FRIENDS AND PROFITS DON’T MIX: THE PERFORMANCE IMPLICATIONS OF REPEATED PARTNERSHIPS

SAMUEL S. HOLLOWAY
University of Portland

ANNE PARMIGIANI
University of Oregon

Firms use repeated partnerships to gain benefits of shared experience such as improved coordination, collaboration, and adaptation. However, there are downsides to partnering repeatedly, including vulnerability to opportunistic partners upon whom the firm becomes dependent, muted efficiency incentives, and overlooking better options. This paper unpacks the effects of repeated partnerships by investigating their impact on two distinct types of performance: revenue and profitability. To understand repeated partnerships, we analyze a unique dataset of 580 partnerships that completed 144 bridge construction projects. Controlling for project attributes that affect the level of outsourcing, we posit that a greater proportion of repeated partners and deeper relationships with these partners will result in greater revenue through winning bids, but that the prime contractor will not necessarily garner higher profits. We find support for these predictions, highlighting the trade-offs of repeated partnerships.

All firms must engage with partners to meet their goals and satisfy customers. Partnering with known firms can be beneficial, as firms can build on past exchanges and enjoy the benefits of cooperation based upon mutually aligned incentives as all parties work on present and future relationships (Granovetter, 1985; Heide & Wathne, 2006; Klein & Leffler, 1981). They should enjoy more efficient coordination due to co-developed routines (Dyer & Singh, 1998; Frohlich & Westbrook, 2001), more richly collaborate and jointly problem solve (Granovetter, 1985; Uzzi, 1996), and have greater capacity for adaptation and flexibility (Gulati, Puranam, & Tushman, 2012; Williamson, 1985). These advantages have generally been supported by empirical work that has positively associated repeated partnerships with performance (e.g., Ferguson, Paulin, & Bergeron, 2005; Gulati, Lawrence, & Puranam, 2005; Krause, Handfield, & Tyler, 2007; Poppo & Zenger, 2002). However, scholars have also explored disadvantages to repeated partnering. These include the potential for partners to exploit their dependence (Molina-Morales & Martínez-Fernández, 2009; Noordhoff, Kyriakopoulos, Moorman, Pauwels, & Dellaert, 2011); muted efficiency incentives, as repeat partners may shirk and rely on the established relationship to retain the business (Poppo, Zhou, & Zenger, 2008b; Villena, Revilla, & Choi, 2011); and overlooking technically superior options (March & Simon, 1958; Nelson & Winter, 1982; Poppo, Zhou, & Ryu, 2008a).

This paper considers both the advantages and disadvantages of repeated partnerships by proposing that repeated partnerships have distinct effects on two types of performance: revenue and profitability. We suggest that the benefits of coordination, collaboration, and adaptation all help to improve revenue, as firms will want to leverage their established routines, creatively problem solve, and maintain flexibility to obtain new business. However, vulnerability...
to opportunistic partners, reduced efficiency incentives, and overlooking lower-priced, capable partners can lead to lower profits.

We test and find support for these predictions using a unique dataset of bridge construction projects. In this mature sector, prime contractors are mandated to outsource by using at least one subcontractor. Numerous subcontractors are available, and prime contractors frequently use repeated partners. Following other work that has connected governance and performance, we use econometric techniques to control for factors that affect the degree of outsourcing (Leiblein, Reuer, & Dalsace, 2002; Mayer & Nickerson, 2005; Sampson, 2004). In contrast to survey-based empirical work that aggregates different types of self-reported performance into a single measure (e.g., Ferguson et al., 2005; Gulati et al., 2005; Krause et al., 2007; Poppo & Zenger, 2002), we use separate and objective performance measures for revenue and profitability. Our choice of setting, specific data, and modeling techniques provide confidence that our data operationalize our theorized constructs and provide a credible empirical test.

We provide several contributions to the literature. First, we link repeated partnerships to multiple, objective performance measures, providing evidence that the use of repeated partners improves revenue but not profitability. This suggests that trade-offs exist, as repeated partners can be counted on for better coordination and collaboration, but not necessarily for optimal efficiency, and they may want some compensation for their commitment in supporting the ongoing relationship. Close relationships promote synergies for growth and obtaining new revenue, but may also weaken efficiency incentives and provide subcontractors with bargaining power that can limit prime contractors’ profits. Second, we analyze fine-grained project-level data that allow us to control for the degree of outsourcing and cleanly connect the identity and history of partners with project-specific performance measures for revenue and profitability. Finally, we tease out the effects of the number of repeated partners versus the depth of these relationships, and show that the depth of prior relationships is what drives performance differences. We thus highlight the importance of how repeated ties are measured (Podolny & Page, 1998). The prime contractor’s dyadic relationships drive our results, rather than how the contractor constructs its overall system of partner relationships. In this way, we contribute to the literature connecting governance and performance. Although the performance outcomes of governance modes have been studied (e.g., Leiblein et al., 2002; Masten, Meehan, & Snyder, 1991; Mayer & Nickerson, 2005), less is known about partnership configuration or the selection of specific partners.

This paper proceeds as follows. First, we briefly review the literature on repeated partnerships and relational governance, highlighting the advantages and disadvantages of using known partners. We then propose hypotheses relating the use of repeated partnerships and their differing effects on revenue and profitability. We next describe our setting of bridge construction, provide details of our measures and analysis, and present our results. We conclude with a discussion of the findings, limitations, and extensions of this research.

THEORETICAL FOUNDATIONS

Firms return to partners with whom they have worked in the past if they prove to be reliable and cooperative. Often, these relationships develop into deep, long-term partnerships. These enduring partnerships are typically managed through relational governance or relational contracting, as this mode of organizing emphasizes the ties between partners and their shared goals of maintaining goodwill, exchanging information, and continuity (Baker, Gibbons, & Murphy, 2002; Ring & Van de Ven, 1992). Research in this area has built on the foundational work of Macaulay (1963), who noted that the “give and take” of business is built upon social relationships that complement, and perhaps are more important than, formal, legal contracts. MacNeil (1978, 1980) expanded upon these ideas, contrasting short-term exchanges with relational contracts that are built upon norms of mutual fairness and flexibility, with the expectation that these relationships will continue indefinitely.

Advantages and Disadvantages of Repeated Partnerships

Due to their shared history, firms will enjoy improved coordination with repeated partners. By coordination, we refer to how firms allocate, manage, and integrate a set of interdependent tasks (Gulati et al., 2012; Okhuysen & Bechky, 2009). For repeated partners, the established relationship justifies bilateral investments that are specific to the dyad, such as common communication platforms, custom equipment, and specific training (Bensaou & Anderson, 1999; Frohlich & Westbrook, 2001; Poppo & Zenger, 2002; Williamson, 1996).
Coordination will also be promoted through co-developed routines that the partners use to enhance productivity and efficiency (Dyer & Singh, 1998; Gil & Marion, 2013; Nelson & Winter, 1982; Zollo, Reuer, & Singh, 2002). These specific investments and routines enable better task allocation and effectiveness through tools and processes that are unique to the dyad.

