ARE JOINT VENTURES POSITIVE SUM GAMES?
THE RELATIVE EFFECTS OF COOPERATIVE AND NONCOOPERATIVE BEHAVIOR

M. V. SHYAM KUMAR*
The Lally School of Management and Technology, Rensselaer Polytechnic Institute, Troy, New York, U.S.A.

Are joint ventures (JVs) characterized mainly by cooperative behavior or noncooperative behavior? In this research, we address this question by examining the interrelationship between the values created for two partners when they announce a JV. We argue that, on average, if cooperative behavior and common benefits are more influential than noncooperative behavior and private benefits, there will be a positive association between the values created for the two partners. Conversely, if private benefits and noncooperative behavior are more influential, there will be a negative association as partners derive value at the expense of each other rather than by creating new opportunities through the JV. Using a sample of 344 JVs we find evidence of a positive association between the values created for the two partners after controlling for various factors. This suggests that the stock market perceives JVs to be positive sum games rather than zero sum games, and that value creation in JVs is mainly attributable to synergies rather than appropriation of resources. Our analysis also reveals other conditions under which cooperative behavior and noncooperative behavior become dominant, such as the strength of the resources of the two partners, product market competition, and JV experience.

INTRODUCTION

Joint ventures (JVs), on average, create value for parent firms. This has been documented in a number of studies examining stock price reactions to JV announcements using an event study approach (e.g., McConnell and Nantell, 1985; Woolridge and Snow, 1990; Koh and Venkatraman, 1991; Balakrishnan and Koza, 1993; Madhavan and Prescott, 1995; Anand and Khanna, 2000; Merchant and Schendel, 2000; Kale, Dyer, and Singh, 2002). Broadly speaking, the literature has found that value creation is enhanced when a JV is related to existing businesses and when a parent firm possesses experience with interfirm collaboration.

Although this literature has contributed important insights, it assumes that the value creation experienced by parent firms in JVs is mainly the result of synergies and common benefits. Given their shared governance structure, JVs are associated not only with synergies and common benefits but also with significant private benefits. These private benefits arise as parent firms appropriate resources from each other and exploit them outside the JV. The existence of private benefits and the inherent tension between cooperative and noncooperative behavior in JVs in turn raises some important questions about their efficiency as an organizational form: do collaborative behavior and common benefits play a more significant role in

Keywords: joint ventures; value creation; transaction cost economics; resource-based view; event studies
* Correspondence to: M. V. Shyam Kumar, The Lally School of Management and Technology, Rensselaer Polytechnic Institute, 1108th Street, Troy, NY 12180, U.S.A.
E-mail: kumarm2@rpi.edu

Copyright © 2010 John Wiley & Sons, Ltd.
explaining value creation in JVs when compared to private benefits? Conversely, are noncooperative behavior and private benefits more influential than common benefits? Under what conditions do each type of behavior and benefits become dominant in impacting value creation?

In this study we attempt to shed light on the above questions. While previous research has focused on the value created for individual parent firms in JVs, our focus is on the *interrelationship* between the values created for the two parents under various conditions. The logic behind our approach is that the interrelationship between the values created provides greater insight into the extent of various types of behavior when compared to the value created for an individual parent.¹ Thus, if cooperative behavior is dominant in JVs, then both firms are likely to gain simultaneously when a JV is announced, as new opportunities are created through the collaboration. On the other hand, if noncooperative behavior and private benefits are dominant in JVs, then one partner would gain at the expense of the other when a JV is announced, as each firm appropriates the other’s resources and opportunities and as common benefits assume a relatively less significant role.² Hence, by examining the interrelationship between the values created for the two partners we gain a better understanding of whether JVs are mainly associated with cooperative behavior as opposed to noncooperative behavior. Ultimately, this informs us whether JVs are positive sum games as opposed to zero sum games, and whether they are an efficient organizational form for sharing resources between firms under various conditions.

¹ To clarify further, two firms may enter into a JV and jointly invest in a negative net present value project. While such an investment may lead to negative returns for both parent firms, it may nevertheless be characterized by cooperative behavior and may lead to a positive interrelationship between the values created. Conversely, two firms may enter into a JV and mainly engage in noncooperative behavior. In such instances, both firms may derive positive value from the JV. But the underlying interrelationship between values created may be negative since value is being derived at the expense of the partner rather than by creating new opportunities. These issues are discussed in further detail below.

² In an approach parallel to ours, Berkovich and Narayanan (1993) make a similar argument in the case of mergers and acquisitions. They note that if synergies are the main source of value, then acquirers and targets will gain simultaneously when an acquisition is announced. On the other hand, if agency motives are dominant, then targets are likely to gain at the expense of acquirers.

To address our research questions, the empirical method we adopt is to use a simultaneous equation approach with the values created for the two partners at the time of the JV announcement serving as the endogenous dependent variables (Kalaignanam, Shankar, and Varadarajan, 2007). This approach provides us with the advantages of (1) controlling for other factors while addressing the question of whether value creation occurs jointly or at the expense of the partner in a JV; (2) modeling bilateral causal relationships between the values created rather than unidirectional relationships, and (3) developing unbiased parameter estimates in the presence of potential endogeneity.

The paper proceeds as follows: in the next section we discuss our theory and hypotheses; in the following section we describe our methods; next we outline our results along with various robustness checks, and in the final section we conclude with a discussion.

THEORY AND HYPOTHESES

JVs provide firms with a means for combining resources with value creating complementary resources possessed by partners (Teece, 1986; Hennart, 1988). These complementary resources may include technical knowledge, upstream/downstream production knowledge, financial resources, and knowledge related to a target market such as customer characteristics, distribution channels, knowledge of culture and institutions, and so forth. The advantages of JVs arise because often the value-creating complementary resources possessed by the partner tend to be imperfectly mobile and imperfectly imitable in nature (Chi, 1994). Under these circumstances, both internal development and acquisitions become relatively costly as alternatives. Internal development becomes costly because building the complementary knowledge typically tends to be time consuming due to path dependencies and time compression diseconomies. Acquisitions become costly for potentially two reasons. First, the desired complementary knowledge may constitute only a subset of the partner’s operations (Hennart, 1988) and may be comingled and inseparable from other undesired assets (Hennart and Reddy, 1997; Reuer and Koza, 2000). Second, if the complementary knowledge is tacit in nature—a characteristic that is typical of imperfectly mobile and imitable
In addition, JVs also expose firms to the threat of opportunism and appropriation of resources by partners. These hazards are particularly pronounced considering that while JVs facilitate the transfer of relatively valuable knowledge bases compared to market contracts (Hennart, 1988; Anand and Khanna, 2000), their partial control and ownership structure also expose these very knowledge bases to appropriation by the partner.

There are at least two mechanisms by which firms appropriate resources from their partners in JVs (Lavie, 2006). The first is through spillovers (Inkpen and Dinur, 1998; Ahuja, 2000). Given their shared decision-making structure, JVs may not only facilitate the combination of complementary knowledge bases but may also provide opportunities for a partner to closely observe a firm’s competencies and overcome barriers to imitation created due to causal ambiguity. This may result in the transfer of resources beyond what a firm may have intended to share through the venture. A second form of appropriation arises when a partner willfully extracts resources from a firm over the course of the JV, beginning with the contract negotiation stage. This form of opportunism has also led previous researchers to use various metaphors to describe JVs, such as prisoner’s dilemma (Parkhe, 1993), learning race (Hamel, 1991), and Trojan horses (Reich and Mankin, 1986). Both types of appropriation mechanisms may necessitate significant managerial effort by the firm so that it is able to capture the resources and realize associated benefits outside the JV.

While these various costs and benefits highlight the tension between cooperative behavior on the one hand and noncooperative behavior on the other, to further understand the relative effects of these two types of behavior on value creation, following Khanna, Gulati, and Nohria (1998), the gains derived by a firm from a JV can be partitioned into two components: private benefits and common benefits (Dyer, Singh, and Kale, 2008). As Khanna et al. note:

Private benefits are those 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. Common benefits are those that accrue to each partner in an alliance from the collective application of the learning that both firms go through as a consequence of being part of the alliance; these are obtained from operations in areas of the firm that

\[3\] As Postrel (2002) notes, situations requiring mutual understanding of another entity’s (a division or, in this case, another firm) knowledge base are relatively rare in the economy. When knowledge is tacit, however, developing such mutual understanding may be essential for firms since otherwise they may not be able to forecast the value that can be derived from combining their knowledge bases and the attendant costs. Under the circumstances, “black boxing” (Postrel, 2002) through arms-length contracts such as licensing may not be effective.
are related to the alliance (Khanna et al., 1998: 195).

Thus while private benefits stem chiefly from appropriability hazards of various forms, common benefits derive mainly from the creation of joint value through sharing of resources.

