Why partners' endowments are not enough: the effect of resource commitment and status for firm performance in a firm's alliances

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Abstract :

We develop and test the conditions under which a firm mitigates the impact of partners' bargaining power on firm performance in its alliances portfolio. We propose that although the bargaining power of partners constrains firm performance, this negative impact is contingent upon a firm's own characteristics. Our longitudinal analysis of 64 semiconductor firms shows that the impact of partners' bargaining power decreases when firms' relative commitment to technological resources is high. In particular, the effect of such resource commitment is stronger when firms have relatively low status. These results suggest the significant implications when a firm leverages the resource endowments of partners in its alliance portfolio.

Key words : Alliance portfolio, economic performance, resource commitment, status,

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1. Introduction

How does a technology-intensive firm's technological resource commitment to its alliances and its status vis-à-vis its alliance partners impact value appropriation on the alliance portfolio level? A fundamental question in alliance portfolio research concerns how the resource endowments of alliance partners influence a focal[1] firm's performance (Lavie, 2006, 2007; Wassmer, 2010). Strategically critical partner resources can affect a firm's performance positively by providing access diverse knowledge (Baum, Calabrese, and Silverman, 2000; Powell and Smith-Doerr, 1996; Stuart, 2000), potential entry into new market (Mitchell and Singh, 1992), market power (Eisenhardt and Schoonhoven, 1996), legitimacy to acquire additional resources (Weigelt and camerer, 1988), and opportunities to create synergistic and rent creating resource combinations on the alliance portfolio level (Wassmer and Dussauge, 2012). In technology-intensive firms such strategically critical resources can be considered technological resources which facilitate a firm's understanding and exploitation for external technological knowledge and lead to innovative technology development (Ahuja, 2000a; Lane and Lubatkin, 1998; Stuart, 1998).

Although partner resources can help to create value, there are also various drawbacks related to the dependence on partners for critical resource access. Resource dependence theory suggests that when alliance partners control resources critical to a focal firm's survival, the partners' bargaining power impedes a fair share of the value the focal firm is able to extract from its alliances (Bae and Gargiulo, 2004; Emerson, 1962; Khanna, Gulati, and Nohria, 1998; Pfeffer and Salancik, 2003). Research in this domain also points out that factors such as new businesses different from current set of activities or capacity of resource development may offset the impact of such asymmetric power relationships (Pfeffer and Salancik, 2003). Alliance research, on the other hand, has suggested that firms can mitigate their partners' bargaining power by leveraging competitive relationships between the partners (Lavie, 2007) and by making use of alternative alliances (Bae and Garguilo, 2004). What the extant literature has underemphasized, however, is that a technology-intensive firm's technological resource commitment and its status vis-à-vis its alliance partners can play an important role in

[1] By focal firm we refer to the firm that maintains the alliance portfolio.

mitigating the bargaining power of partners and thus affect value appropriation on the alliance portfolio level.

The crux of our theoretical argument concerns the impact of a focal firm's technological resource commitments to its alliances and its status vis-à-vis its alliance partners on the firm's economic performance. Specifically, we argue that a focal firm's commitment of technological resources to its alliances can improve its bargaining position and thus offset the effect of its partners' bargaining power on its performance. Furthermore, we investigate how a firm's status that associates with legitimacy driven by institutional pressure affects its commitment of the technological resource. Status is socially accepted ranking of organizations in a social system (Podolny, 2005; Washington and Zajac, 2005). Firms can achieve their legitimacy by establishing status as consequence of its relations with key constituents. Put differently, firms establish their status by making activities which would be legitimized by third party (Deephouse, 2000). Specifically, firms' quest for legitimacy leads firms to specific action such as resource acquisitions and development (Philippe and Zuckerman, 2001; Philippe and Durand, 2011). We argue that when a firm has relatively lower status than partners and it has low-status in its industry, it attempts to make greater commitment of technological resource.

Taking this into account, we posit that a different status reflects a different degree of social legitimacy, which has implications for a firm's resource commitment. We also contend that when a focal firm has a relatively lower status than its partners and a low-status in its industry, the firm engages in greater organizational commitment and the moderating effect of that resource commitment is pronouncing.

For the purpose of this study, we define an alliance as a voluntary arrangement between two or more independent firms involving the exchange, sharing, or co-development of products, technologies, or services (Gulati, 1998). We define a firm's alliance portfolio as the set of all its direct active alliances across vertical and horizontal boundaries (Baum, Calabrese, and Silverman, 2000; Lavie, 2007; Wassmer, 2010). Moreover, we conceptualize bargaining power as a focal firm's ability to favorably change the terms of agreements and influence the outcomes of negotiations with its alliance partners (Bae and Gargiulo, 2004; Yan and Gray, 1994).

Our study intends to make several contributions. First, we extend resource dependence theory by examining how a focal firm can reduce the bargaining power of its alliance partners by controlling key resources in the alliance. More specifically, we shed light on the issue of how a focal firm's technological resource commitment to its alliances influences the

bargaining power of partners. Second, we contribute to the alliance portfolio literature by examining how a focal firm's status vis-à-vis its partners influences the firm's ability to appropriate value from its alliance portfolio. More specifically, we provide insights on how status differentials affect the relationship between a focal firm's technological resource commitment to its alliances and its economic performance. Third, by investigating the performance effect of the interaction between a firm's technological resource commitment and status, we offer a complementary explanation to status theory on how partners' industry status can enhance alliance formation and firm performance. Finally, our study contributes to the literature on the relationship between partners' resource endowments and value appropriation in alliance portfolios. More specifically, our study extends previous work that has focused on the moderating effect of structural alliance portfolio aspects by identifying focal firm characteristics that influence the relationship between the partners' resource endowments and focal firm performance.

The remainder of the paper is organized as follows. First, we review relevant background literature and develop hypotheses which we test on a longitudinal dataset on firms and horizontal alliances in the global semiconductor industry from 1997 to 2007. We then describe our results and discuss their implications, limitations of this study, and avenues for future research.

2. Relevant background literature and hypotheses

2.1. Alliance and firm performance

Studies on alliances portfolios have shown that collaborations with partners who possess strong resource endowments are beneficial because these resources directly affect the focal firm's performance (Gulati, 1999; Gomes-Casseres, 1994; Powell et al., 1996; Stuart 2000). Access to critical technological or commercial partner resources and skills can be critical for a focal firm's competitive success in its industry (Baum et al., 2000; Powell, 1996; Stuart, 2000). By having access to such partners, firms are better able to develop their own technological resources and innovation and continuously adapt to environmental uncertainty by leveraging partners' size, technological capabilities and/or knowledge transfer (Hagedoorn and Schakenraad, 1994; Stuart, 2000). Similarly, access to such partner firms also allow firms to increase their innovation and learning rates and thus grow and increase revenues (Powell et al., 1996; Stuart et al., 1999). For instance, research found that firms increased their patent rate and sales growth by entering into technology alliances with larger firms possessing superior resources in terms of innovativeness and size (Hagedoorn and Schakenraad, 1994;

Stuart, 2000).

