



Relationship Governance in a Supply Chain Network

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The authors examine how a firm's strategy in a (downstream) customer relationship is contingent on how a related relationship outside of the focal dyad is organized. Drawing on emerging perspectives on interfirm governance and networks, the authors propose that the ability to show flexibility toward a (downstream) customer under uncertain market conditions depends on the governance mechanisms that have been deployed in an (upstream) supplier relationship. The governance mechanisms take the form of (1) supplier qualification programs and (2) incentive structures based on hostages. The authors develop a set of contingency predictions and test them empirically in the context of vertical supply chain networks in the apparel industry. The tests show good support for the hypotheses. The authors discuss the implications of the findings for marketing theory and practice.

Interfirm relationships and relationship governance issues are receiving considerable attention in the marketing literature. A growing body of research addresses different aspects of firms' relationships with exchange partners from a variety of theoretical perspectives (e.g., Bergen, Dutta, and Walker 1992; Cannon and Perreault 1999; Wilson 1995). For example, several studies have relied on the new institutional economics literature, including transaction cost analysis (TCA), to examine how particular governance processes are carried out between firms (e.g., Ghosh and John 1999; Heide 1994; Noordewier, John, and Nevin 1990).

The predominant focus in much of the existing research has been on individual dyadic relationships between firms, such as those between a manufacturer and a customer. However, some scholars have suggested that to understand fully the nature of dyadic interfirm relationships, greater attention must be directed to the larger networks in which the relationships exist (e.g., Anderson, Håkansson, and Johanson 1994; Iacobucci 1996; Levy and Grewal 2000; Möller and Wilson 1995). For example, the industrial networks perspective, as presented by the Industrial Marketing and Purchasing Group (e.g., Håkansson and Snehota 1995; Wilkinson 2001), posits that the implicit assumption of *ceteris paribus* in other relationships, which underlies much of the extant dyadic research, is an unrealistic one.

In this article, we begin with a particular governance process: adaptation to uncertainty (Williamson 1985). Consistent with TCA, we argue that uncertain conditions in a

focal dyadic relationship require the use of governance structures that allow for flexible adaptation to changing circumstances (Williamson 1991). However, we broaden the established TCA model by drawing on extant network perspectives (e.g., Cook and Emerson 1978; Håkansson and Snehota 1995), and we posit that adaptation to uncertainty in a focal dyad depends on how a connected relationship is organized.

We test our conceptual arguments in the context of vertical supply chain networks in the apparel industry. Specifically, our study examines the relationships (1) between a manufacturer and an independent (downstream) customer and (2) between the manufacturer and an independent (upstream) supplier. On the basis of the existing governance literature, we identify two governance mechanisms that a manufacturer can use to structure its relationship with the upstream supplier: supplier qualification and incentive design. Next, we describe the effect of these governance mechanisms on the manufacturer's ability to adapt in a flexible manner to uncertainty in the downstream relationship. The research design used to test our hypotheses about governance effects across levels involves data from matched pairs of manufacturers and retailers in an overall supply chain.

We seek to make the following contributions to the literature: First, from a theoretical standpoint, we want to broaden existing models of interfirm governance. More specifically, we examine whether the normative predictions from TCA about a firm's governance response in a dyadic relationship depend on another one in its immediate network context. As such, we attempt to expand the unit of analysis relative to extant governance research.

Second, from a practical standpoint, firms are increasingly recognizing that relationship management involves more than a single relationship. For example, many manufacturers are recognizing that their downstream customer relationships are constrained by other relationships elsewhere in the larger supply chain (*The Economist* 2001). We respond to the call for research on supply chain issues in marketing (e.g., Stewart 1999) by identifying specific strategies that can be used to manage supply chain relationships

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and by describing their effects across levels in the overall chain.

The remainder of this article is organized as follows: We begin by presenting our conceptual framework and research hypotheses. We then describe the research method used to test the hypotheses and the empirical results. We conclude with a discussion of the implications of our findings, the study's limitations, and possible topics for further research.

Theoretical Framework

Figure 1 shows a vertical supply chain network that involves relationships at two different levels: (1) between a manufacturer and a (downstream) customer and (2) between the manufacturer and an (upstream) supplier. As an example, the manufacturer might be an apparel company (e.g., Jockey), the customer an independent retailer (e.g., Marshall Field's), and the supplier an independent contractor. We begin by considering the dyadic relationship between a manufacturer and a downstream customer.

