Keywords: Alliance formation, family ownership, adverse selection, moral hazard, inter-firm trust, corporate strategy.
THE ROLE OF FAMILY OWNERSHIP ON ALLIANCE FORMATION

ABSTRACT

Many studies in strategy and organization have explored the factors affecting the formation of alliances. However, this literature has largely neglected the role of corporate ownership and the related literature on family firms. Filling this void, we submit that family ownership makes firms less likely to be selected or accepted as a partner for an alliance. More specifically, we develop arguments that concern trustworthiness and informational opaqueness for family firms that can hinder alliance formation. In order to examine the influence of such mechanisms, we also hypothesize that the overall negative effect of family ownership on a firm’s alliance intensity/likelihood is mitigated by (a) the presence of institutional investors, (b) analyst coverage, and (c) financial transparency. We provide support for our hypotheses using a dataset of US listed firms both at the firm and the dyadic level of analysis. Additional analyses also show that the negative influence of family ownership on alliance formation might vary depending on the type of alliance.

INTRODUCTION

Finding the right partner is key to the success of alliances (Kale & Singh, 2009). Several studies have tried to unpack the antecedents of alliance formation and have provided evidence of the influence of networks and network positioning (Ahuja, Polidoro, & Mitchell, 2009; Ebbers & Wijnberg, 2010; Gulati, 1995a; Gulati & Gargiulo, 1999; Stuart, 1998), status and social capital (Chung, Harbir, Kyungmook, Singh, & Lee, 2000; Kim & Higgins, 2007; Pollock & Gulati, 2007; Stern, Dukerich, & Zajac, 2014), or resource and capability complementarity (Colombo, Grilli, &
Piva, 2006; Eisenhardt & Schoonhoven, 1996; Lavie & Rosenkopf, 2006; Mitsuhashi & Greve, 2009; Rothaermel & Boeker, 2008; Zhang, Baden-Fuller, & Mangematin, 2007), among others.

Despite the potential benefits that alliances bring firms, previous research has also emphasized that the formation of alliances can be impaired by the perceived risk of adverse selection (Chung et al., 2000; Ring & Van de Ven, 1994, 1992; White & Lui, 2005) and moral hazard among potential partners (Gaynor & Gertler, 1996; Gulati & Singh, 1998). As a consequence, a variety of theoretical lenses from organization economics (e.g., transaction cost economics, agency theory, information economics) have been applied to study the influence of factors such as inter-firm trust, accountability, and information asymmetry as antecedents of alliance formation (Das & Teng, 2000). A basic tenet of these studies is that mechanisms that improve inter-firm trust and information exchange between firms, such as geographical collocation (e.g., Reuer & Lahiri, 2014), managerial ties (Gulati & Westphal, 1999; Rosenkopf, Metiu, & George, 2001), or repeated interactions (Gulati, 1995b; Gulati & Sytch, 2008), may decrease the perceived risks of exchange hazards such as adverse selection and moral hazard, thus increasing the likelihood of alliance formation.

We conjecture that one of the key, albeit neglected, elements that shape the perceived risks that firms incur in alliance formation is the identity of firms’ owners. In particular, we expect the presence of a family as the major owner of the firm to increase perceived risks in alliances because of (a) the higher degree of opaqueness that characterize family firms and (b) the different motivations that guide these firms’ behavior (Miller, Breton-Miller, & Lester, 2013). More specifically, previous works have documented how family-owned firms display more severe levels of informational opaqueness due to their stronger incentives to entrench themselves for extracting private benefits and to the higher level of control family shareholders can exert on managerial decisions (Anderson, Duru, & Reeb, 2009; Villalonga & Amit, 2006, 2010). As a consequence,
family firms have been observed to behave differently from other firms in terms of acquisitions (Miller, Breton-Miller, & Lester, 2010), divestitures (Feldman, Amit, & Villalonga, 2016), or diversification (Anderson & Reeb, 2004), and to privilege counterintuitive and often sub-optimal decisions for the sake of nepotism towards family members (Bertrand & Schoar, 2006) or the preservation of consolidated family connections and control (Gomez-Mejia, Cruz, Berrone, & De Castro, 2011; Zellweger, Kellermanns, Chrisman, & Chua, 2012). For these reasons, we expect the presence of a family major owner to influence negatively the perception of trustworthiness and accountability in the eyes of external potential partners. Therefore, we submit that family ownership would impede alliance formation in general.

Moreover, consistent with these arguments, we also develop the idea that when a family firm’s opacity and trustworthiness are mitigated through external information diffusion and monitoring mechanisms, the negative relationship between family ownership and alliance formation will be attenuated. As such, we hypothesize that a stronger presence of institutional investors (Boone & White, 2015), a higher number of financial analysts (Thomas, 2002), or an increased level of financial transparency (Durnev, Morck, & Yeung, 2004; Durnev, Morck, Yeung, & Zarowin, 2003) will reduce the perceived risk of partnering with a family firm so as to reduce the baseline negative influence of family ownership on alliance formation. These arguments and analyses help us identify the channels through which family ownership affects alliance formation and also indicate how family ownership will exert varying levels of influence on inter-firm collaboration across firms.

We test our hypotheses using a comprehensive panel dataset of US-listed firms. To do so, we approach our analyses both at the firm and the dyadic level. At the firm level, we find support for the notion that family ownership significantly reduces the propensity of a firm to be involved in strategic alliances. Moreover, consistent with our theory on the role of countervailing
information conduits and monitoring mechanisms, we find evidence confirming that a firm’s percentage of institutional holdings, the level of analyst coverage, and the degree of financial transparency will attenuate the negative effect of family ownership on alliance formation. In a similar way, results at the dyadic level show that the presence of at least one family firm in the dyad significantly reduces the likelihood of alliance formation between two prospective partners. Moreover, the total number of analysts covering the two firms and the number of joint institutional investors ties significantly reduce this effect, whereas the effect of financial transparency does not hold at the dyadic level.

Additional analyses shed further light on the qualitative differences across different types of alliances in terms of risk and complexity. We find, for instance, that the negative effect of family ownership is stronger for non-equity alliances than for equity-based ones that are supported by incentives and controls to mitigate risk. Supplemental analyses also show that the negative effects of family ownership are stronger for alliances that carry out activities in industries unrelated, rather than related, to those of the allying firms.

By joining together the literatures on collaborative strategy and family firms in this study, this paper makes contributions to two distinct streams of research. First, we advance our understanding of the antecedents of alliance formation by introducing the role of the identity of firms’ owners. We build upon and extend research on alliances that has examined how resource complementarity, networks, and other sources of strategic benefits or transactional frictions shape alliance formation by theorizing on how family ownership can potentially undermine the efficiencies of a collaboration. For future research on collaborative strategy, our arguments and findings therefore emphasize the important role played by ownership types at the firm level, in addition to the dyadic- or network-level considerations emphasized in previous research. Beyond demonstrating that family ownership can impede alliance formation, our theory identifies a
number of contingencies that operate to reduce some of family firms’ disadvantages in the alliance context. Second, we contribute to the family firm literature with a theoretical and empirical assessment of the complexities associated with this specific type of ownership structure in the context of firms’ external corporate development activities. Previous investigations have shown that family firms are less prone to be involved in acquisitions (Bettinazzi, Miller, Amore, & Corbetta, 2018; Miller, Breton-Miller, et al., 2010) or divestitures (Feldman et al., 2016). The present study shows that they are also less likely to be involved in alliances, and we identify particular circumstances when this is so. By documenting when family firms face particular disadvantages in forming alliances, our study invites new research on how family firms might set up and manage inter-firm collaborations and overcome some of their liabilities in the context of external corporate development activities.

THEORY AND HYPOTHESES

Previous studies have shown that firms can benefit from alliances in terms of access to complementary resources and capabilities (Colombo et al., 2006; Jonghoon & Gargiulo, 2004; Zhang et al., 2007), to new markets (Baum, Calabrese, & Silverman, 2000), or to social capital (Chung et al., 2000; Kim & Higgins, 2007), in turn enhancing firm performance (Eisenhardt & Schoonhoven, 1996; Sampson, 2007).