Despite acknowledging that partners' resource endowments influence a focal firm performance, numerous scholars have identified a negative impact of partner resource endowments on firm performance due to an asymmetric distribution of alliance benefits between alliance partners (Dyer and Singh, 1998; Dyer, Singh, and Kale; 2008; Khanna, Gulati, and Nohria, 1998). In particular, they have focused instead on the negative effect created by strong partner firms. These studies argue that the benefits derived from access to diverse knowledge may be impaired by resource-rich partners as they may impede a fair share of the value created by the alliance. Thus, a dilemma results wherein an alliance portfolio constituted of resource rich partners, on the one hand, provides a focal firm with strong resources, while on the other hand risks an asymmetric distribution of the alliance value (Bae and Gargiulo, 2004; Lavie, 2007). A few studies have addressed this concern by examining the structural aspect of an alliance portfolio as a moderator of the relationship between partners and firm performance. These studies identified the availability of alternative alliances (Lavie, 2007) or third-party relationships (Bae and Gargiulo, 2004) as critical factors that can help mitigating the bargaining power of strong partners. Such options, however, might not apply in a situation where a focal firm's alternatives are limited or the firm's needs for critical resources controlled by partners increases.

When firms have similar endowments of partner resources, performance differentials could still occur due to other contingent factors such as firm characteristics, structural contingency of networks, or industry context (Ahuja, 2000b). Scholars have acknowledged that a firm's specific factors, such as technological capability, may help explain the distribution of alliance value appropriation (Stuart, 2000). That is, how a focal firm extracts benefits from multiple simultaneous partnerships largely depend upon the characteristics of the individual firm, as one of key boundary conditions to the effect of diverse partner endowment in an alliance portfolio (Barnett, Greve, and Part, 1994; Shipilov, 2009). For example, firm performance may vary with various firms-specific configurations of resources, by influencing its particular strategy like diversification (Hitt, Hoskisson, and Kim, 1997).

Alliances research has suggested that the performance impact of alliances can be better understood by incorporating focal firm-specific attributes into the analysis (Zaheer and Bell, 2005). Recent studies found evidence on the effect of firm-specific attributes on performance. For instance, a focal firm's breakthrough innovations in R&D alliances are contingent on the quality of the focal firm's internal strengths and technological resources (Srivastava and Gnyawali, 2011). Put differently, the extent to which a focal firm can extract benefits from its

alliance portfolio may be contingent upon its internal characteristics including the firm's own resources (Stuart, 2000). In the next section, we explain how the conditions of a firm's internal factors help to better understand the effects of partner endowments in an alliance portfolio.

2.2. Bargaining Power and Firm Performance

A firm's survival depends on the extent to which the firm has access to critical resources and resource alternatives (Cook and Emerson, 1978; Emerson, 1962; Pfeffer and Salanicik, 2003). As those resources are controlled by other firms, the firm's survival is heavily dependent on these firms. Because such resource dependency may cause asymmetric power relations between the firm and its partner, it is critical to have ability to manage such relations. That is, the extent to which a firm appropriates a value from an alliance depends upon its relative bargaining position, derived from interdependence between the firm and its partner (Dyer and Singh, 1998; Pfeffer and Salancik, 2003).

The relative bargaining power depends upon key resources controlled by others. In a firm's alliance portfolio, when partner firms endow the more critical or scarce resources to the alliance at the initial negotiation, they might appropriate higher shares of common alliance benefits in ex-ante negotiations (Dyer, Singh, and Kale, 2008). The partner firms who control key resources might choose whether to continue or terminate the alliances or choose to affiliate again with the firm in the future (Harrigan and Newman, 1990). Scholars have highlighted two interdependence situations influencing the relative bargaining position; context-based and resource-based situation (Emerson, 1962; Pfeffer and Salancik, 2003), which may offer a firm opportunity to overcome such paradoxical situation.

Context-based situation concerns how much a focal firm can have potential alternative alliances to substitute existing partners. When the firm has access to alternative alliances, lower switching costs of the firm reduce its dependence on specific partners (Yan and Gray, 1994). Indeed, firms tend to increase the number of their suppliers in maximizing bargaining power and profits (Dyer and Singh, 1998). A few alliance portfolio studies found that the effect of the relative bargaining position of partners on firm performance is contingent upon external conditions, such as availability of alternative alliances (Lavie, 2007) and third-party relationships (Bae and Gargiulo, 2004). Bargaining power is also considered in resource-based context where firms may increase their resource commitment to the alliance. Khanna *et al* (1998) conceptualized the incentives of resource commitment as private benefits that "a firm can earn unilaterally by picking up skills from its partner and applying them to its own

operations in areas unrelated to the alliance activities" (1998: 195). As the higher level of private benefits drives firm to facilitate more learning race, the more the firm devote resources commitment to alliances, the more its fate is bound to the alliance.

2.3. Mitigating Partner Bargaining Power through Technological Resource Commitments

While resources controlled by partners constrain a firm' appropriation capacity, the firm can mitigate this negative effect by increasing its resource commitment to the alliance (Demirbag and Mirza, 2000; Kwon, 2008). Because a firm is likely to seek power relative to those on whom it is dependent, asymmetric commitment and incentives to allocate resources can affect the likelihood that the firm will increase its bargaining position (Khanna et al., 1998; Thompson, 1967). It implies that firm's internal commitment is likely to influence the firm's value appropriation capability, and thus firm profitability (Beamish 1984; Hamel, 1991; Mowday, Porter, and Steers, 1982). In an alliance context, a firm's resource commitment to its alliances relates to the degree of co-specialization between a firm and its alliance partner (Gimeno, 2004). Organizational scholars suggest that firms build exclusive relations with partners by engaging in high co-specialized asset investments, which make interfirm contracts more self-enforcing by increasing opportunistic cost (Cook and Emersion, 1978, Williamson, 1983). A high degree of co-specialization between alliance partners normally includes a high level of resource commitment which serves as a credible commitment that sustains cooperation (Gimeno, 2004).