Collaboration is also improved through repeated partnerships. Collaboration refers to joint learning and problem solving that rely on knowledge transfer. Common communication systems and language will develop that enable greater and richer knowledge transfer (March & Simon, 1958; Tunis & Zanfei, 1998). Shared goals and values between partners will also promote mutual learning (Fiol & Lyles, 1985; Holcomb & Hitt, 2007; Hult, Ketchen, & Arrfelt, 2007). Trust built from prior exchanges will act as a safeguard, deterring partners from appropriating knowledge for their own benefit (Heiman & Nickerson, 2002; Hoetker & Mellewigt, 2009).

Repeated partnerships also facilitate adaptation, responding to changing situations and uncertainty. These deeper relationships are typically characterized by an intermediate governance form, incorporating the flexibility of the market with the coordination of the hierarchy, both of which are important when dealing with uncertainty (Gulati et al., 2005; Williamson, 1985). Their established relationship will motivate partners to look toward the future and the “bigger picture,” such that they may be willing to absorb some of the costs of uncertainty and be more flexible. Uncertainty can result in considerable conflict and renegotiation, both of which are reduced when partners have experience working together (Jeffries & Reed, 2000; Zaheer, McEvily, & Perrone, 1998). As conditions change, partners with a deeper relationship are more likely to develop joint actions to mutually adapt and coordinate their responses (Mellewigt, Madhok, & Weibel, 2007; Zaheer & Venkatraman, 1995).

In addition to advantages, there are some disadvantages to repeated partnerships. Firms may become vulnerable to opportunism from repeated partners, as they are less likely to employ monitoring and formal mechanisms in these relationships, opening the door to shirking or slacking (Williamson, 1985; Wuyts & Geyskens, 2005). Over time, partners will learn about each other’s cost structures and weaknesses, and could take advantage of this for their own gains (Anderson & Jap, 2005). Moreover, one partner may appropriate the other’s knowledge for its own purposes (Khanna, Gulati, & Nohria, 1998; Noordhoff et al., 2011). Particularly in cases of greater specific investments, repeat partners may shirk on performance as they assume that partners are unlikely to recreate these investments with a new partner (Poppo et al., 2008a).

Another disadvantage of repeated partnerships is overlooking better, alternate partners. Firms in an established relationship may have little motivation to undergo a costly search if the current partner is satisfactory, wallowing in “collective ignorance” regarding alternatives (Ernst & Bamford, 2005; Jones, Hesterly, & Borgatti, 1997; March & Simon, 1958). Developed routines also lead to inertia, as they would be costly to reproduce with a new partner (Levinthal & Fichman, 1988). By remaining in a relationship for a long period of time, firms can become overembedded, making it difficult to create new partnerships (Uzzi, 1997). Firms may also be reluctant to disrupt strong personal relationships and suffer the negative affect that may ensue (Anderson & Jap, 2005).

Our next section proposes hypotheses based on the advantages and disadvantages of repeated partnerships. We posit that the advantages promote revenue growth whereas the disadvantages mitigate profitability, and suggest how these effects may play out at the system and dyadic levels by considering both the proportion of repeated partners and the depth of specific, dyadic relationships.

HYPOTHESIS DEVELOPMENT

In this section, we connect a firm’s use of repeated partners with organizational performance. We call this firm a prime contractor, as it is our focal firm, a lead firm that manages a group of subcontracted partners to whom it outsources various activities. Although there is simultaneity and endogeneity in the decision to outsource, such as the degree of specific investment and partner selection, we assume that the prime contractor considers all necessary tasks and internalizes those that have the highest degree of uncertainty and specific investment (Geyskens, Steenkamp, & Kumar, 2006; Macher & Boerner, 2006; Williamson, 1985). We take the extent of outsourcing as a given and focus on partner selection, investigating why a prime contractor would choose a repeated partner versus a new partner. This assumes that there are numerous, capable partners available, such that the prime contractor is not stuck with a single partner due to some unusual capability or unique investment. Thus, our hypotheses may only hold in contexts
where the pool of partners is sufficiently deep. We also propose arguments for both the proportion of repeated partnerships and the depth of these relationships, as the former is an indication of the overall system configuration of repeated partners and the latter reflects specific dyadic connections between the partners. Further, we also consider two types of organizational performance: revenues and profitability. Revenues refer to “top line” growth, whereas profitability is an accounting-based measure that explicitly includes costs. Later, we discuss how our empirical setting matches these assumptions, how we econometrically control for the effects of endogeneity on outsourcing, and how our project-level data and analysis allow us to cleanly connect partner selection and performance.

Using repeated partners will facilitate coordination and communication based upon shared routines. Having a greater proportion of repeated partners gives the prime contractor confidence that the project will run smoothly, as it already has procedures in place to work with these partners (Boh, Slaughter, & Espinosa, 2007; Gil & Marion, 2013). Partners that have experience working together will better understand how their skills and assets fit together to create shared routines (Dyer & Singh, 1998; Gulati, 1999; Krause et al., 2007; Mayer & Argyres, 2004; Zollo et al., 2002). These include routines that are focused on improvement, such as waste reduction, and on revenue generation, such as new product development (Peng, Schroeder, & Shah, 2008). When an opportunity arises, experienced partners can better leverage and tweak these established routines to address customer requirements. Coordination based upon bilateral investments such as equipment or information systems will be facilitated, since partners will want to leverage the sunk costs of these investments.

Collaboration will be facilitated with repeated partners due to rapport built over past exchanges and the anticipation of future business (Heide & Miner, 1992; Poppo et al., 2008a). This richer collaboration will be useful in obtaining revenue as these partnerships improve knowledge transfer due to the common understanding of challenges faced by the firms, as well as the understanding that gains will be mutually shared (Ahuja, Coff, & Lee, 2005; Diestre & Rajagopalan, 2012; von Hippel, 1988). Going after a new business opportunity often involves solving problems, which is easier to do with familiar partners. The trust developed in an established relationship will improve collaboration toward a novel solution, even if it benefits one party more than the other, as together they share a common goal (Ireland & Webb, 2007; Zaheer et al., 1998). Having a group of repeated partners will also reduce the overall anticipated risk for the prime contractor, as the combined exchange histories in the system of partnerships will improve predictability (Eccles, 1981a, 1981b; Skilton, 2009).