Although previous research has tended to treat private benefits and common benefits as being independent of each other, we propose that from a theoretical standpoint the two types of benefits are also likely to be fundamentally interrelated and are likely to influence each other in important ways. JVs can be viewed as investment decisions with a fixed and predetermined level of managerial resources allocated to them by parent firms (Inkpen, 2000). This fixed level of managerial resources, which comprise the scientists, engineers, and other managerial and administrative personnel transferred to the JV (Inkpen, 2000), are then subdivided between cooperative behavior and the creation of common benefits on the one hand and noncooperative behavior and the appropriation of resources on the other (Khanna et al., 1998). To the extent that each firm is constrained by a fixed level of managerial resources, an increase in the allocation of effort toward noncooperative behavior by one partner would reduce the resources available for cooperative behavior and common benefits for both partners in the JV. Thus a fixed level of managerial resources implies that there is likely to be a trade-off effect between cooperative behavior and common benefits on the one hand and noncooperative behavior and private benefits on the other as firms divide their resources between these two activities.

The basic trade-off between common benefits and private benefits has also been noted by other authors in previous research. Hamel (1991: 91) observes that many Western firms adopted defensive attitudes on discovering their Japanese partner’s intent to appropriate resources, which led to overall lower learning and unsatisfactory performance of their ventures. Parkhe (1993) makes a similar point when he notes that when there is a potential for high private benefits, value will be eroded in the JV as partners set up various contractual safeguards that increase coordination costs (cf. Reuer and Ariño, 2007). Larsson et al. are explicit about the trade-offs inherent between creating common benefits and attempts to derive private benefits. Thus they note:

...most socio-economic interaction involves the individual trade-off decisions of each actor regarding how much of his/her limited efforts are to be spent on collaborating and internally competing, respectively. While the collective focus on integrative collaboration would produce a plus-sum game where all actors can win, the focus on distributive competition actually results in a minus-sum game due to the diversion of productive efforts to distributive infighting (Larsson et al., 1998: 288).

To formalize these points and examine the implications of cooperative and noncooperative behavior for value creation, consider two firms, 1 and 2, entering into a JV with each other. Assume that the returns to cooperative behavior are positive and are increasing at a constant rate with effort invested. This assumption implies that ceteris paribus, devoting greater effort toward cooperative behavior and common benefits is not counterproductive unless very high levels of effort are reached. In addition, assume that the returns to noncooperative behavior are also positive and constantly initially increasing with effort. However as the effort devoted to noncooperative behavior increases further, the marginal returns decrease beyond a point. This is likely to occur, for example, as the partner begins to withhold its resources and builds various safeguards to prevent further appropriation when it detects opportunistic behavior (Ariño and de la Torre, 1998). Under these assumptions, the return to effort devoted to cooperative behavior is an upward sloping straight line, while the return to effort devoted to noncooperative behavior is a concave curve. In addition to these assumptions, assume that both firms initially face a marginal return with respect to effort devoted to cooperative behavior that is lower than the marginal return with respect to effort devoted to noncooperative behavior. This assumption makes it efficient for both firms to devote some effort to private benefits, and absent this assumption pure cooperation and common benefits would be the optimal outcome. These conditions together imply that each firm in the JV would allocate an effort level to noncooperative behavior and private benefits up to the point that the marginal return from this effort equals the marginal return from the effort devoted to cooperative behavior and common benefits. After this effort level has been allocated to deriving private benefits, the
residual effort in each firm will be devoted to common benefits given the constant returns to this effort. These conditions also highlight that there would be a trade-off between private benefits and common benefits. Given a fixed level of managerial resources, a unit increase in the effort devoted to noncooperative behavior would decrease the effort available for cooperative behavior, and consequently private benefits would increase while common benefits would decrease and vice versa.

The simple model outlined above bears some similarity to models that attempt to flesh out the tension between allocating resources to coordinating actions across divisions, and conducting specialized activities within a particular division of a multiunit firm (e.g. Postrel, 2002; Kretschmer and Puranam, 2008). In these models, specialization can potentially be counterproductive by making activities less similar across divisions, thereby increasing coordination difficulties (e.g. Kretschmer and Puranam, 2008). This creates a threshold level for integration and coordination below which collaboration incentives across divisions can actually be detrimental to overall productivity. Similar to these models, our assumptions suggest that the existence of private benefits creates a threshold level of effort below which firms would be unwilling to divert effort toward common benefits. This threshold increases as the marginal returns on private benefits increase, and if a firm does not have adequate resources to exceed this threshold, then pure noncooperative behavior would be efficient and the shared incentive structure of JVs would have a minimal effect.

Based on these arguments, we may write the value derived by the two firms from the JV as follows:

\[
V_1 = V_c + V_{1p} + V_{1d} - V_{2d} \quad (1)
\]

\[
V_2 = V_c + V_{2p} - V_{1d} + V_{2d} \quad (2)
\]

In Equations 1 and 2, \(V_1\) and \(V_2\) are the total values derived by each firm from the JV. In these equations, \(V_c\) denotes the common benefits derived by each firm. Assuming equal equity shares, the common benefits are also equally divided, the total common benefits being \(2V_c\). Equations 1 and 2 also decompose private benefits of each firm into different components. \(V_{1p}\) and \(V_{2p}\) are private benefits that can be captured without destroying value directly for the other partner in the JV, that is, they are non-rivalrous in nature. These benefits could arise, for example, by observing and learning relatively diffused practices from the partner, such as the organization of specific production processes, inventory management, market and country specific knowledge, and so forth. Equally critically, \(V_{1d}\) and \(V_{2d}\) may also arise as each firm takes skills and resources created in the JV and exploits them outside the cooperation without sharing the benefits with the partner. Thus, these benefits may arise as firms attempt to maximize their shares of the joint value created beyond what was negotiated \(ex\ ante\) through the equity shares. While \(V_{1p}\) and \(V_{2p}\) may occur either through willful extraction or through spillovers, in either instance they are likely to require significant managerial resources for their realization as the partner diverts effort from cooperative efforts to learning and capturing the associated gains.\(^4\)

In contrast with \(V_{1p}\) and \(V_{2p}\), \(V_{1d}\) and \(V_{2d}\) constitute private benefits that are value destroying in their impact on the other partner, that is, they are rivalrous in nature. These benefits may arise from various sources. One potential source is when a partner appropriates relatively proprietary resources, including resources that are not directly deployed to the JV. Once again, this may occur either through spillovers or willful extraction (such as poaching employees, stealing secrets, etc.) while entailing significant managerial effort. In this case, while a partner may overtly claim to be interested in creating joint value and synergies, appropriating the other firm’s proprietary resources may constitute another significant motive for entering into the venture. Another potential source of \(V_{1d}\) and \(V_{2d}\) is when a firm attempts to capture a disproportionate share of common benefits by using its bargaining power to negotiate a higher equity share \(ex\ ante\). This would directly reduce the partner’s share of the common benefits, while increasing the firm’s share of these benefits. Note that while \(V_{1d}\) has a positive impact on \(V_1\), it has a negative impact on \(V_2\). Similarly \(V_{2d}\) has a positive impact on \(V_2\), and a negative impact on \(V_1\). Thus \(V_{1d}\) and \(V_{2d}\) constitute a wealth transfer between the two firms. The main point to be highlighted is that \(V_{1d}\) and \(V_{2d}\) have a dual effect: not only do they directly destroy value for the other partner due to their rivalrous

\(^4\) We thank the anonymous reviewers for highlighting this particular source of private benefit and its implications for common benefits.
nature but they also suppress common benefits in the JV by diverting managerial effort away from cooperative behavior and the creation of synergies for each firm. This occurs because when the two firms devote managerial resources and effort to capture \( V_{1d} \) and \( V_{2d} \) there is lesser residual effort left in both firms to create common benefits. In contrast with \( V_{1d} \) and \( V_{2d} \), the value suppressing effects of \( V_{1p} \) and \( V_{2p} \) on the other firm occur only through the diversion of effort from cooperative behavior rather than direct value reduction.

Equations 1 and 2 can be rewritten to recognize that if the total managerial effort allocated by each firm to the JV is fixed, then there are likely to be potential trade-offs between various types of private benefits and common benefits. To the extent that both value destroying and non-value destroying private benefits draw "from the same bucket" of managerial resources, lesser resources would be available for deriving common benefits when both types of private benefits are derived. Thus, although \( V_{1p} \) and \( V_{2p} \) are non-rivalrous in nature, in effect they become rivalrous with each other and with \( V_c \) in a JV since the effort level for each firm is fixed and the resources required to derive \( V_{1p}, V_{2p}, \) and \( V_c \) are utilized from the same pool of resources. Consequently, \( V_{1p} \) and \( V_{2p} \) also have a rivalrous impact on firm 2 and firm 1's value creation respectively despite their non-rivalrous nature. Accordingly we may rewrite common benefits, \( V_c \), as follows, taking into consideration that all four components \( V_{1p}, V_{2p}, V_{1d}, \) and \( V_{2d} \) would have a negative impact on it:

\[
V_c = f(-V_{1p}, -V_{2p}, -V_{1d}, -V_{2d}, \Theta) \quad (3)
\]

where \( \Theta \) constitutes a set of parameters relating common benefits to the total residual managerial effort left in both firms after efforts have been devoted to appropriating private benefits by each firm. \( \Theta \) would also be a function of various factors such as the potential synergies that can be realized by combining the resources of the two firms per unit of managerial effort, and the attractiveness of the JV's focal business and industry. In Equation 3, \( V_c \) is decreasing with increases in non-rivalrous and rivalrous private benefits \( V_{1p}, V_{2p}, \) and \( V_{1d} \) and \( V_{2d} \). In addition, \( ceteris paribus, V_c \) is increasing with increases in \( \Theta \). Substituting Equation 3 into Equations 2 and 1 we get:

\[
V_1 = f(-V_{1p}, -V_{2p}, -V_{1d})
\]

\[
V_2 = f(-V_{1p}, -V_{2p}, -V_{1d}, \Theta) + V_{1p} + V_{1d} - V_{2d} \quad (4)
\]

\[
V_2 = f(-V_{1p}, -V_{2p}, -V_{1d}) - V_{2d}, \Theta) + V_{2p} - V_{1d} + V_{2d} \quad (5)
\]