Commitment in alliances involves two intertwined components: behavioral commitment and attitudinal commitment (Cullen et al., 1995). A firm's behavioral commitment relates to the willingness to invest resources as an instrumental aspect which includes equity contributions, organizational knowledge or technology, and human resources among others. When a firm has less bargaining power in an alliance, it is likely that it will encounter more difficulties in achieving its own alliance goal. To mitigate the dependency on its partner, the firm might increase its resource contribution to the alliance. A firm's attitudinal commitment, on the other hand, relates to a strong desire to achieve organizational goals by conceiving long-term orientation beyond contractual requirement in its alliances. When a firm perceives such potential benefits in its alliance, it is more likely to increase its effort and attention to the alliance (Mohr and Spekman, 1994; Tsang, 2002). Scholars recognize that these two types of commitments often have interactive effects in alliances (Ren, Gray, and Kim, 2009). The more resources a firm endows to an alliance, the more the firm is bound to the alliance, leading to higher attitudinal commitment. High commitment, therefore, functions

as an efficient governance mechanism that helps mitigating potential opportunistic behavior by a partner (Cook and Emerson, 1978; Williamson,1983). Moreover, a high degree of investment in co-specialized assets increases the cost of ending a relationship because they increase the cost of switching to alternatives outside the alliance (Klein, 1980; Williamson, 1983). Increasing the level of co-specialization thus acts as a mechanism that sustains cooperation (Gimeno, 2004; Jones et al., 1997). A firm's willingness to increase its resource commitment to its alliances might enhance its bargaining position relative to its alliance partners and increase its ability to appropriate more value from its alliance portfolio.

In high-tech industries, firms' commitment to technological resources is significant and affects firms' ability to appropriate value from in their alliance portfolios (Srivastava and Gnyawali, 2011). By strengthening their endowments of technological resources such as R&D expenditure and R&D employees, firm are able to learn new ways to compete and develop new products (Caves, 1996; Miller and Chen, 1996). When a firm's commits to a high level of technological resources in its alliances. For instance, higher commitment than partners relates to learning race (Khanna et al., 1998). Because entering into learning races implies that the firm stands to gain larger private benefits than other partner firms from common value or novel technological knowledge of alliances, a focal firm's high commitment to technological resource might allow the firm to exploit faster access to knowledge of opportunities over the period of alliance (Cohen and Levinthal, 1990). Further, high commitment is likely to facilitate understanding and acquisition of partners' knowledge (Chang, 1995; Kogut and Chang, 1996).

Alliance scholars examined the effect of resource commitment in alliances on firm performance and argued that such commitment reduces transaction and partnering costs in alliances and thus affects firm performance positively (Isobe et al., 2000; Kwon, 2008; Nakos and Brouthers, 2008; Robins et al., 2002). Child and Yan (2003) demonstrate that increasing commitment in capital investment, new facilities, and operational inputs influences a firm's profitability in joint ventures. Isobe et al. (2000) find that a firm's resource commitment to technology transfer has a positive impact on its economic performance. These studies suggest that a strong technological resource commitment to alliance weakens the bargaining position of alliance partners and is thus likely to improve firm performance. Taking all of that into account, we hypothesize:

Hypothesis 1: A firm's economic performance is less associated with its partners' bargaining power when the firm's technological resource commitment to its alliances is higher than its alliance partners' commitments.

2.4. The Interaction between Technological Resource Commitments and Status

Besides a firm's resource commitments to its alliances, other firm level factors may also weaken the motivation of strong partners to use their bargaining power to derive more private benefits from the alliance (Khanna, 1998). The status of the focal firm represents one of these factors that can decrease the bargaining power of alliance partners.

A firm's status is determined by its legitimacy in the interorganizational field and legitimacy is thus viewed as a conferred status controlled by organizations other than the status seeking firm (Pfeffer and Salancik, 2003). Firms seek legitimacy by conforming to social norms and standards in their industry environment (Meyer and Rowan, 1977; Pfeffer and Salancik, 2003). A social norm sets a behavioral standard based on the behavior of a reference group (Warron, 2003) and firms are frequently forced to comply with them (Meyer and Rowan, 1977). To become legitimate firms adopt managerial practices, organizational forms, and activities that other firms have (Deephouse, 2000; Duran et al., 2007). One way for firms to comply with social norms and achieve social legitimacy is to associate with socially accepted firms (Benjamin and Podolny, 1999; Dacin et al., 2007; Pfeffer and Salancik, 2003; Podolny, 1994).

Two different contexts may explain interfirm relationships between similar status and different status firms. On the one hand, firms have incentives to protect their positions in a status hierarchy by partnering with firms of similar status (Benjamin and Podolny, 1999; Chung et al., 2000; Podolny, 1994). On the other hand, high-status firms may partner with low-status firms because of business opportunities associated with partners occupying different positions in the industry (Gargiulo and Benassi, 2000; Gulati and Gargiulo, 1999; Li and Rowley, 2002; Stuart, 2000). For example, firms that are poor in social capital increase their chances of entering alliances when they possess path breaking inventions (Ahuja, Polidoro, and Mitchell, 2009). As a result, lower status firms with new technologies can provide higher-status firms with opportunities to obtain novel knowledge in a different part of the industry.

Considering that status associated with legitimacy is one important part of the management of a firm's interdependent environment, a firm's status has implications for the firm's resource commitments to its alliances. In other words, we expect that the status difference between a focal firm and its partners determines the firm's resource commitments to its alliances. Because prestige associated with higher-status firms can provide a reputational advantage and verify the reliability of lower-status firms to other potential allies, lower status

firms are likely to have more alliances with higher status firms (Podolny, 1994; Podolny and Phillips, 1996; Stuart et al., 1999). However, in order to attract and maintain high status firms into such relationships, lower status firms are likely to agree to generous financial terms and/or access to promising development-stage technologies (Stuart, 1998). Similarly, low status firms may increase the resource commitment to its alliances to offset the relatively lower status vis-a-vis high status partners (Castellucci and Ertug, 2010). In order to benefit from higher status partners, a lower status firm increase their organizational effort with strong management involvement (Mohr and Spekman, 1994; Tsang, 2002) in return for improving its status and maintaining the relationship with the higher status partner. A firm's willingness to make efforts and to increase incentives for commitment may improve its bargaining position and appropriation capacity relative to the strong partner. Thus, we expect that the impact of a firm's technological resource commitment to its alliance on the relationship between the bargaining power of its partners and its economic performance is stronger when the firm has a lower status than its partners. Therefore, we hypothesize:

Hypothesis 2: A focal firm's technological resource commitment to its alliances will affect the firm's economic performance more positively when the firm has a lower status than its alliance partners.