Prime contractors using repeated partners should also enjoy increased revenue due to better adaptation to uncertainty.Repeated partners will be more likely to jointly develop solutions to adaptation challenges (Zaheer & Venkatraman, 1995). Due to their long-standing bonds, these solutions are likely to be quickly accepted by the partners. When selecting a partner, the prime contractor must assess the resources a potential partner brings, along with how the value derived from that partner’s resources may change in the face of changes in the external environment (Ariño & Reuer, 2004; Skilton, 2009). Because future changes are unknown when the partner is selected, Reuer, Zollo and Singh (2002) suggested that the initial partnership choice is only one component of a much broader series of challenges that cooperating firms must adjust to in the face of uncertainty. The increasing reliance on adaptation under high uncertainty favors partners with greater relational embeddedness, because prior experience with a partner increases flexibility and allows for lower cost adaptations (Luo, 2002). Thus, prime contractors with a greater proportion of repeated partners will be more flexible overall, as their experienced partners will adapt more readily to changing conditions. Deeper dyadic relationships also provide the basis for investing in specific investments that will allow for mutual adaptation (Heide & Miner, 1992; Poppo et al., 2008a; Williamson, 1985).

Thus, the systemic and dyadic advantages of coordination, collaboration, and adaptation with repeated partners will increase the revenue of prime contractors, as we formally predict:

**Hypothesis 1a.** For a given level of outsourcing, the greater the proportion of repeated partners, the greater the prime contractor’s revenue.

**Hypothesis 1b.** For a given level of outsourcing, the deeper the relationships with repeated partners, the greater the prime contractor’s revenue.

Although we hypothesize that the impact upon revenue of selecting repeated partners is positive, we anticipate that its effect on profitability will be negative. Revenue is a “top-line,” market-based
measure, based on customer satisfaction, and generally forward looking; one could say it represents the entire “size of the pie.” However, profitability is a “bottom-line,” accounting-based measure, founded on cost reductions and efficiency in implementation; among multiple partners, it can be thought of as how the pie is divided (Hartmann, Perego, & Young, 2013; Miller, Washburn, & Glick, 2013; Steers, 1975). Due to the fundamental differences in these types of performance, we posit that the use of repeated partners has a distinct effect on each measure. Although coordination, collaboration, and adaptation all support revenue as they facilitate responsiveness to market conditions, these aspects of repeated partnerships also result in vulnerability, muted efficiency incentives, and overlooking better options, which increase costs and thus decrease profits.

Prime contractors that have formed deep relationships with repeated partners will trust them and share information, thus becoming vulnerable to opportunism. Repeated partners may know the cost details of the prime contractor and thus be well positioned to negotiate for a bigger piece of the overall profits. Partners may become increasingly dissatisfied and thus more likely to take advantage of the other’s weaknesses (Anderson & Jap, 2005). Concerns over repeated-partners’ opportunism could thwart knowledge sharing, increasing the prime contractor’s costs since additional safeguards may be required (Diestre & Rajagopalan, 2012; Noordhoff et al., 2011). The dark side of these deep relationships suggests that reduced information asymmetry from multiple exchanges makes the prime contractor more vulnerable to opportunistic partners.

The use of repeated partners also mutes efficiency incentives. Specific investments and established routines between the prime contractor and a repeated partner represent sunk costs, making it less likely that partners will seek efficiency improvements. They will ignore technically superior options since they do not want to change and make new investments, as this would disrupt their established operations and exchanges. This “dark side” of long-term relationships was found by Poppo and colleagues (2008b), who showed that firms using repeated partners with a longer exchange tenure and greater specific investments tended to be less satisfied with cost, quality, and responsiveness. Srinivasan and Brush (2006) also found that in cases of relationship-specific investments, the expectation of continuity was not a sufficient incentive for suppliers to avoid slacking. Likewise, Villena and colleagues (2011) found evidence of an inverted U-shaped relationship between trust and operational performance, suggesting that repeated partners may become slack over time. Prime contractors may also be less likely to monitor repeated partners as they are more concerned about new partners, which could also lead to slacking by repeated partners.

Finally, prime contractors with repeated partners may be unlikely to search for new, better alternatives (Anderson & Jap, 2005). It involves a considerable amount of work to search for new partners and establish an initial exchange; thus, boundedly rational prime contractors may just retain established partners, ostensibly becoming “locked in” to these relationships (Burgelman, 2002; Ernst & Bamford, 2005; Jones et al., 1997; March & Simon, 1958). This may be particularly true if the prime contractor’s current project has a large proportion of repeated partners. Although using a repeated partner avoids search costs, it can increase costs overall since new partners are likely to be less expensive. New partners understand that prime contractors are reluctant to incur switching costs from repeated partners. Thus, a new partner must offer the prime contractor a significantly lower price as an incentive to switch. Likewise, repeated partners will price their services above what a new partner would ask, likely just at the prime contractor’s willingness-to-pay threshold. Thus, repeat partners may leverage their unique history with the prime contractor, and appropriate most of the efficiencies of their established relationship (Anderson & Jap, 2005; Wuyts & Geyskens, 2005). Last, new partners may be technically more capable and efficient; by overlooking these technically better partners in favor of familiar partners, the prime contractor’s costs will increase.

These arguments all support the idea that repeated partners will be more costly, and thus less profitable, than new partners, which we formally state below:

Hypothesis 2a. For a given level of outsourcing, the greater the proportion of repeated partners, the lower the prime contractor’s profitability.

Hypothesis 2b. For a given level of outsourcing, the deeper the relationships with repeated partners, the lower the prime contractor’s profitability.

In sum, we posit that there are differential performance effects of using repeated partners. Although the coordination, collaboration, and adaptation advantages of repeated partners will enhance revenue, the disadvantages of potential opportunism, muted efficiency incentives, and overlooking alternate and
more technically capable partners will increase costs and decrease profitability. These effects occur both at the systemic and the dyadic levels. We now turn to the bridge construction sector, from which we gathered project-level data to test these hypotheses.

**CONTEXT AND METHODOLOGY**

Our study involves prime contractors and their subcontractors that build bridges together. We follow Eccles (1981a, 1981b), who noted that in the construction sector there are particularly salient examples of persistent interfirm relationships. In bridge construction, prime contractors actively contribute to production and design project partnerships by first determining their degree of vertical integration and then selecting the number and identity of partners as subcontractors. In our research setting, bridge construction projects in Oregon from 2000–2007, prime contractors typically outsourced tasks to about three partners for projects lasting from eight months to over five years, averaging about $7.5 million to build.

The bridge construction industry introduces industry-wide controls of a single customer with one performance metric that facilitates comparing these project partnerships. The department of transportation is the only customer, and because the federal government largely funds bridge construction, federal regulations only permit a contract to be awarded to a prime contractor with the lowest overall cost for completing a bridge. Regulations also require the prime contractor to use at least one federally approved materials supplier, thereby mandating outsourcing. This low-cost requirement controls for firm-level strategy, making this an excellent setting to relate the structural characteristics of project partnerships to revenue and profitability.