Equations 4 and 5 provide the following implications. If the primary source of value in JVs is the private benefits earned by the two firms, then in a sample of JVs, \( V_1 \) and \( V_2 \) would be negatively correlated. This is because \( V_1 \) would stem mainly from \( V_{1p} \) and \( V_{1d}, \) which directly and indirectly (through common benefits) reduce \( V_2 \) and vice versa. Consequently, higher values of \( V_1 (V_2) \) in the sample would be associated with lower values of \( V_2 (V_1). \) Note that \( V_1 \) and \( V_2 \) may be positive despite being negatively correlated. This may occur, for example, when the two firms create some common benefits in the JV (Khanna et al., 1998: 200) while mainly deriving various types of private benefits (for example, firm 1 may be appropriating non-value destroying and non-rivalrous market knowledge and applying it elsewhere, while firm 2 may be appropriating rivalrous proprietary technologies from firm 1). Under these conditions, the JV primarily becomes a mechanism to appropriate resources for the two firms rather than a means to cooperate and create synergies (Hamel, 1991).

In contrast if common benefits are the main source of value in JVs, then \( V_1 \) and \( V_2 \) would be positively correlated. This is because \( V_1 \) would mainly arise from the effect of the parameter \( \Theta, \) which simultaneously increases \( V_2. \) Hence a higher value of \( V_1 (V_2) \) in the sample would be associated with a higher value of \( V_2 (V_1). \) Analogous to the above arguments, however, it is possible that common benefits may be negative despite both firms devoting substantial effort to cooperative behavior if, for example, potential synergies are themselves weak and are not enough to offset coordination costs, and the JV's industry is not structurally attractive.

\[5\] It is, of course, not necessary that both firms will derive their value mainly from private benefits. There could be situations where one firm may be deriving most of its value from private benefits, while the other firm is chiefly deriving common benefits. If this were the case, we would expect that in our empirical analyses the impact of the value of one partner on the other would vary. For example, firm 1’s value may have a negative impact on firm 2’s value, but not vice versa. While we do not highlight this asymmetry in our theoretical discussion and hypotheses, our empirical tests do not preclude the possibility. As we discuss subsequently, we do find some evidence of this asymmetry in our sample.

---

DOI: 10.1002/smj
Given these various effects, in a semi-strong efficient stock market when JVs are announced, the values derived by two partners would reflect the market’s expectations of the future dynamics of the collaboration and the relative extent of cooperative and noncooperative efforts. If, on average, the market expects cooperative behavior and common benefits to be dominant in JVs, and that firms allocate their effort mainly to deriving these benefits as opposed to private benefits, then the two partners are likely to experience value creation simultaneously when a JV is announced. Thus:

**Hypothesis 1:** On average, if cooperative behavior and common benefits outweigh the effects of noncooperative behavior and private benefits, there will be a positive association between the values derived by two partners when a JV is announced.

On the other hand, if, on average, noncooperative behavior and private benefits are more dominant in JVs than cooperative behavior and common benefits, then the gains of one partner would be negatively correlated with the other as each partner attempts to exploit existing resources and opportunities rather than to create new opportunities and synergies through the JV. This would lead to elements of a zero sum game as opposed to a positive sum game as there is both a dissipation of joint value and common benefits and a partial wealth transfer between partners. Hence:

**Hypothesis 1-alt:** On average, if noncooperative behavior and private benefits outweigh the effects of cooperative behavior and common benefits, there will be a negative association between the values derived by two partners when a JV is announced.

Hypotheses 1 and 1-alt test the overall effects of cooperative behavior versus noncooperative behavior in JVs. We now turn to the specific conditions under which these two types of behavior are likely to be more influential. Previous research (e.g., Park and Russo, 1996) has examined the degree of competition between partners as one factor that affects the extent of cooperative behavior. Below we examine two additional factors: the strength of resources of the two firms, and their JV experience.

One factor that may influence whether cooperative behavior and common benefits dominate noncooperative behavior and private benefits is the strength of the resources that both partners bring to the venture. The resource-based view (RBV) suggests that the value created in a JV would be higher when both partners in the dyad possess relatively unique and valuable resources. Under these conditions the combination of resources is likely to yield higher rents as the two firms find new and unexplored opportunities through the JV, and as the JV provides an efficient mechanism for combining their causally ambiguous knowledge bases (Chi, 1994). In contrast, when both partners in the dyad are not equally matched in terms of the strength of their resources, and if any one partner possesses relatively weak resources, the tendency to derive private benefits is likely to be higher. This is because the differential in the quality of resources may motivate the partner with weaker resources to divert greater effort toward appropriation and noncooperative behavior (Kumar, 2010). As a result the partner with stronger resources may withhold its resources, thereby causing an overall shift in focus in the JV from cooperative behavior to noncooperative behavior. In terms of Equations 4 and 5, we expect that when both firms bring valuable resources to the JV, private benefits \( V_{1p}, V_{2p} \), and \( V_{1d} \) and \( V_{2d} \) would all tend to be relatively high. But at the same time, since both firms possess valuable resources, the returns from devoting managerial resources to cooperative behavior as reflected by the parameter \( \varnothing \) are also likely to be high. Hence, the motivation to pursue synergies may be stronger than the tendency for subgoal pursuit and private benefits continue to appropriate resources, leading to a negative association but positive returns to both partners. In addition to these possibilities, a fourth possibility is a JV where there is a pure learning race and where partners engage in tit-for-tat behavior. In these JVs we expect the returns to the two partners as well as the association between returns to be negative as both firms attempt to appropriate as much value as possible from the partner, and there is a pure wealth transfer between the two firms. We thank an anonymous reviewer for highlighting this possibility.

---

6 So far we have considered the following possibilities: (1) a JV dominated by cooperative behavior leading to a positive association and positive returns for both partners; (2) a JV dominated by cooperative behavior, but the investment opportunity is poor, leading to a positive association but negative returns for both partners; and (3) a JV dominated by noncooperative behavior but both firms maintain sufficient common benefits so that they may continue to appropriate resources, leading to a negative association but positive returns to both partners. In addition to these possibilities, a fourth possibility is a JV where there is a pure learning race and where partners engage in tit-for-tat behavior. In these JVs we expect the returns to the two partners as well as the association between returns to be negative as both firms attempt to appropriate as much value as possible from the partner, and there is a pure wealth transfer between the two firms. We thank an anonymous reviewer for highlighting this possibility.
Are Joint Ventures Positive Sum Games?

(Kretschmer and Puranam, 2008) leading to the following hypothesis:

**Hypothesis 2:** Value creation will be positively associated between two partners in a JV when both firms possess relatively strong resources.

Another factor that is likely to influence whether cooperative behavior and synergies are eclipsed by noncooperative behavior and private benefits is the extent of product market competition between firms in the dyad. Park and Russo (1996) suggest that JVs between relatively direct competitors tend to be fragile and unstable for two reasons. First, the incentives to appropriate resources and gain an advantage are particularly high when two competitors join forces since this is likely to be the dominant strategy for both players. Consequently, any attempts to appropriate resources are likely to be quickly reciprocated with similar behavior potentially devolving the JV into a learning race or tit-for-tat behavior. Second, the ability to appropriate resources for both partners is also high because each firm is familiar with the other’s operations and hence has a high degree of absorptive capacity with respect to the other’s underlying knowledge (Mowery, Oxley, and Silverman, 1996; Lane and Lubatkin, 1998; Tsang, 2000). Given these two factors, the capital market’s *ex ante* expectation might be that JVs between firms that are in closely related product markets are likely to be characterized mainly by noncooperative behavior and private benefits as opposed to synergies and common benefits. In terms of Equations 4 and 5, in JVs between competitors the non-value destroying private benefits $V_{1p}$ and $V_{2p}$ are likely to be significant as firms learn various nonproprietary knowledge and processes pertaining to the industry from each other. However, we also expect value destroying private benefits $V_{1d}$ and $V_{2d}$ to be relatively high in these JVs compared to other types of JVs as firms have high incentives as well as high absorptive capacity to appropriate their direct competitors’ proprietary knowledge base. This type of appropriation would lead to a wealth transfer between the partners that would accentuate the negative correlation between the values created and the effects of noncooperative behavior. Hence:

**Hypothesis 3:** Value creation will be negatively associated between two partners in a JV when the two firms are in closely related businesses and are relatively direct competitors.

