MRINAL GHOSH and GEORGE JOHN*

Branded components are becoming increasingly popular in industrial markets; yet extant research provides limited understanding of the use of such arrangements in the real world. The authors use the governance lens of transaction cost economics to propose that leveraging the vendor's brand reputation and safeguarding the vendor's customization investments are key motivators for choosing branded component contracts. Data on 191 contracts from three engineering-intensive industry sectors provide support to the authors' hypotheses. The authors find that firms are more likely to choose branded component contracts when the supplier's brand name adds significant differentiation (leveraging) and when the component supplier has made significant component customization investments (safeguarding). This safeguarding motivation is relevant even to suppliers with modest brand reputation. The authors also investigate the normative consequences of these contracting decisions and find significant adverse outcomes from choosing the "wrong" contract form. Furthermore, they find that these outcomes are asymmetric in nature. In particular, choosing a "white box" contract when the theory argues for a branded component contract leads to more adverse outcomes than choosing a branded component contract when the theory predicts a "white box" contract. Finally, the authors draw key conclusions for theory and managerial practice.

*Keywords*: component branding, self-enforcing agreements, transaction cost analysis, business-to-business marketing, organizational relationships

# When Should Original Equipment Manufacturers Use Branded Component Contracts with Suppliers?

Original equipment manufacturers (OEMs) often develop and market products that comprise technologically separable components procured from independent suppliers. Legal contracts govern the relationship between such independent firms, so a great deal of effort goes into crafting appropriate contracts. An increasingly popular contract form is the so-called branded component contract, which is distinguished by the legal obligation to use the supplier's brand on the OEM's end product and/or on marketing materials in conjunction with the OEM brand name. There are many variations of this contract form. For example, parties might agree to affix the brand names and logos to the equipment itself. Other agreements call for both brand names to be used in marketing communications and sales brochures. In essence, both brand names are conspicuously communicated to the end user. Early prominent examples include G.D. Searle's "Nutrasweet" brand placed on diet soda cans and Intel's "Intel Inside" logo placed on personal computer equipment. Consumer behavior scholars (e.g., Desai and Keller 2002; Park, Jun, and Shocker 1996) have studied cobranding (or ingredient branding) in the laboratory and have concluded that a synergistic fit between a strong ingredient brand and a strong host brand enhances end-customer preferences for the host product; in essence, a host brand can leverage a strong component brand to

*Mrinal Ghosh is W. "H" and Callie Clark Associate Professor of Marketing, Department of Marketing, Eller College of Management, University of Arizona (e-mail: mghosh@eller.arizona.edu). George John is General Mills-Gerot Chair of Marketing, Carlson School of Management, University of Minnesota (e-mail: johnx001@umn.edu). The authors thank Shantanu Dutta, Shankar Ganesan, Manuel Gonzalez-Diaz, Jan Heide, Desmond Lo, Robert Lusch, and Scott Masten for their valuable advice and suggestions.


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achieve greater differentiation. However, two key gaps exist in applying this leveraging insight to branded component contracts.

First, it is not obvious that leveraging effects from laboratory studies can order real-world contracts, especially given the institutional complexities and the multiple motives of the parties. Second, casual observation of practice reveals patterns that go beyond the leveraging rationale. In Table 1, we describe several branded component contracts assembled from public data sources. In many of these cases, the same component brand name is affixed to different versions of the component that have been incorporated into various OEMs' end products. Thus, Leece-Neville brand alternators with large design, performance, and functionality differences are incorporated into many different products (e.g., heavy-duty trucks, power-generation sets, construction, mining and materials handling equipment) produced by different firms.[1] Indeed, the practice of customizing the same basic component is the norm in many industrial markets. The differences across the customized versions undercut the sine qua non of using a brand name to signal consistent quality and performance. Yet Table 1 shows that FUJITSU Electronics and Baker Hughes explicitly attribute their

[1]These examples contrast sharply with both Nutrasweet and Intel, which involved identical components sold to different OEMs. Perhaps the prominence of these two cases led the subsequent work to ignore the customization of components that is so prevalent in many instances.

Table 1

BRANDED AND WHITE BOX COMPONENTS IN BUSINESS-TO-BUSINESS MARKETS

| *OEM Brand/Product* | *Component Vendor Brand/Product* | *Sales Pitch Employed in OEM Product Manuals/Brochures and/or Advertisements in Magazines/Trade Journals* |
|---|---|---|
| | *Branded Components* | |
| Nissan multifuel industrial engines | Zenith electronic fuel management system | Frankly, the performance will amaze you,… specially designed to switch "on-the-fly" from propane to gasoline and back seamlessly and without loss of power. |
| IBM services | Siebel e-business software | IBM's infrastructure and industry expertise. Siebel System's sophisticated e-business software. Combined, they enable personalized relationships via phone, Web, and e-mail. No more customer #345H … only happier Bobs and higher sales. |
| Andersen Consulting (now Accenture) | Fasturn e-business solutions | To customize a Web-enabled marketplace for retailers and manufacturers,… combines Fasturn's e-business solutions with Andersen Consulting's retail industry knowledge and experience … to deliver high-value results. |
| Mathcad from MathSoft | Microsoft Excel | Patented electronic math technology lets engineers work with math notations,… seamlessly integrate(s) a variety of third-party data sources based on Excel.... |
| FUJITSU Electronics | Comodo (Internet security specialists) | Collaborated on the development, marketing and distribution of products containing the SIDEN Trust Chip—a market leading security chip offering unrivalled cost effectiveness. Comodo's expertise in cryptography and integrated circuits has enabled considerable functionality to be incorporated,… whilst the cost of the chip has been dramatically reduced. |
| Dell PowerEdge servers | Intel Xeon processors | Optimized to provide maximum flexibility, value, and price/performance. |
| Baker Hughes AutoTrak rotary steerable oil drilling machines | Hughes Christiansen PDC (polycrystalline diamond compact) drill bits | Drill bits are specially designed for these machines to deliver breakthrough performance.... |
| Freightliner Custom Chassis Corporation | Delco Remy or Leece-Neville alternators | (Components) have been chosen to optimize your flexibility.... |
| | *White Box Components* | |
| IBM Tivoli storage area network management system | Brocade Communications network switches and software | |
| Ford Motor midsize/heavy trucks | Detroit Diesel engines | |
| Presidio Networked Solutions enterprise voice and data communication | New Global Telecom Voice over Internet Protocol and service | |
| Lycoming aircraft engines | Crane Cam valve train and camshaft subsystem | |

Notes: The last column is not applicable for white box component because OEMs do not communicate the vendor's brand name in these instances.

product's differentiation as arising at least in part from incorporating a customized (branded) component.

The leveraging rationale is also at odds with the cases in Table 1 in which the OEM's brand is much more prominent than its supplier's brand. For example, Nissan arguably enjoys much greater visibility than Zenith among industrial engine buyers; similarly, Accenture is a better-known brand than Fasturn in the information technology marketplace. As such, these branded component contracts appear to violate the dictum of leveraging the vendor's strong brand reputation. In other words, it is not clear how an OEM with a well-reputed brand can leverage a relatively unknown supplier brand. This might expose the better-known OEM brand to the risk of dilution.

This research addresses two key issues. First, what prompts the choice of a branded component contract over a "white box" contract in the real world?[2] Second, what performance consequences follow from these contract choices? We begin with the position that these two contract forms are alternative governance institutions. To address the first question, we supplement the leveraging argument for branded contracts with the logic of self-enforcing agreements in the transaction cost analysis (TCA) tradition (e.g., Klein 1996; Williamson 1983).[3] Here, branded contracts offer a comparative governance advantage over the white box contract in safeguarding suppliers' efforts to customize components. Using primary data from 191 OEM–supplier contracts, we test these two explanations—whether branded contracts are actually chosen for their superior ability to support suppliers' customization investments and whether they are chosen for their ability to support differentiation gains from leveraging suppliers' brand names. We find that OEMs indeed follow a comparative advantage rule in making their component branding decisions. Specifically, OEMs that stand to gain more from a branded component contract (because of higher levels of the two aforementioned factors) choose such contracts more often.

We also examine the normative outcomes of these decisions and draw three conclusions. First, we find that there are significant costs to the OEM from providing insufficient support for vendor customization investments and from foregoing differentiation gains that could be had by leveraging the supplier's brand name. Second, we find that these costs of misalignment are surprisingly asymmetric. Original equipment manufacturers that do not choose branded contracts when the theory argues for this contract form face significantly more adverse outcomes than OEMs that choose branded contracts when the theory argues against this contract form. Third, we find that the costs of misalignment that arise from providing insufficient support for the supplier's customization investment are larger than costs that arise from foregoing the differentiation gains from leveraging the supplier's differentiation capabilities.