In addition to the low cost requirement imposed on bridge construction firms, several other controls are present in this research setting. First, within a particular bridge project, there is no product variation and each competing prime contractor has near perfect information about product characteristics in the form of engineering blueprints and project specifications. Further, prime contractors are not allowed to introduce alternative bridge designs within that project—each prime contractor must bid on the design as is. Second, technology does not vary widely within the industry—cranes and bulldozers are uniformly available and their functionality has remained consistent for decades. Third, all firms are relatively small, such that no single firm has considerable economic power over another. Thus, firms within this industry tend to be relatively homogeneous and generalist in nature; they do not vary widely due to product innovation, customer innovations, technology innovations, or strategy.

The project bidding process represents a sequence of decisions related to how much work a prime contractor wishes to do internally, and what gets outsourced to subcontractors. After the call for bid proposals goes out to every qualified prime contractor, each prime contractor first determines what tasks to complete internally based on task characteristics and available capacity, and then selects partners for the remaining tasks. In general, prime contractors prefer to conduct tasks internally as they can dictate timing, reduce risk, and have more control. However, they may lack capacity or require equipment that is more cost-effective to obtain from a new partner. In these cases, the prime contractor must select from a pool of partners based upon their competencies, availability, and an estimate of the coordination costs related to using that partner. The core decision comes down to whether to use a new partner that may have a cheaper price but whose behavior is difficult to predict, or to use a known and trusted partner. As one of our prime contractor informants stated:

> When putting together a cost estimate, I know that everyone else out there (other prime contractors bidding on the same project) has the same prices from subcontractors, the same plans and specifications, and because we are a relatively small group of competitors, I know the equipment everyone brings to the table. If I don’t have a piece of equipment, I can partner with someone who does or I can rent the equipment and it comes with an experienced operator. Where we make our money is deciding how much of the work we do ourselves, and then selecting the right partners for the rest of it. The real tension surfaces when you realize the partners you’d like to use may be easier to manage and easier to work with, but they expect to be paid more. Finding the right balance between close partners and cheaper (unknown) partners is the name of the game.

Dave Mingo, President Cascade Bridge, LLC

To summarize, the largest source of variation among prime contractors is whom they select as their project-specific system of partners. To capture revenue, prime contractors select subcontractors and design their partner system in order to optimize several competing variables: coordination costs of new partners, timing and risk reduction from internal production, higher prices due to using repeated
partners, and technical capability variance among and between partners. In this mature setting, revenue is only captured when these competing variables are packed into a partner system with the lowest overall bid cost. If they are successful in winning the bid, prime contractor profitability then results from efficient and effective project implementation. As our informant stated: “Everyone knows the prices everyone else has,” so they must compete on partner system design—that is the number of repeated versus new partners. To isolate the effects of repeated partners, we use econometric techniques to control for the other factors that affect the degree of outsourcing (see Appendix A), and thus can closely investigate how repeated-partner relationships affect performance.

Sample

The sample selection process consisted of identifying all bridge projects (and their associated prime contractors and partners) constructed in the state of Oregon from 2000–2007. Since February 2000, the Oregon Department of Transportation (ODOT) has required a Subcontractor Disclosure Form (SDF) to be submitted with each bid. The SDF is a written list of all project participants that perform greater than 5% of the work on a particular bridge project. This list contains the name of each major partner used in each prime contractor’s bid proposal, and is thus the source of all project and partner data.2

In order for a project to be selected for the sample, it had to contain a bridge structure or other traffic control structure (e.g., a retaining wall) that was constructed onsite and from raw materials. Eccles (1981a) suggested that the increased complexity from onsite construction is inherently necessary to isolate the strategies behind subcontracting as an organizational form. In projects without more complex onsite construction processes, asset specialization drives the structure and performance of partnerships and often results in stand-alone, single-firm contractors completing the work (Hampson & Tatum, 1997; Teece, 1984). Since single-firm contractors do not use partners, they are outside of the domain of our study.3

Bridge projects that require onsite construction from raw materials are strategically different from other projects because they entail sufficient complexity in scope to require multiple autonomous firms to furnish and integrate specialized inputs in a coordinated fashion (Eccles, 1981a; Hampson & Tatum, 1997). To accurately select these projects, we reviewed every Request for Proposal issued by ODOT from 2000–2007, and included all projects with bridge or traffic control structures that were constructed onsite and from raw materials.4 This initial list included complete data on 330 projects, eliciting 1,380 proposed projects with prime contractor and partner listings. Within this initial sample, we then screened projects to include only those with specific environmental regulations. This step was necessary to ensure we could model the exchange conditions (uncertainty arising from environmental regulations) that would dictate the degree of outsourcing. The final sample, which met the minimum criteria of salient exchange conditions and onsite construction requirements, produced 144 bridge projects eliciting 580 sets of prime contractors and partners.

Measures and Analysis

Due to the voluminous records kept by the ODOT, constructing variables to test the hypotheses was straightforward. Generally, we were able to construct a measure for each variable directly from the bid tabulations. Bid tabulations record detailed estimates of costs expected for completing a bridge project for every submitted proposal. For each of the 580 proposals that were retained from the screening process, a complete bid tabulation was available.

---

2 A subset of this data was used in a prior paper (Holloway & Parmigiani, 2011) that addressed the question of organizational form (summarized as aggregate tie strength), rather than the performance implications of repeated partnerships. The current paper includes dependent-variable data on winning bids and project profitability that were gathered specifically for this version, such that there is little data overlap between these papers.

3 Single-firm contractors represent fewer than 3% of projects in a given year. Removing these single-firm contractors from all years left 330 projects and 1,380 proposals, which were further screened to include only projects with specifications related to environmental uncertainty.

4 The first author has extensive experience in U.S. highway bridge construction, including a degree in civil engineering and over five years’ experience as an estimator within the bridge construction industry, where the author’s primary responsibility was designing project partnerships groups. Nevertheless, we asked external bridge construction experts to review our data collection process, its design, methodology, and project list to ensure its validity.
The bid tabulation is composed of total cost information for each proposal, a full list of partners, and the schedule of work items that must be completed. This work schedule, called the “bid schedule” by ODOT, stipulates each component of the project that must be completed, including all bridge components, roadside improvements, landscaping, grading and excavation work, lighting and electrical work, painting, paving, and other tasks needed to ensure the bridge is structurally sound and aesthetically pleasing.

**Dependent variables.** Revenue (Won Bid) is a binary measure (1, 0) that indicates whether a prime contractor won the bid, meaning that its cost proposal was the lowest among all bids for a particular project. Among the 580 bids selected during our sample frame, 144 were winners. Since federal regulations only award bids to the lowest-cost proposal, revenue is only generated when a prime contractor submits the lowest bid. No new business is awarded for second place.