However, alliances are generally perceived as risky means of corporate development (Das & Teng, 1996), for several reasons. To begin with, since contracts on which partnerships are based are inherently incomplete and the distribution of the outputs’ property rights is oftentimes ill-specified, the risk of moral hazard in alliances is significant (Das, Sen, & Sengupta, 1998). As such, the expected costs of monitoring untrustworthy partners and the costs of litigation might account for a large part of the expected benefits of an alliance. Confirming this notion, Parkhe (1993) found
evidence of how the expectations of opportunistic behaviors among partners impair the ability of alliances to create value.

In addition, because of the asymmetric distribution of information between the two parties, firms face significant difficulties in assessing ex-ante the quality of the potential partners’ resources and capabilities as well as the synergies that can be exploited (Gulati & Higgins, 2003). As a consequence, the perceived risk of adverse selection can be significant and lead to a relationship not being formed when poor information exists on a prospective partners’ resources and prospects (Gulati, 1995a; Shipilov, 2009). For instance, White and Lui (2005) showed that even in the absence of opportunistic threats, firms that decide to partner undertake costly activities to share and obtain information with the intent of setting the expectation of joint output. More generally, the overall claim of this stream of research is that the risk firms perceive with respect to entering in an alliance is a function of the amount and accuracy of information about the counterpart’s resources (Colombo et al., 2006; Rothaermel & Boeker, 2008).

These perspectives suggest that firms would typically privilege alliance partners that (a) appear to be more trustworthy and present fewer exchange hazards (Gulati & Singh, 1998) and (b) are less opaque from an informational standpoint (Das & Teng, 2002). For this reason, several studies have investigated firm characteristics and behaviors that could act as signals of trustworthiness and/or reduce information asymmetry on a firm’s resource quality. For instance, Stern and colleagues (2014) found that the status and reputation of a firm’s founder increase the likelihood of it being involved in alliances. In a similar way, several studies have examined affiliations with prominent actors as signals that reduce adverse selection on potential partners’ resources (Kim & Higgins, 2007; Pollock & Gulati, 2007; Reuer, Tong, & Wu, 2012; Ozmel, Reuer, & Gulati, 2013). Likewise, network positioning (Larson, 2006; Rosenkopf & Padula, 2008; Soh, Mahmood, & Mitchell, 2004), reputation (Barney & Hansen, 1994; Saxton, 1997), openness
to auditing (Barney & Hansen, 1994) or previous ties (Gulati, 1995b) have been treated as signals of trustworthiness which can in turn increase the likelihood of alliance formation.

We shall argue that a key neglected element that can also influence a firm’s degree of trustworthiness as well as informational opacity, and thus how risky it is perceived as an alliance partner, is its ownership type. In fact, numerous studies of corporate governance have shown the central role that ownership plays in shaping an organization’s investments and activities. For instance, different ownership structures have been shown to adopt different modes of diversification (Amihud & Lev, 1999), invest in innovation differently (Baysinger, Kosnik, & Turk, 1991), and, in many cases have different performance levels (Kang & Sorensen, 1999; Thomsen & Pedersen, 2000; Xia & Walker, 2015).

In particular, family-owned firms have been seen to display idiosyncratic behaviors that significantly depart from those of other firms. For instance, they are less likely than their non-family counterparts to engage in acquisitions or divestitures in order to preserve the family legacy with the organization (Feldman et al., 2016; Gomez-Mejia, Patel, & Zellweger, 2018; Miller, Le Breton-miller, & Lester, 2010), they underprice more heavily their equity at the IPO (Kotlar, Signori, De Massis, & Vismara, 2018), they are more likely to invest in long term projects (Le Breton–Miller & Miller, 2006), and react more strongly to negative performance (Chrisman & Patel, 2012).

We wish to advance this stream of research by submitting that family and non-family owned firms are also different in terms of perceived trustworthiness and informational opacity, thus resulting in a different likelihood of alliance formation. First, family-owned firms might be perceived by prospective partners as less trustworthy than other firms because of their family-centric objectives and priorities. Family shareholders might, in fact, tend to prioritize non-pecuniary benefits such as satisfying the social and emotional welfare of family members over the
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creation of value for shareholders or other external stakeholders (Cennamo et al., 2012; Gomez-Mejia et al., 2011; Miller and Le Breton-Miller, 2014). Moreover, firms owned by families often have aspirations and goals related to the preservation of family values and the creation of welfare for family relatives. In addition, family owners might be more concerned with the preservation of family control and independence (Zellweger et al., 2012), and thus are more likely to behave opportunistically vis-à-vis partners, in terms of external financing or hiring non-family managers that could undermine family power (Capron & Pistre, 2002; Gomez-Mejia, Cruz, Berrone, & de Castro, 2011). Collectively, these arguments suggest that partnering with family firms might lead to a comparatively higher exposure to problems of value expropriation (Chen, Dasgupta, & Yu, 2014). Interestingly, since these goals are largely idiosyncratic to the needs and objectives of each controlling family (which in turn vary along with specific demographic and socio-cultural factors), family-owned firms might be perceived as potentially less trustworthy and reliable partners, even by other family-owned firms.

Second, family-owned firms are perceived as comparatively more informationally opaque than other firms. Indeed, previous work has been shown that family owners are less likely to voluntarily disclose information to the public (Bushman, Chen, Engel, & Smith, 2004) and tend to distribute information only in moments of economic downturn (Ali, Chen, & Radhakrishnan, 2007; Chen, Chen, & Cheng, 2008). For instance, Anderson, Duru, and Reeb (2009) document that, due to private benefit concerns, firms controlled by families have greater financial informational opaqueness than other firms. Likewise, Anderson, Reeb, and Zhao (2012) provide evidence suggesting that family firms benefit from inside information at the expense of outside shareholders. Similarly, family firms have been observed to sacrifice part of their profit margin (e.g. forgo tax discounts) with the specific intent of avoiding external scrutiny arising from outside monitors and potential investors (Chen, Chen, & Shevlin, 2010). This high degree of opacity among family firms
has been also documented to generate difficulties in corporate borrowing and increase the costs of debt financing (Lin, Ma, Malatesta, & Xuan, 2011).

 Taken together, these arguments point to a stronger perceived untrustworthiness and informational opaqueness of family firms as compared to non-family owned firms, which in turn increases the perceived risk of exchange hazards such as moral hazard and adverse selection in partnering with firms controlled by family owners. These factors are likely to reduce the ability of partnering firms to create value from the alliance due to high expected coordination and monitoring costs. Taken together, these considerations will result in a lower likelihood of observing alliances that involve family firms. Thus:

*Hypothesis 1: Family ownership negatively influences the formation of alliances.*

**The moderating effects of informational mechanisms**

In our baseline prediction we postulated that family firms will be comparatively less likely to be involved in a partnership because they will be perceived as presenting a higher risk of opportunistic behavior and will be more opaque from an informational perspective. We propose three factors that, by influencing the information availability and the degree of monitoring the family firm is subject to, could mitigate the perceived risk of moral hazard and adverse selection in alliance formation. The first is the presence of institutional investors with significant holdings, which represent perhaps the most effective type of minority shareholder when it comes to monitoring ability (Chen et al., 2007). The second relates to an important governance device external to the firm, i.e., the number of analysts covering a given company. The third, which is a proxy for the extent of a firm’s informativeness to stock market actors, is the firm’s level of financial transparency. In the next sections we discuss how these three mechanisms provide important boundary conditions to our baseline hypothesis on family control and alliance formation.
Institutional investors

Our first strand of theoretical considerations pertains to the presence of institutional investors in a firm’s ownership structure. We propose that the presence of institutional investors mitigates the negative influence of family ownership and alliance formation by acting on information availability and on the managerial discretion.