We organize the remainder of the article as follows: We first present our conceptual framework. Then, we present our empirical study. We conclude with a discussion of our findings and implications for research and practice.

## *THEORY*

Consider the class of contracts between an OEM and an independent supplier for an engineered component (or line of related components) that is physically incorporated into the OEM's product and integral to its proper functioning. These multiyear contracts typically involve significant research, design, and development activities that vary in their level of specificity to the exchange partner and can be undertaken by one or both parties during the contract's execution phase.[4] In our investigation, we exclude contracts that govern the supply of commodities, such as steel ingots, copper wire, and so on, and contracts for intangible property, such as a trademarked character or logo, because these do not involve engineering investments in the execution phase. We also exclude intrafirm agreements and joint ventures because the contracting problem is fundamentally different when the two parties are owned by a single legal entity. Finally, we focus on contracts in which the OEM initiates the relationship. Within this class of contracts, we distinguish two forms: white box contracts and branded component contracts.

A white box contract is a legal arrangement between an OEM and a component supplier that does not obligate the OEM to use the supplier's brand alongside its own brand on marketing materials and/or the product. This form incorporates many variants, including "private-label" arrangements, in which the supplier's identity is concealed from end customers. In another variant, the supplier's brand is present on the component, but it is not visible to the user in ordinary use (e.g., a branded air filter under the hood of a car). Yet another variant is when the supplier actually communicates its brand to end users, but it does so unilaterally and without any contractual agreement with the OEM.[5] In summary, the defining characteristic of a white box contract is that the marketing efforts of the two parties are undertaken without any legally binding agreement to use their two brand names in conjunction.

A branded component contract is a legal agreement that specifies that the two brands will be used together in marketing efforts over the length of the contract. It creates a cospecialized asset relationship in that each party is obligated to deploy its own brand (asset) in conjunction with the other's brand. In TCA, it is argued that such cospecialized relationships better support higher levels of cooperation and coordination than white box contracts, albeit at a higher governance cost. The presence of commingled assets gives each party a secure basis for engaging the other party across a wide range of activities that might otherwise be allocated solely to one or the other party. These activities include writing the specifications of the component and the end product and defining the technical interface between them, developing marketing programs and media plans on joint promotions, and negotiating financial burdens. These joint activities are unlikely to be completely

[2] The origins of this term reside in the practice of shipping components in plain white boxes without any conspicuous use of the vendor's brand name. We use the term "white box" to refer to unbranded components. Table 1 offers several examples.

[3] We use the terms "branded component contract" and "branded contract" interchangeably.

[4] "Specificity" refers to the degree to which the investments have reduced value outside their planned use.

[5] An example would be brand names that are visible on automobile tires, but the contract does not specify the use of the component brand name in downstream marketing.

specified at the time of the initial agreement and will need to be revised in the face of changing circumstances during the execution phase. Additional costs are also incurred for monitoring because adverse events associated with one brand could spill over to the other brand. The greater adaptation pressure within this contract form than with the simpler, arm's-length white box form is likely to manifest in several characteristic ways.

First, cospecialized assets require a longer planning horizon; thus, the duration of branded contracts can be expected to be longer than that of white box contracts. Second, to facilitate efficient adjustments to the original terms, the processes used to determine the price and technical design issues are likely to be more open-ended within branded contracts than white box contracts. Finally, the social norms of branded contracts carry expectations of greater flexibility, willingness to work together, and information exchange from each party than white box contracts.[6] In essence, branded contracts create an environment that fosters cooperation and coordination between parties that have an incentive to work toward a fruitful customer-side realization and appeal *ex post*.

Taken together, these aspects of branded contracts mirror the joint action that occurs in purchasing alliances (e.g., Heide and John 1990) in which parties expend resources *ex ante* to craft complex, long-term arrangements and then expend resources *ex post* to enforce agreements, coordinate activities, and adapt to unforeseen situations. The costs of writing and enforcing branded contracts exceed the corresponding costs of simpler white box contracts, which leads to the key question, What motivates parties to use the costlier governance form? We argue that branded contracts mitigate trading hazards while encouraging value-enhancing adjustments, which makes them more attractive in exchanges with elevated hazards and/or larger adjustment possibilities. Subsequently, we identify these hazards; however, we digress briefly to clarify the notion of viewing these agreements regarding brands as governance forms as distinct from viewing brands as product attributes.

It could be argued that a customer evaluating a product carrying two brand names (OEM and supplier) versus the same product carrying just one brand name (OEM) might consider the second brand an additional product attribute. Under this lens, a branded contract is reduced to conveying an additional attribute (the second brand) to the customer. This is correct as far as the customer is concerned. However, note that when a white box form is employed, the supplier's brand name is still in existence; it is simply not conspicuously visible or promoted alongside the OEM's brand name. Neither party can unilaterally add the second brand; it takes a legal agreement with the other party. Thus, the OEM's choice of contract form is independent from the existence of the individual brands, which indeed act as attributes of their respective products. In other words, a branded contract and a white box contract are alternative governance forms, not merely attributes of the products.

### *Mitigating Hazards*

As we noted previously, we are interested in ties in which independent suppliers undertake component design and engineering activities that improve the functionality and end-user appeal of the client's product. These responsibilities require that the supplier invest significant resources that are specialized to the client at hand, including the development of engineering designs and specs, manufacturing processes, specialized tools and equipment, and employee training in product development and integration tasks. Such investments generate value, but their low salvage value across alternative clients makes them hazardous to the investing party (the vendor) because the other party (the OEM) could opportunistically renegotiate terms during the execution stage. Uncertainties about technology requirements and market shifts amplify such renegotiation opportunities. Anticipating this problem, farsighted suppliers will seek safeguards to support such investments, and farsighted OEMs will offer safeguards. Absent sufficient safeguards, investment levels will drop, and desire to adapt will be low. In turn, consider the classic safeguards posited in TCA.

*Complete contracts*. Complete contracts plan for contingencies and fold required safeguards into the original legal agreement. As a practical matter, contracts are invariably incomplete in engineering-intensive settings (e.g., Crocker and Reynolds 1993). For example, OEMs engage suppliers early to reduce development cycle times. This also requires that the suppliers revise original designs to accommodate new developments. Consequently, the original designs at the contract initiation stage are often different from the implemented designs. Increasing the completeness of the initial design diminishes the hazard of opportunistic renegotiation; however, writing more completely specified contracts is costlier, and such contracts lock the parties in to the original specifications and reduce the flexibility to make desired changes *ex post* (e.g., Ghosh and John 2005). This opportunism–flexibility trade-off leads to contracts for engineered components being typically incomplete in many significant respects, and thus complete contracts are not a practical solution to the problem of hazardous investments.

*Relational contracts*. Relational contracts refer to agreements in which cooperative behavior is sustained by social norms and bilateral punishment rather than courts of law. Social norms enable parties to employ relatively incomplete contracts without fear of opportunistic renegotiation. Relational contracts are particularly valued for their ability to promote adaptation. Anderson and Weitz (1992) show that to promote relational behavior, buyer–supplier ties exchange hostages (Williamson 1983) in the form of symmetric-specific investments. Symmetric investments create self-enforcing agreements because both parties face adverse consequences from relationship termination. Unfortunately, symmetric investments are impractical in our setting because tasks cannot be simply shifted from the OEM to the supplier (or vice versa) without affecting the quality of outcomes. For example, not only is product design and development in engineering-intensive settings

[6]In spirit, branded contracts are not unlike other channel contracts (e.g., exclusive dealing and territories, franchising) in the sense that parties formally agree to enter into a long-term association but leave specific subclauses (e.g., pricing, product specifications and introductions, product-line design, focus of marketing and promotional programs) open for future adjustments.

an inherently creative task, but it also involves technical capabilities and expertise across diverse engineering disciplines (Carson 2007). In many cases, the vendor possesses superior expertise in designing the component and thus is the logical party to make the investment. Forcing symmetric investments under such circumstances reduces the marginal productivity of these investments. In summary, the differences in the technological capabilities between the contracting parties preclude symmetric investments as a practical safeguard for suppliers' specialized investments. Given the infeasibility of complex, complete contracts and the difficulties of enacting relational contracting through symmetric investments, we consider the utility of branded contracts next.