Level I: Manufacturer–Customer Relationship

In the fashion apparel industry, rapid changes in consumer demand create considerable uncertainty in the downstream market. For example, as a result of continuously changing consumer tastes, retailers face uncertainties in terms of both product design and volume needs (Djelic and Ainamo 1999; Iyer and Bergen 1997). The inherent characteristics of such markets have important implications for the relationships between the firms that serve the end consumers (i.e., retailers) and the firms that supply them (i.e., apparel companies). Specifically, the uncertainties faced by downstream retailers affect the relationship with apparel companies in the form of ongoing needs for flexibility or relationship modification. In the terminology of TCA, because the relevant downstream uncertainties cannot be easily contracted for in advance (i.e., complete contracts that define all the relevant contingencies in the manufacturer–customer relationship cannot be written *a priori*), they create significant adaptation problems. Trans-

action cost theorists have suggested that adapting to uncertainty is the “central problem of economic organization” (Williamson 1991, p. 163).

Adaptation problems require a specific governance response. In relationships with high levels of uncertainty, TCA suggests that firms will try to craft agreements with good adaptation properties that can economize on ongoing transaction costs (Williamson 1985, 1991). In relationships that require coordinated responses between two independent exchange partners (e.g., an apparel company and a retailer), TCA predicts reliance on so-called relational interfirm contracts (Dwyer, Schurr, and Oh 1987; Gibbons 1999; Noordewier, John, and Nevin 1990; Williamson 1991). Such contracts are based on particular contracting norms (Kaufmann and Stern 1988; Macneil 1980) that enable the parties to overcome planning gaps and adapt in a flexible manner as circumstances change.

However, as Noordewier, John, and Nevin (1990) and other scholars (e.g., Granovetter 1994; Masten 1993) note, TCA is based on a normative decision heuristic that emphasizes a firm's motivation to craft adaptive governance structures. It does not directly address a firm's ability to achieve relational solutions. Drawing on the network literature, we argue that a firm's ability depends in part on how other connected relationships are organized.

Level II: Supplier–Manufacturer Relationship

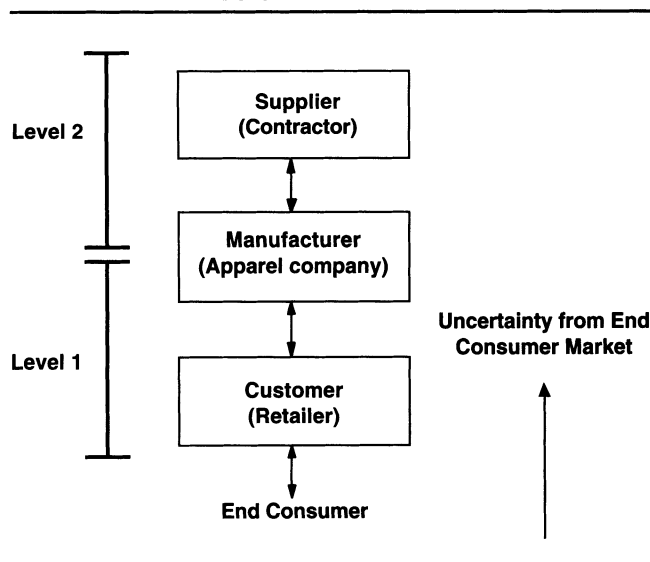
As we noted previously, scholars have argued for the need to expand the unit of analysis from dyads to business networks (for a historical analysis of network thinking in marketing, see Wilkinson 2001). A noteworthy dimension of the network perspective is that individual relationships are connected (Anderson, Håkansson, and Johanson 1994; Cook and Emerson 1978) in the sense that exchange in one relationship is contingent on or has consequences for exchange in the other relationship (Yamagishi, Gillmore, and Cook 1988).

Consider again the supply chain network in Figure 1. The product that the manufacturer sells to the downstream customer (i.e., the retailer) is obtained from an upstream supplier. For example, many of Jockey's branded garments are not manufactured internally but are sourced from outside contractors subject to company specifications. Thus, when conditions in the downstream market create a need for manufacturer flexibility in relation to the customer, demands are also placed on the upstream relationship. In other words, accommodating the downstream retailer requires modifications in the relationship between Jockey and its upstream contractor.¹

Consider next the likelihood that a manufacturer's request for (upstream) modifications will be accommodated.