Since institutional owners gather information about the companies they invest in, they signal the availability of such positive information to the market. Prior work in this area has shown that since institutional holdings are positively associated with the availability of public information (Ajinkya, Bhojraj, & Sengupta, 2005; Karamanou & Vafeas, 2005) and high disclosure quality (Bushee & Noe, 2000), their presence in a firm’s ownership structure conveys signals to the market about the reliability of a firm’s information (Pollock, Rindova, & Maggitti, 2008). Consistent with the view that institutional owners hold significant informational advantages and certify the value of firms in which they invest, Schnatterly, Shaw, Jennings, (2008) find that holdings by institutional owners command a lower bid-ask spread. Moreover, when institutional owners invest in multiple firms, they convey information across the firms they invest and increase disclosure incentives (Park, Sani, Shroff, & White, 2019). By a similar logic, we propose that the presence of institutional investors as shareholders convey to potential alliance partners the quality of the resources controlled by the firm and the reliability of the information provided about them. By doing so, the presence of institutional investors may counterbalance the negative effect of family firms’ informational opacity, reducing the perceived risk of adverse selection on the part of potential alliance partners.

Second, institutional owners can actively serve as a governance mechanism (Connelly, Hoskisson, Tihanyi, & Certo, 2010) that is helpful to discipline a firm’s management and avoid
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perceived problems of misbehavior and expropriation risks (Karamanou & Vafeas, 2005). Consistent with this view, Aggarwal, Erel, Ferreira and Matos (2011) document that institutional ownership has a positive effect on the termination of poorly performing CEOs and triggers governance improvements. Similarly, institutional owners are able to reduce managers’ value appropriation through the provision of performance-based incentives (Hartzell & Starks, 2003). Relatedly, Cheng and colleagues (2010) noted that institutional investors often act as whistleblowers in cases of managerial misbehavior. Other studies in this area have found that the presence of institutional investors help to keep a firm’s strategy oriented towards long-term objectives, for instance by increasing R&D investments (Baysinger et al., 1991), or to undertake corrective actions to reduce the use of debt (Chaganti & Damanpour, 1991). In the context of family firms, we similarly expect institutional investors to serve as effective monitors of managerial conduct, thus reducing the possibilities of expropriation of firm resources on the part of the family owners (Gomez-Mejia, Larraza-Kintana, & Makri, 2003). This may, in turn, mitigate the perceived risk of moral hazard on the part of potential alliance partners.

Taken together, these arguments suggest that institutional owners will help diminish adverse selection and moral hazard concerns that can arise in family firms. As a consequence, they are expected to attenuate the disadvantages of family firms as alliance partners we have identified. More specifically, we expect this effect to be increasing in the number of institutional owners, rather than the percentage that is controlled by institutional investors. Whereas the presence of more institutional investors could lead to higher disclosure and transparency (Karamanou & Vafeas, 2005), concentrated ownership in the hands of few institutional investors can reduce (rather than increase) the amount of information about a firm’s resources (Ajinkya et al., 2005). We therefore posit that the number of institutional owners in a firm will diminish the negative effects of family ownership on alliance formation:
Hypothesis 2: The number of institutional investors reduces the negative influence of family ownership on alliance formation.

Financial analyst coverage

Whereas the forgoing discussion emphasized the capacity of investors to mitigate the perceived risks of partnering with a family firm, in this section we discuss the role of financial intermediaries as information diffusion and governance mechanisms, which can influence family firms’ alliance formation. As such, we posit that the number of financial analysts covering a firm might act as a moderator of the relationship between family ownership and alliance formation.

Financial analysts represent important actors for the correct functioning of financial markets. Given their extensive training in finance and industry-specific knowledge, financial analysts provide valuable information in the form of earnings forecasts and recommendations which are useful to investors, and stakeholders more broadly, in order to assess the financial conditions (Lang & Lundholm, 1996) and prospects of firms (Das, Guo, & Zhang, 2006). Relatedly, the literature has documented that analyst coverage has a negative impact on measures of accounting opaqueness, such as earnings management (Yu, 2008) and the aggressiveness of tax-avoidance actions (Allen, Francis, Wu, & Zhao, 2016). Analyst coverage has also been shown to alleviate informational frictions in financing policies, making firms better able to obtain external financing from equity markets (Chang, Dasgupta, & Hilary, 2006). In addition, previous work has documented a positive correlation between the number of analysts following a firm and the likelihood of voluntary disclosure of information (Hutton, 2005). As such, the analysts covering a firm act both as information intermediaries and as stimuli for firms’ transparency to the external markets as well as to potential partners. Thus, we can expect the number of analysts to
counterbalance family firms’ opacity and to reduce the potential risk of adverse selection perceived by potential alliance partners.

In addition, analysts may reduce managerial discretion over firm strategic moves by increasing monitoring (Healy & Palepu, 2001; Jensen & Meckling, 1976) and reducing the informational advantage of company insiders over other shareholders (Ellul & Panayides, 2018). By doing so, analysts typically reward managerial behaviors that are more predictable and less radical or discontinuous (Benner, 2010) and foster the use of more independent boards of directors as a form of guarantee for external parties’ interests (Westphal & Graebner, 2010). Thus, we can expect firms that feature greater analyst coverage to be more likely to behave consistently with the objectives announced by managers and less likely to exploit information asymmetries at their own advantage, thus being perceived as more reliable by external parties. As a result, we might expect the number of analysts covering a firm to reduce the perceived risk of moral hazard associated with family ownership (e.g., value appropriation at the expense of alliance partners).

Collectively, these arguments suggest that the greater the number of analysts the more information are available about a given company (Angel, 1997) and the more attentive control will be exerted on a firm’s managers (Healy & Palepu, 2001). Thus, we expect the number of analysts to mitigate the negative effect of family ownership on alliance formation.

Hypothesis 3: Financial analysts’ coverage weakens the negative influence of family ownership on alliance formation

Financial transparency

So far, we discussed the role of institutional investors and financial analysts in reducing information asymmetry and increasing vigilance over family firms. The last element we consider pertains to the degree of informativeness of family firms’ attributes in financial markets, which we
label as financial transparency. When financial transparency is high, it is easier for the market to map observable actions and outcomes into firm value, thereby facilitating investments by external investors and other partners.

On the one hand, financial transparency could act as a deterrent to the extraction of private benefits of control on the part of the managers (Villalonga & Amit, 2010). We expect that a higher degree of transparency would also impose more stringent accountability on managers’ behavior, thus reducing their possibility to act opportunistically vis-à-vis the alliance counterpart. This expectation finds support in previous work that has observed financial transparency to be high among firms that display stronger legal investor protection (Morck, Yu, & Yeung, 2000), firms that use more independent boards of directors (Torchia & Calabrò, 2016) and firms that use more transparent mechanisms of managerial control (Bushman & Smith, 2001). As such, financially transparent firms are normally inhibited to engaging in socially unacceptable activities and comparatively more likely to have corporate philanthropic behavior (Qian, Gao, & Tsang, 2015). In a similar way, financial transparency may act as a deterrent to opportunistic managerial behavior, which in turn could increase the firm’s perceived reliability in the context of alliances. As such, an increased level of financial transparency might mitigate the perceived risk of potential opportunistic behavior on the part of family firms, thus reducing the negative influence of this ownership type on alliance formation.