*Branded component contracts as self-enforcing agreements*. Agreements are self-enforced when each party finds it beneficial not to breach the mutually understood intent and terms of the relationship (e.g., Klein 1996; Telser 1981). We contend that a branded contract is a credible, self-enforcing safeguard that the OEM can offer its vendor to encourage investment in value-enhancing but noncontractible customized investments. To support our argument, recall that in a branded contract, the parties formally agree to jointly promote the two brands. The joint promotion and commingling of the two brands necessitates close coordination between the parties to generate a fruitful realization *ex post*. This visible ongoing association between the two brands amounts to a hostage exchange and creates mutual dependence because improper coordination and implementation miscues can hurt both brands. As such, a branded contract works as a credible safeguard to support a supplier's investment.

Specifically, a branded contract curbs the OEM's desire to renegotiate opportunistically because negative fallout from any adverse outcome (e.g., improper coordination) could hurt its own brand. In effect, in a branded contract, it is in the OEM's interest to coordinate the joint activities to facilitate effective implementation. For the supplier, the presence of its own brand boosts its bargaining position during renegotiation, which strengthens its anticipated returns from its noncontractible investments (Gonzalez-Diaz, Barcala, and Arrunada 2002). Farsighted suppliers will anticipate this safeguard from a branded contract and will be better motivated to undertake specialized investments. Furthermore, the supplier's ownership rights arising from the presence of its brand on the end product motivate the search for value-enhancing adjustments (e.g., in product design) *ex post* (Whinston 2003); thus, less time will be spent renegotiating with the other party and convincing it of the productive redeployment of its activities.

In summary, branded contracts extend the self-enforcing range of agreements between an OEM and its supplier, encourage investments, and foster adaptation at comparatively low governance costs. The utility of this safeguard increases with the levels of potentially hazardous customization investments made by the supplier. As such, we expect that the likelihood of using a branded contract is higher at higher levels of such investments.

> $H_1$: The greater the specific investments of the supplier, the higher is the likelihood of a branded component contract with that supplier.

### *Enabling Differentiation Gains*

Commingling two brands enables each brand to leverage the reputational capital of the other brand (Aaker 2004). Specifically, Simonin and Ruth (1998) show that respondents rated a product more highly when it was cobranded with a component that possessed a strong brand itself and enjoyed a good fit with the host brand. Desai and Keller (2002) show that respondents perceived the host brand more favorably when it was combined with another brand that added some unique properties. Finally, Park, Jun, and Shocker (1996) show that the quality of the constituent brands was perceived more for the jointly branded item when the two brands fit each other. Overall, these studies suggest that commingling two brands that reinforce each other enables differentiation gains.

Applied to our context, we expect OEMs to use branded contracts with suppliers that possess strong brands that add to the appeal of the host product. We denote this attribute of the supplier as its *ex ante* differentiation capability. Note that this supplier capability is unrelated to and exists before the investments made by the supplier during contract execution.

> $H_2$: The greater the *ex ante* differentiation capability of the supplier's brand with respect to the OEM's end product, the higher is the likelihood of a branded component contract with that supplier.

### *Contract Outcomes*

$H_1$ and $H_2$ employ TCA's governance cost minimization logic to predict the use of branded contracts. As such, choosing the "correct" alternative should lead to more favorable outcomes, and choosing an incorrect alternative should lead to less favorable outcomes. Specifically, using a white box contract when the vendor's investments are large or when it's *ex ante* differentiation capability is high would be an incorrect choice and should lead to more adverse outcomes. Likewise, using a branded contract when the vendor's investments are small or when it's *ex ante* differentiation capability is low would be an incorrect choice and should lead to more adverse outcomes. This leads to the following expectation:

> $H_3$: OEMs that choose an incorrect contract form (branded component or white box contract) suffer adverse outcomes.

We distinguish and investigate two forms of outcome variants here. First, prospective gains or losses can accrue to a randomly selected firm that is contemplating choosing a contract form but has not yet done so. Second, retrospective gains or losses can be incurred by a firm that is contemplating switching away from its extant contract choice to an alternative (counterfactual) choice.

## *EMPIRICAL STUDY*

Our model requires microlevel contract data that are unlikely to be found in archival sources. Thus, we employed a mail questionnaire administered to a carefully selected set of key informants from firms in three industry sectors. We selected nonelectrical machinery (Standard Industrial Classification [SIC] 35), electrical and electronic machinery (SIC 36), and transportation equipment (SIC 37) firms because our initial field interviews informed us that both contract forms are feasible alternatives in these settings. After we reviewed the relevant trade journals, it appeared that both forms were likely to be found in sufficient numbers. To foreshadow our results, approximately 35% of our contracts were branded component contracts.

Our selected industry sectors fit our assumptions of (1) the impracticality of complete contracts, (2) the difficulties of relational safeguards, and (3) the absence of complete backward vertical integration. The end products incorporate numerous engineered components that require the contracting parties to engage in significant levels of design and engineering activities and to seek revisions during the contract execution stage; as such, written contracts are incomplete and cannot be relied on to safeguard investments. Component suppliers in these sectors also possess unique, specialized skills; as such, relational safeguards through symmetric investments are difficult to enact for the reasons described previously. Finally, the diverse technologies make it infeasible for OEMs to backward-integrate completely into component design and production.

*Data Collection*

We describe our data collection in an abbreviated way here. (For more details, we direct the reader to our previous article [Ghosh and John 2005].) Comprehensive open-ended field interviews were undertaken at a dozen sites to establish the substantive relevance of our concepts. From these interviews and previous empirical research, we generated a survey instrument, which was then pretested at 18 sites to verify wording, response formats, and so forth. We purchased a commercial list of names and addresses of purchasing managers and directors at manufacturing firms in the specified SIC codes and drew a random sample of 1016 names from this list. Each contact on the list was called to identify and qualify him or her as a key informant. This process required an average of five calls per firm and sometimes resulted in another person being nominated by our initial contact. After qualifying the contacts as informants, we asked them to identify their firm's most important end-product line. We asked them to identify a contract that was organized within the last 12 months, under which their firm procured an engineered component from an independent supplier. This component had to be physically embedded into the previously identified end product. All subsequent questions made reference to this contract. Our unit of analysis is the identified contractual relationship between each OEM and its identified supplier for a single component or a set of closely related components procured under a single contract.[7]

Our qualification and screening efforts yielded 521 key informants who were then mailed the questionnaire. Follow-up telephone calls and reminder cards yielded 193 completed questionnaires, from which we eliminated 2 questionnaires for missing data. Our final sample consisted of 191 ties. We assessed informant knowledge and involvement using two self-report items. Their mean responses were significantly above the midpoint of the seven-point scale for each item. Similarly, we compared early respondents with later respondents to assess whether nonresponse biases existed. We found no significant differences, lending support to our conclusion that there are no significant nonresponse bias issues in these data.

We reiterate the institutional context of these OEM–supplier ties to fix the boundary conditions that apply to our theory test. These are not arm's-length ties. The buyers are relatively large firms (on average, ten times larger than their suppliers) that nevertheless do not contract with their suppliers on a take-it-or-leave-it basis or employ standard-form contracts. They write customized contracts covering an extended period (two-plus years, on average). In general, there are several potential suppliers and buyers for these components. On average, the buyers and suppliers maintain commercial relationships with each other (though not necessarily for the focal component) for 8.1 years.[8] In other words, markets exist, but there are significant potential trading hazards.

*Dependent Variable Measures*

In Tables 2 and 3, we show the measures and sample statistics, respectively. Next, we describe each of the measures.

*Contract form*. We developed a grounded measure of this variable as follows: Each informant was asked whether his or her formal contract specified the use of the supplier's brand name on the end product and/or in promotions/marketing materials and activities. To put this into perspective, our branded contract form does not include observations in which a supplier's brand name can be discerned only after the end product has been disassembled. This is a conservative measure; however, it guarantees that the contracting firms expended effort in discussing and formalizing the issue. For our contract form measure, BRAND = 1 denotes branded contracts, and BRAND = 0 denotes white box contracts.

*Contract outcomes*. Governance costs are the costs imposed on the OEM by self-interested strategic behavior and guile on the part of the supplier during contract execution. Recall that an opportunistic supplier might exploit incomplete contract terms by providing components with different specifications or inferior quality. Although a supplier might comply with the letter of the contract, it might not seek out improvements aggressively because the revised terms might be less favorable. Choosing the right contract form dampens such behavior, while an incorrect contract form exacerbates such behavior. Our vendor opportunism (VENDOPPT) measure of this construct consists of a six-item scale. We adapted the seven-point Likert-type items from John (1984).