¹We assume that the manufacturer is motivated to respond to the downstream customer as circumstances change. In addition to the TCA arguments we noted previously, we base our assumption on a manufacturer decision calculus that involves a positive trade-off between the opportunity costs of failing to satisfy the customer (Rindfleisch and Heide 1997) and the direct costs of responding in a particular way. At the end of this section, we discuss how we have tried to explicitly account for (in our empirical test) conditions that affect the manufacturer's decision calculus.

FIGURE 1
Supply Chain Network



Because the manufacturer and the supplier are separate companies that have individual goals (Iyer and Bergen 1997), it is not definite that the supplier will support the manufacturer's request. In addition, opportunism may undermine the manufacturer's downstream strategy in various ways. For example, the supplier may have misrepresented its production capacity when the relationship was being established (i.e., an *ex ante* adverse selection problem, as per Akerlof's [1970] research). In addition, the supplier may fail to make necessary capacity adjustments *ex post* and opportunistically exploit the manufacturer's request for changes by demanding concessions. As Williamson (1991, p. 278) notes, "although it is in the collective interest of exchange parties to fill gaps, correct errors, and effect efficient realignments, it is also the case that the distribution of the resulting gains is indeterminate." Research in the transaction cost tradition shows that various forms of opportunistic behavior are common in interfirm relationships, especially during renegotiations of original agreements (John 1984; Masten 1988; Wathne and Heide 2000; Williamson 1985).

As we describe in the next section, the firm's ability to adapt to uncertainty downstream ultimately depends on its having deployed particular governance mechanisms in the (connected) upstream relationship that mitigate the potential problems of incompatible goals and/or opportunism. In the absence of appropriate governance efforts upstream, management of the ongoing supplier relationship may be associated with substantial renegotiation costs, which may actually undermine the manufacturer's ability to respond to uncertainty in the downstream market. Consider next the specific governance mechanisms that can be used in a relationship with an (upstream) contractor to ensure flexible adaptation downstream.²

Governance of Supplier Relationship

Extant theory has proposed several strategies or governance mechanisms that can be used to manage relationships with exchange partners. In general, the mechanisms fall into two categories (Eisenhardt 1985; Heide 1994). First, a firm can a priori identify or select exchange partners that possess the ability and motivation to support its strategy (Ouchi 1980). For example, an apparel company may require a potential contractor to participate in a formal qualification program. Second, a firm can design incentive structures (Williamson 1983) that reward the necessary behaviors and/or penalize noncompliance in the ongoing relationship. Our general expectation is that the greater the investment by a firm (e.g., an apparel company) in either form of governance in the upstream (contractor) relationship, the greater is its ability to

adapt to uncertainty in the downstream (retail) market. We discuss each of these governance strategies subsequently.

Supplier qualification. Firms frequently require potential exchange partners to participate in formal qualification programs (Stump and Heide 1996). In a broad sense, qualification programs are designed to ascertain certain aspects of an exchange partner in a prerelationship phase (e.g., Dwyer, Schurr, and Oh 1987). From a theoretical standpoint, the general purpose served by such programs is proactively solving potential governance problems by means of systematic selection.

Selection is discussed in different streams of literature, some of which make different assumptions about its specific effects. In the organizational theory literature, the conventional rationale for selection is to assess a party's likely "fit" on particular criteria (Chatman 1991; Etzioni 1975). Per our previous example, an apparel company may use a qualification program to evaluate potential contractors in areas such as product quality, manufacturing capability, and financial strength (e.g., Gadde and Håkansson 2001; Sarkis and Talluri 2002). Contractors that fail to meet established thresholds on the relevant criteria will be eliminated from further consideration.

However, such assessments are limited because they only provide evidence about a contractor's particular skills or abilities. Such assessments do not guarantee that the contractor will actually apply the skills to the relationship in question (Kirmani and Rao 2000). To the extent that holding back efforts produces cost savings for the contractor, this scenario is not unlikely.

However, organization theory suggests that selection efforts serve an additional purpose, namely, that of a socialization process (Ouchi 1979). More specifically, the qualification program may be specifically designed to expose an exchange partner to a firm's goals and values, and the interaction during the program may promote internalization of the relevant goals (Dwyer, Schurr, and Oh 1987). To the extent that the parties' goals become aligned *ex ante* in this way, the likelihood of subsequent motivation-related problems is greatly reduced (Coleman 1990).