Similarly, we expect that financial transparency will reduce information asymmetry between the firm and the external markets (Barth & Schipper, 2008). Apart from the obvious effect on the financial markets (Durnev et al., 2003), financial transparency may affect positively the amount of information other firms may leverage to assess the firm’s resources and capabilities for prospective alliances. For instance, previous studies have shown that firms displaying higher financial transparency tend to allocate capitals more efficiently (Durnev et al., 2004; Wurgler,
2000) and, so face smaller costs for external borrowing by reducing adverse selection and perceived liquidity risk (Diamond & Verrecchia, 1991) especially in contexts characterized by poor protection of creditors (Hope, Thomas, & Vyas, 2011). By a similar token, we can expect financial transparency to increase the level of information that is available to potential partners to assess the potential for value creation through the alliance. As such, the level of financial transparency can reduce the perceived risk of adverse selection in the eyes of potential alliance partners, thus reducing the negative effect of family ownership on alliance formation. Thus:

_Hypothesis 4: Financial transparency weakens the negative influence of family ownership on alliance formation_

**METHODS**

**Data and initial sample**

The analyses focus on a sample of the largest 2,000 US-based listed firms from 2001 to 2010. The firms have been selected based on 2001’s total asset figure and then followed for a decade to create a panel. Following previous research, public utilities, financial firms, master limited partnerships, and firms in bankruptcy have been excluded from the sample (Anderson et al., 2009, 2012). Table 1 summarizes the initial sample. We then developed a unique dataset by merging a number of different data sources together. First, we combined this sample with the Securities Data Corporation (SDC) database to obtain information about the firms’ alliances. Moreover, we relied on Compustat and CRSP for financial and accounting data. Institutional Brokers’ Estimate System (I/B/E/S) database has been used for data on analysts’ coverage, and we also use these data. In addition, we collected data from the Thomson Reuters 13-F institutional holding dataset for data on institutional investors, and we complemented this information with the data aggregated by
Bushee (2001) and Bushee and Noe (2000).¹ Net of missing values in the main variables (described below), we have a panel sample of 9,529 firm-year observations for 1,936 firms.

**Analytical approach**

We tested our hypotheses using two different approaches. To begin with, we analyzed alliance formation at the firm level by estimating a firm’s intensity of alliance formation as a function of its characteristics. In addition, we analyzed alliance formation at the dyadic level in order to also control for other firms’ characteristics (i.e., attributes of potential alliance partners). In doing so, we estimated the likelihood of alliance formation between two firms as a function of the characteristics of the dyad. At the firm-year level of analysis, we relied on the panel of 9,529 firm-year observations. We used a negative binomial model in our estimations with firm clustered standard errors to reduce multicollinearity issues and to account for potential overdispersion in the data. Results are robust to the use of alternative specifications, such as zero-inflated negative binomial and Poisson models. At the dyadic level of analysis, we estimated the likelihood of an alliance occurring, or the formation of a collaboration for a risk set of prospective collaborators (Gulati, 1995a; Rosenkopf et al., 2001; Wang & Zajac, 2007). Within our dataset², the risk set is composed of all possible pairs of firms. After excluding the inverse permutation of the same dyad (e.g. since Firm A and Firm B can combine as “Firm A and Firm B” and “Firm B and firm A”, we considered only one of the two cases) this results in 1,931,202 dyads of firms that could potentially produce an alliance in a given year and 12,875,496 dyad-year observations. Among those, 747

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¹ Data collected by Bushee (2001) and Bushee and Noe (2000) distinguish “dedicated” institutional investors (who have low turnover and invest in long-term relationships with their firms) from “transient” institutional investors (who focus on short-term trading profits) and “quasi-indexers” (who have passive, non-relational, buy-and-hold strategies in many firms). Institutional Investor Classification Data have been built by aggregating investors’ behavior over time through factor loading analyses Data can be accessed at http://acct.wharton.upenn.edu/faculty/bushee/Iclass.html.

² Please note that this second set of analyses we considered only alliances between firms within our initial sample. Thus we have excluded all alliances with firms that are not in our original panel.
dyads formed at least one an alliance in a given year and 12,874,749 did not. We used logistic regressions in all our models with dyad-clustered standard errors. We also checked the robustness of results using rare event logit models (King & Zeng, 2001) and Firth logit models (Firth, 1993) and the interpretations presented below coincide with the results obtained from these estimation approaches. Results are also robust to the use of alternative specifications of the risk set (see below for details). After accounting for missing data and dyads excluded by the regression algorithm we relied had 8,953,378 observations for analysis. In both cases (firm and dyad level of analysis), we used a one-year lag for the independent and control variables to account for potential reverse causality problems.

**Variables**

**Dependent variable**

The dependent variable of our hypotheses is alliance formation. At the firm level, it reflects the intensity of alliance activity of the firm, measured as the number of alliances formed by a firm in a given year (Gulati, 1995a; Rothaermel, 2001). At the dyadic level, we measured alliance formation as a binary variable that takes the value of 1 if an alliance has been formed within the dyad and zero otherwise.

**Explanatory variables**

The first explanatory variable is family ownership. We measured it following the classification approach of Anderson et al. (2012). A firm is identified as family-owned when the family maintains a 5% or greater ownership stake (Villalonga & Amit, 2006). Thus, at the firm level of analysis we used a dummy that equals one when a family holds at least 5% of voting rights and zero otherwise. At the dyadic level of analysis, we operationalized it as a dummy that indicates the
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presence of *One or both family-owned* in the dyad (i.e., one if **at least** one of the two firms of the dyad is family owned, zero otherwise).

The second explanatory variable concerns the involvement of institutional investors. At the firm level analysis, we operationalize it as the logarithm of total *number of institutional investors* that invested in that firm, to address positive skewness in the raw variable. We focused on the number of strategic investors, rather than the percentage to account for the dual effect of institutional ownership on information availability. Whereas previous studies found correlation between the presence of institutional investors and higher disclosure and transparency (Karamanou & Vafeas, 2005), concentration in ownership has been associated with smaller disclosure (Ajinkya et al., 2005). Thus, the number of institutional investors represent a more appropriate measure to account for the predicted effects. Likewise, at the dyadic level of analysis, we focused on how the ties that are generated by cross-investments by institutional investors may act as mechanisms to convey information. Thus, we looked at the *number of institutional investors ties* between the two firms of the dyad (i.e. the number of institutional investors that invested in both firms) in a given year.

The third explanatory variable is coverage by financial analysts. At the firm level we operationalized this variable as the *number of analysts* covering a firm in a given year. Since the IBES database reports quarterly data, we used the average of four quarters’ figures to obtain a yearly score. At the dyadic level we operationalized this variable as the *total number of analysts* covering the two firms in the dyad.

The fourth explanatory variable is financial transparency. To operationalize it, we followed Durnev et al. (2004, 2003) and Villalonga & Amit, (2010) and used the explained stock return variation. To calculate this variable, we regressed the focal firm returns on daily stock market returns and the returns of a 2-digit industry value-weighted portfolio, in a given year. At the firm
level of analysis, we took for each firm the explained sum of squares relative to the total sum of squares (i.e., R2) from this regression as the explained stock return variation, and so, as our measure of firm financial transparency. At the dyadic level of analysis, we used the sum of the individual financial transparency scores of the two firms to measure the dyad financial transparency.

**Control variables**

At the firm level we incorporated the following controls to reduce the influence of firm heterogeneity. We control for the Size of the firm using the number of employees. Larger firms might, in fact, have more resources to develop alliances and also be more attractive to other partners (Eisenhardt & Schoonhoven, 1996). For similar reasons, we control for Tobin's Q; Resource slack, using the firm liquidity ratio; and Earnings per Share (EPS). We control for firm’s strategy indicators such as innovativeness, using the amount of research and development expense over sales (R&D intensity), the capital expenditure over total sales and the firm diversification (the number of segments in which the firm operates) (Roordaermel, 2001; Roordaermel & Boeker, 2008). We accounted for the effect of previous experiences with alliances using the number of alliances the firm conducted in the previous five years (Alliance experience) (Kale & Singh, 2007, 2009). Given the potential spillovers between accumulated acquisition experience and alliance performance (Zollo & Reuer, 2010), we also controlled for the number of acquisitions the firm conducted in the previous five years. We accounted also for the size of the TMT as the number of executive members of the board and for the average salary of the TMT. Year and sector fixed effects are added to the estimations. Importantly, we controlled for the degree of board independence (calculated as the percentage of non-executive board members) which could act as antecedent for some of our moderating variables. As such, an increased level of transparency might
be just the expression of board composition, rather than a mechanism that mitigate the influence of family firm per se.