*Independent Variable Measures*

*Vendor's specific investments*. This measure (SUPPINV) captures the physical and human asset investments the sup-

[7]"Closely related components" refer to slight specification differences in components that OEMs might need to incorporate into different versions of the systems they sell downstream. For example, an OEM selling CNC Systems machines/systems might seek different versions of an ASIC (application-specific integrated circuits) chip for different downstream applications.

[8]The mean, median, minimum, and maximum values for the average length of the relationship in our data are 8.1 years, 7.6 years, 1.5 years, and 20 years, respectively.

plier makes to customize the component to the OEM's needs. We borrowed the six-item, seven-point Likert-type scale from Ghosh and John (2005).

*Differentiation capability*. We measured the extent to which a component from this supplier improves customers' perceptions of the OEM's product with a four-item scale

Table 2

OPERATIONAL MEASURES OF CONSTRUCTS

| *Descriptive and Confirmatory Fit Statistics* | *Item Description and Response Format* |
|---|---|
| BRAND | Does your formal contract with the vendor specify the use of this vendor's brand name in joint promotions or displays on your end product (or sales brochures) so that it is easily visible to the customers? |
| Differentiation (DIFF)<br>$\chi^2(2) = 5.63$,<br>CFI = .99,<br>NFI = .99, and<br>reliability = .84 | 1. The item procured under the relationship[c] with this vendor has enhanced customer perceptions of our end-product performance.<br>2. The relationship with this vendor for this item has enabled us to differentiate our end product vis-à-vis our competitors'.<br>3. The image of our end product in our customer's eyes has received a boost due to the item supplied in this relationship.<br>4. This relationship has allowed us to better capture design and engineering synergies between their item and our end product. |
| Vendor's specific investments (SUPPINV)<br>$\chi^2(9) = 24.1$,<br>CFI = .97,<br>NFI = .97, and<br>reliability = .91 | 1. This supplier has made significant investment in specialized tools and equipment dedicated to the relationship with us.<br>2. This supplier has spent significant resources designing the specifications for their item(s) to ensure that it fits well with our production capabilities.<br>3. The procedures and routines developed by the supplier for their item(s) are tailored to our particular product.<br>4. We have some unusual technological norms and standards which have required extensive adaptation on the part of this supplier.<br>5. Most of the training that the supplier's people have undertaken related to our requirement for this item(s) cannot be easily adapted for use with another customer.<br>6. Training our personnel has involved substantial commitment of time and money on the part of the supplier. |
| OEM's specific investments (OEMINV)<br>$\chi^2(9) = 17.75$,<br>CFI = .99,<br>NFI = .98, and<br>reliability = .90 | 1. We have made significant investment in tools and equipment dedicated to the relationship with this supplier.<br>2. We have spent significant resources designing the specifications for this item(s) to ensure that it fits well with the supplier's production capabilities.<br>3. The procedures and routines we have developed to obtain this item(s) are tailored to this particular item from this supplier.<br>4. This supplier has some unusual technological norms and standards which have required extensive adaptation on our part.<br>5. Most of the training that our people have undertaken related to this supplier's item(s) would be of little value in dealing with another supplier.<br>6. Training this supplier's people has involved substantial commitment of time and money. |
| Relative size of OEM to vendor (RELSIZE) | With respect to your last year's sales volume, how large is your firm relative to this supplier? |
| Number of potential vendors (NPOTVEND) | What is the total number of potential vendors for this type of item(s)? |
| Number of potential OEMs (NPOTOEM) | What is the total number of potential OEM buyers for this type of item(s)? |
| Technological uncertainty (TECHUNCT)[a]<br>$\alpha = .83$ | 1. Widely accepted/no industry standards for end-product design and specifications exist.<br>2. Industry standards for this item's performance specifications are very predictable/unpredictable.<br>3. Competitors' end products are very similar/dissimilar to our end product. |
| Norm of flexibility (FLEXIBLE)<br>$\chi^2(9) = 30.7$,<br>CFI = .97,<br>NFI = .96, and<br>reliability = .92 | 1. Both parties are expected to be flexible in response to requests made by the other.<br>2. It is expected that parties will make adjustments in the ongoing relationship to cope with changing circumstances.<br>3. When an unexpected situation arises, parties would rather work out a new deal than holding each other to the original terms.<br>4. The parties are open to the idea of making changes, even after having made an agreement.<br>5. Parties are expected to make adjustments in their manufacturing processes to deal with unforeseen events.<br>6. Changes in the terms of the contract are not ruled out, if considered necessary. |
| Vendor opportunism (VENDOPPT)<br>$\chi^2(9) = 12.60$,<br>CFI = 1.00,<br>NFI = .96, and<br>reliability = .91 | 1. This supplier has sometimes altered facts slightly in order to get what it wanted.<br>2. This supplier always carries out its duties without any supervision on our part. (reverse coded)<br>3. Sometimes the supplier has presented us facts in such a way that has made them look good.<br>4. This supplier has sometimes promised to do things without actually doing them later.<br>5. This supplier feels it is OK to do anything within its means that will help further its own interests.<br>6. On occasion, the supplier has lied about certain things in order to protect its own interests. |
| Norm of joint action (JOINT)<br>Reliability = .91 | 1. Problems that arise in this relationship are expected to be resolved jointly.<br>2. Both parties are expected to make effort toward improvements that benefit the relationship as a whole rather than the individual party.<br>3. Parties are expected to undertake extensive joint effort in activities like component testing and prototyping, forecasting demand, and long-term planning. |
| Vendor control over decisions (CONTROL)[b]<br>$\chi^2(2) = 6.91$,<br>CFI = .98,<br>NFI = .98, and<br>reliability = .84 | 1. Ongoing design and engineering changes.<br>2. Supplier's production processes and manufacturing technology.<br>3. Selection of supplier's subsuppliers.<br>4. Supplier's quality control procedures. |

Table 2
CONTINUED

| *Descriptive and Confirmatory Fit Statistics* | *Item Description and Response Format* | *Descriptive and Confirmatory Fit Statistics* | *Item Description and Response Format* |
|---|---|---|---|
| Importance of component (IMPTCMPT)[a] | Item is very unimportant/important element of our end product. | Contractual price flexibility (FLEXPRIC) | How would you describe the pricing arrangement for the item(s) under this contract? (choose one)<br>•Fixed prices over the length of the contract.<br>•Specified prices but with adjustment formulas (e.g., inflation, Producer Price Index).<br>•Specified prices but with negotiated adjustments.<br>•Prices not specified ahead of time of shipment. |

[a]Seven-point semantic differential scale.
[b]The anchors for this scale are 1 = "entirely decided by our firm" and 7 = "entirely decided by this supplier."
[c]The OEM respondents had identified an independent vendor from which their firm procured components that were physically incorporated into one of their most important product lines. Throughout the survey, respondents were reminded that this particular contractual exchange or "relationship" for the procurement of the component (or a set of related components) was to be their sole focus in providing their assessment.
Notes: Unless otherwise indicated, the anchors for the scale points are 1 = "strongly disagree" and 7 = "strongly agree." CFI = comparative fit index, and NFI = normed fit index.

Table 3
CORRELATION MATRIX OF MEASURES

| *Construct* | *M* | *SD* | *Skew* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. BRAND | .36 | .48 | .57 | 1.00 | | | | | | | | | |
| 2. DIFF | 4.01 | 1.31 | .18 | .30 | 1.00 | | | | | | | | |
| 3. TECHUNCT | 2.91 | 1.32 | .42 | .06 | .18 | 1.00 | | | | | | | |
| 4. SUPPINV | 3.68 | 1.07 | .10 | .32 | .41 | .22 | 1.00 | | | | | | |
| 5. OEMINV | 3.52 | 1.13 | .13 | –.10 | .35 | –.04 | .29 | 1.00 | | | | | |
| 6. IMPTCMPT | 5.02 | 1.30 | –.26 | .08 | .12 | .08 | .12 | .14 | 1.00 | | | | |
| 7. RELSIZE | .09 | .87 | .00 | –.16 | .05 | .27 | .14 | .04 | .10 | 1.00 | | | |
| 8. NPOTOEM | 45.05 | 62.35 | 2.26 | .01 | –.06 | –.18 | –.17 | –.07 | –.08 | –.22 | 1.00 | | |
| 9. NPOTVEND | 20.34 | 53.26 | 3.32 | –.13 | –.09 | –.13 | –.06 | .03 | –.12 | –.05 | .25 | 1.00 | |
| 10. VENDOPPT | 3.13 | 1.26 | .24 | .07 | –.12 | –.09 | –.07 | .03 | –.07 | .12 | –.11 | –.03 | 1.00 |

Notes: Matrix represents pairwise correlations. All correlations greater than .14 are significant at the .05 level.