Another factor that may influence the behavior of firms within a JV is their prior experience with interfirm collaboration (Anand and Khanna, 2000; Merchant and Schendel, 2000). Experience with JVs may have an impact along various dimensions. First, it may help a firm strike the right balance between divulging knowledge on the one hand and protecting it from appropriation on the other through the development of isolating mechanisms (Simonin, 1999; Kale, Singh, and Pem mutter, 2000). Second, it may also help a firm formulate better JV contracts *ex ante*. This may enable it to anticipate various environmental contingencies where its resources can be appropriated, and to preemptively formulate contracts that attenuate incentives for appropriation (Kumar, 2010).

While these mechanisms may promote cooperative behavior, we suggest that experience with JVs also allows firms to gain an appreciation of the delicate balance that exists between value creation on the one hand and value appropriation on the other in interfirm collaboration. Firms with experience in operating JVs are more likely to recognize the importance of devoting efforts toward common benefits and cooperative behavior in sustaining a mutually beneficial relationship from the outset. These firms are also likely to understand the importance of factors such as creating the right initial conditions and making appropriate adjustments over time to realize the goals of the JV (Ariño and de la Torre, 1998). In contrast, firms with less experience in operating JVs may not have such a well-developed understanding of the value creation logic of JVs and may have a tendency to adopt competitive postures in the relationship. In terms of Equations 4 and 5, we expect that when JV experience is high among both firms it would lead to lesser effort being devoted to $V_{1p}$, $V_{2p}$, and $V_{1d}$ and $V_{2d}$, and greater effort being devoted to cooperative behavior and deriving common benefits. Based on these arguments we suggest the following hypothesis:

**Hypothesis 4:** Value creation will be positively associated between two partners in a JV when both firms possess JV experience.
METHODS

Sample and event study methods

To test Hypotheses 1–4, the first step was to conduct an event study analysis of a suitable sample of JV announcements to measure value creation. Our data source in identifying the sample was the Securities Data Corporation (SDC) database on mergers, acquisitions, and alliances. The database has been used extensively in previous JV research (e.g., Anand and Khanna 2000; Gulati and Wang, 2003; Sampson, 2005). Using this database, we retrieved information on JVs beginning with the first year, which was 1985, up to the year 2003. At this stage we restricted ourselves to two partner JVs where the JV was a distinct and separate entity from the parent firms, and where both partners were based in the United States. This was done so that stock price data could be retrieved from the Center for Research in Stock Prices (CRSP) database. For these two partner JVs we then retrieved information pertaining to the date of the announcement, partner names, equity shares held, and the primary Standard Industrial Classification (SIC) code assigned to the JV.

Next, we obtained stock price data for both partners on and around the announcement date from CRSP. In addition, we also obtained various secondary data items pertaining to Tobin’s q and firm size (discussed further below) from Compustat. After combining all data items we were left with 688 firms belonging to 344 JVs in the sample.

The event study was conducted by estimating the market model over the period −250 to −50 with the announcement date acting as day 0. We used the software EVENTUS with the CRSP equally weighted index serving as the market return. Prediction errors were then calculated for the window [−1.0] for each partner. After calculating the prediction errors we obtained the value created for each partner by multiplying the market value at the year-end preceding the formation of the JV by the prediction error.7 The average prediction error over the [−1,0] period for the 688 firms in our sample was 0.75 percent and the average value created was USD 33 MN. These figures are consistent with previous research (e.g., McConnell and Nantell, 1985), which indicates that our sample and event study results were valid and reliable. Following Kalaignanam et al. (2007) we used the values created for the two partners over the [−1,0] period in each JV as the endogenous dependent variables in our study.8

Empirical approach

In this research, our objective was to understand the relative effects of cooperative and noncooperative behavior in JVs. However, since the components $V_1$, $V_2$, $V_1p$, $V_2p$, $V_1d$, and $V_2d$ in Equations 4 and 5 cannot be observed directly, our argument is that we can infer the relative effects of cooperative and noncooperative behavior as anticipated by the stock market by looking at how the values of the two firms are interrelated. Following Equations 4 and 5, if we consider two firms, 1 and 2, entering into a JV, we can test our hypotheses by examining how the value created for firm 1 ($V_1$) is correlated with the value created for firm 2 ($V_2$) and vice versa. We therefore specified the following two empirical equations:

$$V_1 = g\left(V_2, \text{ control variables}, \text{ identifying variables}\right)$$

$$V_2 = h\left(V_1, \text{ control variables}, \text{ identifying variables}\right)$$

where $g$ and $h$ are assumed to be linear functions. After specifying equations of the form 6 and 7 we then estimated them simultaneously to test our hypotheses. A simultaneous equation approach allows for the possibility that the values derived by the two partners mutually influence each other and are endogenously determined (given that each partner’s payoffs depend not only on its own managerial effort, but also the allocation of the partner’s

---

7 We also used market value at day −5 as opposed to the year-end preceding the year of the announcement of the JV to calculate value creation. Our results remained unchanged. Below we report results using the previous year-end market value since this is consistent with the measurement of our other independent variables, such as firm size.

8 In addition to the dollar values, we also conducted robustness tests with percentage abnormal returns as the endogenous dependent variables. While the simultaneous equation models did not produce a good fit with these variables, in no instance were the results contradictory to the results we present with dollar values. In general, regressions with abnormal returns do not produce a good fit because these errors are residuals from a previous regression (the market model; Servaes, 1991). In our case, this problem was compounded because we were examining the interrelationship between two prediction errors in our regressions.
managerial effort toward private and common benefits), rather than assuming that there is a causal relationship in any particular direction, such as, for example, assuming only $V_1$ impacts $V_2$ and not vice versa. Second, it enables controlling for other variables when examining the interrelationship between $V_1$ and $V_2$. Finally, by using appropriate methods such as three-stage least squares ($3SLS$) to estimate these equations we also avoid the potential biases in parameter estimates that may be introduced by ordinary least squares (OLS) given the non-recursive nature of these equations and the correlations of the endogenous variables with the error terms.

Having decided on a simultaneous equation approach to test our hypotheses, the next important issue we needed to address was how do we divide partners into groups so that we can specify Equations 6 and 7 and examine the interrelationship between the values derived by the two firms? From a theoretical standpoint, what is the appropriate criterion or characteristic that can be used to assign partners into separate groups for purposes of understanding the relative effects of cooperative and noncooperative behavior? Unlike acquisitions where there is a natural distinction between the two firms in a dyad (acquirers and targets), JVs are indistinguishable dyads (Kenny et al., 2006) where there is no criterion as such by which firms can be distinguished. Thus, based on theoretical considerations an appropriate variable needs to be identified by which partners can then be divided into groups for purposes of testing Equations 6 and 7 (Kenny et al., 2006).

In our analysis we used Tobin’s $q$ to distinguish between the two partners in each JV dyad. Tobin’s $q$ is a measure of the value of the intangible resources possessed by a firm (Villalonga, 2004). The higher the Tobin’s $q$, the higher the value of intangible resources. Based on Tobin’s $q$, we assigned firms in the 344 JVs into two groups: firms with higher Tobin’s $q$ than the partner in the dyad (the HI group) and firms with lower Tobin’s $q$ than the partner in the dyad (the LO group). Once having grouped firms using this criterion, we then examined the association between the values derived by the HI and LO group by estimating the system of simultaneous equations represented by 6 and 7. Tobin’s $q$ was used as the criterion to distinguish between the partners since it fundamentally reflects the value of the resources of the two firms, and hence captures the direction in which resources are likely to be appropriated in a JV. Thus it enables testing whether firms with less valuable resources are appropriating value at the expense of their partners, or whether value creation is occurring simultaneously for both firms in JVs. In contrast, using an alternative criterion such as firm size to distinguish between partners may be not as suitable for testing the interrelationship since differences in size may not always capture the direction in which appropriation is likely to take place. Larger firms can have stronger resources and a higher Tobin’s $q$ than their smaller partners, as was the case with 127 out of 344 cases in our sample, and grouping partners based on size may confound the relationship between $V_1$ and $V_2$ (since in some cases Group 1 firms would have a higher Tobin’s $q$ than Group 2 firms and vice versa). For this reason, we decided to use Tobin’s $q$ as our criterion. We did, however, conduct robustness checks by distinguishing between partners based on size. In addition we also conducted a robustness check by assigning firms randomly into Groups 1 and 2. As discussed in the next section, the results with respect to our overall hypothesis (Hypothesis 1 and Hypothesis 1-alt) about the relative effects of cooperative and noncooperative behavior remained unchanged with these different group assignments.

Tobin’s $q$ was measured as the sum of market value of equity, short- and long-term debt, preferred stock at liquidating value, and book value of convertible debt normalized by book value of total assets (Perfect and Wiles, 1994).