Agency theory (e.g., Bergen, Dutta, and Walker 1992) recognizes another possible effect of selection efforts that is due to the opportunities they create for imposing costs on the other party. Per our previous example, if the qualification process is costly or time consuming for potential contractors, "appropriate" contractors (i.e., ones with the right skills and motivation) can self-select, because only such contractors will get a return on their efforts through repeat sales. Similarly, a firm may use selection criteria that directly or indirectly have a cost dimension. For example, an apparel company may select on the basis of contractor reputation or observed behavior in other relationships (e.g., Ganesan 1994; Kumar, Scheer, and Steenkamp 1995; Rubin 1990). To the extent that a given contractor's reputation is valuable, subsequent behaviors that contradict the established reputation may lead to a monetary loss and therefore are less likely to take place.

Consider the specific effects of partner qualification in the context of a particular supply chain network (see Figure 1). Recall from our previous discussion that uncertainty in

²Our theoretical argument here follows the transaction cost notion that though decision makers are boundedly rational, they are far-sighted in the sense that they have the ability to "look ahead, perceive potential hazards," and factor these into the organization of the supplier relationship (Williamson 1996, p. 9). Thus, although manufacturers cannot accurately predict specific conditions in the downstream market (or potential adaptation problems), manufacturers that operate in such markets will make the necessary efforts to structure their upstream relationships appropriately.

the downstream market creates the need for relational contracts between the manufacturer and the customer, which ensure flexible adaptation to changing circumstances. In transaction cost terms (e.g., Williamson 1985), uncertainty requires agreements with good adaptation properties. However, when the manufacturer relies on an independent supplier to produce the products, the ability to be flexible (or the actual effect of downstream uncertainty) is contingent on the nature of the manufacturer's upstream relationship.

If the manufacturer has made insufficient efforts to organize the upstream relationship (i.e., limited qualification efforts), renegotiation difficulties may prevent the firm from accommodating customers' needs. In effect, the relationship with the supplier will serve as a constraint on the firm's actions (Håkansson and Snehota 1995). From the downstream customer's perspective, this implies insufficient flexibility when circumstances require it or a lack of responsiveness on the part of the manufacturer. In contrast, if the necessary qualification efforts have been made upstream, the greater is the likelihood of having identified a supplier that is able and motivated to support the manufacturer, the lower are the focal renegotiation costs, and the greater is the likelihood that the need for adaptation in the downstream market can be met.

The previous discussion implies that the effect of uncertainty in the downstream market on manufacturer flexibility will be nonmonotonic (Schoonhoven 1981) and that it will shift over the range of the manufacturer's (upstream) supplier qualification efforts. More generally, it suggests that the normative TCA prediction for adaptation to uncertainty in the (dyadic) manufacturer–customer relationship is contingent on the governance efforts made in the manufacturer–supplier relationship. We summarize our theoretical discussion in the following contingency hypothesis:

- H₁: Downstream uncertainty will have (a) a negative effect on the manufacturer's flexibility toward the downstream customer for lower levels of upstream qualification efforts and (b) a positive effect on the manufacturer's flexibility toward the downstream customer for higher levels of upstream qualification efforts.

Incentive design. Another general governance strategy that is available to a firm is the design of an incentive structure in which the long-term gains from maintaining the relationship exceed the short-term payoffs from potential opportunism (Eisenhardt 1985).

A specific strategy available to a manufacturer is reliance on a "hostage" from the supplier (Williamson 1983). For example, a supplier may provide a performance guarantee in the form of manufacturer-dedicated assets (e.g., Mariotti and Cainarca 1986). By dedicating assets, the supplier essentially reduces its ability to replace the particular manufacturer, because the assets can be used only in that particular relationship. As Mariotti and Cainarca (1986, p. 361) describe, "should this particular supply agreement terminate prematurely, the dedicated assets ... lose [their] value, as with other types of asset specificity." The effect of the hostage is to lock in the supplier (Heide 1994) and thereby create incentives for behaviors that support the relationship and its continuity. Thus, when circumstances in the downstream market require the manufacturer to make

requests of the upstream supplier, the presence of a supplier hostage increases the likelihood that the renegotiation requests will be accommodated. As such, at least in principle, an upstream supplier hostage has the ability to promote flexible adaptation to uncertainty in the downstream market in a way that is parallel to upstream qualification efforts (see H₁).