(DIFF). These items are identical to Ghosh and John's (2005) EPEOUTCOME measure with one exception. We dropped the fifth item for EPEOUTCOME ("The relationship with this vendor for this item has helped boost the sales of our end product") from the DIFF measure because a boost in sales could also be generated without differentiation (e.g., lowered costs). Each item employs a seven-point Likert-type format.

In addition to the two hypothesized effects, we included other independent variables that have been shown to influence procurement contracts. We describe each of these variables briefly.

*OEM's specific investments*. Specific investments by the OEM that parallel investments by the supplier could create a relational safeguard and thus affect the choice of the contract form. To control for this possibility, we use the six-item scale (OEMINV) from Ghosh and John (2005).

*Importance of component*. Original equipment manufacturers' end products typically incorporate dozens of engineered components. It is impractical to write a branded contract for each component, and thus OEMs are likely to consider the relatively costly branded contract form for components that are relatively more significant to the performance of the end product. A single-item measure (IMPTCMPT) on a seven-point Likert-type scale captures the component's impact on the overall performance of the OEM's end product.

*Technological uncertainty*. The uncertainty of the evolution of technology is also a major concern to the parties. Higher levels of technological uncertainty require them to make larger or more frequent adaptations to their initial designs. The adaptation advantages of the branded contract form make it more suitable than the white box form in such circumstances. To control for this possibility, we use the three-item scale (TECHUNCT) with a seven-point Likert format from Ghosh and John (2005) to measure technological uncertainty.

*Relative size*. Although TCA emphasizes efficient (i.e., joint-profit-enhancing) contracts, a powerful incumbent might sacrifice efficiency gains to maintain its share of a smaller total pool of profits. Recall that OEMs in our setting were relatively more powerful than their suppliers, so they might be reluctant to write branded contracts because embedding suppliers in this way might lead to their own margins being bargained away. They might sacrifice the efficiency gains from branded component contracts to protect their own margins. To control for this possibility, we use the RELSIZE measure from Ghosh and John (2005), who measure the ratio of the OEM's sales volume to the supplier's sales volume.

*Number of potential vendors*. "Thicker" markets discipline exchange partners more closely, making arm's-length forms sufficient over a wider range of settings. Thus, having a large number of potential suppliers would make the use of a branded contact form less likely. Note that this would be true regardless of the actual number of incumbent suppliers. To control for this possibility, we use the informants' estimates of potential suppliers for this class of components (NPOTVEND) as our measure.

*Number of potential OEMs*. Paralleling the foregoing argument, having a large number of potential buyers for a component reduces the likelihood of using the branded contract form. However, note that these potential buyers need not be located in the same end-product market. To control for this possibility, we use informants' estimates of the number of potential buyers for this class of components (NPOTOEM) as our measure.

*Unobserved effects*. To control for possible unobserved industry effects, we use two dummy variables (SIC 35, SIC 36) for the three sectors. However, note that unobserved firm differences beyond the measured variables cannot be controlled for, because we have only one observation per firm.

### *Measure Validity*

Our measure validation process follows that of Anderson and Gerbing (1988). We computed item-to-total correlations for each multi-item scale and dropped items with estimates below .30. Then, using LISREL 8.0, we estimated congeneric (single-factor) models for each set of items and used Werts and colleagues' (1978) formula to compute the scale reliability estimates (see Table 2). We conclude that our multi-item scales exhibit a satisfactory level of internal consistency and unidimensionality.

Next, we assessed discriminant validity with confirmatory factor analysis. Following accepted practice, for each set of closely related constructs, we estimated a base model that allowed each item to load only on its own unobserved trait, and the different traits were intercorrelated. For each base model, we estimated a constrained model that restricted the intertrait correlations to 1.0. We tested the fit differences between the constrained and base models, which revealed significant differences between each pair. We conclude that the traits are sufficiently discriminated from each other. Given the adequacy of our measures, we turn to the tests of the hypotheses.

### *Contract Form Hypotheses*

Table 4 reports probit models of contract form choices. Model 1 is a baseline specification with only the control variables as predictors, and Model 2 adds our two focal variables (vendor investments and differentiation capability). Model 2 shows a good fit to the data (pseudo-$R^2$ = .35) and an improvement over Model 1, suggesting a significant contribution from the focal variables.

Examining the vendor investment hypothesis first ($H_1$), we find a positive estimate for the relevant coefficient ($\hat{\beta}$ = .42, $p < .01$), which supports our prediction that OEMs use branded contracts as a safeguard for their vendors' hazardous investments. Turning to the differentiation capability hypothesis ($H_2$), we find a positive estimate for the differentiation coefficient ($\hat{\beta}$ = .29, $p < .05$), which supports our prediction that OEMs use branded contracts to gain from the differentiation capabilities of their vendors. We conducted additional analyses to assess the potential endogeneity of the DIFF measure.

*Endogeneity correction*. The DIFF measure captures the extant differentiation enabled by incorporating the vendor's component into the OEM's end product. As such, this includes the differentiation gains from two contracting stages: (1) the gains arising from the preexisting strength of the vendor's brand name evident at the contract writing stage and (2) the gains arising from the vendor's investments and activities during the contract execution stage.

Table 4
PROBIT MODELS OF OEM'S CONTRACT CHOICE

| *Dependent Variable: BRAND* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Independent Variables* | *Hypothesis* | *Coefficient Model 1* | | *Coefficient Model 2* | | *Coefficient Model 3 (IV1)* | | *Coefficient Model 4 (IV2)* | |
| *Model Variables* | | | | | | | | | |
| Vendor's specific investments (SUPPINV) | + | | | .42*** | (.14) | .50*** | (.14) | .55*** | (.13) |
| Differentiation (DIFF) | + | | | .29** | (.13) | | | | |
| Vendor *ex ante* differentiation (EXANTEDIFF) | + | | | | | .20** | (.10) | .16** | (.08) |
| *Control Variables* | | | | | | | | | |
| OEM's specific investments (OEMINV) | | –.07 | (.11) | –.14 | (.12) | –.15 | (.11) | –.06 | (.14) |
| Relative size of OEM to vendor (RELSIZE) | | –.24** | (.09) | –.35*** | (.10) | –.28*** | (.08) | –.26*** | (.09) |
| Number of potential vendors (NPOTVEND) | | –.03*** | (.01) | –.02** | (.010) | –.02** | (.01) | –.02** | (.01) |
| Number of potential OEMs (NPOTOEM) | | .01 | (.01) | –.00 | (.01) | –.00 | (.01) | –.00 | (.01) |
| Importance of component (IMPTCMPT) | | .08 | (.09) | –.06 | (.09) | –.07 | (.09) | .04 | (.10) |
| Technological uncertainty (TECHUNCT) | | –.06 | (.09) | –.09 | (.08) | –.09 | (.10) | .07 | (.08) |
| SIC 35 | | .12* | (.07) | .10* | (.06) | .11* | (.06) | .14** | (.06) |
| SIC 36 | | .05 | (.06) | .05 | (.06) | .05 | (.06) | .07 | (.06) |
| Constant | | –.41 | (.53) | –3.36*** | (.61) | –2.58*** | (.59) | –3.50*** | (.68) |
| Wald $\chi^2$(d.f.) | | 23.01 | (8)*** | 39.26 | (10)*** | 42.32 | (10)*** | 35.41 | (10)*** |
| Pseudo-$R^2$ | | .20 | | .35 | | .39 | | .33 | |
| n | | 191 | | 191 | | 191 | | 191 | |

*$p < .1$ (two-tailed).
**$p < .05$ (two-tailed).
***$p < .01$ (two-tailed).
Notes: Positive values indicate greater probability of branding the component. Standard errors are in parentheses.

Because $H_2$ speaks to the gains from preexisting brand strength, we control for possible endogeneity as follows.

We regress DIFF on a set of exogenous variables correlated with differentiation gains made at the contract execution stage. We select these variables from related work (e.g., Ghosh and John 2005; Jap 1999; Nickerson, Hamilton, and Wada 2001). These studies show that end-product differentiation is correlated with more coordinated effort, specialized investments, and relational norms. Table 5 reports our regressions. The residuals from this regression are a purified measure of differentiation gains that is no longer correlated with vendor investments and activities undertaken during the contract execution phase. We replace the original differentiation measure (DIFF) in the probit models with this residual measure, denoted as "vendor *ex ante* differentiation."