**Identifying and control variables**

In estimating the above simultaneous equations, another important issue was that we needed to include independent variables in 6 that did not appear in 7 and vice versa for identification purposes. Recent research suggests that the value
derived by a firm from a JV depends not only on its own characteristics but also on the partner’s characteristics (e.g., Stuart, 2000; Gulati and Wang, 2003; Lavie, 2007). Thus, in deciding our specifications of Equations 6 and 7 it was necessary to consider what firm characteristics to include in each of the two equations as well as what partner characteristics to include and exclude in a particular equation. Following previous research, we expected that a focal firm’s value derived from a JV would depend not only upon its own resources but also upon the resources that the partner brings to the JV. Partnering with a firm with strong resources may create more value for a focal firm through, for example, signaling effects (Lerner and Merges, 1998) and spillover effects such as reputation spillovers (Kumar, 2010). Hence, it is necessary to control for these effects since they may potentially impact the interrelationship between the values created for the two firms independent of cooperative and noncooperative behavior. To control for these effects, we included the Tobin’s q of the partner in Equations 6 and 7. In addition, we also included the industry adjusted Tobin’s q of a focal firm as a control in the two equations. The reason we used a firm’s industry adjusted Tobin’s q was to avoid spurious correlations between raw Tobin’s q and the dependent variable (value creation) since both variables are based on the firm’s market value. The industry adjusted Tobin’s q measure was calculated as the Tobin’s q of the focal firm minus the average Tobin’s q of all firms reporting the same SIC code as their principal activity as the focal firm in Compustat. Industry adjusted q was added as a control because, ceteris paribus, firms with more valuable intangible resources may experience lower returns from a JV given the appropriability hazards that these firms are likely to face. Conversely, these firms may also experience higher returns due to the potential synergies they may generate in the JV.

In addition to a firm’s industry adjusted q and partner q, we also included firm size and partner size as controls in each equation. Size was included as a control since, ceteris paribus, larger firms may exercise their market power, thereby creating greater value for themselves as well as the partner in the JV. This may create a positive correlation between the values derived by the two partners. Hence, firm size was added along with partner size in Equations 6 and 7 to control for this effect. In addition, we also added controls for a focal firm’s prior experience with JVs and the relatedness of the JV with each parent. Independent of the dynamics of cooperative and noncooperative behavior, ceteris paribus, firms with greater experience in JVs are likely to realize greater value from their cooperation (Anand and Khanna, 2000). Similarly, related JVs may create greater value than unrelated JVs (Koh and Venkatraman, 1991). JV experience was measured as a count of all prior JVs undertaken by a firm listed in the SDC database. A similar measure has also been used by Anand and Khanna (2000) and Zollo, Reuer, and Singh (2002). JV relatedness was calculated as a distance measure (Balakrishnan and Koza, 1993) given by the absolute value of the difference in SIC code of the core business of the parent (obtained from Compustat) and the SIC code of the JV (obtained from the SDC database).

Model specification and hypotheses tests

We specified the following two simultaneous equations to test our hypotheses:

\[
\begin{align*}
\text{LOVALUE} &= a_0 + a_1 \text{HIVALUE} + a_2 \text{LOQADJ} \\
&\quad + a_3 \text{HIQ} + a_4 \text{LOSIZE} + a_5 \text{HISIZE} + a_6 \text{LOEXPERIENCE} + a_7 \text{LODISTANCE} + \epsilon \tag{8}
\end{align*}
\]

\[
\begin{align*}
\text{HIVALUE} &= b_0 + b_1 \text{LOVALUE} + b_2 \text{LOQ} \\
&\quad + b_3 \text{HIQADJ} + b_4 \text{LOSIZE} \\
&\quad + b_5 \text{HISIZE} + b_6 \text{HIEXPERIENCE} \\
&\quad + b_7 \text{HIDISTANCE} + \epsilon \tag{9}
\end{align*}
\]

Where:

- LOVALUE = Value derived by the low Tobin’s q firm (i.e., Tobin’s q < partner’s Tobin’s q) over the \([-1,0]\) period obtained by multiplying abnormal returns with market value
- HIVALUE = Value derived by the high Tobin’s q firm (i.e., Tobin’s q > partner’s Tobin’s q) over the \([-1,0]\) period obtained by multiplying abnormal returns with market value
- LOQ = Tobin’s q of the firm whose Q is lower in the dyad (LOQ<HIQ); Correspondingly, LOQADJ = industry adjusted Tobin’s q (LOQ−industry average Q)
- HIQ = Tobin’s q of the firm whose Q is higher in the dyad (HIQ>LOQ); Correspondingly, HIQADJ = industry adjusted Tobin’s q (HIQ−industry average Q)
**LOVALUE** = size of the firm with lower Tobin’s q
**HIVALUE** = size of the firm with higher Tobin’s q
**LOEXPERIENCE** = experience of the firm with lower Tobin’s q
**HIEXPERIENCE** = experience of the firm with higher Tobin’s q
**LODISTANCE** = relatedness of the JV with respect to the low Tobin’s q firm
**HIDISTANCE** = relatedness of the JV with respect to the high Tobin’s q firm
\[ \varepsilon = \text{error terms} \]

In the above two simultaneous equations, **LOVALUE** and **HIVALUE** are the endogenous dependent variables. Thus the coefficients of interest in our hypotheses tests are the coefficients \( a_1 \) and \( b_1 \). As discussed earlier, Equations 8 and 9 each contain identifying variables that do not appear in the other equation (all variables apart from the two Ssize variables). Thus both equations are overidentified.

Hypothesis 1 suggests that if cooperative behavior and common benefits are more influential than noncooperative behavior and private benefits in JVs, then, on average, the values derived by two partners will be positively associated. Support for Hypothesis 1 implies that the coefficient of **HIVALUE** \( a_1 \) will be >0 in Equation 8 and the coefficient of **LOVALUE** \( b_1 \) will be >0 in Equation 9. In contrast Hypothesis 1-alt suggests that if noncooperative behavior and private benefits are more influential and stronger, then there will be a negative association between the values of the two partners. Support for Hypothesis 1-alt implies \( a_1 <0 \) and \( b_1 <0 \).

Hypothesis 2 suggests that the value derived by the two partners will be positively interrelated when both firms bring relatively strong resources to the JV. To test this hypothesis, we identified the subset of JVs in the sample where both the low Tobin’s q firm and the high Tobin’s q firm had q values above the median. The median Tobin’s q of the LO group was 0.92 and the median Tobin’s q of the HI group was 1.53. The rationale was that in this subsample both firms are likely to possess relatively strong resources when compared to the rest of the JVs. Hypothesis 2 implies that in this subsample \( a_1 >0 \) and \( b_1 >0 \). Hypothesis 3 suggests that when the relatedness of partners is high and they are direct competitors, there would be a tendency for noncooperative behavior to eclipse cooperative behavior. To test this hypothesis, we calculated the absolute value of the difference between the SIC codes of the core business of the two partners. The logic was that the closer the SIC codes and the distance between the two partners, the more likely they will be direct competitors. Thus in the subsample where the difference was below the median of the 344 JVs, we expected \( a_1 <0 \) and \( b_1 <0 \).

Finally Hypothesis 4 suggests that when both firms in the dyad have JV experience, cooperative behavior will tend to dominate noncooperative behavior. This is because experienced firms are likely to possess a better understanding of the value creation logic of JVs and the delicate balance that exists between cooperative and noncooperative behavior. To test the hypothesis, we examined the subsample where both the low Tobin’s q firm and the high Tobin’s q firm had above median JV experience. Our expectation was that in this subsample \( a_1 >0 \) and \( b_1 >0 \).

We used 3SLS to estimate Equations 8 and 9. The reason we preferred 3SLS over alternatives such as two-stage least squares (2SLS) was because the endogenous dependent variables in the two equations pertain to the value associated with announcing the same JV. Hence, there were likely to be correlations between the error terms across the two equations. 3SLS takes this aspect into account when estimating parameters. In addition 3SLS also produces more efficient estimates compared to 2SLS.

**RESULTS**

**Event study results**

As an initial test of our hypotheses, we began by examining the average values created for the LO and HI groups over the \([-1,0]\) period and the total value created in the JV over \([-1,0]\) period based on our event study analysis. Earlier, we had argued that to assess the effects of cooperative behavior and noncooperative behavior in JVs it is necessary to look at the interrelationship between the values created for the two partners rather than the average values created. This is because private benefits can also potentially result in positive gains to both partners. Conversely, both partners can earn negative returns despite best cooperative intentions if synergies are weak and the JV is a poor investment. These limitations notwithstanding, the average values created in various subsamples can be used to
gain initial insight into our data and our hypotheses. Table 1, Panel A presents the results. Using this data, we conducted t tests to examine whether the average values created were significantly above zero or below zero for the two partners and the JV as a whole. The significance of these t tests is also indicated in Table 1.

The t tests suggest that in the overall sample, the value created for the LO group ($22.89 Mn) and HI group ($43.39 Mn) were both insignificantly different from zero, while the total value created ($66.28 Mn) was marginally significant and greater than 0 ($p=0.13$). Table 1, Panel A also shows that in the subsample where both firms had strong resources, only the LO group experienced significant value creation while the HI group’s value and the total value created were insignificant. In the subsample where both partners were direct competitors, value creation was negatively signed and insignificant for both firms. Finally, in the subsample where both firms had JV experience, the LO group experienced significant positive value creation, while the value created for the HI group and the total value created were insignificant. Overall these results only weakly support our hypotheses and the argument that, on average, JVs are characterized by cooperative behavior as opposed to non-cooperative behavior. However, as noted above, the average value created does not always reflect the relative effects of the two types of behavior and a test of our hypotheses calls for estimating Equations 8 and 9 and examining the coefficients $a_1$ and $b_1$ in various subsamples, rather than examining average value creation.