**Profitability** measures the relative profitability of the each winning bid; that is, the difference between the bid cost and the actual completed cost. We created a continuous measure, Percent Margin, which measures the percentage change between the final approved bid cost and actual authorized construction costs, as ODOT scrutinizes the bid and looks for errors, then approves the final approved bid cost. Following construction and final approval, the construction authorization reflects the actual cost of construction. If a prime contractor has an approved bid of $10 million, and the final cost of the project is $9 million, the difference between the two numbers favors the prime contractor and adds to profitability. Values for Percent Margin range from −25 to 65%, with a mean of 3%. These values are consistent with heavy highway construction averages (Hampson & Tatum, 1997). Equation 1.0 models the Percent Margin calculation:

\[
\text{Percent Margin} = \left( \frac{\text{Approved Bid Cost} - \text{Actual Construction Cost}}{\text{Approved Bid Cost}} \right) 
\]

**Equation 1.0**

**Independent variables.** Percent Repeated Partners measures the configuration of the prime contractor’s partnership system. As hypothesized, we are interested in the proportion of repeated partners a prime contractor selects to complete the current project. Prime contractors benefit from using their most recent repeated partners due to a rhythm developed among resources, routines, and capabilities that can be easily redeployed to the current project. Because projects may last from eight months to five years, the ease of reestablishing these routines and capabilities is increased by recent project partnerships. Thus, this variable is operationalized as the number of partners the prime contractor used on the most recent previous job (repeated partners) divided by the total number of partners on the current job. For example, if a prime contractor used three partners, two of whom were also used on the last job, this value would be 2/3. Values for Percent Repeated Partners ranged from 0 to 1, indicating that all partners on the current job are new or all current partners were also on the last job.

**Deep Partner Relationships.** This variable calculates the sum of deep relationships for that project’s partnership group by summing the number of times the prime contractor has used repeated partners over its last five projects. A deep relationship that lasts over many projects (and thus many years) is likely to involve more co-specialized assets, routines, and capabilities. For example, imagine a prime contractor has three partners on the current project—Partner A, Partner B, and Partner C. Partner C is new and has not been used on any of the prime contractor’s previous five jobs; thus, that partner scores a zero for Deep Partner Relationships. Partner A has been used on each of the five previous jobs and Partner B has been used three times within the previous five jobs, scoring 5 and 3, respectively. Thus, at the project level of analysis, the value for Deep Partner Relationships would be 5 + 3 + 0, or 8. We follow Gulati (1995), who found that only the four most recent interactions positively affected current alliance performance. We ran sensitivity analyses to determine the effects of deep repeated partnerships on the first two most recent projects and up to the five most recent projects. These analyses did not show any statistical difference between the three to five most recent partnerships; thus, we included all five in order to use as much information as possible.

We present Table 1 as a descriptive overview of the usage of repeated partners. This table displays the number of repeated partners used by prime contractors based upon the total number of partners for the projects that won bids. For example, for the 33 projects using two partners, 23 of these firms chose all new partners. In four of the other 10 projects, firms used two repeat partners. In the other six, they used one new and one repeat partner. Key takeaways from this table are that prime contractors use a relatively small number of partners, usually three or less, and the more partners they do use, the more likely they will be to use repeat partners.
Control variables. We also included control variables at the firm, industry, and project level. **Prime Contractor Size** was operationalized as the number of employees at the prime contractor’s headquarters, determined by Eccles (1981a) and Seldin and Bloom (1961) as the most valid measure of a general contractor’s capabilities. **Prime Contractor Age** is a count of the number of years since the prime contractor was founded. In this technologically mature and well-established industry sector, **Prime Contractor Size** and **Age** are reasonable proxies to control for prime contractor capabilities across projects. **Size** and **age** affect strategic decision making and could affect the amount of outsourcing per project. **Project Frequency** is a count variable for the total number of bridge projects in Oregon in a given year. **Project Frequency** is particularly important as a control variable in the construction industry. Eccles (1981a) found that when controlling for “market variability,” which he measured as the number of construction opportunities for a given year, previous findings by Stinchcombe (1959) about the structure and performance of the subcontracting organizational form were reversed. **Environmental Nuisance** is measured by the total dollar volume of bridge projects in Oregon in a given year. Eccles (1981a) also suggested that controlling for nuisance allows scholars to more clearly describe the organizational role of subcontracting in construction projects.5

---

5 One control variable that is not included is a variable for new entrants. As noted in Eccles (1981a), entrance into the construction industry is relatively easy when compared to other industries, such as manufacturing. However, the effect of new entrants in heavy highway construction is limited due to the relatively high capital requirements. Nevertheless, we reviewed the sample for any new entrants and found two entrants and one exit during the sampling window. These firms accounted for less than 2% of the 584 proposals that made the final sample. Including a dummy variable for new entrants did not affect the results, and therefore was omitted.

---

We also included two project-level control variables of environmental uncertainty and duration, reflecting overall uncertainty and size. **Environmental Uncertainty** is operationalized as the number of pages contained within Section 00290—Environmental Uncertainty of the Project Special Provisions. Section 00290 calls a prospective bidder’s attention to potential issues regarding the physical environment, such as environmental hazards in existing and proposed structures (e.g., lead-based paint, creosote-treated timbers), the approximate location of cultural sites (e.g., Native American burial grounds, parks), and wildlife behavior (e.g., nesting sites of endangered species, spawning beds and other protected fish habitats). Across the sample of projects, section 00290 ranges from one paragraph (a quarter of a page) to 25 pages. The mean number of pages is 6.85 with a standard deviation of 4.37 pages. **Project Duration** is operationalized by the number of calendar days the ODOT allows for job completion. Every bid comes with a calendar day limit, and each prime contractor understands these limits when submitting a bid for the project. This variable is a proxy for project size, as larger projects generally take more time. We chose to use calendar days, rather than absolute dollars, for project size due to the complexities and variance in the costs of bridge construction components over the seven years of our study, and because ODOT informants suggested that calendar days was a more reliable measure.

Governance mode self-selection. Since we are interested in the performance implications of repeated partners, given the degree of outsourcing, we must control for the empirical problem of endogeneity,6 in which unobservable attributes such as capabilities can influence both strategic choices and performance. We follow prior scholars in employing econometric techniques to control for this problem (Leiblein et al., 2002; Nickerson & Silverman, 2003; Shaver, 1998). To capture the potential endogeneity effects of unobserved variables on performance, we created a variable called **Self Selection Correction** by computing the Inverse Mills ratio. This ratio is based upon the residuals of a first stage equation that

---

6 Endogeneity refers to the problem of self-selection, such that firms will choose strategies based upon their own attributes. Empirical models that predict performance but do not account for this self-selection are misspecified and lead to incorrect conclusions. For a classic example, see Shaver’s study of foreign direct investment via greenfield sites versus acquisitions (Shaver, 1998).
predicts the level of outsourcing. Second-stage models that incorporate the Inverse Mills ratio will then provide consistent and unbiased results. This technique has become increasingly common in strategy selection research (Leiblein et al., 2002; Nickerson & Silverman, 2003; Parmigiani & Holloway, 2011; Shaver, 1998).