Models 3 and 4 in Table 4 report the probit models of contract choice that employ the instrumented measure. The coefficient estimates of the measure ($\hat{\beta}$ = .20 and .16 in Models 3 and 4, respectively) are significant. To summarize, in accordance with $H_2$, OEMs are more likely to use a branded component contract with a supplier whose differentiation-enabling capabilities is higher.[9]

*Other effects.* Several of the nonfocal independent variables show a significant effect. Larger OEMs are less likely to use branded component contracts ($\hat{\beta}$ = –.28 and –.26 in Models 3 and 4, respectively), as is true of OEMs facing large numbers of potential vendors ($\hat{\beta}$ = –.02 and –.02 in Models 3 and 4, respectively). Finally, OEMs operating in SIC 35 were marginally more likely to use branded component contracts ($\hat{\beta}$ = .11 and .14 in Models 3 and 4, respectively) than OEMs operating in SIC 37. Surprisingly, the importance of the component had no effect on contract choice. A potential reason for this could be that our sample consists of components the OEM informants believed to be more important (M = 5.02 on a seven-point scale).

[9]We also investigated the differences in slopes across the SIC sectors for both the focal hypotheses. We find consistent and significant directional support for both sets of predictions. These analyses appear in the Web Appendix (see http://www.marketingpower.com/jmroct09).

Table 5

ENDOGENEITY CORRECTION FOR *EX ANTE* DIFFERENTIATION

| Independent Variables | Model IV1 | | Model IV2 | |
|---|---|---|---|---|
| *Dependent Variable: Differentiation (DIFF)* | | | | |
| Vendor's specific investments (SUPPINV) | .28** | (.09) | — | |
| OEM's specific investments (OEMINV) | .15* | (.07) | — | |
| Norm of joint action (JOINT) | .28** | (.07) | .23** | (.07) |
| Norm of flexibility (FLEXIBLE) | .05 | (.10) | .13 | (.09) |
| Contractual price flexibility (FLEXPRIC) | .20* | (.08) | .22* | (.09) |
| Constant | –1.77* | (.66) | –3.26** | (.70) |
| Pseudo-$R^2$ | .44 | | .21 | |
| n | 191 | | 191 | |

*$p < .1$ (two-tailed).
**$p < .05$ (two-tailed).
Notes: Standard errors are in parentheses.

*Contract Outcomes*

We use a discrete choice switching regression modeling approach (Maddala 1983) to account for the endogeneity in contract choice; the results appear in Table 6. Three separate sets of analyses address contract outcomes. In all subsequent analyses, we use the measure of vendor *ex ante* differentiation obtained as a residual from the regression Model IV1 in Table 5. To begin, we ask whether OEMs choose contract forms that yield better outcomes.

*Contract choice patterns.* The first step of Maddala's (1983) two-step procedure is the probit models (reported in Table 4, Model 3), with contract form as the dependent variable. In the second step, the outcome measure (VENDOPPT) is regressed against the same independent variables and an additional variable, the inverse Mills ratio, computed from the first-stage model. Two equations are estimated in the second step—one for each of the two observed contract forms. The signs of the inverse Mills ratio coefficients in these two equations in Table 6 uniquely identify three possible contract choice patterns: (1) a general tendency to select the branded contract form (positive selection into regime), (2) a general tendency to reject the branded contract form (negative selection into regime), and (3) a discriminating strategy that selects the contract form that yields the firm the better outcome (comparative advan-

Table 6

GOVERNANCE COSTS UNDER ALTERNATIVE CONTRACT FORMS

| | *Branded Component Contracts (n = 70)* | | *White Box Contracts (n = 121)* | |
|---|---|---|---|---|
| *Dependent Variable: Vendor Opportunism (VENDOPPT)* | | | | |
| *Independent Variables* | *Coefficient* | *(SE)* | *Coefficient* | *(SE)* |
| Vendor's specific investments (SUPPINV) | –.290*** | (.083) | .014 | (.087) |
| Vendor *ex ante* differentiation (EXANTEDIFF) | .105 | (.095) | .157* | (.088) |
| OEM's specific investments (OEMINV) | .126* | (.072) | .124* | (.071) |
| Relative size of OEM to vendor (RELSIZE) | .131* | (.068) | .176** | (.081) |
| Number of potential vendors (NPOTVEND) | –.109* | (.060) | –.057 | (.063) |
| Number of potential OEMs (NPOTOEM) | .110* | (.059) | .104* | (.061) |
| Importance of component (IMPTCMPT) | –.035 | (.075) | –.001 | (.078) |
| Technological uncertainty (TECHUNCT) | .011 | (.047) | .115** | (.052) |
| SIC 35 | –.089* | (.050) | .000 | (.051) |
| SIC 36 | .002 | (.045) | .042 | (.048) |
| Inverse Mills ratio for BRAND | .169** | (.076) | | |
| Inverse Mills ratio for NOBRAND | | | –.126* | (.069) |
| Constant | 4.156*** | (1.114) | 2.481** | (.944) |
| $R^2$ | .168 | | .143 | |
| $\chi^2$ | 47.84 | | 42.66 | |
| $p > \chi^2$ | .0001 | | .0001 | |
| Root mean square error | .926 | | .905 | |

*$p < .1$ (two-tailed).
**$p < .05$ (two-tailed).
***$p < .01$ (two-tailed).

tage selection into regime). The third strategy is evidence of our governance cost arguments.

Table 6 shows a positive (negative) inverse Mills ratio coefficient in the branded (white box) contract equation. This pattern uniquely identifies the comparative advantage selection pattern, in which OEMs that stood to reduce vendor opportunism more with a branded contract are likely to select this form, while OEMs that stood to reduce vendor opportunism more with a white box contract are likely to select this form. In summary, our results indicate that the OEMs conform to the normative advice emanating from efficient governance theory.

*Comparative assessment*. Next, we turn to the task of calculating the losses associated with not responding properly to each key independent variable. Because contract form is endogenous, the impact of the two drivers (vendor investment, vendor *ex ante* differentiation) cannot be ascertained simply by inspecting the regression coefficients in Table 6. We employ the technique that Mayer and Nickerson (2005) develop to compare the expected performance of a hypothetical firm that proposes to contract with its supplier under each of the two alternative forms.

We set all the independent variables except for the focal independent variable (i.e., vendor investments, vendor *ex ante* differentiation) in each equation in Table 6 to observed sample averages. Because we are concerned about a randomly selected (hypothetical) project and not an observed project, we do not include the inverse Mills ratio terms. We calculate expected outcomes under four combinations: the two governance choices under low versus high (two standard deviations below and above the mean, respectively) levels of each of the focal independent variable of interest. Figures 1 and 2 plot the results.

Figure 1 shows that at high levels of vendor investment, an OEM that chooses a white box contract (the “wrong” choice) faces a 65% increase in vendor opportunism (3.12 versus 1.73) over the branded component contract (the recommended choice). At low levels of vendor investment, an OEM that chooses a branded component contract (the wrong choice) faces a 3% decrease in vendor opportunism (2.97 versus 3.06) over the white box contract (the recommended choice). Thus, losses from wrong choices made in hazardous circumstances are much larger than the corresponding losses from wrong choices in more benign circumstances. Figure 2 plots the corresponding computations for the other independent variable, vendor *ex ante* differentiation. The results are strikingly similar.

To summarize, the prospective costs of misaligned governance are detected for vendor investments and vendor *ex ante* differentiation capability. Unexpectedly, the computed losses from not conforming to the normative recommendation are much larger for more hazardous exchanges (i.e., high vendor investments or large vendor *ex ante* differentiation capability). We return to this asymmetry subsequently.

*Counterfactual assessment*. We compute expected losses that would accrue to a firm that makes an observed (factual) choice if it were to switch to the alternative (counterfactual) regime. This loss is different from prospective losses computed previously. Unlike the previous calculation, which compares the costs to a hypothetical firm contemplating the two contract forms, the counterfactual assessment is based on our observations that represent intentional choices.