Another way to address the issue of cooperative versus noncooperative behavior is to examine the proportion of JVs where both partners experienced positive returns versus negative returns and the proportion of JVs where the total value created was positive versus negative, rather than examining average value creation.

DOI: 10.1002/smj
the signaling effects of the JV (which may have impacted the values observed in Panel A). Table 1, Panel B presents the results. To assess significance, we conducted binomial tests comparing the observed proportion in various subsamples with the expected proportion under the null hypothesis that value creation occurs randomly in JVs. The expected proportion is 0.25 (0.5 × 0.5) under the null hypothesis that both partners experience positive/negative returns (since there is 0.5 probability that any one partner would experience positive/negative returns under random occurrence). Correspondingly, the expected proportion is 0.5 that total value creation in the JV will be positive/negative in a sample of firms if value creation occurs randomly. As shown in Panel B, when we examine the signs of the value created for both partners, there is support for the notion that the two partners experience positive returns simultaneously in JVs. The number of cases where both partners gained positive value was 105 out of 344, a proportion of 0.31, which was significantly greater than the expected proportion of 0.25. The number of cases where total value created was positive was 189 out of 344, which was significantly greater than 0.5. Table 1, Panel B also shows that both partners experience positive returns when they possess strong resources, and when they have JV experience. However, these results are not corroborated by the number of positives/negatives for total value created. In addition, the results are also not consistent with our expectations in the subsample where both partners were direct competitors. Overall, these results are more supportive of the notion that JVs are dominated by cooperative behavior and are positive sum games. But once again, they do not tell us whether the positive gains for the two partners are the result of private benefits or common benefits. We now turn to more systematic tests of our hypotheses by estimating the simultaneous equations represented by 8 and 9.

**Regression results**

Table 2 presents the correlations between our various dependent and independent variables in Equations 8 and 9. By and large, the correlations were within the acceptable range with the exception of the HIQ and the HIQADJ variables where the correlation was 0.92. The high correlation suggested that the two variables did not
Table 3. 3SLS estimates

<table>
<thead>
<tr>
<th></th>
<th>I: Full model estimates (n=344)</th>
<th>II: Partners with strong resources (n=130)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff</td>
<td>S.E</td>
</tr>
<tr>
<td><strong>LOVALUE equation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIVALUE</td>
<td>1.015***</td>
<td>0.28</td>
</tr>
<tr>
<td>HIQ</td>
<td>17.16</td>
<td>38.53</td>
</tr>
<tr>
<td>LOQADJ</td>
<td>-5.42</td>
<td>17.87</td>
</tr>
<tr>
<td>LOQ SIZE</td>
<td>-0.012**</td>
<td>0.004</td>
</tr>
<tr>
<td>HIQSIZE</td>
<td>0.008+</td>
<td>0.004</td>
</tr>
<tr>
<td>LOQEXP</td>
<td>2.18</td>
<td>4.76</td>
</tr>
<tr>
<td>LOQDISTANCE</td>
<td>-0.002</td>
<td>0.01</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>115.01</td>
<td>130.4</td>
</tr>
<tr>
<td>P Value</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td><strong>HIVALUE equation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOVALUE</td>
<td>1.08***</td>
<td>0.19</td>
</tr>
<tr>
<td>LOQ</td>
<td>30.54</td>
<td>65.21</td>
</tr>
<tr>
<td>HIQIND</td>
<td>8.72</td>
<td>45.92</td>
</tr>
<tr>
<td>LOQ SIZE</td>
<td>0.012***</td>
<td>0.003</td>
</tr>
<tr>
<td>HIQSIZE</td>
<td>-0.008+</td>
<td>0.005</td>
</tr>
<tr>
<td>HIQEXP</td>
<td>-0.74</td>
<td>6.68</td>
</tr>
<tr>
<td>HIQDISTANCE</td>
<td>-0.005</td>
<td>0.02</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-124.42</td>
<td>145.37</td>
</tr>
<tr>
<td>P Value</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

* indicates p<0.10, two-tailed  
** indicates p<0.01, two-tailed  
*** indicates p<0.001, two-tailed

contain unique information and were weak instruments. To address this concern, we substituted the industry adjusted q variable with the industry average q (HIQIND). The correlation between HIQ and HIQIND was lower at 0.69 but was high enough that we could still use HIQIND as a proxy for the high Tobin’s q firm’s resources. While our results remain substantively similar, in the remainder of our analysis we present results with industry average q (HIQIND) in place of industry adjusted q (HIQADJ) in Equation 9. Table 2 also shows the bivariate correlation between the values derived by the two partners over the [−1,0] period (LOV ALUE and HIV ALUE). As shown, the correlation was significant and positive at 0.22, which provides preliminary support for Hypothesis 1 and the argument that, on average, cooperative behavior dominates noncooperative behavior in JVs.

As a next step in our analysis, we tested for endogeneity of the two structural equations, 8 and 9, using the Durbin-Wu-Hausman test. If this test is rejected, then it implies OLS can be used to estimate the two equations and that the parameters would not be biased. The test was implemented using Stata’s `ivendog` command. The test showed strong evidence of endogeneity in both equations (p<0.001). From a theoretical standpoint the implication of this result is that rather than being independent, the values created for the two partners when a JV is announced are simultaneously and endogenously determined and mutually influence each other. Next, since our equations contained more than one identifying variable and were overidentified, we examined whether our instruments were valid and were correctly excluded from each equation by conducting the Sargan’s test (Davidson and McKinnon, 1993). This test weakly accepted the null hypotheses that our instruments were valid and were correctly excluded in both equations (p=0.052 and p=0.045).11

Table 3, Column I presents the results after estimating Equations 9 and 10 using 3SLS. Hypothesis 1 implies that there will be a positive relationship between HIVALUE and LOVALUE. Hypothesis 1-alt, in contrast, implies there will be a negative relationship between HIVALUE and LOVALUE. As shown in Table 3, the coefficients

11 The higher the p value, the greater the confidence in the null hypothesis that the instruments were correctly excluded. While the test results were weak, from a theoretical standpoint our choice of variables to include and exclude seemed reasonable and, hence, we present our results using these specifications.
Table 4. 3SLS estimates

<table>
<thead>
<tr>
<th></th>
<th>I: Closely related partners (n=172)</th>
<th></th>
<th>II: Distant partners (n=172)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff</td>
<td>S.E</td>
<td>P&gt;</td>
</tr>
<tr>
<td><strong>LOVALUE equation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIVALUE</td>
<td>-0.21</td>
<td>0.15</td>
<td>0.17</td>
</tr>
<tr>
<td>HIQ</td>
<td>36.38*</td>
<td>19.8</td>
<td>0.07</td>
</tr>
<tr>
<td>LOQADJ</td>
<td>24.47</td>
<td>34.06</td>
<td>0.47</td>
</tr>
<tr>
<td>LOQ SIZE</td>
<td>-0.001</td>
<td>0.002</td>
<td>0.56</td>
</tr>
<tr>
<td>HIQ SIZE</td>
<td>-0.003</td>
<td>0.004</td>
<td>0.52</td>
</tr>
<tr>
<td>LOQ EXP</td>
<td>4.96</td>
<td>6.92</td>
<td>0.47</td>
</tr>
<tr>
<td>LOQ DISTANCE</td>
<td>-0.103*</td>
<td>0.06</td>
<td>0.07</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-43.57</td>
<td>53.44</td>
<td>0.41</td>
</tr>
<tr>
<td>P Value</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HIVALUE equation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOVALUE</td>
<td>-1.59**</td>
<td>0.51</td>
<td>0.002</td>
</tr>
<tr>
<td>LOQ</td>
<td>121.32</td>
<td>184.72</td>
<td>0.51</td>
</tr>
<tr>
<td>HIQIND</td>
<td>-86.05</td>
<td>162.89</td>
<td>0.59</td>
</tr>
<tr>
<td>LOQ SIZE</td>
<td>0.001</td>
<td>0.001</td>
<td>0.86</td>
</tr>
<tr>
<td>HIQ SIZE</td>
<td>-0.01*</td>
<td>0.01</td>
<td>0.09</td>
</tr>
<tr>
<td>HIQ EXP</td>
<td>-33.87</td>
<td>39.84</td>
<td>0.39</td>
</tr>
<tr>
<td>HIQ DISTANCE</td>
<td>0.04</td>
<td>0.14</td>
<td>0.77</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>49.84</td>
<td>226.53</td>
<td>0.82</td>
</tr>
<tr>
<td>P Value</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* indicates p<0.10, two-tailed  ** indicates p<0.01, two-tailed
*** indicates p<0.001, two-tailed

of both HIVALUE and LOVALUE are significant and positive in the two structural equations. Thus Hypothesis 1 was supported. These results suggest that, on average, the stock market perceives cooperative behavior and common benefits to be the main source of value creation in JVs, and that these effects outweigh the effects of noncooperative behavior and private benefits. Thus, the market views JVs to be positive sum games rather than zero sum games, and to be an efficient organizational form for sharing resources between firms. Hypotheses 2 implies that there will be a positive association between HIVALUE and LOVALUE when both firms in the JV possess strong resources. To test this hypothesis, we conducted the analyses for the three subgroups where one or both firms had q values below median. In these three subgroups, we found insignificant associations between LOVALUE and HIVALUE, which lends further support to Hypothesis 2.