We chose this maximum-likelihood-based method of endogeneity correction over a two-stage least squares (2SLS) procedure because our second-stage dependent variables are binary (winning the bid) and limited in range (profitability). Thus a method such as 2SLS that is based on ordinary least squares (OLS) regression and thus assumes continuous, normally distributed dependent variables is not suitable. In addition, our level-of-outsourcing variable (the number of partners) was limited in range since firms had from zero to nine partners. Typically, scholars use a binary variable (make or not; 0, 1) in the first stage. However, our variable was a continuous measure such that the standard probit estimation is not appropriate (Hamilton & Nickerson, 2003). To incorporate the variation in our data while still constructing normal residuals for the error terms, we follow work in labor economics by using a three-level ordered probit (Hu & Tijdens, 2003). According to Hu and Tijdens (2003), this technique allows for both estimation of the effect of exchange conditions on outsourcing and subsequent construction of Inverse Mills ratios to control for endogeneity in the second-stage performance equations. See Appendix A for more details on this method and our first-stage model.

**Estimation methods for dependent variables.** Our selection of estimation method was driven by the nature of the dependent variables. Since the dependent variable for Revenue (Won Bid) is binary (0, 1), maximum likelihood estimation is preferred (Kennedy, 2003). We used a logit estimation model, clustered by prime contractor to control for firm-specific capabilities. For Profitability, we had a continuous measure with a limited range of values. As shown in Table 2, our values for “percent margin” ranged from −0.26 to +0.65. Kennedy (2003) suggested that when the range of values for the dependent variable is limited, OLS estimates are biased and maximum likelihood estimation is preferred. Thus, we elected to perform a Tobit estimation, clustering by prime contractor to control for capabilities. In both cases, we used a manual two-stage Heckman selection correction procedure based on Inverse Mills ratios to control for endogeneity of governance choice (level of outsourcing).

**RESULTS**

First, Table 2 presents descriptive statistics and correlations. To ensure collinearity was not a problem, we ran OLS regressions to estimate the costs of organizing and profitability (Model 5 in Tables 3 and 4) and with the full range of variables. Following regression, we calculated the variance inflation factor (VIF), which is a salient indicator of collinearity if its value is greater than 10.0 (Meyers, 2006). The largest VIF value in Model 5 was 1.70. Thus, we conclude that collinearity did not degrade the results from the maximum likelihood estimation.

**Estimation of Repeated Partners on Revenue (Won Bid)**

To test the performance measures, we first looked at predictions related to winning the initial bid, which we frame as revenue. Recall that in this setting, choosing the number and identity of partners is the primary means of value creation, since product characteristics (blueprints and bridge specifications), technology (cranes and bulldozers), and strategy (low cost) are largely controlled for. We present our results in Table 3. Model 1 includes only the control variables and provides baseline estimates. Model 2 adds the control for the level of outsourcing. Models 3 and 4 begin introducing the key independent variables, with Model 5 being the full or unrestricted model. To test the goodness-of-fit of the models, we used a \( \chi^2 \) likelihood ratio (LR) test developed by Neyman and Pearson (Greene, 2003). The results from LR testing indicate that Model 5, the full model, is the best fit for these data (\( p < .10 \)).

The results in Model 5 (the full model) connecting Percent Repeated Partners and Revenue do not support Hypothesis 1a as the coefficient is not statistically significant. However, for Deep Repeated Relationships and Revenue, the coefficient is positive and significant across all models, supporting Hypothesis 1b. Apparently, the depth of prior relationships matters more than the proportion of prior relationships in project partnerships does. Turning to the controls, smaller prime contractors are more likely to win bids and a high level of environmental munificence is related to winning a bid. This latter result makes sense as more available money in a given year means more available projects and thus more winning bids.

**Estimation of repeated partners on profitability (percent margin).** The results for Profitability, which we operationalize as “Percent Margin,” are
## TABLE 2
Descriptive Statistics and Correlations

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Revenue</td>
<td>0.25</td>
<td>0.44</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Won Bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Profitability</td>
<td>0.03</td>
<td>0.08</td>
<td>-0.24</td>
<td>0.65</td>
<td>0.04</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Margin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Prime</td>
<td>67.43</td>
<td>102.61</td>
<td>1.00</td>
<td>650.00</td>
<td>-0.06</td>
<td>0.02</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractor Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Prime</td>
<td>38.32</td>
<td>23.62</td>
<td>0.00</td>
<td>130.00</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.36</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractor Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Log Env.</td>
<td>19.41</td>
<td>0.19</td>
<td>19.10</td>
<td>19.74</td>
<td>0.09</td>
<td>0.11</td>
<td>0.09</td>
<td>0.04</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Munificence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Project</td>
<td>517.17</td>
<td>314.01</td>
<td>45.00</td>
<td>1688.00</td>
<td>-0.03</td>
<td>-0.05</td>
<td>0.03</td>
<td>0.20</td>
<td>-0.14</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration (Size)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Self-SelectionVariable</td>
<td>-0.07</td>
<td>0.74</td>
<td>-1.37</td>
<td>1.09</td>
<td>-0.07</td>
<td>0.06</td>
<td>0.02</td>
<td>-0.05</td>
<td>-0.02</td>
<td>-0.29</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) % Repeated Partners</td>
<td>0.11</td>
<td>0.22</td>
<td>0.00</td>
<td>1.00</td>
<td>0.01</td>
<td>-0.02</td>
<td>-0.02</td>
<td>-0.03</td>
<td>0.07</td>
<td>-0.08</td>
<td>-0.06</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>(9) Deep</td>
<td>1.65</td>
<td>2.82</td>
<td>0.00</td>
<td>18.00</td>
<td>0.10</td>
<td>-0.06</td>
<td>-0.13</td>
<td>0.02</td>
<td>0.03</td>
<td>0.08</td>
<td>-0.50</td>
<td>0.42</td>
<td>1.00</td>
</tr>
<tr>
<td>Repeated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationships</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Notes: n = 580. Correlations with an absolute value greater than .08 are significant at p < 0.05*
shown in Table 4. Model 4 indicates that having more deep partner relationships is related to lower levels of profitability. This result also holds in Model 5, with a negative and significant coefficient on Deep Partner Relationships, supporting Hypothesis 2b. The Percent of Repeat Partners is not significant, with no support for Hypothesis 2a, again suggesting that it is the depth or strength of past relationships that influence performance, not just the percentage of repeat partners.