As we described previously, the conventional hostage model assumes that the hostage from the supplier actually increases the manufacturer's control. However, this is not necessarily the case. From the supplier's perspective, hostages can create expropriation hazards, because they allow the manufacturer to extract the supplier's profits. For example, when a supplier is locked in, the manufacturer can demand costly reductions in order-cycle time. As a consequence, unilateral supplier lock-in may actually reduce, rather than increase, the supplier's willingness to support the manufacturer (Buchanan 1992; Heide 1994).

On the basis of the preceding discussion, we propose that the effect of a supplier hostage, as per the conventional hostage model, is contingent on the extent to which the manufacturer has made a corresponding investment in the relationship. If both parties commit, a condition of mutual lock-in is created. To the extent that both parties have constrained the alternatives that are open to them or have made each other irreplaceable (Barney and Ouchi 1986; Jackson 1985), the parties' incentives are aligned because opportunism on the part of one firm can be (credibly) retaliated against by the other firm (Provan and Skinner 1989). Ultimately, from the supplier's standpoint, a bilateral exchange of hostages significantly reduces the ongoing expropriation risks in the relationship.

Thus, we posit that the ability of an upstream supplier hostage to promote flexible adaptation to changing circumstances downstream depends on both the level of the supplier's hostage and the match with a manufacturer hostage. Under mutual and high lock-in, the resulting incentive structure enables the supplier to accommodate the manufacturer's request without the risk of exploitation. However, under unilateral supplier lock-in, expropriation concerns on the part of the supplier may undermine flexible adaptation to downstream uncertainty. Under such conditions, renegotiation difficulties with the upstream supplier will be a constraint on the downstream relationship, and the manufacturer will come across as unresponsive to the downstream customer.

In summary, the discussion in the preceding paragraphs implies that (upstream) supplier hostages have the potential to promote adaptation to (downstream) uncertainty. However, the actual nature of the effect depends on the other party's (i.e., the manufacturer's) hostages. Overall, we predict that the effect of supplier hostages is nonmonotonic over the range of manufacturer hostages.

- H₂: Downstream uncertainty will have (a) a negative effect on the manufacturer's flexibility toward the downstream customer when supplier hostages are not accompanied by hostages from the manufacturer (i.e., unilateral lock-in, as per the conventional hostage model) and (b) a positive effect on the manufacturer's flexibility toward the downstream customer when supplier hostages are accompanied by hostages from the manufacturer (high mutual lock-in).

Other Effects

As we described previously, the main premise of our theoretical arguments is that flexibility downstream is partly a function of a manufacturer's governance efforts in the upstream supply market. Similarly, the downstream customer's own governance efforts with respect to the manufacturer may increase the chances of identifying and keeping an exchange partner that is able and motivated to accommodate the ongoing needs for adaptation. As we describe in the "Research Method" section, we control for the customer's own use of both qualification and incentives with respect to the manufacturer.

We also recognize that manufacturers themselves may rely on operational strategies that affect their flexibility downstream. For example, some apparel companies may use a speculation strategy (Bucklin 1967) to buffer against unpredictable changes in the retail market; specifically, apparel companies can stockpile inventory (e.g., Abernathy et al. 1999). Some manufacturers may rely on a postponement strategy (Bucklin 1967). For example, some apparel companies may try to delay product differentiation until the last possible moment to compress lead times (and to limit finished goods inventory) and thereby secure flexibility in a more cost-effective way (e.g., Abernathy et al. 1999; Johnson and Anderson 2000). To control for the possibility that manufacturer flexibility toward the downstream customer is due to such operational strategies, we included them as additional controls in our empirical test.

A manufacturer's degree of flexibility may also be affected by the firm's view of the focal customer. Recall from our discussion of the upstream manufacturer-supplier relationship that one party's unilateral efforts may be exploited by the other. Conceivably, manufacturer flexibility may lead to increasing customer demands, which ultimately serve to extract the manufacturer's profits. If there is a risk that the customer will exploit the manufacturer, the manufacturer's motivation to show flexibility in the first place is reduced. To control for this, we account for ways the manufacturer can deploy safeguards. For example, we control for retailer lock-in with respect to the apparel company. In addition, we include a measure of the nature of the product being sold, which may serve as a safeguard against customer exploitation that is quite separate from the incentive structure created in the downstream market. Specifically, higher-fashion garments, which represent a critical source of retailer differentiation and for which there are typically fewer alternative sources of supply available (Buchanan 1992), put the apparel company in a position to restrict retail supply. In a broad sense, the nature of the product contributes in unique ways to create retailer dependence on the apparel company. From the apparel company's standpoint, this ensures that the retailer's request can be accommodated without the risk of subsequent exploitation.