Firms also associate themselves with social norms by altering their behavior (Pfeffer and Salancik, 2003). Conforming to social norms is voluntary in that rewards and sanctions for conformity or deviance are imposed by diffuse actors rather than by a central authority (Ingram and Silverman, 2002). Procedures to comply social norm relate to unspecified characteristics or availability of alternative procedures (Soodrick and Salancik, 1996), and a firm may selectively conform to one demand of the norm without conforming to another. As a consequence, conformity to social norm can be interpreted as a heterogeneous behavioral pattern of a firm (Philippe and Durand, 2011). Recent studies document that firms occupying different social positions may have different social-psychological orientation and thus involve in conformity differently (Deephouse and Carter, 2005; Phillips and Zukerman, 2001). For instance, high status firms occupy more advantageous and secure positions, which allows them to exhibit non-conforming behavior (Ashforth and Gibbs, 1990), enhancing their status further (Berkowistz and Macaulay, 1961). Low status firms may attempt to raise their status by conforming to industry practices. In most industries, such as commercial banking, chemical, and high-technology industries, firms' deviation by non-confirming behavior could result in strong restriction by regulators (Grief, 1997; Spong, 1990). Conforming to industry

practices implies that low status firms may have a strong desire to achieve its legitimacy, by making greater efforts and organizational commitment to show their greater conformity (Deephouse and Carter, 2005; Phillips and Zuckerman, 2001). When a firm has low status so that it must conform to demands to dominant social norms and practices, it may increase greater efforts and resource contributions than high-status firms to offset the effect of its low status. Therefore, while firms' technological resources are likely to decrease the effect of partners' bargaining position and thus improve firm performance, we expect that this impact will be more pronounced for low-status firms than high-status in industry. Thus, we hypothesize:

Hypothesis 3: Low status firms will experience a more positive effect of their relative commitment on their economic performance than high status firms.

3. Methods

3.1. Data

Sample firms. In order to test our hypotheses, we constructed a longitudinal panel dataset which consists of the population of global semiconductor firms (SIC 3674) over the years 1997 to 2007. Our sample firms are technology-intensive firms designing, producing, and marketing integrated circuits including microprocessors and memory chips. We selected the semiconductor industry as the empirical setting for various reasons. First, this industry is characterized by numerous alliances between firms with heterogeneous resources and capabilities. During the 1990s and 2000s, this industry experienced significant changes in technology and competition, resulting in a growing use of alliances (Park et al., 2002; Stuart, 2000). Second, the industry is also characterized by rapid and considerable technology change, which allows for the examination of the alliance pattern in leveraging partner endowments in an industry that has had a volatile environment (Bettis and Hitt, 1995; Yayavaram and Ahuja, 2008). Lastly, the available industry data allow for establishing clear and reliable alliance and other firm-level measures. To ensure the reliability and consistency of financial and performance data, we limited the sample to public firms traded on U.S. stock exchanges. Because various strategy studies have suggested that the effects of strategies on individual firms' behavior are likely to be most pronounced for the large and principal firms in an industry (Rajagopalan and Datta, 1996), we chose a sample of firms with the largest sales at the beginning of the study period. The final panel dataset was unbalanced and consisted of 64 firms and 333 firm-year observations.

Alliance data. The alliance data was obtained from the *SDC* database. To improve the reliability of the *SDC* alliance data, we corroborated the data with several archival searches using the *Factiva* press database (Anand and Khanna, 2000). To construct a firm's alliance portfolio, we adopted a four-year moving period that included horizontal alliances formed in the previous three year (e.g., 1994-97, 1995-98, 1996-99, etc.). This approach is common in alliance research to account for the lag structure of learning within each alliance (Phelps, 2010; Stuart, 2000).

Financial data. Firm-specific data and financial data were obtained from the *Bloomberg* database, *Datastream* database, and the sample firms' annual reports. Because some sample firms were diversified (e.g., Hitachi, Samsung, Toshiba among others), we were unable to obtain formal accounting measures reflecting firms' activities in the semiconductor business. However, we were able to gather local accounting measures for the semiconductor operations of each of the sample firms by translating non-English articles into English.

3.2. Dependent Variable

We operationalized our dependent variable *Firm Performance* through a focal firm's log-transformed market value. Following Lavie (2007), we calculated a firm's stock price by averaging the 12 end-of-month daily value of the calendar year to control for the volatility of stock prices. We calculated the annual market value by multiplying the firm's average stock price by the number of common shares outstanding. To control for fluctuations of stock market, we adjusted the annual market value by dividing it by the ratio of the compound S&P 500 market value at year*t+1* to the compound S&P 500 market value in 1997. Thus, a focal firm *i*'s market value at time *t*+1 is as follows:

$$Market\ value_{i,t+1} =$$

$$\left(\left(\sum_{k=1}^{12} Stockprice_{i,t+1,m} \times Outstanding\ shares_{i,t+1,m}\right)/12\right) \Big/ \frac{S\&P\ 500_{t+1}}{S\&P\ 500_{1997}}$$

where *Stock price*$_{i,t+1,m}$ is a focal firm *i*'s stock price of the end-of-month at year *t+1*, Outstanding shares$_{i,t+1,m}$ are the number of common shares issued by a focal firm *i* at year *t+1*, S&P 500$_{t+1}$ is S&P market value at year *t+1*, and S&P 500$_{1997}$ is S&P market value in 1997. We calculated the annual change in market value by dividing the market value at year *t*+1 by the market share at year *t*.

3.3. Independent Variables

Bargaining Power of Partners. To measure the *Bargaining Power of Partners*, we used the partner firms' market power, which represents the extent to which a focal firm's partners control a large share of their respective integrated circuits markets. High market power of partners indicates that the partners have a relatively large resource endowment, and might control a focal firm's access to their privileged resources and physical assets. Thus, the focal firm might be more dependent on the alliances than partner firms, having less bargaining power. Building on Bae and Gargiulo (2004), we calculated the sum of squared market shares, assuming that market power increases at an increasing rate with their market shares. We then used the difference between the market power of partners and the focal firm's market power in a given year as follows:

$$\left[\sum_{j=1}^{N}(\text{Bargaining power}_{j,t}/N_{i,t})\right] - (\text{Bargaining power}_{i,t})$$

where $N_{i,t}$ is the number of parters in firm *i*'s portfolio in year *t*. This variable represents the relative bargaining power of partners based on their market power relative to the market power of the focal firm. It is higher for greater bargaining power of partners.

Technological Resource Commitment. We operationalize a focal firm's *Technological Resource Commitment* through the log-transformed patenting frequency of each firm and its partners, i.e., the number of patents received in a given year. Patents are an important measure of technological resources because they represent the very real resources as inputs (Deeds and Hill, 1996; Levin et al., 1987) and an externally validated effort for new product development (Griliches, 1990). The number of patents is a relevant proxy for measuring firms' technological resource heterogeneity because firms differ in their patenting propensity (Cohen and Levin, 1989). We used the count of patents issued from the U.S. Patent Office's online database. To calculate a focal firm's technological resource commitment, we used the mean difference between the focal firm's and its partners' technological resources as follows:

$$Technological\ Resource\ Commitment_{\ i,t+1} = TR_{i,t+1} - \left[\sum_{j=1}^{N}(TR_{j,t+1}/N_{i,t})\right]$$

where $TR_{i,t+1}$ is a focal firm *i*'s number of patents in year *t+1*, $TR_{j,t+1}$ is the focal firm's partners' number of patents, and $N_{i,t}$ is the number of partners in a focal firm *i*'s alliance portfolio in year *t*. A higher value of this variable suggests that a focal firm *i* has a relatively higher technological resource commitment than its partners in year *t+1*.