At the dyad level we translated the control variables as follows. We control for the relative size of the two firms using the absolute value of the difference in total assets between two firms, weighted by the sum of their total assets. We added relative performance as the absolute value of the difference between the two firm’s Tobin’s Q, divided by the absolute value of the sum of their Tobin’s Q. Similarly, we calculated the relative EPS and the relative resource slack (based on liquidity ratio). We control for business similarity using SIC codes. Where the SIC codes matched at the 4-digit level a similarity value of 4 was assigned, where they matched at 3, 2 or 1-digit level a 3, 2, or 1 was assigned respectively, and 0 otherwise. We also control for similarity in R&D investments as one minus the absolute value of the difference in the R&D/sales ratios of the two firms. We control for the similarity in capital expenditure between the two firms using one minus the absolute value of the difference of the two firms CAPEX/sales ratios. Likewise, we control for the similarity in diversification as one minus the absolute value of the difference in the number of segments between the two firms, weighted by the sum of the number of segments of the two firms. We added as a control the cumulate acquisition and alliance experience as the sum of the experiences in these two tasks of the two firms. We accounted for the relative size of the TMT between the two firms and for the difference in the average salary of the TMT. Given the importance of geographical distance in alliance formation (Chakrabarti & Mitchell, 2013; Zaheer & Hernandez, 2011) we added it as an additional control. We used the log of the kilometers between longitude and latitude coordinates of the zip codes in which the two firms’ headquarters are located (for the mathematical properties see Vincenty, 1975). We controlled for the dyad average board independence as the mean for the two firms’ percentages of non-executive board members. We
included year fixed effects and both firms’ industry (2 digits SIC code) fixed effects. Table 2 reports
the summary statistics and the pairwise correlations.

--- Insert Table 2 here ---

RESULTS

Main analysis at the firm level

Table 3 reports the regression models used to test our hypotheses at the firm level. Results
show that family firms are less likely to undertake a. The coefficient in Model 2 of the family firm
dummy is, in fact, negative and significant (-0.230, p=0.002), providing support to Hypothesis 1.
Family firm in our sample are in fact 20.6% less likely to enter into an alliance (IRR=0.794). In
our second hypothesis we predicted that the number of institutional investors reduces the influence
of family firms on alliances. Results reported in Model 4 show a positive coefficient of the
interaction between the number of institutional investors and the dummy family firm (p=0.004). In
Figure 1 we report the marginal effect of family firms as a function of the number of institutional
investors. The influence of family ownership is significantly negative below 257 institutional
investors, then it becomes non-significant.

Our third hypothesis submitted that the number of analysts covering a firm reduces the
negative effect of family ownership on the intensity of alliance activity. Results confirm the
prediction. The coefficient of the interaction term between family ownership and number of
analysts is positive and significant in Model 6 (p=0.002). Therefore, results support Hypothesis 3.
In Figure 2 we observe the marginal effect of family ownership at an increasing level of the number
of analysts. The influence of family ownership is significantly negative below 13 analysts, then it
becomes non-significant.
Our fourth hypothesis proposed that financial transparency attenuates the negative influence of family ownership on the intensity of alliance activity. Results support this prediction. In Model 8, the coefficient of the interaction term between family ownership and the degree of financial transparency is positive and significant (p=0.028), and Figure 3 plots this relationship.

--- Insert Table 3, Figure 1, 2 and 3 here ---

**Main analysis at the dyadic level**

Results at the dyadic level of analysis are reported in Table 4. Model 10 shows that dyads of firms where at least one of the two firms is family owned are less likely to engage in an alliance. The coefficient of *One or both family-owned* is, in fact, negative and significant (−0.510, p = 0.000) indicating that when at least one family-firm is present in the dyad, the chances of alliance formation between the two is reduced by 42.7%.

Hypothesis 2 submitted that the presence of institutional investors would reduce the negative influence of family ownership on alliance formation. At the dyadic level we focused on the number of ties between the two firms of the dyad. Results (Model 12) indicate a strongly positive coefficient for the interaction between *One or both family-owned* and the *Number of investor ties* between the two firms (0.025, p = 0.029), which provides further evidence in support of Hypothesis 2.

Similarly, Hypothesis 3, at the dyadic level, predicts that the influence of at least one family firm would be reduced as the total number of analysts covering the two firms increase. Model 14 corroborates this prediction showing a positive coefficient for the interaction between *One or both family-owned* and the number of analysts (0.012, p = 0.043).

Lastly, the degree of financial transparency at the dyadic level is expected to attenuates the negative influence of the presence of (at least) one family firm in the dyad on alliance formation.
We did not find evidence of this prediction at the dyadic level. The coefficient of the interaction term in Model 16 is in fact not significant.

--- Insert Table 4 here ---

In summary, the results of the analyses at the dyadic level indicate that alliances, where at least one family firm is involved, are less likely to occur. This effect is attenuated by the total analysts’ coverage of the two firms and by the number of institutional investors the two firms share (Number of ties). We did not find evidence of a significant moderation of financial transparency on the relationship between family ownership and alliance formation at the dyadic level.

Additional analyses

In the hypotheses development, we have postulated that family firms are less likely to be involved in an alliance because potential partners perceive family owned firms as higher risks of adverse selection and moral hazard. Our results corroborated this prediction. However, an alternative explanation of our findings might come from the possibility that family owned firms are themselves less prone to seek out alliances and be willing to collaborate. This would be in line with previous work that observed a smaller tendency among family firms to conduct acquisitions (Miller, Breton-Miller, et al., 2010) or divestitures (Feldman et al., 2016). We tried to sort out this alternative explanation empirically. In particular, we checked whether family owned firms, in addition of being less likely to complete or sign alliance agreements, are also less likely to attempt to partner. To do so, we estimated the influence of family ownership on the number of alliances attempts that have not been formally completed or signed and, thus remained “pending” for long period or have been withdrawn. We relied on the classification reported in the SDC database to
The Role of Family Ownership in Alliance Formation

distinguish the status of the alliances between “completed/signed”, “pending”, and “withdrawn”\(^3\).
Results\(^4\), show no significant influence of family ownership on the intensity of alliance attempts
(i.e. the total number of “pending” and “withdrawn” acquisitions) indicating that family firms are
not significantly different from other firms in terms of willingness to create alliances. Conversely,
as our main results indicate, they are less be able to sign or conclude alliance agreements. This
corroborates the intuition that the reduced alliance activity of family firm, might depend on other
firms’ reluctance to partner with them, rather than on their willingness to undertake alliances.

In a second set of additional analyses, we wanted to understand if family firms are more or
less likely to ally with other family firms or prefer non-family firms as a partner. This may allow
us to shed more light on the relationships we are studying. Thus, we checked what ownership
combinations are more likely to ally. To do so, we generated three dummy variables that define
ownership combinations depending on the two ownership types: both-family, both-nonfamily, and
only-one-family. To the extent that one ownership combination is more likely to ally than the
others, the coefficient of the other two dyads is negative when we exclude its dummy variable from
the estimation model. In Table 5, we test what ownership combination is more likely to become an
alliance. Results indicate that the dyad of ownership that is more likely to generate an alliance is
composed of two non-family firms. Coefficients in Model 19 that identify only-one-family owned
and both family-owned firms are, in fact, negative and significant (-0.444, p= 0.000, and, -0.843,
p= 0.000, respectively). Specifically, coefficients of only-one-family owned and both nonfamily-
owned, reported in Model 17, are both positive and significant (0.398, p= 0.007, and, 0.843, p=
0.000, respectively), indicating that a dyad composed by two family firms is the least likely to
generate an alliance. If previous results suggested that family firms are less likely to ally, these

\(^3\) SDC uses other additional categories but they account for less than 1% of the complete SDC Aliiances dataset.
\(^4\) Available upon requests to the authors.
additional set of analyses suggest that when they do, they are more prone to ally with a non-family rather than a family firm. The alliance between two family firms is, in fact, comparatively less likely to occur than an alliance between two non-family firms or between two different types of owners.