Another characteristic of the downstream relationship that may affect a manufacturer's flexibility is the percentage of sales to the focal customer, or the degree of downstream concentration. Presumably, in supply chains that have a higher degree of exchange concentration in the downstream market, the stronger is the bargaining position of the focal customer, and the higher is the likelihood that the manufac-

turer will accommodate the customer's request. Finally, a manufacturer's degree of flexibility may be affected by its relative size as compared with that of the upstream supplier and the downstream customer. Specifically, larger apparel companies may be able to extract concessions from the upstream contractor (e.g., in the form of reduced order-cycle time) and may be less pressured to accommodate the need for flexibility downstream. To account for these additional effects, we control for relative size in both relationships.

Research Method

Research Context

The empirical context for our study is the U.S. apparel industry. Specifically, our research setting focuses on apparel companies in the Standard Industrial Classification Group 23 (apparel manufacturing) and their relationships with (upstream) contractors and (downstream) retailers. Group 23 comprises companies that are primarily engaged in manufacturing cut-and-sew apparel (men's, women's, children's, and infantwear) from woven fabric and purchased knit fabric. The contractors and retailers represent suppliers and customers, respectively, in our conceptual framework (Figure 1). The specific unit of analysis for the study is the sourcing arrangement used for a particular garment.

We used three main criteria in selecting this empirical context. First, all our main independent variables needed to manifest themselves in the setting to various degrees. Most important, the context needed to exhibit substantial variation in downstream market uncertainty. Second, we required a context in which customer flexibility involved a significant and ongoing effort on the focal manufacturer's part, rather than just maintenance of excess inventory to meet demand fluctuations. Third, the manufacturer, the downstream customer, and the upstream supplier needed to be independent (i.e., not integrated, no equity cross-holdings).

With respect to our first two criteria, the apparel industry faces several categories of consumer demand, from supplying consumers with utilitarian attire that changes little in style from year to year to providing fashion apparel that is characterized by short product life and fickle consumer preferences (Djelic and Ainamo 1999; Richardson 1996). Fashion apparel poses considerable manufacturing and marketing difficulties. Highly unpredictable consumer demand makes it difficult for retailers to select appropriate merchandise and to specify clearly terms of exchange with apparel companies (Mariotti and Cainarca 1986). Furthermore, because timing is a major determinant of consumer value for these products, and because fashion apparel is characterized by short life cycles, apparel companies must continuously adapt their product lines (Buchanan 1992). In this context, relationships between retailers and apparel companies are not easily governed by complete or explicit contracts. Although long-term relationships exist between apparel companies and retailers, the relationships must continuously adapt in response to changing circumstances (Djelic and Ainamo 1999).

With respect to our third criterion, apparel companies are increasingly relying on (1) external contractors to man-

ufacture their products and (2) independent retail outlets to sell the products (including discount stores, off-price retailers, specialty stores, department stores, and major chains) (Djelic and Ainamo 1999).³

Questionnaire Development

We used mail surveys of apparel companies and their retail customers to measure the relevant theoretical variables. To develop the questionnaires, we used the procedures recommended by Churchill (1979) and Gerbing and Anderson (1988). Initially, we conducted in-depth interviews with (1) production managers at four different apparel companies, (2) purchasing managers at two retail companies, and (3) two directors of the American Apparel Manufacturers Association. In total, we spent more than 15 hours on personal interviews. On the basis of the interviews and a review of previous research on buyer-supplier relationships, we developed preliminary versions of the questionnaires. When it was possible, we used existing scale items (e.g., Ko and Kincade 1998; Stump and Heide 1996), after we adapted them to our research context. Subsequently, the questionnaires were sent to a sample of ten production managers to verify the appropriateness of the terminology used, the clarity of the instructions, and the response formats. Six questionnaires were returned, and no particular problems appeared to exist with the scales. We also conducted telephone interviews with all of the managers *ex post* to verify the relevance and clarity of the survey questions.

