 0.009$, $p < 0.05$) has a significant positive effect on the firm's long-term growth and performance, which reflects that firms have achieved a "synergistic effect" from simultaneously engaging into *equity alliances* and *non-equity alliances*, which increased their long-term performance. On average, a one-unit increase in the firm's *combined effect of alliances*, or a simultaneous increase of one equity alliance and one non-equity alliance, conducted by the firm in a specific year is associated with a 0.009 increase in the firm's Tobin's Q three years later. This suggests that firms that can engage and manage a larger number of both equity and non-equity alliances acquire unique capabilities overtime that accentuate their long-term growth. Therefore, H (4) is supported. Next, we test the moderating hypothesis H (5) that the *balanced effect* of alliances negatively moderates the positive relationship between the *combined effect* of alliances and firm performance. As shown in Model 7, the interaction of the balanced effect with the combined effect is negative and significant ($\beta = -0.001$, $p < 0.05$). As further illustrated in the interaction plot in figure 2, these results suggest support for H (5) that greater *balance effect* lessens the impact of *combined effect* on long-term firm performance.

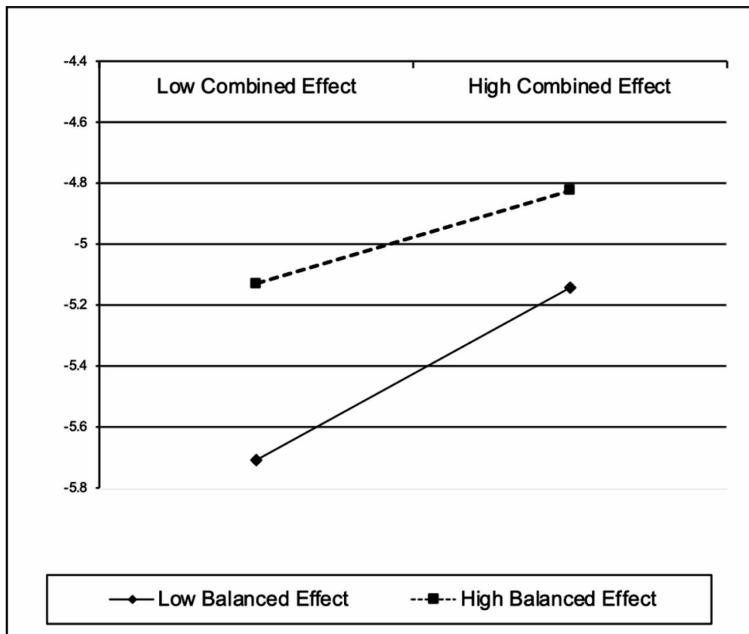


Figure 2. Interaction between the combined and balanced effects of alliances

Discission

Through alliances, firms develop capabilities to acquire knowledge that may create unique investment opportunities that are often unavailable to them without collaboration (Gulati, 1998), such as the entry of foreign and emerging markets (Khanna *et al.*, 1998) and the development of new technology (Kogut, 1988). The findings in this study provide evidence to support these views and suggest that firms that simultaneously engage in equity and non-equity alliances obtain synergistic effects that increase the value they create through alliances even further.

Contributions

This article makes three theoretical and empirical contributions. First, it contributes to the conversation on the dynamics of alliance portfolio by emphasizing the effects of simultaneous alliances on the firm's performance. Firms engage in alliances to obtain additional strategic synergies with their partners. While the partner-partner synergies have been thoroughly emphasized in prior studies (e.g. Hitt *et al.*, 2000), the alliance-alliance synergies are often overlooked, despite the ample theoretical support of such effects (Gulati, 1998).

Therefore, this work has shed light on these alliance-alliance synergies and extended their effect on organizational capabilities and learning over time.