Status. Following previous studies, we measured the status of a focal firm and its partners using Bonacich's eigenvector centrality, which is interpreted as a status score when

computed using network data (Podolny, 2001; Benjamin and Podolny, 1999). This indicator captures not only the connectedness of the focal firms but also the connectedness of its partners (Bonacich, 1987). It is usually computed using valued sociomatrices. Firms obtain higher eigenvector centrality by being connected to a group of partners that have many well-connected partners of their own. To calculate this status score, we constructed adjacency matrices for each year among all possible pairs of firms in our sample. We then constructed the industry network for each year and computed centrality scores using UCINET (Borgatti et al., 2002). To test Hypothesis 2, we operationalized the variable *Relative Status* as the difference between a focal firm's status and the mean of its partners' status by one minus the difference in a given year. More formally:

$$Relative\ Status_{i,t} = \mathrm{Status}_{i,t} - \left[\sum_{\mathrm{j}=1}^{\mathrm{N}} (\mathrm{Status}_{j,t}/\mathrm{N}_{i,t})\right]$$

where $\mathrm{N}_{i,t}$ is focal firm *i's* number of partners in year *t*; $\mathrm{Status}_{i,t}$ represents the focal firm's status, and $\mathrm{Status}_{j,t}$ represents the status of a partner j. A higher value of this variable suggests that a focal firm has a lower status than its partners.

3.4. Control Variables

We controlled for a number of factors that may affect a firm's performance. We controlled for *Focal Firm Age*, calculated as the number of years from the firm's year of founding to year *t*. We controlled for *Focal Firm Size*, measured as the log-transformed number of employees. As prior performance can influence firm's activities and future performance, we controlled for a focal firm's *Prior Firm Performance* of year *t*–1. A firm that makes a consistent commitment to capital expenditures is continually building their property, plant, and equipment (Chatterjee and Wernerfelt, 1991). As the availability of such physical assets and resources can improve firm performance by increasing its productivity, we controlled for the focal firm's *Capital Intensity* as the log-transformed capital expenditure divided by sales in year *t*. Furthermore, as R&D expenditures are investments in knowledge creation (Griliches, 1990) and contribute to firm's ability to absorb extramural knowledge, leading to improving firm performance (Cohen and Levinthal, 1990), we controlled for *R&D Intensity* by dividing firm *i*'s R&D expenditure by its sales in year *t*. In addition, as accumulated alliance management experience can influence the performance of any subsequent alliances, we controlled for a focal firm's *Alliance Experience* calculated as the log-transformed number of alliances in the ten year prior to year *t* (Wassmer and Dussauge, 2012). Furthermore, equity joint ventures are assumed to be effective governance mechanisms for interfirm learning and

knowledge transfer, improving firm productivity and development of novel technology (Kogut, 1988). Thus, we controlled for *Governance* as the proportion of joint ventures out of the total number of alliances in focal firm *i*'s alliance portfolio. As more alliance partners can provide a firm with access to more diverse resources and knowledge, enhancing firm outcomes, we controlled for the focal firm's *Alliance Portfolio Size* measured as the log-transformed number of alliance partners for firm *i* in year *t* by adopting a four-year window moving. Finally, to control for the effect of geographical and cultural distances between a focal firm and partners on firm performance, we controlled for the degree of *Internationalization* in a focal firm's alliance portfolio measured as the percentage of foreign partners in focal firm *i*'s alliance portfolio in year *t*.

3.5. Analysis and results

Table 1 presents the descriptive statistics and the correlation matrix for all the variables. As one could expect, larger firms on the average had a bigger alliance portfolio and high technological resource commitment ($p<0.05$). Firms' alliance experience on the average was higher when their age was high. Greater bargaining power of partners on average impairs firm performance. In addition, status is negatively correlated with technological resource commitment ($p<0.05$). As we expected, firms with low status have more resource commitment than firms with high status.

Table 2 provides the regression results with *Firm Performance* as the dependent variable. Given the panel data structure of our dataset with repeated, within-subject measures, we used generalized estimating equations (GEE) to test our hypotheses. GEE is a form of generalized linear models that allows for the modeling of correlated observations within subjects in longitudinal studies. Compared to fixed or random effect models, GEE estimates more consistent and robust parameters when autocorrelation is present (Liang and Zegar, 1986). GEE does this by estimating parameters and standard errors based on an estimation correlation derived from within-cluster residuals. In using GEE, we specified an identity link function to connect firm's market performance and specific covariates and an exchangeable correlation matrix for the within-firm variation, and computed a sandwich type robust estimator of standard errors (Liang and Zegar, 1986). All analyses were performed using the "xtgee, link (identity) corr (exchangeable) vce (robust)" function in Stata 12.1. To check for possible multicollinearity, we assessed the variance inflation factors for all models, which were consistently below the critical value of 10 (i.e., highest VIF 7.6 and the mean VIF 2.53).

Table I. Descriptive statistics and correlation matrix[a]

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
Firm performance	8.85	1.98													
Prior Firm Performance (year *t*-1)	9.04	1.71	0.70*												
Focal Firm Age	31.85	28.18	0.00	0.06											
Focal Firm Size[b]	8.80	2.23	0.44*	0.36*	0.65*										
Capital Intensity	-0.27	1.13	0.01	0.00	-0.02	-0.06									
R&D intensity	0.21	0.92	0.08	0.03	-0.07	-0.07	0.08								
Alliance Experience[b]	1.46	1.00	0.10	0.13*	0.33*	0.30*	0.02	-0.00							
Governance	0.15	0.36	-0.02	-0.02	0.04	0.08	-0.03	-0.01	0.10						
Portfolio Size[b]	7.64	2.69	0.32*	0.27*	0.48*	0.78*	-0.00	-0.04	0.18*	0.05					
Internationalization	0.83	0.24	-0.17*	-0.13*	0.02	-0.11*	-0.01	0.04	-0.10*	-0.11*	0.08				
Status	0.07	0.07	0.06	0.04	-0.05	-0.02	0.06	0.06	-0.03	0.03	-0.03	-0.03			
Bargaining Power of Partners	0.08	0.12	-0.16*	-0.12*	0.06	-0.00	-0.09	-0.03	-0.08	-0.03	-0.01	0.05	0.16*		
Technological Resource Commitment[b]	5.14	2.25	0.58*	0.41*	0.10	0.36*	0.02	0.01	0.06	0.03	0.27*	-0.13*	0.02	-0.18*	
Relative Status	0.19	0.14	-0.13*	-0.05	-0.02	-0.09	-0.03	-0.01	-0.01	-0.00	-0.04	-0.00	0.06	0.09	-0.12*