Measures

We operationalized the key constructs in our conceptual framework by using multi-item reflective scales (Bollen and Lennox 1991). The Appendix contains a description of response formats and specific items for the multi-item scales.

Downstream market uncertainty. In our context, the main domains in which downstream uncertainty exists are demand and design characteristics (Djelic and Ainamo 1999; Iyer and Bergen 1997). Specifically, uncertainty exists to the extent that apparel companies are unable to forecast accurately the sales volume and style preferences in the downstream market. The actual items are based on the ones developed by Heide and John (1988, 1990) and Ko and Kincade (1998).

Apparel company flexibility. We conceptualized flexibility as a global contracting norm. In our particular context, flexibility describes the retailer's perception of the apparel company's flexibility in the focal relationship. For example, one of the items measures the retailer's perception of the apparel company's flexibility in response to its requests for changes. Note that though the primary governance or adaptation problem in this context pertains specifically to volume

and design changes for particular garments, the accommodation of such changes requires modifications (i.e., flexibility) across a broad range of relationship dimensions (e.g., delivery, pricing, terms). Thus, we needed to measure flexibility in global terms. Our conceptualization is consistent with that in the existing literature (Heide and John 1992; Noordewier, John, and Nevin 1990).

Unlike many of the other measures that pertain to the apparel company's upstream governance efforts, we obtained the flexibility measure from the retailer. Given that our ultimate focus is on flexibility in the downstream customer relationship, the most appropriate source of data on flexibility is the customer in question. The customer's perspective need not coincide with an apparel company's self-report. For example, our asking the apparel companies to report on their flexibility with respect to a retailer may have introduced a social desirability bias into the study (Mick 1996). Social desirability can manifest itself as a tendency for apparel companies to present themselves as "good" companies. In addition, having the same source (i.e., the apparel company) report on the independent and the dependent variable may introduce common method biases. For example, informants may theorize about underlying relationships (Podsakoff and Organ 1986), which can affect the relationships among the variables in the study (e.g., by inflating the correlation between variables and thereby creating a relationship in which no true relationship exists).

We define *contractor qualification* as the scope and extent of selection efforts that are undertaken by the apparel company *ex ante* to verify the contractor's ability (e.g., technical expertise, manufacturing capacity) and motivation (e.g., general business philosophy, reputation) to perform as needed. We asked the apparel company to consider the time when it first established the relationship with the contractor and to indicate the extent of qualification efforts undertaken by the firm. We adapted the specific items from the ones used by Heide and John (1990) and Stump and Heide (1996), and we modified them on the basis of the in-depth interviews.

Incentive design. As we discussed previously, the incentive structure in the upstream relationship is captured by the existence of supplier and manufacturer hostages, which create lock-in or replaceability problems. Specifically, we relied on two different scales that measure the degree to which the contractor can replace the apparel company ("contractor hostages") and whether the apparel company faces a corresponding lock-in situation ("apparel company hostages"). Both parties committing bilaterally creates a condition of high mutual lock-in, which in turn serves to align the respective parties' interests. We adapted our measures from the ones used by Heide and John (1988) and Heide (1994).

Control variables. In addition to the focal theoretical variables, we included nine control variables in the model. As we discussed previously, the first set of control variables pertains to the retailer's governance efforts with respect to the apparel company. We included measures of qualification efforts and incentive design. We then included a second set of variables that captures operational strategies that apparel companies can use to meet fluctuations in customer demand.

³As we describe in the "Research Method" section, we purposely eliminated from the study firms that relied on vertical integration as a governance approach because of the different way adaptation problems are managed under ownership. Rindfleisch and Heide (1997) point to the mixed pattern of results for uncertainty in previous research, which may partly be due to differences in terms of the governance approaches used.

These strategies are inventory maintenance and delayed product differentiation. The third set of control variables pertains to the apparel company's safeguards with respect to the retailer. In addition to controlling for the retailer's investments with respect to the apparel company, we included a categorical measure of garment characteristics (budget/mass, moderate, better, bridge, and designer). In our model, the garment characteristic variable is represented by four dummy variables (with budget/mass as the reference category). Finally, we also included measures of relative firm size (upstream and downstream) and percentage of sales to the focal customer (i.e., retailer concentration).