Second, through empirically differentiating the value patterns between alliance governance modes, we contribute to the empirical evidence in inter-organizational learning (Lane *et al.*, 2001) by emphasizing the role of synergistic learning and trade-offs in strategic alliances. While prior studies have generally emphasized the mutual learning between firms, the differences between alliance relationships are often overlooked. In this research, we empirically tested for and found that firms achieve different patterns of value depending on the alliance governance mode, a finding that emphasizes the effect of alliance mode on inter-organizational learning between firms. Further, such long-term value appears to take different timings depending on the alliance governance mode. Specifically, firms that engage in non-equity alliances create more immediate value from their alliances, mostly allocated during the first year of the alliance. In contrast, firms that engage in equity alliances obtain deferred benefits that are mostly allocated after the first year of the alliance. Such finding echoes Das's (2006) research on the temporalities of strategic alliances and illustrates that each of the alliance governance modes entitles the partners to distinct benefits and impose different sets of challenges and restrictions.

Third, this study contributes to the resource-based view of the firm (Barney, 1991; Penrose, 1959) by conceptualizing and breaking down the synergistic effects within the firm's alliance activities, i.e., the balance effects and the combined effects of alliances. By emphasizing the alliance-alliance effects, this study extends our understanding of how the firm's alliance activities can be translated into organizational capabilities, specifically, how firms become more capable of creating 'synergistic' value by engaging and managing multiple and simultaneous alliance activities over time. We have shown that firms that achieve a *balanced alliance effect*, on average, have obtained lower long-term growth. Unlike the firm exploitation vs. exploration activities (Cao *et al.*, 2009), the firm's choice of alliance governance mode imposes high opportunity costs in the form of irreversible costs for firms that choose equity alliances instead of non-equity alliances (Kogut, 1988); thus, a trade-off between the two alliance modes needs to be considered with caution. Hence, firms that maintain an unbalanced alliances activity may be more capable of reaping more synergies from their alliances.

Our analysis shows that firms that have achieved a *combined alliance effect*, on average, obtain higher long-term growth. This finding indicates that firms that

achieve high value from their alliance activities are those that expand their alliance networks through both modes of alliances, without sacrificing one mode for the other. The synergistic value from simultaneous alliances is higher among those firms that have developed large alliance networks including both equity and non-equity alliances. Such synergistic benefits are particularly high among firms that developed an extensive network of non-equity alliances while maintaining a concrete base of equity alliances. This finding provides support to the effect of social embeddedness and inter-organizational trust within alliance networks on the firm's long-term performance (Gulati, 1998).

Limitations and Suggestions for Future Research

As with any empirical study, this study has several limitations, which can open the door for future research opportunities. While the findings in this study provide insights into the synergies that firms achieve from simultaneous alliance activities, they focus primarily on the number instead of the value/costs of such simultaneous alliances. Given the differences between the two alliance modes in terms of structure and costs, it can be expected that such dimension can play an important role in organizational learning and the value created from simultaneous alliances; therefore, the effects of the cost variance between the two alliance modes can be an interesting extension to the theory presented in this paper. Further, the analysis does not consider the effects of board interlocks on the relationship between alliance portfolio and long-term performance due to limitations on the extensive data on board interlocks between the firms in our sample and their partners from 1995 through 2015. We encourage future studies to examine the interactive effects of board interlocks and alliance portfolio reconfigurations on synergies and inter-organizational learning, particularly concerning the balanced and combined effects. Finally, the findings may lack generalizability since the sample used in this study consisted only of US public firms.

Several avenues for future research can be identified. Our study focuses only on one dimension of alliance governance mode, namely the equity versus non-equity alliances and the relationship between the two modes in an alliance portfolio. Other dimensions of alliance governance modes are not investigated. For example, how does the configuration of the length of alliance contracts in an alliance portfolio affect the short-term and long-term performance of the firm? What are the synergies/conflicts created from an alliance portfolio with multiple degrees of governance mechanism formality (e.g., Hoetker & Mellewigt, 2009)? Such questions may be investigated in future studies by examining in greater detail

the various dimensions and elements of alliance governance modes (De Man & Roijakkers, 2009).