[a] n=333
[b] Logarithm
* $p<0.05$

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Table II. Regression results [a]

Independent variables	Model 1	Model 2	Model 3
Constant	1.751**	2.000***	2.119***
	(0.733)	(0.667)	(0.675)
Prior Firm Performance (year *t*-1)	0.418***	0.383***	0.380***
	(0.053)	(0.053)	(0.052)
Focal Firm Age	–0.023***	–0.021***	–0.021***
	(0.008)	(0.007)	(0.007)
Focal Firm Size[b]	0.417***	0.365***	0.361***
	(0.081)	(0.064)	(0.065)
Capital Intensity	–0.002	–0.021	–0.018
	(0.031)	(0.032)	(0.032)
R&D Intensity	0.065	0.067	0.065
	(0.057)	(0.069)	(0.068)
Alliance Experience[b]	–0.031	–0.038	–0.037
	(0.051)	(0.056)	(0.057)
Governance	0.061	0.019	0.028
	(0.131)	(0.121)	(0.121)
Portfolio Size	0.024	0.013	0.014
	(0.034)	(0.030)	(0.030)
Internationalization	0.033	–0.017	0.008
	(0.290)	(0.258)	(0.257)
Status	0.538	0.401	0.380
	(0.708)	(0.667)	(0.644)
Bargaining Power of Partners		–2.738**	–2.709**
		(1.146)	(1.156)
Technological Resource Commitment [b]		0.133***	0.132***
		(0.045)	(0.045)
Technological Resource Commitment X Bargaining Power of Partners		0.463**	0.277
		(0.189)	(0.191)
Relative Status			–0.613
			(0.398)
Relative Status X Technological Resource Commitment X Bargaining Power of Partners			0.969**
			(0.464)
Year dummies included	Yes	Yes	Yes
Number of observation	333	333	333
chi-square	456.22	534.25	594.68

[a]The exchangeable working correlation structure are used. Robust standard errors adjusted for 64 firms clusters are in parentheses.
[b] Logarithm.
*** $p<0.01$, ** $p<0.05$, *$p<0.10$

Model 1 serves as a baseline model that includes only control variables. Model 2 tested the effect of the variable *Technological Resource Commitment* on the relationship between the *Bargaining Power of Partners* and the focal firm's *Firm Performance*. The results show that the coefficient of the interaction term is positive and statistically significant (β= 0.463, p<0.05). Hypothesis 1, which posited that a relatively higher technological resource commitment constrains partners' bargaining power and thus increases focal firm performance, is therefore supported. It is also worthwhile noting that Models 2 and 3 show that partners' bargaining power leads to significant decrease in firm performance, and relative technological resource commitment has a positive and significant effect on firm performance.

Model 3 tests Hypothesis 2, which predicted that the effect of relative to *Technological Resources Commitment* on the relationship between *Partners' Bargaining Power* and *Firm Performance* is likely to strengthen when *Focal Firm Status* is lower than that of its partners. The interaction term takes on a positive sign and is statistically significant (β= 0.969, p<0.05), suggesting that a firm with lower status is likely to strengthening its resource commitment to the alliance portfolio, leading to increased firm performance. Hypothesis 2 is therefore supported.

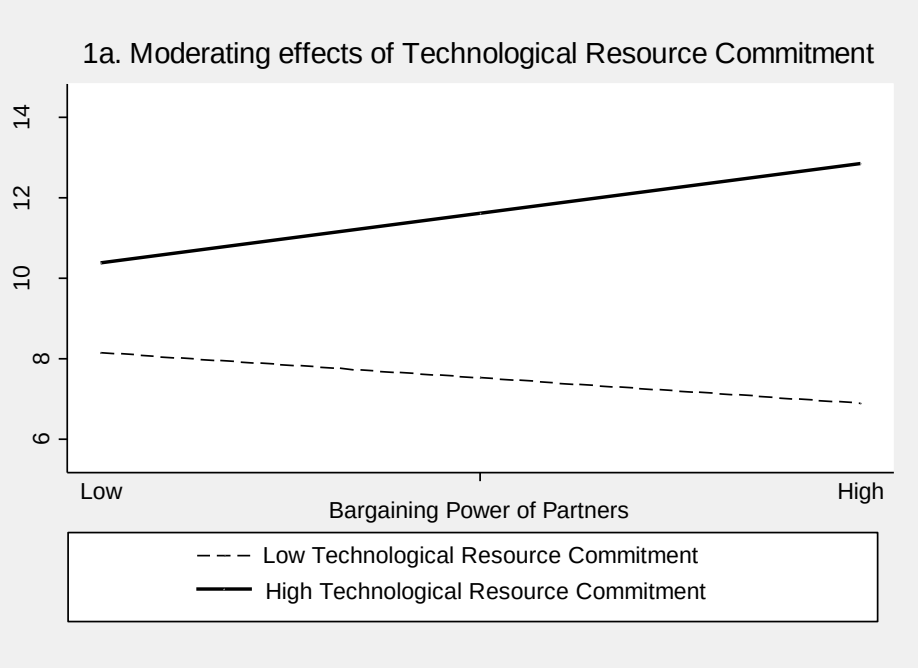
Table 3 presents the GEE regression results with *Firm Performance* as the dependent variable under the conditions of varying *Focal Firm Status*. Hypothesis 3 predicted that the moderating effect of increasing *Technological Resource Commitment* is more likely to be positive for low status firms, suggesting that such firms might have greater motivation than high status firms to conform to industry practices with more effort and resource commitment. To test this hypothesis, we split the sample at different quartiles for the variable *Focal Firm Status*. Model 2 in Table 3 reports estimates for the first quartile. The coefficient for the moderating effect of *Technological Resource Commitment* on *Firm Performance* is positive and significant for low status firm (β= 0.986, p<0.05). Model 3 reports estimates for the intermediate quartiles. The coefficient for the moderating effect of *Technological Resource Commitment* on *Firm Performance* is significantly different from zero (β= 0.724, p<0.05). Model 4 shows the estimates for the highest quartile, which is not statistically significant. These findings support the hypothesis that the effect of *Technological Resource Commitment* will be more likely to improve *Firm Performance* when firms have a relatively low status in the industry. Figure 1 shows that at high levels of technological resource commitment, the relationship between the bargaining power of partners and firm performance is positive.