Hypothesis 3 implies there will be a negative association between LOVALUE and HIVALUE as partner firms become more related in terms of their core businesses, and as they become relatively direct competitors. To test the hypothesis, we split our sample based on the median value of the difference in SIC codes between the principal businesses of the two partners. Table 4, Column I presents the results. The results suggest that in the subsample where the partners were relatively close to each other, LOVALUE had a negative impact on HIVALUE. However, while HIVALUE was negatively signed, the coefficient was insignificant. These results provide partial support for Hypothesis 3. In addition, they also imply that in our sample when partners were relatively close competitors to each other, the ratio of private to common benefits may have been relatively greater for the low Tobin’s q firm. This may have caused it to
Table 5. 3SLS estimates

| LOVALUE equation | Coeff | S.E  | P>|z| | II: High Tobin’s q firms with low JV experience (n= 186) | Coeff | S.E  | P>|z| |
|------------------|-------|------|-------|----------------------------------|-------|------|-------|
| HIVVALUE         | 0.51***| 0.14 | 0.00  | −0.56**  | 0.18 | 0.003 |
| HIQ              | 42.61 | 48.30 | 0.37 | 31.614*  | 15.02 | 0.04 |
| LOQADJ           | −29.08 | 24.67 | 0.23 | −59.89*** | 18.48 | 0.001 |
| LOQ SIZE         | −0.01+ | 0.00 | 0.06 | −0.001   | 0.002 | 0.54 |
| HIQSIZe          | 0.01  | 0.01 | 0.12 | 0.001    | 0.004 | 0.86 |
| LOQEXP           | 8.28  | 8.83 | 0.34 | −3.58    | 6.78  | 0.59 |
| LOQDISTANCE      | 0.02  | 0.03 | 0.48 | −0.003   | 0.011 | 0.78 |
| CONSTANT         | −61.79| 230.07 | 0.78 | −93.01   | 59.9  | 0.12 |
| P Value          | .0000 | .0000 |      | .0000    | .0000 |      |

| HIVALUE equation | Coeff | S.E  | P>|z| |
|------------------|-------|------|-------|
| LOVALUE          | 1.58***| 0.32 | 0.00  |
| LOQ              | −41.18 | 281.64 | 0.88 |
| HIQIND           | −162.81| 175.99 | 0.35 |
| LOQSIZe          | 0.01*  | 0.01 | 0.03 |
| HIQSIZe          | −0.02  | 0.01 | 0.15 |
| HIQEXP           | −13.63 | 26.20 | 0.6  |
| HIQDISTANCE      | −0.01  | 0.06 | 0.83 |
| CONSTANT         | 180.22 | 584.25 | 0.75 |
| P Value          | .0000 | .0000 |      |

+ indicates p<0.10, two-tailed  * indicates p<0.05, two-tailed  ** indicates p<0.01, two-tailed  *** indicates p<0.001, two-tailed

appropriate value to some extent at the expense of the high Tobin’s q firm, whereas the reverse was not necessarily true. To test the hypothesis further, we also analyzed subsamples where the distance between the core businesses of the two partners in terms of the SIC code was lower than the median value in the full sample. Since the median value was fairly high at 1550, we chose distance values of less than 1,000 (i.e., the two partners are in the same two-digit code; n=126) and 500 (n=103). The results (not reported) showed a significant negative association between LOVALUE and HIVALUE in both these subsamples indicating support for Hypothesis 3. As a further test of this hypothesis, Column II in Table 4 presents the results pertaining to the subsample where the partners were relatively distant and unrelated to each other. As shown, LOVALUE and HIVALUE were positively associated with each other in both equations. Hence, as the degree of competition decreased, synergies and common benefits began to significantly outweigh the effects of noncooperative behavior and private benefits leading to positive gains for both partners (Park and Russo, 1996). These results were also obtained in subsamples where the distance in SIC codes was greater than 1,000 and 500 indicating consistent support for Hypothesis 3.

Finally, Hypothesis 4 suggests when both firms possess JV experience, cooperative behavior is likely to become more dominant than noncooperative behavior leading to a positive correlation between the values created. To test the hypothesis we identified the subsample where both firms had above median JV experience. Table 5, Column I presents the results. Consistent with Hypothesis 4, the relationship between LOVALUE and HIVALUE was positive and significant when both firms had above median JV experience. To test this hypothesis further, we also created three subsamples where either one or both partners had below median JV experience. This analysis revealed that the relationship between LOVALUE and HIVALUE was insignificant when the low Tobin’s q firm had below median JV experience (results not presented). Interestingly when the high Tobin’s q firm had below median JV experience, LOVALUE and HIVALUE were negatively associated in both equations. These results are presented in Column II of Table 5. Thus, it appears
Are Joint Ventures Positive Sum Games?

Table 6. 3SLS estimates

<table>
<thead>
<tr>
<th></th>
<th>I: Groups based on size</th>
<th></th>
<th>II: Groups based on random assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef</td>
<td>S.E</td>
<td>P&gt;</td>
</tr>
<tr>
<td>Partner 1 equation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VALUE2</td>
<td>1.11***</td>
<td>0.30</td>
<td>0.000</td>
</tr>
<tr>
<td>Q2</td>
<td>60.20</td>
<td>37.21</td>
<td>0.11</td>
</tr>
<tr>
<td>Q1ADJ</td>
<td>28.24</td>
<td>23.71</td>
<td>0.23</td>
</tr>
<tr>
<td>Q1 SIZE</td>
<td>-0.01</td>
<td>0.01</td>
<td>0.43</td>
</tr>
<tr>
<td>Q2 SIZE</td>
<td>0.01**</td>
<td>0.00</td>
<td>0.000</td>
</tr>
<tr>
<td>Q1EXP</td>
<td>0.22</td>
<td>18.14</td>
<td>0.99</td>
</tr>
<tr>
<td>Q1 DISTANCE</td>
<td>0.01</td>
<td>0.02</td>
<td>0.61</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-156.62</td>
<td>90.63</td>
<td>0.08</td>
</tr>
<tr>
<td>P Value</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner 2 equation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VALUE1</td>
<td>1.13***</td>
<td>0.27</td>
<td>0.000</td>
</tr>
<tr>
<td>Q1</td>
<td>-38.86</td>
<td>34.57</td>
<td>0.26</td>
</tr>
<tr>
<td>Q2ADJ</td>
<td>-61.72</td>
<td>51.10</td>
<td>0.23</td>
</tr>
<tr>
<td>Q1 SIZE</td>
<td>0.01</td>
<td>0.01</td>
<td>0.69</td>
</tr>
<tr>
<td>Q2 SIZE</td>
<td>-0.01***</td>
<td>0.00</td>
<td>0.001</td>
</tr>
<tr>
<td>Q2 EXP</td>
<td>-4.34</td>
<td>7.10</td>
<td>0.54</td>
</tr>
<tr>
<td>Q2 DISTANCE</td>
<td>-0.01</td>
<td>0.02</td>
<td>0.72</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>188.85</td>
<td>143.86</td>
<td>0.18</td>
</tr>
<tr>
<td>P Value</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* indicates p < 0.10, two-tailed  * indicates p < 0.05, two-tailed
** indicates p < 0.01, two-tailed  *** indicates p < 0.001, two-tailed

that the experience of the firm with more valuable resources plays an important role in creating the proper collaborative atmosphere in JVs. Finally LOVALUE and HIVALUE were insignificantly related when both firms had below median JV experience (results not reported). Hence, there was support for Hypothesis 4 and the role of experience of both partners in creating a positive sum game in JVs.

In terms of our control variables, by and large our results indicate that the value derived by the low q firm in the dyad was positively associated with the Tobin’s q of the high q firm. The reverse, however, was not true indicating the presence of reputation spillovers and knowledge transfers from the high q firm to the low q firm (Kumar, 2010). Another effect we observed was that while firm size was negatively associated with value creation (McConnell and Nantell, 1985), partner size was positively associated. Hence there appeared to be positive value creation effects associated with partnering with larger firms. These results further support the argument that a firm’s value from a JV doesn’t just depend upon its own resources and characteristics but also the partner’s characteristics, and that partnering with larger firms can confer benefits such as monopoly power and can signal quality of resources (Lerner and Merges, 1998).