The dynamics of portfolio alliances interactions can open the door for future research related to the effects of sequential alliances. While our study takes a static view of the simultaneous alliances, we see opportunities to extend the research by studying the synergetic effects of sequential alliances. The inclusion of alliance timing to study the temporal effect of simultaneous alliances (e.g., Niesten & Jolink, 2018) can further our understanding of the synergetic effect of different alliance governance modes. Future research may also explore the added synergistic effects due to having simultaneous alliances with specific partners (i.e., both nonequity and equity alliances with the same partner). This point can be enriched by incorporating information on the history of interaction between the partners, such as the previous alliance governance modes or the duration of prior alliances. Future research may further explore the specific boundary conditions under which different combinations of alliance governance modes have beneficial or negative effects on firm outcomes. Examples of potential moderators include firm and industry characteristics (e.g. industry dynamism), as well as alliance motivation attributes.

Conclusion

This paper has investigated the effects of the firm's simultaneous alliance activities in equity and non-equity alliances on its long-term performance. First, it shows that while firms often create long-term value from their activities in either equity or non-equity alliance, the value created through each mode of alliances varies in terms of pattern and time. Specifically, non-equity alliances generate immediate value within one year of the alliance's formation, while equity alliances create deferred benefits that are mostly allocated after the first year of the alliance. Second, this research indicates that such variation in value patterns, along with the distinct nature of each alliance mode, can enable firms to obtain synergies between their alliance activities that enhance the long-term value created through alliances. One dimension of such synergies is the balance between equity and non-equity alliances, while another is the combined magnitude of the firm's alliance activities in both modes of alliances. It is found that firms can create synergies through less balanced alliance activities, which are also larger in terms of the combined magnitude of alliances. Finally, firms can accentuate the separate values of these two effects by simultaneously applying them in their alliance activities. These

findings enhance our understanding of how firms develop capabilities by simultaneously managing multiple alliances at the same time.

To sum up, if this article could contain only one message, we would like it to be the following: Firms can increase the value creation from their alliance portfolio in a specific period when they engage in both governance modes simultaneously while also using more non-equity than equity alliances in their portfolios.

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الملخص

النمو من خلال الشراكات المتزامنة: آثار التعلم والتعاون

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هدف الدراسة: تهدف الدراسة إلى تحليل الفوائد الإضافية من خلال ممارسة الشركات لنشاطات الشراكات الإستراتيجية المبنية على التملك وتلك المبنية على العقود بشكل متزامن، وتفصل بين الفوائد الناجمة عن موازنة هذه النشاطات، والفوائد الناتجة عن ممارستها معاً بشكل متزامن. **منهجية الدراسة:** اعتمدت على بيانات كمية سنوية لنشاطات الشراكات؛ لمعرفة تأثيرها على الأداء المالي قصير المدى وطويل المدى.

البيانات وعينة الدراسة: استخدمت عينة من 202 شركة من شركات Fortune 500 المدرجة في الولايات المتحدة الأمريكية بين عامي 1995 و 2015.

نتائج الدراسة: تحقق الشركات فوائد إضافية من خلال ممارسة كل من نوعي الشراكة الإستراتيجية بشكل متزامن، وكان لذلك أثر إيجابي على الأداء طويل المدى، كما كان لعامل الموازنة لنشاطات الشراكة تأثير سلبي على الأداء طويل الأجل؛ مما يشير إلى أفضلية بناء محافظ شركات تعتمد بشكل أكبر على الشراكات المبنية على العقود، ولكن تتضمن كذلك عدداً من الشراكات الإستراتيجية المبنية على التملك.

الخاتمة: يمكن للشركات دعم موقعها التنافسي من خلال الإدارة الزمنية الفعالة لمحافظ الشراكات الإستراتيجية.

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تنشر لأساتذة التربية والمختصين بها من مختلف الأقطار العربية والدول الأجنبية.

الاشتراكات:

في الكويت: ثلاثة دنائير للأفراد، وخمسة عشر ديناراً للمؤسسات.
في الدول العربية: أربعة دنائير للأفراد، وخمسة عشر ديناراً للمؤسسات.
في الدول الأجنبية: خمسة عشر دولاراً للأفراد، وستون دولاراً للمؤسسات.

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