Table III. Results of GEE regression analysis for firm market performance[a]

Independent variables	Prediction	Model 1 Full sample	Model 2 Status lowest quartile	Model 3 Status second and third quartile	Model 4 Status highest quartile
Constant		2.119***	0.245	2.864***	1.408
		(0.675)	(0.915)	(0.641)	(1.502)
Prior Firm Performance (year t-1)		0.380***	0.624***	0.420***	0.372**
		(0.052)	(0.078)	(0.045)	(0.158)
Focal Firm Age		–0.021***	–0.014**	–0.025***	–0.030***
		(0.007)	(0.008)	(0.007)	(0.009)
Focal Firm Size[b]		0.361***	0.286***	0.316***	0.386***
		(0.065)	(0.082)	(0.102)	(0.149)
Capital Intensity[b]		–0.018	0.004	–0.007	–0.020
		(0.032)	(0.074)	(0.048)	(0.064)
R&D Intensity		0.065	–0.072	0.240**	–0.018
		(0.068)	(0.170)	(0.096)	(0.104)
Alliance Experience		–0.037	0.103	–0.193*	0.268
		(0.057)	(0.077)	(0.110)	(0.166)
Governance		0.028	–0.357	0.005	0.080
		(0.121)	(0.404)	(0.154)	(0.328)
Portfolio Size[b]		0.014	–0.006	0.093	0.064
		(0.030)	(0.041)	(0.079)	(0.093)
Internationalization		0.008	0.397	–0.648*	–0.934**
		(0.257)	(0.532)	(0.388)	(0.427)
Status		0.380			
		(0.644)			
Bargaining Power of Partners		–2.709**	–4.440*	–6.058***	–0.062
		(1.156)	(2.412)	(1.618)	(2.165)
Technological Resource Commitment[b]		0.132***	0.034	0.101	0.232***
		(0.045)	(0.051)	(0.063)	(0.065)
Technological Resource Commitment X Bargaining Power of Partners	H3	0.277	0.986**	0.724**	0.318
		(0.191)	(0.431)	(0.317)	(0.366)
Relative Status		–0.613	–1.429	–0.456	0.979
		(0.398)	(0.959)	(0.560)	(0.075)
Relative Status X Technological Resource Commitment X Bargaining Power of Partners		0.969**	–1.108	1.665*	–1.033
		(0.464)	(1.563)	(0.959)	(0.635)
Year dummies included		Yes	Yes	Yes	Yes
Number of observation		333	84	165	84
chi-square		594.67	760.61	1618.36	301.69

[a]The exchangeable working correlation structure are used. Robust standard errors adjusted for 64 firms clusters are in parentheses.
[b] Logarithm.
*** $p<0.01$, ** $p<0.05$, *$p<0.10$

Figure 1. Moderating effects of Technological Resource Commitment on firm performance



4. Discussion and conclusion

In this section, we discuss the implications of this study for alliance portfolio literatures, the resource-based view of the firm (RBV), and resource dependence theory. We also examine the implications for alliance managers and practitioners. We end this discussion by highlighting some of the limitations and future avenues for empirical research.

Research on the effects of resource endowment of partners on firm performance has highlighted a fundamental dilemma: alliance portfolio composed by prominent and resource-rich partners provide access to new and diverse resources and knowledge but their bargaining position may restrict a firm's share of value appropriation. Recent research proposes that improvement of firm performance in alliances with strong partners depends on how to leverage multiple relationships in a portfolio, such as availability of alternative alliances or competition between partners (Lavie, 2007). However, few empirical studies helped to understand how firms can address such a dilemma by leveraging firms' internal factors, such as their own resources and efforts or characteristics. We thus respond to an understudied question in the extant portfolio literature on value appropriation: How and when do firms' internal resource and characteristics influence the dilemma of partner endowment in alliance portfolio.

We found that negative impact of bargaining power of partners on firm market performance is moderated when a focal firm's relative commitment to technological resources is high. We argue that when a firm contributes to its alliances with relatively higher commitment to technological resource than partners, the effect of partners' bargaining power on firm performance decreases. Such higher commitment to technological resources can improve a firm's relative bargaining position in its alliances. It appears that a firm's adequate capacity and efforts to fully exploit its internal firm attributes can function as a significant factor to improve its relative bargaining position and mitigating the impact of partners' bargaining power in its alliance portfolio.

We also found that the effect of a firm's higher commitment to technological resources was stronger when a firm has relatively lower status than partners. We argue that a firm that seeks to achieve legitimacy by improving its status intends to build partnerships with higher status partners, and such relationships require the lower status firm greater resource commitment to its alliances than its partners. Making greater resource efforts than partners leads to offset the effect of partners' bargaining power on firm performance by relatively improving the firm's bargaining position. Further, we found that when a focal firm has low status in its industry, the moderating effect of resource commitment is generally higher than when the firm has middle or high status. We argue that a low status firm's conforming behavior to achieve legitimacy results in higher commitment to technological resources, and strengthens the effect of the resource commitment on the relationship between firm performance and bargain power of partners. These results confirm our argument that a firm's internal factors can influence the impact of partners' bargaining position of partner on firm performance.

Our results have several implications for the alliance portfolio literature. First, our results provide a novel contribution to the alliance portfolio literature studying factors influencing firm's value appropriation. Prior research has predominantly examined firm performance in multilateral relationship structure and viewed structural conditions as main determinants for constraining partners' bargaining position and increasing value appropriation. We show that firm's relative commitment to technological resources influences the negative effect of bargaining power of partners on firm performance by improving its relative bargaining position. The negative impact of the bargaining power of partners is consistent with the recent findings that resource endowments of prominent partners can reduce firm performance by limiting a firm's appropriation capacity (e.g., Lavie, 2007). Our results help not only build a stronger theoretical foundation for a link between the resource endowment of

prominent partners and value appropriation in alliance portfolio, but also extend recent findings by suggesting the importance of firm internal aspects to overcome the negative impact of such partners.

Second, our study contributes to the alliance portfolio literature by highlighting the importance of firm internal factors. The prior studies examining the link between alliance portfolio and firm performance have focused primarily on the impact of partner resources so that the extent to which a firm increases its performance depends upon partners' resource conditions. However, the discussions on firm performance have primarily revolved around partners' aspects rather than the focal firm itself, paying less attention to the amelioration function of firm's own efforts or internal aspects. By showing that a firm's resource commitment and status influence firm performance, our findings suggest that not only partner resources but focal firm's resource and characteristics should be considered as factors influencing firm's value appropriation in alliances. Theoretical model should take firm's internal factors into consideration.