Following Maddala (1983), we compute these counterfactual outcomes and plot them in Figure 3. Original equipment manufacturers that chose a branded contract would face much higher vendor opportunism levels (1.74 versus 4.09, $p < .01$) if they were to switch to a white box contract. Similarly, OEMs that chose a white box contract would face significantly increased vendor opportunism (3.34 versus 4.67, $p < .05$) if they were to switch to a branded contract form. However, note that the loss is much greater for firms that originally chose the branded contract

Figure 1

GOVERNANCE COSTS OF VENDOR INVESTMENTS UNDER ALTERNATIVE CONTRACT FORMS

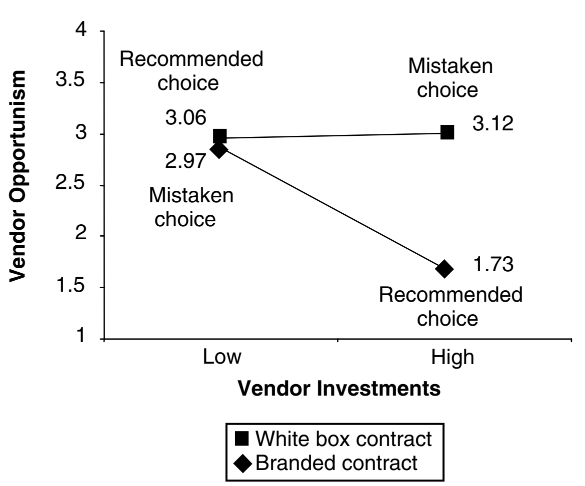


Figure 2

GOVERNANCE COSTS OF VENDOR *EX ANTE* DIFFERENTIATION CAPABILITY UNDER ALTERNATIVE CONTRACT FORMS

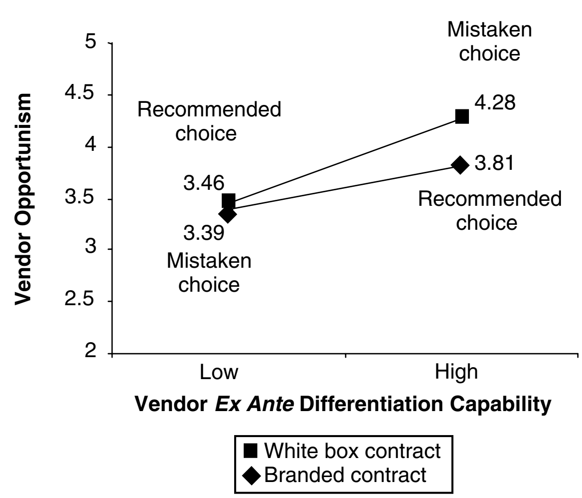

Figure 3
OVERALL GOVERNANCE COSTS UNDER ALTERNATIVE CONTRACT FORMS

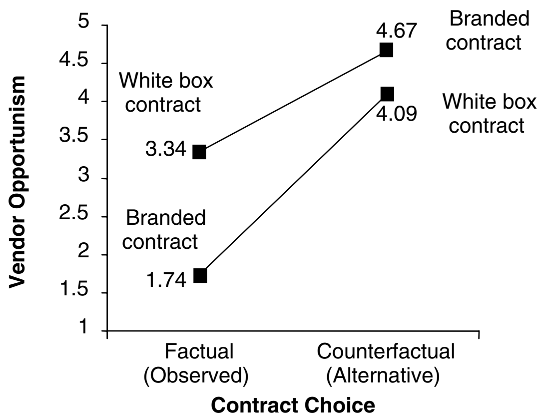


Table 7
COMPARISON OF CONTRACTUAL AND NONCONTRACTUAL FEATURES

| *Features* | *Branded Component Contracts (n = 70)* | *White Box Contracts (n = 121)* |
|---|---|---|
| Contract duration (years) | 2.78** | 1.45 |
| Number of suppliers used for functionally similar component | 1.80** | 3.75 |
| Contract clause: price flexibility | 2.40** | 1.70 |
| Contract clause: design flexibility | 2.55** | 1.60 |
| Informal norm of joint action | 4.50** | 3.20 |
| Informal norm of flexibility | 4.85* | 4.01 |
| Informal norm of information exchange | 4.52 | 4.41 |

*$p < .1$ (two-tailed).
**$p < .05$ (two-tailed).
Notes: Comparisons were made using independent samples t-tests.

(i.e., under more hazardous conditions). We conducted identical analyses on a second measure of performance—namely, OEM profitability from the relationship. The results were qualitatively similar to those we obtained previously and are available on request.

In summary, these results make a strong case for $H_3$. Branded contract forms and white box contracts must be aligned in a discriminating way with the attributes of the exchange. Incorrect alignment decisions adversely affect performance, and there is a decided asymmetry in these misalignment losses.

*Nomological Validity*

*Allocation of control rights*. Recall our core argument that branded contracts support noncontractible vendor investments. It follows that OEMs writing branded contracts should also be willing to concede control over decisions related to component design and development to the vendor. These are complementary contracting aspects because delegating decision control enables the vendor to make the best use of its investments and to make efficient *ex post* adjustments. We investigate this by regressing vendor control against the two-way interaction between the vendor's specific investments and contract choice. We find that vendors have more control over these decisions when their noncontractible investments are supported by branded component contracts ($\hat{\beta} = .27$, $p < .01$).

*Differences in contractual subclauses and informal norms*. Compared with white box contracts, the greater coordination and adaptation within branded contracts imply closer relationships with longer contract horizons and more open-ended contractual subclauses and cooperative behavioral expectations. Table 7 shows a comparison of the two contract forms in our sample on various key features. Contract duration is significantly longer for branded contracts than for white box contracts. The written clauses specifying the processes used to determine price and technical design issues are also significantly more open-ended in branded contracts. We also find that the behavioral norms are more cooperative in branded contracts than in white box contracts. Finally, the number of suppliers the OEM uses for a functionally similar component is significantly lower for branded component arrangements. In summary, the data support our thesis that branded contracts create an overarching environment that fosters cooperation and coordination between the two parties.

## *DISCUSSION*

Extant research offers little evidence of the relative merits of using branded component contracts over alternative white box forms. We used the governance lens of TCA to argue that these contracts are self-enforcing agreements used to economize on transaction costs generated by exchange hazards. We predict the actual choice of firms and assess the comparative merits of these alternative governance devices using contract-level data. We draw on research in consumer behavior and governance analysis, and our results contribute to each of these theoretical streams.

*Commingling Brands*

Consumer behavior experiments have demonstrated the differentiation benefits of commingling a component and host brand but are silent about how this might be accomplished in practice. By examining contracting practices in engineering-intensive industry sectors, we identify the branded component contract as an institutional mechanism to accomplish commingling of a host brand with a component brand. Our contract data provide the first evidence about cobranding practices in the real world in that suppliers with brands that are likely to differentiate the OEM's end product are more likely to be engaged under branded component contracts.

*Governance Analysis*

Our study demonstrates the utility of branded component contracts as governance devices as distinct from their utility as differentiation-enabling devices. We show that these contracts secure vendors' noncontractible investments to customize the component to the OEM's benefit and that OEMs that stand to benefit more from a branded contract are more likely to choose that contract form. In effect, these OEMs appear to follow the comparative advantage decision rule implicated in governance theories. Our finding adds to the emerging literature on brands as governance devices (e.g., Gonzalez-Diaz, Barcala, and Arrunada 2002) and complements recent developments that extend the efficient governance logic of TCA to address strategic marketing choices (e.g., Ghosh and John 2005; Nickerson, Hamilton, and Wada 2001). There are two additional specific insights from our work.

*Asymmetric costs of misalignment*. A surprising result of our analysis was that the costs of wrong choices were much larger for more hazardous exchanges. Specifically, penalties for making wrong choices in response to potential trading hazards posed by vendor investments or vendor differentiation capability were much larger at high levels of these variables. Our counterfactual computations also show a similar asymmetry in costs of misalignment. Thus, OEMs that switch from an existing branded contract form to a white box form suffer more than OEMs that switch from an existing white box contract to a branded contract form.

When examining the limited number of TCA studies addressing contract outcomes, we find a consistent asymmetric pattern. Anderson's (1988) pioneering study of employee salespeople and independent representatives finds that the firm's realized ratio of cost to revenue was not significantly lower given the wrong choice (employees in low-uncertainty settings) in less hazardous exchanges, but it was significantly higher given the wrong choice (representatives in high-uncertainty settings) in more hazardous exchanges. Similarly, Noordewier, John, and Nevin (1990) find that the percentage of late deliveries and the percentage of wrong deliveries by suppliers did not increase given the wrong choice (relational contracts in low-uncertainty settings) in less hazardous exchanges, but it was significantly worse given the wrong choice (discrete contracts in high-uncertainty settings) in more hazardous exchanges. These early studies did not correct for the endogenous selection bias issue, so we examined two more efforts that control for this issue. Masten, Meehan, and Snyder's (1991) study of the costs of misalignment for make versus buy decisions in ship-building components shows significantly larger penalties for wrong choices (buy) under more hazardous exchange conditions than for wrong choices (make) under less hazardous exchanges. Finally, Mayer and Nickerson's (2005) outsourcing study finds that the profitability of information technology projects is more adversely affected from making the wrong choice (contractors) under hazardous exchange conditions than making the wrong choice (employees) under nonhazardous conditions.