--- Insert Table 5 here ---

In the third set of additional analyses, we have checked whether the influence of family firms depends on the type of alliance considered. So far, in fact, we have treated all types of alliance as being homogeneous. Among others, two dimensions of heterogeneity are particularly relevant for our study: the distinction between equity and non-equity alliances and the degree of relatedness of alliance vis-a-vis the businesses in which the two parties operate.

For what concerns the first dimension, extant research has long argued that the use of equity, can promote ex ante commitments in terms of investment into the alliance, and facilitate the enforceability of the relative commitments by alliance partners (Pisano, 1989). As such, joint ventures would be comparatively less subject than non-equity alliances to misalignment of interests and to opportunistic behavior between the parts (Das & Teng, 1996). Therefore, we analyzed weather this heterogeneity between joint ventures and non-equity alliances could influence the relationship between family ownership and alliance formation. We might expect that joint ventures, compared to non-equity alliances would be less subject to the perceived risk (due to increased information asymmetry) of partnering with a family firm. We distinguished, between joint-ventures and non-equity alliances using the classification reported in the SDC database (Reuer & Ragozzino, 2012).

For what concerns the second dimension, previous work pointed out that partnerships in related vs. unrelated industries display systematic differences in terms of risk and complexity.
Since industries often share operating processes, cultures and dominant logics (Laamanen & Keil, 2008), firms will have a greater ability to gather information, evaluate actions and measure the potential success of an alliance that belong to the same sector of the firms’ core activity. By contrast, alliances aimed at entering unrelated industries will be perceived as entailing a higher degree of uncertainty, due to the increased complexities managers face in evaluating resources and capabilities that are dissimilar to those of the focal firm. This will in turn erects coordination costs and raise contractual complexity, creating more room for opportunistic behavior by partners. Therefore, we analyzed whether these differences between related and unrelated alliances could play a role in influencing family ownership on alliance formation. We might expect the formation of an alliance in a related industry to be less likely to suffer from the negative effects of family ownership, in terms of perceived opacity and intrinsic risk, compared to an alliance in a distant industry. We distinguished between related and unrelated alliances using SIC codes. Specifically, we classified an alliance to be related when the alliance’s and firm’s primary SIC codes share at least the first 2-digits and unrelated otherwise.

Model 20 and 21 reported in Table 6 allow us to analyze the influence of family ownership separating between equity and non-equity alliances at the firm level. Results display a negative but not significant (-0.036, p=0.790) influence of Family ownership in the prediction of Equity alliance intensity and a negative and significant coefficient of Family firm in the estimation of Non-equity alliance intensity (-0.184, p=0.036). The difference in coefficients is, however, not significant.

In a similar way, Model 22 and 23 allow us to analyze whether family ownership affects differently related and unrelated alliances formation at the firm level. Results show a negative but only moderately significant coefficient of Family ownership when estimating the intensity of related alliances (-0.190, p=0.079) and a significantly negative coefficient of the same when
predicting Unrelated alliance intensity (-0.289, p=0.001). The difference in coefficients is highly significant (p=0.001).

--- Insert Table 6 here ---

Analogously, we analyzed the heterogeneity between equity and non-equity alliances and between related vs. an unrelated alliance at the dyad level. To do so, we used multinomial logit and we treated the decision between equity, non-equity and no-alliance, as well as related, unrelated and no-alliance as non-ordered alternatives of a choice model. Then we estimated the likelihood of occurrence of joint ventures and non-equity alliance formation relative to non-formation as well as the probability of related and unrelated alliance formation relative to non-occurrence alliance formation. Results also reported in Table 7 show that the presence of at least one family firm in the dyad does not account for the difference in the likelihood of forming an equity alliance over the decision to not ally (Model 26), but it does reduce the likelihood of a non-equity alliance over the no alliance formation (Model 27). Results also indicate that the presence of at least one family firm in the dyad reduces the likelihood of both related and unrelated alliances over the decision to not partner. However, the effect is stronger for unrelated, rather than related alliances (Model 26 and 27).

--- Insert Table 7 here ---

**Robustness checks**

We checked the robustness of our results along different dimensions. First, we checked whether the specifications used in our models affected the results. At the firm level, we replicated

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5 Typically, in multinomial logit models one of the categories (in our case non-occurrence of the alliance) is chosen as a reference category and the cases are modeled on the basis of their probability of being into the other categories rather than the referent category.
The Role of Family Ownership in Alliance Formation

the analyses using zero-inflated negative binomial models and Poisson models. Results remained consistent. At the dyadic level, checked the robustness using rare event logit models (King & Zeng, 2001) and Firth logit models (Firth, 1993). Results remained consistent.

We replicated the analyses at the dyadic level using different specifications of the risk set. First, we replicated the analyses using randomly selected samples of dyads with proportions of realized vs unrealized alliances ranging between 1:20 and 1:10. Second we employed Coarsened Exact Matching (Iacus, King, & Porro, 2011) to match each participant to the realized alliances with 10 comparable firms that did not participate in an alliance in the same year (Bettinazzi et al., 2018; Rogan & Sorenson, 2014) based on business similarity, relative size and year. Then we used all possible combinations among these matched firms as a risk set (in addition to the realized alliances). Results, in both cases overlap.

We replicated the analyses at the firm level using as a dependent variable alliance activity (a dummy that takes the value of one if the firm has conducted at least 1 alliance in the focal year, zero otherwise) in place of alliance intensity. Results overlap, but the significance of the interaction between the number of analysts and family ownership is reduced to 6.5% (p=0.065).

**DISCUSSION AND CONCLUSION**

**Summary of Results**

This paper has analyzed the influence of family ownership on alliance formation. Our data show that family firms are indeed less like to participate in alliances. We theorize that this relationship is attributable to the fact that family firms are perceived as more risky allied by other firms, because of their increased opacity and heterogeneous business objectives. Our evidence support these intuitions by showing that mechanisms of information diffusion and managerial control reduce the negative influence of family ownership on alliance formation. Additional
analyses also show that the family ownership does not necessarily influence how firms attempt to form an alliance, rather their possibility/capacity of signing/completing them. In addition, results indicate that family ownership has a stronger negative influence on the formation riskier types of alliances such as non-equity alliances or partnerships in unrelated sectors.

Although this findings, taken together, make us propend to a demand-sided set of explanations for the reduced alliance activity of family owned firms (i.e. family owned firms ally less because other firms perceive them as more risky), we still cannot completely exclude that other offer-sided explanations could play a role in these mechanisms (e.g. that family owned firms ally less because they have smaller incentives to ally).

**Contributions**

Our study bridges the organizational and strategy literatures on alliances with that on family ownership and provides several contributions to streams of research. We argue that bringing ownership attributes into the debate of what makes firms likely to ally might be valuable to single out those drivers of strategic alliance formation related to asymmetric information and incentives for opportunistic behavior. The alliance literature has accounted for these effects by focusing, for instance, on the geographic distance and technological similarity between partners (Reuer & Lahiri, 2014). Going beyond this approach, we conjecture that a partner’s ownership structure represents the key attributes that may engender trustworthiness or raise suspicion from an informational standpoint. Thus, focusing on partners’ ownership structure provides an ideal albeit underexplored angle to broaden existing knowledge on alliance formation. Partners’ ownership identity has been largely overlooked in the literature so far. Using a comprehensive panel dataset of US firms, we provide support for our hypothesis that the features brought by family ownership in terms of idiosyncratic goals and informational opaqueness make family firms less likely to ally than other
firms. This result is especially pronounced in alliances that are more susceptible to incentive misalignment problems, such as those not based on equity and those in industries unrelated to the core activity of the partnering firms. Finally, we validate our informational mechanism by showing that family firms face more obstacles to enter alliances whenever they feature more opaque financial outcomes that impair external scrutiny.