Last, since our profitability models were based only on winning bids, we were curious as to which effects repeated partners had among project partnerships associated with losing. For these losing bids, we computed how much a prime contractor overbid on the project, and constructed an Overbid variable that took the higher project cost and divided it by the winning bid cost. We then used a Tobit model with the same explanatory models we used for profitability in Table 4. We found that the percentage of repeated partners was positively and significantly related to the degree of overbidding, whereas the depth of these relationships was not significant. In other words, when trying to predict which explanatory variables lead to the highest project cost (overbid variable), resulting in never obtaining new revenue, a prime contractor that designs a system of lightly repeated partners instead of focusing on those repeated partners with whom it has deep relationships will increase their bid cost significantly and never win a job. This suggests that deep relationships work in favor of generating new revenue, and that less overall familiarity with a group of partners lowers the chances of obtaining revenue—resulting in overbidding. Thus, we can infer that prime contractors may wish to include some newer partners along with deep repeated partners to optimize their system of partnerships.7

DISCUSSION AND CONCLUSION

Our study of how repeated partnerships affect revenue and profitability confirmed the importance of partner selection and configuration on organizational performance. As in many other studies on

7 We thank an anonymous reviewer for suggesting we run the overbid model as a robustness check.
repeated partnerships (Ferguson et al., 2005; Gulati et al., 2005; Krause et al., 2007; Poppo & Zenger, 2002), we find that deep relationships with partners did lead to superior performance—but only for revenue, since this is based upon the coordination, collaboration, and adaptation advantages originating from strong partnerships. Unlike these other studies, we looked at different types of performance and found that vulnerability from using an established partner, along with muted efficiency incentives and overlooking better alternate partners, harm profitability, providing evidence of the “dark side” of these relationships (Anderson & Jap, 2005; Poppo et al., 2008a) and highlighting the trade-offs of repeated partnerships.

In addition to investigating the connection between repeated partnerships and two different types of performance, our empirical approach adds nuance to previous theoretical discussions of repeated partnerships, since we were able to model the overall configuration of the partnership system as well as the depth of these relationships. Our results suggest that deep partner relationships affect revenue and profitability more than the proportion of prior relationships does. This finding has implications for studies of partner portfolios (e.g., Wassmer, 2008), as it highlights the importance of how repeated partnerships are measured. It also introduces the question of how and whether repeated partnerships necessarily lead to relational governance. Whereas prior research has typically assumed that a prior tie naturally leads to relational governance, our results suggest that this may not always be the case. Incentives appear to be conflicting and trade-offs exist, suggesting that relational governance alone may not be the optimal way to manage repeated partnerships.

Our study also adds empirical support to prior work that has theorized about how firms and their partners manage their relationship, given the potential for future exchange, sometimes termed “the shadow of the future.” First, with respect to the learning benefits of longtime partnerships (Poppo et al., 2008a), our results suggest that when a prime contractor knows how to work with a subcontractor due to their deep relationship, the contractor lowers its bid price and wins the job. This suggests that longtime partners amortize the costs of learning across many project relationships, enjoying reduced

TABLE 4
Tobit Estimation

<table>
<thead>
<tr>
<th>DV—Profitability (Percent Margin)</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Repeated Partners (Hypothesis 2a)</td>
<td>-0.008</td>
<td>0.004</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep Repeated Relationships (Hypothesis 2b)</td>
<td>-0.002**</td>
<td>-0.002**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prime Contractor Size</td>
<td>-0.000**</td>
<td>-0.000</td>
<td>-0.000*</td>
<td>-0.000*</td>
<td>-0.000*</td>
</tr>
<tr>
<td>Prime Contractor Age</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Project Frequency</td>
<td>-0.000</td>
<td>-0.000</td>
<td>-0.000</td>
<td>-0.000</td>
<td>-0.000</td>
</tr>
<tr>
<td>Log Munificence</td>
<td>0.068</td>
<td>0.071</td>
<td>0.072</td>
<td>0.072</td>
<td>0.071</td>
</tr>
<tr>
<td>Environmental Uncertainty</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
</tr>
<tr>
<td>Project Duration</td>
<td>-0.000</td>
<td>-0.000</td>
<td>-0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Self-Selection Variable</td>
<td>-0.011*</td>
<td>-0.009</td>
<td>-0.007</td>
<td>-0.007</td>
<td>-0.007</td>
</tr>
<tr>
<td>n</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
<td>144</td>
</tr>
<tr>
<td>Log Pseudo Likelihood</td>
<td>-144.12</td>
<td>-145.06</td>
<td>-145.08</td>
<td>-145.42</td>
<td>-145.43</td>
</tr>
<tr>
<td>Pseudo R-Squared</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Notes: One-tailed tests. Standard errors in parentheses, constant suppressed.

* p < 0.1

** p < 0.05
coordination costs while anticipating and accepting lower profits from job to job. Second, there may be a negative effect of deep repeated partnerships related to technical capabilities. If a prime contractor ignores a newer but more technically gifted partner in favor of a longtime partner, profitability can be lower because the partners incur more costs due to inferior technical capabilities and outdated, relationship-driven routines. Although these older routines may enhance coordination, it is at the expense of finding newer, more technically effective routines. Investments in relationship-specific assets and routines can also lead to muted efficiency incentives that further reduce profitability. Another mechanism that may reduce profitability is that repeated partners understand their value to the prime contractor in uncertainty reduction, and can thus prevent prime contractors from extracting above-average profits. Paraphrasing Adegbesan and Higgins (2011), firms may choose a smaller pie if they can get a larger slice.

We also contribute to transaction cost economics (TCE) theory by highlighting the importance of partner identity in performance. Partners, or suppliers, may not be as interchangeable as once believed, even in situations where technology is stable and products are well specified. Our results suggest that once the vertical integration choice has been made, choosing the right partners clearly affects performance. Indeed, in our mature setting where firms largely compete on the basis of their governance configuration, choosing the right partners has a greater affect on revenue and profits than transaction characteristics or internal capabilities. For example, the effect of prime contractor size, a proxy for capabilities in our setting (Eccles, 1981a), was negative and significant for revenue while the effect of deep partnerships was positive and significant, with an effect size four times larger (Cummings, 2011). This suggests that for revenue, the identity of partners matters more than transaction characteristics or internal capabilities do.

Several insights from our studies apply to managers. First, although choosing the appropriate degree of outsourcing depending upon the project attributes will lead to improved performance, the specific partner choice may be even more important. Second, there are trade-offs between using a trusted partner, which will reduce uncertainty, with an unproven one, which may be more efficient and thus more profitable. Being aware of this balance has important implications regarding the size, demographics, and management of one’s partnership portfolio. Third, in settings where repeated partnerships are common and firms can be in either the prime contractor or subcontractor position, it is important to consider the depth of a partner relationship. Although better for revenue growth and developing new business opportunities, deep relations may be less profitable. In such a repeated game framework, it may make sense to break some of these ties or enter a different sector if profit maximization is the dominant goal.

Managers may also appreciate the economic significance of repeated partnerships on revenue and profitability. While estimating the statistical significance in Tables 3 and 4 confirms the theoretical impact a deep repeated partnership has on revenue and profitability, the effect size (Cummings, 2011) allows for estimating the economic significance of repeated partnerships. In considering revenue, 144 firms submitted winning bids and 436 submitted losing bids. Among the 436 losers, 23 lost by less than 1%, while 111 lost by less than 5%. In real dollar terms, this means that 25% of firms lost a bid by less than $42,000. With an average bid cost of $8.27 million over all 144 projects, this means that a prime contractor needs every advantage they can get in order to win. The Deep Repeated Relationships variable predicts an 8% greater chance of winning a bid, highlighting its importance as ignoring its influence can cost firms millions of dollars in near misses. The effect size of Deep Repeated Relationships on profitability is negative and much smaller in magnitude (−0.2%). However, on the largest projects ($75 million in our sample), this still suggests a swing of almost $150,000 in prime contractor profitability. Thus, the differences in the effect sizes and economic significance on revenue and profitability further confirm the double-edged nature of deep repeated partnerships.