The common thread in all these studies, including the current one, is that larger penalties result from mistakes in governing more hazardous exchanges. Given that governance theories implicitly assume symmetric costs of misalignment, these findings call for further work. We speculate that hierarchical modes may be more robust and may provide insurance against costly mistakes, assuming modest setup costs.

*Market failure or successful hierarchies*? There is an ongoing debate about the origins of the comparative merits of alternative governance forms. Traditionally, it has been assumed that the comparative merits of hierarchies in governing hazardous exchange arise from the failure of the market mode rather than the superiority of the hierarchical mode. However, most studies estimate reduced-form regressions that relate observed governance forms to exchange attributes. As Masten (1993) argues, such tests cannot distinguish between market failure and hierarchical success; outcomes need to be measured and studied directly, as we do in the current study. Table 6 shows that as vendor investments increase, vendor opportunism is lower ($\hat{\beta} = -.29$) in the branded contract sample but is insignificantly affected in the white box contract sample. Thus, the gains from branded contracts do not arise from trading hazards adversely affecting outcomes under the white box contracts. Instead, they arise from improved outcomes under the branded contract mode. In summary, the hierarchical mode succeeded in our data as opposed to the market mode failing. These results point to a reworking of the basic theory.

### *Implications for Managerial Practice*

A cursory glance at the industrial landscape suggests that branded components are popular in practice, but the underlying costs and benefits are not well understood. Our study provides a variety of new insights to help managers make decisions with regard to this strategy. Consider the following five insights.

*Sensing the need for branded contracts*. Typically, OEMs (even small firms) are aware of the potential value of engaging suppliers with strong brand names. For example, Verado, a small Web applications hosting firm, prominently uses the brand name of its key component, Oracle, to claim "safe and reliable management of complex web and applications hosting at lower costs." Various personal computer manufacturers have similarly used the "Intel Inside" logo to differentiate their product lines. However, OEMs are much less aware of the use of a branded contract to support the development of components designed exclusively for an OEM. Consider the following case example from a supplier of a truck engine component: This component was customized to the shape of the hood to reduce engine noise and vibrations. The OEM, which had its own in-house component division, offered the vendor an exclusive production contract for one year. However, a contract of longer duration would be required by the vendor to recover its investment costs. Furthermore, to coordinate the development, the supplier would be obligated to disclose its engineering modeling processes used to achieve the noise reduction to the OEM's in-house component division. The vendor's customization investments are clearly in jeopardy of being appropriated. We contend that a cobranding approach might have created switching costs to protect the supplier. Indeed the two parties discussed cobranding as a potential form of organization; unfortunately, they could not agree on the specific terms of the arrangement.

*Separating preengagement capabilities and investment effects*. The value added by the preexisting strength of a supplier's brand is distinct from the value added by the supplier's actions and investments in the contract execution phase. Engaging a supplier with a highly respected brand under a branded contract will not always pay off if significant investments are made in the contract execution phase. Consider Bose Automotive Systems Division, which supplies branded audio systems to multiple OEMs. Each model of automobile has its unique acoustic fingerprint, and Bose uses a proprietary design process called "Clean Sheet Approach" to customize the circuits, digital signal processors, and speakers for each model. The end customer's quality perception (quality and fidelity of music) is driven by these customization efforts. Anecdotal evidence from Internet boards and blogs suggests that Bose car audio systems are well received for some host brands (e.g., Lexus) but not for other host brands (e.g., Infiniti). Although we are not certain about the reasons for the variation in performance across the different applications, it is clear that engaging highly reputed suppliers under component branded contracts will not automatically translate into benefits for the host product when customized engineering activities are important for value creation.

*Branded suppliers' go-to-market strategies*. The relative significance of preexisting brand strength versus investments during contract execution has significant implications for the component firm's go-to-market strategies. Consider the case of a supplier that possesses a strong brand backed up with unique technology, but for which customization is relatively insignificant. For example, Bosch is a visible technology leader in automotive components. Two equally attractive go-to-market strategies are available to such a firm. First, it can shop around its innovative component to various OEMs and strike an exclusive deal for the best offer, in which case the OEM receives a unique differentiator. Second, the firm could supply multiple OEMs (in which case the component is not a differentiator because competing OEMs have access to it) and rely on end-user preferences to extract a better price.

In contrast, when customization is the key to providing differentiation, a component vendor could simultaneously provide meaningful points of differentiation to multiple OEMs (even competing OEMs), as is true of Leece-Neville in Table 1. In this scenario, focusing on an exclusive supplier–OEM relationship becomes less attractive than a multiple-OEM strategy. These suppliers would also need to use a different approach to pricing their components. Because adaptations to an initial design to meet changing technological conditions are critical for such customized components, more flexible pricing structures (e.g., cost-plus pricing) are likely to be more valuable than using mechanisms that determine the actual (final) price *ex ante*.

*Multiple go-to-market strategies versus multiple suppliers*. Many suppliers (e.g., International Truck and Engine Corporation) sell the same basic component (diesel engines) under branded and nonbranded contracts. Our study shows that, and explains why, there is an important nexus between the contract form and the specification and functionality of the component's variants. To the degree that customization activities are important and branded contracts serve to safeguard these investments and activities, greater differences between the variants sold to different OEMs can be supported under branded contracts compared with the variants possible under white box contracts. This is consistent with the commonly observed practice of offering enhanced performance components under branded contracts and standard performance components under white box contracts (private labels). Furthermore, our theory suggests that if customization activities are important, a vendor is unlikely to offer identical components under a branded component contract versus under a white box contract.

Likewise, OEMs face a parallel problem when the component–end product interface needs to be optimized. On the one hand, an OEM could contract with a single branded component supplier to customize the component to different applications and segments. For example, according to an executive at a large OEM of CNC Systems, the company requires its sole branded component supplier to provide different versions of its ASIC (application-specific integrated circuits) chip for different product applications. Alternately, OEMs could purchase noncustomized branded components from different suppliers to serve different customer markets and performance requirements. For example, IBM markets its xSeries servers with the 64-bit Intel Xeon brand of processors, its 325 line of eServers with AMD's 64-bit Opteron processors, and its iSeries and pSeries lines with its in-house Power5 processors. Again, nonexclusive branded components tailored to OEM systems (and to which OEM systems are tailored in turn) can provide substantial differentiation gains to the OEM.

*Creating versus leveraging brands*. Received wisdom suggests that a branded component approach is used primarily to leverage the vendor's strong brand reputation. By directing attention to the *ex post* differentiation created by the component vendor, we also explain why a highly reputed OEM, such as Accenture, was willing to use Fasturn, a relatively unknown brand, for cobranding purposes. Essentially, we believe that Accenture realized the potential value that could be added by Fasturn's innovative product. However, this would require Fasturn to undertake significant levels of noncontractible development effort to ensure a successful integration and coimplementation with Accenture's information technology and consulting solutions. To incentivize Fasturn to undertake this effort, Accenture used its own market power (brand equity) to generate broader market coverage and to create potential future value (and revenue stream) for the Fasturn brand; in effect, Accenture created a market for Fasturn. The FUJITSU/Comodo example in Table 1 also fits this motivation. This approach of incentivizing vendors could be a valuable strategy while dealing with state-of-the-art technology-based entrepreneurial companies that currently do not have an established reputation but have the capabilities in innovative niche technologies.

### *Limitations*

First, our sample is drawn from industry sectors in which suppliers are routinely engaged with the same OEM for relatively long periods. It is not clear whether the cooperation required to implement a branded component contract successfully is achievable with shorter-term exchanges. Second, we examined engineered components that are embedded into the end product and are necessary for its proper functioning. Contrast this with cobranding cases in which the constituent products have independent end-user markets in their own right. Here, the joint efforts of the parties serve primarily to capitalize on the preexisting brand equities established in their individual markets, and attention is focused on the fit of the brands. Furthermore, our components were not commodity products but required some form of research, design, and engineering activities—either general purpose or customized; thus, caution must be exercised when generalizing our conclusions beyond our setting. Third, we used a simple, additive specification to parse out the preexisting differentiation capabilities of the supplier from the realized differentiation measure. Nonlinear or multiplicative specifications might provide different results. Fourth, we obtained our measures for the key constructs from informant reports with their attendant biases (e.g., due to the time lag between the contract date and our survey administration). Finally, we used a perceptual measure of performance as reported by the OEM. Perceptions obtained from supplier informants might reveal different patterns. Systematic research on branded component contracts in other contexts is essential to address these limitations.

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