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<table>
<thead>
<tr>
<th>Year</th>
<th>Number of firms</th>
<th>Alliances</th>
<th>Equity alliances</th>
<th>Non-equity alliances</th>
<th>Related alliances</th>
<th>Unrelated alliances</th>
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<td>2001</td>
<td>1,979</td>
<td>1,056</td>
<td>190</td>
<td>866</td>
<td>379</td>
<td>677</td>
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<td>2002</td>
<td>1,912</td>
<td>745</td>
<td>144</td>
<td>601</td>
<td>316</td>
<td>429</td>
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<td>2003</td>
<td>1,837</td>
<td>899</td>
<td>83</td>
<td>816</td>
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<td>2004</td>
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<td>729</td>
<td>63</td>
<td>666</td>
<td>212</td>
<td>517</td>
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<tr>
<td>2005</td>
<td>1,667</td>
<td>797</td>
<td>100</td>
<td>697</td>
<td>284</td>
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<td>2006</td>
<td>1,564</td>
<td>694</td>
<td>105</td>
<td>589</td>
<td>291</td>
<td>403</td>
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<td>2007</td>
<td>1,447</td>
<td>654</td>
<td>123</td>
<td>531</td>
<td>239</td>
<td>415</td>
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<td>1,373</td>
<td>553</td>
<td>108</td>
<td>445</td>
<td>233</td>
<td>320</td>
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<tr>
<td>2009</td>
<td>1,311</td>
<td>216</td>
<td>88</td>
<td>128</td>
<td>112</td>
<td>104</td>
</tr>
<tr>
<td>2010</td>
<td>1,241</td>
<td>120</td>
<td>84</td>
<td>36</td>
<td>83</td>
<td>37</td>
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<td>Total</td>
<td>16,098</td>
<td>6,463</td>
<td>1,088</td>
<td>5,375</td>
<td>2,429</td>
<td>4,034</td>
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Table 2. Descriptive statistics and correlation matrix

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<th>Mean</th>
<th>S.D.</th>
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<th>Max</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<th>14</th>
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<td>1.51</td>
<td>0</td>
<td>51</td>
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<td></td>
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<tr>
<td>2 Family ownership</td>
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<td>0.476</td>
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<td>1</td>
<td>-0.043</td>
<td>1</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>3 Number of analysts</td>
<td>8.246</td>
<td>6.658</td>
<td>1</td>
<td>43.83</td>
<td>0.258</td>
<td>-0.159</td>
<td>1</td>
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<tr>
<td>4 Financial transparency</td>
<td>0.256</td>
<td>0.163</td>
<td>0</td>
<td>1</td>
<td>0.067</td>
<td>-0.132</td>
<td>0.286</td>
<td>1</td>
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<tr>
<td>5 N of institutional investors</td>
<td>189.9</td>
<td>197.8</td>
<td>1</td>
<td>1643</td>
<td>-0.193</td>
<td>0.676</td>
<td>0.383</td>
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<tr>
<td>6 Alliance experience</td>
<td>0.24</td>
<td>0.744</td>
<td>0</td>
<td>6.023</td>
<td>0.529</td>
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<tr>
<td>7 Acquisition experience</td>
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<td>0.246</td>
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<td>0.329</td>
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<tr>
<td>8 Tobins q</td>
<td>2.633</td>
<td>1.17</td>
<td>-4.207</td>
<td>9.818</td>
<td>-0.021</td>
<td>0.332</td>
<td>0.119</td>
<td>0.258</td>
<td>0.103</td>
<td>0.038</td>
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<tr>
<td>9 Earnings per share</td>
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<td>32543</td>
<td>0</td>
<td>1580</td>
<td>0.009</td>
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<tr>
<td>10 Board Independence</td>
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<tr>
<td>11 TMT size</td>
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<td>14</td>
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<td>0.039</td>
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<td>12 TMT average salary</td>
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<td>193.1</td>
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<td>0.134</td>
<td>-0.007</td>
<td>0.339</td>
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<td>0.569</td>
<td>0.168</td>
<td>0.086</td>
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<td>-0.017</td>
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<td>1</td>
<td>12</td>
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<td>0.053</td>
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**Table 3. Main analyses (firm level): estimating firms' alliance intensity**

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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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<td>DV: Alliance intensity</td>
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<tr>
<td>Acquisition experience</td>
<td>0.448***</td>
<td>0.447***</td>
<td>0.334***</td>
<td>0.332***</td>
<td>0.409***</td>
<td>0.408***</td>
<td>0.448***</td>
<td>0.447***</td>
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<tr>
<td>Alliance experience</td>
<td>0.231***</td>
<td>0.235***</td>
<td>0.143**</td>
<td>0.141**</td>
<td>0.154***</td>
<td>0.151***</td>
<td>0.203***</td>
<td>0.205***</td>
</tr>
<tr>
<td>Tobins q</td>
<td>0.132***</td>
<td>0.133***</td>
<td>0.060*</td>
<td>0.053+</td>
<td>0.059*</td>
<td>0.05*</td>
<td>0.131***</td>
<td>0.127***</td>
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<td>0.000*</td>
<td>-0.001</td>
<td>0.000</td>
<td>-0.000</td>
<td>-0.006</td>
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<td>Board Independence</td>
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<td>0.070</td>
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<td>-0.090</td>
<td>-0.179</td>
<td>-0.148</td>
<td>-0.204</td>
<td>-0.191</td>
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<td>TMT size</td>
<td>0.125***</td>
<td>0.116***</td>
<td>0.091**</td>
<td>0.094**</td>
<td>0.107***</td>
<td>0.106***</td>
<td>0.122***</td>
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<td>TMT average salary</td>
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<td>0.002***</td>
<td>0.001***</td>
<td>0.001***</td>
<td>0.001***</td>
<td>0.002***</td>
<td>0.002***</td>
<td>0.002***</td>
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<tr>
<td>R&amp;D over sale</td>
<td>1.180***</td>
<td>1.098***</td>
<td>1.181***</td>
<td>1.172***</td>
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<td>0.923***</td>
<td>0.958***</td>
<td>0.940***</td>
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<tr>
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<td>0.002**</td>
<td>0.000</td>
<td>0.000</td>
<td>0.001**</td>
<td>0.001**</td>
<td>0.001**</td>
<td>0.001**</td>
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<tr>
<td>Capital expenditure</td>
<td>0.001</td>
<td>0.000</td>
<td>-0.004</td>
<td>-0.004</td>
<td>-0.003</td>
<td>-0.003</td>
<td>-0.003</td>
<td>-0.003</td>
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<tr>
<td>Diversification</td>
<td>-0.048*</td>
<td>-0.047*</td>
<td>-0.075*</td>
<td>-0.081**</td>
<td>-0.039</td>
<td>-0.040</td>
<td>-0.055*</td>
<td>-0.057*</td>
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<tr>
<td>Resource slack</td>
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<td>-0.001</td>
<td>-0.001</td>
<td>-0.017</td>
<td>-0.017</td>
<td>-0.021</td>
<td>-0.020</td>
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<tr>
<td>Family ownership</td>
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<td>-0.453***</td>
<td>-0.209*</td>
<td>-0.487***</td>
<td>-0.241***</td>
<td>-0.481***</td>
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</tr>
<tr>
<td>N of institutional investors</td>
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<td>0.001***</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family own. x N instit. investors</td>
<td></td>
<td></td>
<td>0.001**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of analysts</td>
<td></td>
<td></td>
<td>0.037***</td>
<td>0.029***</td>
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<td></td>
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<tr>
<td>Financial transparency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.589*</td>
<td>0.309</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family own. x Fin. transparency</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>0.944*</td>
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<td>8,963</td>
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<td>9,767</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year FE</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

Firm clustered p-value in parenthesis. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1
Table 4. Main analyses (dyad level): estimating alliance formation in a dyad of firms