Third, this study contributes to the literature by showing the potentially important role and implication of social status and conforming behavior in alliance portfolios. Although the positive impact of network resources and firm resources has received scholarly attention, very few studies have focused on different level of firm's social status in understanding performance implications in the context of alliance portfolio. Our study demonstrates that firm behavior to additional resource commitment in overcoming partners' bargaining position may be contingent on level of status. For a firm with relatively lower status than partners, conforming to external norms imposed by industry hierarchy may lead the firm to make greater organizational efforts and commitment. Similarly, for a firm with low status in its industry, conforming industrial or social norms can facilitate firm's commitment activities and efforts further, which may provide the potential to yield additional benefits or erode external constraint by strong partners. To our knowledge no research has addressed the likelihood of decreasing effect of the relative bargaining position by firm internal factors, including resource commitment and status.

Fourth, this study adds contribution to the resource-based view of the firm by providing evidence that a focal firm's resource characteristics influence its performance variation. The resource-based view of the firm offers an insight for the importance of resource for understanding performance differentials in competitive dynamics (Barney, 1991). Our study shows that firm's resource characteristics are also a key factor for understanding firm performance in not only competitive dynamics with rivals but also cooperative partnerships.

Our results are also consistent with the stream of works related to resource management showing that a firm's actions meditate the relationship between resources and performance (Ndofor, Sirmon, and He, 2011; Sirmon, Hitt, Ireland, and Gilbert, 2011). An important implication of our results is that a firm needs to continue resource developing actions in managing alliance portfolio.

Finally, our study also contributes to the literature on resource dependence theory. Prior research has often viewed interfirm collaborations as merely asymmetric power relationships in which partners that control key resources imped a fair share of alliance value. This conventional approach, though insightful, ignores the important roles of firm-level characteristics in interfirm relationships. Our study extends current resource dependence theory by demonstrating how the influence of bargaining power can be moderated by firm characteristics such as resource commitment that can increase a firm's value appropriation capacity in relationships with powerful partners. Unlike previous studies that have focused on the impact of bargaining power of strong partners (e.g., Bae and Gargiulo, 2004; Lavie, 2007), this study finds that partners' resource commitment can also influence their bargaining power by affecting value appropriation processes.

Finally, what are the managerial implications of this study ? Our findings confirm that resource endowments of prominent alliance partners improve a firm's performance, provided that the firm is motivated to increase its technological resource commitment relative to its partners. The theory and results point to the benefits of a firm's commitment to alliances when there is likelihood to exercise bargaining power by partners. Thus, managers should attend to internal resources and firm capacity in building alliance portfolios, because a firm's own internal capacity and effort in alliances with strong partners may help avoid the negative effect of the bargaining position of partners. Although relative resource commitment is expected to mitigate partners' bargaining power, the results of this study implies that a firm's motivation to increase firm's resource commitment relates to its relative social position in external environment. Managers should pay attention to how organizational situation compared to peers or competitors in its industry can increase their firms' organizational motivation to facilitate higher attentions and efforts to make resource and capability development.

Inevitably, our study is not free of limitations. First, although we assumed that strong partners would exercise their bargaining power, it is likely that powerful partners do not exercise their bargaining power by several reasons, such as long-term based trust between a focal firm and partners or cooperative environment in alliances. In addition, we measured

bargaining power of partners by using market share. Bargaining power, however, could be tested by using several other proxies, such as market capital, size, industry influence, or relative benefit. More fine-grained research design could have distinguished such different aspect and types of bargaining power. Second, this study is limited to one type of commitment of firm. We did not reflect different types of commitment activities existing among alliances. If a firm's commitment activities, such as a series of investment in gaining supplementary information and knowledge, may provide it with diverse sources to increase alternatives on resource endowment of existing partners, they may also reduce the partners' motivation to exercise their bargaining power. Similarly, a firm's expanded investment in different value chain activities or relationships with partners' competitors may also represent one type of commitment activities, constraining partners' motivation to exercise bargaining power (Lavie, 2007). Third, conceptualization of this study is based on broad institutional theory to predict the effect of different firm status. It is likely that we overlooked fine-grained differences between legitimacy, reputation, and status identified in previous studies. Fourth, we tested firm status by using network data, assuming that degree of interfirm ties reflects firm status. Network status, however, may not capture social status, such as fame, prestige, or reputation. Future research can examine the effect of social status on the relationship between resource commitment and performance. Finally, our sample highlights on a single industry. Characteristics of resource commitment may vary from industry to industry. Samples on more industries with different characteristics may make our results more generalizable.

Our study raises opportunities for future research. First, we show that a focal firm's greater commitment to technological resources can function as a moderator of the bargaining power of partners. It is possible, however, that a firm's resource commitment may have additional effects in alliances. For example, a focal firm that has invested more effort in its technology is more likely to be sought out than those that have not because they bring more value to the relationship. Future research can examine whether more resource commitment can provide alternatives to replace existing powerful partners. Similarly, although we measure technological resource commitment by using patents, it would be interesting to examine how real investment in the portfolio influences a firm's attractiveness felt by partners and bargaining situation. A firm could devote all its effort toward internal R&D projects and the partners would be prone to seek out the focal firm because it has made itself more valuable. In this situation, the focal would have an edge in the negotiations. Future research could also make more finely grained measure for firm status. Finally, additional research could replicate this work and address some of its limitations. For example, we measured one type of resource

commitment. However, there are other types of resource commitment in which a focal firm engages. Thus, it is worthwhile to further investigate whether the moderation effect of resource commitment on the relationship between bargaining power of partners and firm performance still holds for other measures. In addition to examining the different types of commitment, future studies could look at the interaction among resource endowments of partners, a focal firm-specific characteristics, and characteristics of alliance portfolios, such as dimension and width of alliance portfolio. The conventional assumption has been that firm performance is a function of that prominence of partners' resource endowment and partners' motivation to leverage the bargaining position. However, more recent studies has drawn attention to the possibility of other contingent factors improving and limiting firm performance (e.g., Jiang, Tao and Santoro, 2010; Srivastava and Gynawali, 2011). Thus, one could argue that understanding of performance implications of alliance portfolio requires multiple aspects involved in the alliance activities.

To conclude, because firms have strong incentives to leverage partners' prominent resources by allying with resource rich partners, the question of how and when firms can avoid the negative impact of the bargaining power of strong partners is fundamental to understanding how and when resource endowment of partners influences firm performance. The results of this study reinforce previous studies addressing the relationship between partner endowments and firm performance by helping to identify additional conditions under which firms are able to improve their performance in alliances facing the bargaining power of partners. Results suggest that benefit of partner endowments can be contingent upon a firm's resource commitment to alliances and level of firm status.

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