This study has some limitations that provide extensions for future work. Our context was a mature industry with established firms and a single performance criteria—low cost. It would be enlightening to investigate rapidly changing industries where innovativeness and speed are more important. It may be that in those cases, revenue through new business is easier to obtain and extraordinary gains are created such that all firms involved can gain abnormal profits, at least for a time. Our measures for revenue and profitability are at the level of the project, which enabled us to tie these together quite specifically. Although we could identify profitability of the prime contractor, our data were not sufficiently detailed to provide specific profit levels for each partner. We also could not obtain richer details about each dyadic relationship. If possible to obtain, that type of data could lead to interesting insights, such as how value created by a set of partners is actually distributed among them. In this context, outsourcing is highly
correlated with the number of partners, but in other contexts this may not be the case. It would be informative to test and understand how repeated partnerships affect revenue and profits in situations with specific investments or uniquely skilled suppliers. Future research may also look at the nature of the product or service being transacted, and how that affects repeated partnerships. Further, scholars could investigate how the advantages and disadvantages of repeated partnerships develop over time, as our data suggest that it takes many years for this to happen. Researchers also could explore what specific governance mechanisms are used and how these develop.

Outsourcing makes sense when tasks are numerous and uncertainty is not acute, especially since working with repeated partners helps firms grow through improved utilization of joint resources, better communication, and greater adaptability. However, a price is paid for this collaborative relationship: firms can become vulnerable, experience slacking, and overlook better, alternate partners. In that sense, friends and profits do not mix.

REFERENCES


APPENDIX A

FIRST STAGE MODELS FOR LEVEL OF OUTSOURCING

To construct our self-selection variables, we first needed to model three levels of outsourcing for the ordered probit. Our explanatory variables included Environmental Uncertainty and Project Duration, both of which are likely to be connected to less outsourcing (Williamson, 1985). We also included the Number of Tasks, Prime Contractor Size, Prime Contractor Age, Project Frequency, and Environmental Munificence. We employed an instrument, % DBE required, to model behavioral uncertainty in the self-selection equation. On some federally funded projects, prime contractors are required to use Disadvantaged Business Enterprises (DBE) on a specific percentage of tasks. These DBEs are often unfamiliar to the prime contractor and thus it is difficult to estimate their future behaviors. To ensure that % DBE was a good choice for the instrument, we computed Woolridge’s (1995:66-87) robust score, which involves a post-estimation calculation and a resulting test statistic. Our results on Woolridge’s robust score test confirm that % DBE is a good instrument to control for endogeneity. The % DBE variable is included only in the first stage; this improves the reliability of second stage estimates.

We developed three discrete categories for model variation in the Level of Outsourcing variable (low level of outsourcing, moderate level of outsourcing, high level of outsourcing). These three choices are ordinal and mutually exclusive. An ordered probit model can then be derived in the form of a latent variable model, denoted by $y^*$, where $y^* = \gamma Z_j + u_j$ and the subscript $j$ indexes the prime contractor’s choices of level of outsourcing (low, moderate, high). The above latent variable model shows that prime contractors have individual choices on level of outsourcing that depends on certain measurable factors, $Z$, and the unobservable factors, $u$ (Hu & Tijdens, 2003). For identification, we assume the error term (i.e., unobservable factors) has a standard normal distribution with unity variance. Thus, we observe:

$y = 1$ if $y^* < \mu$ the prime contractor selected low outsourcing

$y = 2$ if $\mu < y^* < \mu_1$ the prime contractor selected moderate outsourcing

$y = 3$ if $\mu_1 < y^*$ the prime contractor selected high outsourcing

where $\mu$ and $\mu_1$ are the two thresholds that a prime contractor has to cross over to make $y$ observable (Greene, 2003). The probabilities of observing the three outcomes for Level of Outsourcing are:
\[
\text{Pr}(y_j = 1) = 1 - \Phi(\gamma Z_{ij}) \\
\text{Pr}(y_j = 2) = \Phi(\mu_1 - \gamma Z_{ij}) - \Phi(-\gamma Z_{ij}) \\
\text{Pr}(y_j = 3) = 1 - \Phi(u - Z_{ij}\gamma)
\]

where the subscript \( i \) notes that the prime contractor, \( \phi(\cdot) \), is the standard normal probability density function and \( \Phi(\cdot) \) is the standard normal cumulative distribution function. Finally, following Main and Reilly (1993), we can compute the Inverse Mills ratio, \( \lambda_{ij} \), for the three intervals of the dependent variable, as follows:

Inverse Mills ratio for low level of outsourcing (with subscripts \( i \) and \( j \) suppressed):

\[
\lambda(1) = -\phi(Z'\gamma)/[1 - \Phi(Z'\gamma)]
\]

Inverse Mills ratio for moderate level of outsourcing:

\[
\lambda(2) = [\phi(-Z'\gamma) - \phi(\mu_1 - Z'\gamma)]/\left[\Phi(\mu_1 - Z'\gamma) - \Phi(Z'\gamma)\right]
\]

Inverse Mills ratio for high level of outsourcing:

\[
\lambda(3) = \phi(\mu_1 - Z'\gamma)/[1 - \Phi(\mu_1 - Z'\gamma)]
\]

### TABLE A1

<table>
<thead>
<tr>
<th>DV—Level of Outsourcing (Count of Subcontractors)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Uncertainty</td>
<td>-0.029**</td>
</tr>
<tr>
<td>Project Duration (Size)</td>
<td>-0.000</td>
</tr>
<tr>
<td>Number of Tasks</td>
<td>0.001***</td>
</tr>
<tr>
<td>Instrument (% DBE)</td>
<td>-1.503*</td>
</tr>
<tr>
<td>Prime Contractor Size</td>
<td>0.001</td>
</tr>
<tr>
<td>Prime Contractor Age</td>
<td>-0.000</td>
</tr>
<tr>
<td>Project Frequency</td>
<td>0.004</td>
</tr>
<tr>
<td>Log. Environmental Munificence</td>
<td>-0.910**</td>
</tr>
</tbody>
</table>

\( n = 580 \)

Log Pseudo Likelihood | -592.46
Pseudo \( R^2 \) | 0.02

**Notes:** One-tailed tests. Standard errors in parentheses, constant suppressed.

* \( p < 0.1 \)
** \( p < 0.05 \)
*** \( p < 0.01 \)