<table>
<thead>
<tr>
<th>Variables</th>
<th>(9) DV: Alliance formation</th>
<th>(10) DV: Alliance formation</th>
<th>(11) DV: Alliance formation</th>
<th>(12) DV: Alliance formation</th>
<th>(13) DV: Alliance formation</th>
<th>(14) DV: Alliance formation</th>
<th>(15) DV: Alliance formation</th>
<th>(16) DV: Alliance formation</th>
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<tbody>
<tr>
<td>Business similarity</td>
<td>0.636***</td>
<td>0.630***</td>
<td>0.627***</td>
<td>0.626***</td>
<td>0.579***</td>
<td>0.579***</td>
<td>0.637***</td>
<td>0.637***</td>
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<tr>
<td>Geographical distance</td>
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<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Cum. acquisition experience</td>
<td>0.046***</td>
<td>0.044***</td>
<td>0.042***</td>
<td>0.042***</td>
<td>0.022***</td>
<td>0.022***</td>
<td>0.042***</td>
<td>0.042***</td>
</tr>
<tr>
<td>Cum. alliance experience</td>
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<td>0.010***</td>
<td>0.010***</td>
<td>0.010***</td>
<td>0.008***</td>
<td>0.008***</td>
<td>0.009***</td>
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</tr>
<tr>
<td>Relative Tobins q</td>
<td>-0.147</td>
<td>-0.097</td>
<td>-0.101</td>
<td>-0.100</td>
<td>-0.599***</td>
<td>-0.611***</td>
<td>-0.102</td>
<td>-0.097</td>
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<tr>
<td>Relative EPS</td>
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<td>-0.441***</td>
<td>-0.376**</td>
<td>-0.372**</td>
<td>-0.125</td>
<td>-0.115</td>
<td>-0.375**</td>
<td>-0.376**</td>
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<tr>
<td>Average board independence</td>
<td>0.662</td>
<td>0.413</td>
<td>0.188</td>
<td>0.228</td>
<td>0.199</td>
<td>0.229</td>
<td>0.115</td>
<td>0.101</td>
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<tr>
<td>Relative TMT size</td>
<td>0.477</td>
<td>0.406</td>
<td>0.430</td>
<td>0.403</td>
<td>0.399</td>
<td>0.394</td>
<td>0.388</td>
<td>0.387</td>
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<tr>
<td>Difference in TMT salary</td>
<td>1.470***</td>
<td>1.384***</td>
<td>1.289***</td>
<td>1.278***</td>
<td>0.813***</td>
<td>0.803***</td>
<td>0.854***</td>
<td>0.852***</td>
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<tr>
<td>Similarity in R&amp;D inv.</td>
<td>0.813*</td>
<td>0.920*</td>
<td>0.872*</td>
<td>0.870*</td>
<td>0.956*</td>
<td>0.962*</td>
<td>0.807+</td>
<td>0.806+</td>
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<tr>
<td>Relative size</td>
<td>-0.325+</td>
<td>-0.333*</td>
<td>-0.208</td>
<td>-0.201</td>
<td>-0.313*</td>
<td>-0.316*</td>
<td>-0.198</td>
<td>-0.199</td>
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<tr>
<td>Similarity in CAPEX</td>
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<td>0.024</td>
<td>0.020</td>
<td>0.020</td>
<td>0.023</td>
<td>0.024</td>
<td>0.015</td>
<td>0.015</td>
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<tr>
<td>Similarity in diversification</td>
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<td>-0.086</td>
<td>-0.082</td>
<td>-0.087</td>
<td>-0.189</td>
<td>-0.197</td>
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<tr>
<td>Relative resource slack</td>
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<td>-0.727***</td>
<td>-0.749***</td>
<td>-0.747***</td>
<td>-0.724***</td>
<td>-0.727***</td>
<td>-0.737***</td>
<td>-0.736***</td>
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<td>One or both family-owned</td>
<td>-0.510***</td>
<td>-0.506***</td>
<td>-0.725***</td>
<td>-0.340***</td>
<td>-0.698***</td>
<td>-0.550***</td>
<td>-0.405+</td>
<td>-0.405+</td>
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<tr>
<td>N of institutional investors ties</td>
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<td>0.022**</td>
<td>0.034**</td>
<td>0.022**</td>
<td>0.025*</td>
<td>0.025*</td>
<td>0.025*</td>
<td>0.025*</td>
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<tr>
<td>1 or 2 family owned x N ties</td>
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<td>0.075***</td>
<td>0.081***</td>
<td>0.075***</td>
<td>0.081*</td>
<td>0.081*</td>
<td>0.081*</td>
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<td>Total number of analysts</td>
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<td>0.012*</td>
<td>0.012*</td>
<td>0.012*</td>
<td>0.012*</td>
<td>0.012*</td>
<td>0.012*</td>
<td>0.012*</td>
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<td>Dyad financial transparency</td>
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<td>1.858***</td>
<td>1.975***</td>
<td>1.858***</td>
<td>1.975***</td>
<td>1.858***</td>
<td>1.975***</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<tr>
<td>Firm B Sector FE</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<tr>
<td>Year FE</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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DV: Differences in board and firm variables; Average board independence = average board independence of both firms; Main analyses (dyad level): value in parenthesis. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.
Table 5: Additional analyses (dyad level): what ownership pair is more likely to generate an alliance

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<td>(0.000)</td>
<td>(0.000)</td>
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<td>Only one family-owned</td>
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</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.000)</td>
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<tr>
<td>Both nonfamily-owned</td>
<td>0.843***</td>
<td>0.444***</td>
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</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
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</tr>
<tr>
<td>Both family-owned</td>
<td>-0.398**</td>
<td>-0.843***</td>
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</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.000)</td>
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</tr>
<tr>
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<td>8,953,378</td>
<td>8,953,378</td>
<td>8,953,378</td>
</tr>
<tr>
<td>Firm A Sector FE</td>
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<td>YES</td>
<td>YES</td>
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<tr>
<td>Firm B Sector FE</td>
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<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year FE</td>
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<td>YES</td>
<td>YES</td>
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<tr>
<td>Other controls</td>
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<td>YES</td>
<td>YES</td>
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</table>
| Firm clustered p-value in parenthesis. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 6: Additional analyses (firm level): different alliance types

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<tr>
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<td>-3.186***</td>
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<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>Family ownership</td>
<td>-0.036</td>
<td>-0.184*</td>
<td>-0.190+</td>
<td>-0.289***</td>
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<td>(0.790)</td>
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<td>(0.079)</td>
<td>(0.001)</td>
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<td>Observations</td>
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<td>12,602</td>
<td>12,602</td>
<td>12,602</td>
</tr>
<tr>
<td>Sector FE</td>
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<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year FE</td>
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<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Other controls</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
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</tbody>
</table>
| Firm clustered p-value in parenthesis. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1
### Table 7: Additional analyses (dyad level): different alliance types

<table>
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<tr>
<th></th>
<th>Equity and non-equity alliances</th>
<th>Related and unrelated alliances</th>
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</thead>
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<td>Multinomial Logit models</td>
<td>Multinomial Logit models</td>
</tr>
<tr>
<td>(24)</td>
<td>(25)</td>
<td>(26)</td>
</tr>
<tr>
<td>DV: Equity alliance vs. no all. formation</td>
<td>DV: Non-equity alliance vs. no all. formation</td>
<td>DV: Related alliance vs. no all. formation</td>
</tr>
<tr>
<td>Constant</td>
<td>-35.886 (0.997)</td>
<td>-49.461 (0.998)</td>
</tr>
<tr>
<td>One or both family-owned</td>
<td>-0.368 (0.170)</td>
<td>-0.522*** (0.000)</td>
</tr>
<tr>
<td>Observations</td>
<td>9,218,709</td>
<td>9,218,709</td>
</tr>
<tr>
<td>Firm A Sector FE</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Firm B Sector FE</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Year FE</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Other controls</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

Dyad clustered p-value in parenthesis. *** p<0.001, ** p<0.01, * p<0.05, + p<0.1
Figure 1 – Average marginal effect of family ownership on alliance intensity at increasing number of institutional investors

Figure 2 – Average marginal effect of family ownership on alliance intensity at increasing number of analysts

Figure 3 – Average marginal effect of family ownership on alliance intensity at increasing financial transparency