While Tables 3–5 present the main results of our hypotheses tests, we also conducted various robustness tests of our results. We did this in two main ways: by dividing firms into groups based on their size instead of their Tobin’s q, and by assigning firms randomly into groups. Once having divided firms into groups based on these two criteria, we then constructed all other independent variables accordingly and reestimated Equations 8 and 9. Table 6 Column I presents the results after dividing partners based on their size. In Column I, Partner 1 comprises all firms that were smaller in size in the JV dyad, while Partner 2 comprises the larger firm in the dyad. Consistent with Hypothesis 1, the results showed that there was a positive association between the values derived by larger and smaller partners in both equations. These results further corroborate the results presented in Table 3 and highlight the relatively stronger effect of cooperative behavior and common benefits in JVs when compared to noncooperative behavior and private benefits. However, although the overall associations in both equations were positive, we did not
find support for our hypothesized relationships in various subsamples when we used size to distinguish between partners. In terms of testing the effects of randomly assigning partners into groups, we conducted 20 such random assignments and estimated Equations 8 and 9 in each of these samples. In nine out of the 20 random samples, the values of the two partners were positively correlated with each other, indicating support for Hypothesis 1. Table 6 Column II presents the results of estimating Equations 8 and 9 in one of these random samples. In the remaining 11 samples, while one partner’s value had a positive impact on the other, the reverse relationship was insignificant.

In addition to these various steps, we conducted two additional analyses to ascertain the robustness of our results. First we included dummy variables for the JV industry in Equations 8 and 9. The objective was to control for variations in the attractiveness of the JV investment and its impact on the correlation between LOVALUE and HIVALUE. To do this, we included industry dummies for various economic sectors such as mining, construction, wholesale trade, retail trade, transportation and services, other services, chemicals, electronics and other manufacturing. Although these dummies capture industry effects at a very aggregate level, lack of sufficient number of observations in various two-digit categories prevented us from using a more fine-grained approach. The results remained unchanged when we used these dummy variables as controls, and there continued to be a positive correlation between LOVALUE and HIVALUE in the full sample. Next, we also conducted regressions using the total value created in the JV as our dependent variable. The rationale was that if JVs are characterized by greater cooperative behavior when both partners bring strong resources (Hypothesis 2) and have JV experience (Hypothesis 4), then the total value created should be positively associated with the sum of the Tobin’s q of the two partners in the JV and the sum of JV experience due to higher common benefits. Conversely, if JVs are characterized by noncooperative behavior when partners are direct competitors (Hypothesis 3), then the total value created should be negatively associated with the distance between the core businesses of the two partners due to lower common benefits. Results (not reported) indicated that after controlling for factors such as parent firm size, total value creation was positively associated with the sum of the Tobin’s q of the two partners, but was insignificantly related to the sum of experience and distance. These results indicate support for Hypothesis 2, but not for Hypotheses 3 and 4. Total value creation provides an alternative way to test our hypotheses, but it does not fully reflect the relative effects of cooperative and noncooperative behavior for two reasons. First, when the values of the two partners are summed, the wealth transfer effects represented by \( V_{1d} \) and \( V_{2d} \) in Equations 4 and 5 are, in effect, canceled out, which does not take into consideration the full impact of noncooperative behavior in total value creation. Second, total value created also contains the non-value destroying private benefits appropriated by the two firms. Thus, when the individual values of the parents are summed, these private benefits may offset any lower common benefits in the JV due to noncooperative behavior, making it difficult to discern whether higher total value creation is due to higher common benefits or higher private benefits.\(^{12}\)

**DISCUSSION AND CONCLUSION**

The results of our study indicate that in the JVs in our sample, on average, the effects of cooperative behavior and common benefits were stronger than noncooperative behavior and private benefits. This was evidenced by the finding that after controlling for various factors, the values created for the two partners at the time of the JV announcement were positively associated with each other. Over the last few decades, scholarly research has highlighted that JVs create value for individual parent firms. However there has been comparatively lesser evidence pertaining to whether this value stems from cooperative behavior and common benefits or resource appropriation and private benefits. Our study sheds light on this aspect by using a simultaneous equation framework to examine how the values derived by two partners are interrelated. Thus, our study shows that, on average, JVs create value simultaneously for the two parent firms and are positive sum games rather than zero sum games. In doing so, it attests to

\(^{12}\) The total value creation variable also does not allow for a direct test of the interrelationship between the values created for the two partners.
the efficacy of JVs as a means for accessing complementary resources and creating value for both partners rather than as a means for any one partner to appropriate resources and derive value at the expense of the other.

But though our results indicate that, on average, JVs are positive sum games, we also found various contingencies that influenced to what extent value creation occurred simultaneously for the two partners. One important contingency we identified was the strength of the resources of firms and how equally matched the two firms were along this dimension in the dyad. Our results suggest that value creation occurred simultaneously when the two partners possessed relatively strong resources as measured by Tobin’s q. In contrast, value creation did not occur simultaneously when one or both firms possessed relatively weak resources. This result points to the fundamental role of resources in influencing the dynamics of interfirm collaboration. Previous research has tested the impact of the resources of network partners on value creation (Lavie, 2007), but it does not examine how the distribution of resources within the dyad impacts the dynamics of a focal JV. Our findings fill this gap in the literature by showing that cooperative forces eclipse competition when both firms possess valuable resources. In doing so, they also point to a critical difference between acquisitions and JVs. In the case of acquisitions (e.g., Lang, Stulz, and Walking, 1989; Servaes, 1991) it has been consistently found that value creation is enhanced when firms with high Tobin’s q acquire firms with low Tobin’s q. But the results of our study suggest that the same does not apply to JVs because, unlike acquisitions, JVs offer a significant potential for resource appropriation and private benefits. This shifts incentives away from cooperative behavior to noncooperative behavior when there is high differential in the value of resources, thereby leading to elements of a zero sum game.

Another important contingency our study identifies is the degree of relatedness and product market competition between parent firms. Previous research has theoretically identified product market competition as an important factor that influences the degree of cooperative behavior in a JV (e.g., Hamel, 1991; Inkpen and Beamish, 1997; Khanna, 1998). Evidence in this regard has mainly come from qualitative studies and from studies that have examined the duration of the JV as a function of various factors (Park and Russo, 1996). Our research complements these studies and shows that the degree of product market competition has an important impact on whether value is created simultaneously or at the expense of the partner in a JV. In doing so, it points to the hazards of partnering with direct competitors despite the potential for value creation through various mechanisms such as economies of scale. Relatally, our study also shows that partnering with firms that are not direct competitors and are distant can be value creating for both partners. This finding also corroborates the argument that JVs can be more efficient than acquisitions when they involve moderately unrelated parent firms since they not only reduce information asymmetry (Balakrishnan and Koza, 1993) and provide nonoverlapping knowledge bases (Sampson, 2007) but also because they are associated with greater incentives for cooperative behavior.

In addition to these findings, our research also emphasizes the importance of experience in setting the tone for a JV and the dynamics of interfirm collaboration. Previous research has mainly focused on the experience of a focal firm on the value derived from a JV (see Hoang and Rothaermel, 2005, for an exception). Our findings suggest that JV experience of both firms in the dyad is critical in promoting collaboration. Experience with interfirm collaboration plays an important role not only in framing JV contracts and developing mechanisms to protect resources (Kale et al., 2000) but also in understanding the subtle value creation logic of JVs. Firms that lack experience may be tempted to allocate greater effort to immediate and short-term outcomes such as appropriating resources to the detriment of long-term cooperative outcomes, leading to zero sum outcomes. This was evidenced in our research in the subsample where high Tobin’s q firms lacked JV experience. In this subsample, there was a strong negative association between the values derived by the two partners, which suggests that inexperience may lead to greater emphasis on noncooperative behavior.

Future research could build on our study in various ways. First, future research could examine whether these findings hold in alternative samples and settings, especially with regard to the positive association between the values derived by the two partners. This would be critical toward establishing that, on average, cooperative behavior and
common benefits play a more influential role in JVs compared to noncooperative behavior and private benefits. Second, future research could also examine a wider set of factors and contingencies impacting the interrelationship apart from what we explored here. Thus, for example, it would be useful to examine whether the number of prior collaborations with a particular partner influences the extent of competition versus cooperation. Similarly it would be valuable to study whether the presence or absence of an alliance function has an impact on the nature of the relationship (Kale et al., 2002). Ceteris paribus, a dyad where the two firms have alliance functions may have a greater tendency to exhibit cooperative behavior and synergies versus noncooperative behavior (Kale and Singh, 2007). Finally, it would also be useful to examine situations where there are asymmetries in the relationship between the values derived between the two partners (i.e., conditions where a firm’s value may be positively associated with the partner’s value, but the partner’s value may be negatively associated with the firm’s value). In our research, there was some evidence of this effect in the subsample where the two partners were direct competitors. In this subsample, the high q firm’s value had an insignificant impact but the low q firm’s value had a negative impact (Table 4, Column I) which suggests that the ratio of private to common benefits may have been substantially greater for the low Tobin’s q firm. Future research could examine other such conditions that lead to asymmetric effects.

ACKNOWLEDGMENTS

I thank Anna Cui and Ikenna Uzuegbunam for comments on an earlier version. The paper has also benefitted immensely from the comments of the two anonymous reviewers, and I am grateful for their guidance. Responsibility for any remaining errors is mine.

REFERENCES