Data Collection

Our research design involves a multilevel effort, because data are collected from two parties in the supply chain network (Figure 1). We obtained measures of the key independent variables (i.e., downstream market uncertainty, contractor qualification, and incentive design) from the apparel companies. We obtained the key dependent variable, apparel company flexibility in the downstream market, from purchasing managers and buyers in retail companies.

Apparel companies. Our sample was a national mailing list, purchased from List Source USA, that contained names of managers at 9574 independent U.S. apparel companies. All managers were contacted personally by telephone to screen their firm for eligibility and to locate a key informant in the production, planning, and control department. Campbell's (1955) criteria of informants being knowledgeable about the phenomena under study and able and willing to communicate with the researcher constituted the criteria for selection. In many cases, our presurvey screening process required multiple telephone calls or successive "snowballing" to locate an appropriate key informant.

On the basis of the telephone contacts, we identified 1764 managers who (1) were knowledgeable about the phenomena under study, (2) worked in companies we judged appropriate for the study, and (3) agreed to complete the questionnaire. The remaining firms could not be reached (36%), were not eligible for the study (38%) on the basis of the established criteria (i.e., use of independent contractors and sales to independent retailers), or refused to participate (8%).

Each of the 1764 managers received a mail questionnaire and was asked to complete it with respect to one particular contractor and retailer about which he or she was knowledgeable. The managers were asked to select and describe a particular sourcing arrangement in which the contractor was the largest source for a particular apparel item (in terms of annual dollar value). If the item was sold to more than one retailer, the managers were asked to select the largest retailer of the item (in terms of annual purchase volume).

As an additional step toward increasing the quality of the informant reports, each questionnaire included *post hoc* checks on the informant's knowledge about his or her firm's dealings with the contractor and retailer, respectively (seven-point scale). The questionnaire packet contained a cover letter, a prepaid envelope, and the questionnaire. To motivate informants to respond, they were offered an incen-

tive in the form of a report that summarized the results of the study.

Three follow-up telephone calls were made to nonrespondents, and a second mailing was sent to informants who had lost or not received the first survey. Of the 1764 mailed questionnaires, 497 were returned, for an overall response rate of 28%. Although the response rate is somewhat modest, it is consistent with other distribution channel (e.g., Mishra, Heide, and Cort 1998) and alliance (e.g., Rindfleisch and Moorman 2001) studies that have relied on the same data collection strategy. Of the 497 questionnaires received, we discarded 13 because of an excessive amount of missing information. In addition, on the basis of the *post hoc* test of informant quality, we eliminated 63 companies, which had scores lower than four on either of the two knowledge scales. The average knowledge scores for the informants were 6.3 (standard deviation [s.d.] = .89) and 6.2 (s.d. = .99), respectively, which indicates that the selected informants were highly qualified to report on their firm's relationships with contractors and retailers. The final sample of apparel companies consisted of 421 firms, for a usable response rate of 24%.

To assess whether nonresponse bias was an issue, we compared data from early and late survey respondents, following the procedure that Armstrong and Overton (1977) suggest. Specifically, we tested the null hypothesis of no mean difference across the two groups (using t-tests) with respect to the key independent variables in the conceptual framework (i.e., downstream uncertainty, contractor qualification, and incentive design). In our final sample, approximately 32% of the questionnaires were received before two weeks and 68% were received after two weeks. We found no significant differences between the two groups on any of the variables, which suggests that nonresponse bias is not a problem.

In addition to comparing early and late respondents, we were also able to compare our final sample of firms with the larger sample of U.S. apparel companies with respect to the number of employees. Again, our hypothesis of no mean difference was supported, providing additional evidence that nonresponse bias may not be a problem.

Retailers. We used a similar procedure to that described previously to identify an informant within the retailer's firm. The informant from the apparel company was asked to identify a person in the customer firm who was knowledgeable about his or her firm's relationship with the apparel company. In total, 218 names were obtained and subsequently contacted by telephone. Of the 218 retailers that were contacted, 178 (82%) agreed to participate and were mailed a questionnaire. In total, 81 questionnaires were returned, for a response rate of 46%. We did not eliminate any cases on the basis of the *post hoc* test of informant quality. The final score on the knowledge scale was 6.5 (s.d. = .74).

In our final sample, 36% of the retailer questionnaires were received before two weeks and 64% were received after two weeks. To evaluate nonresponse bias, we compared the two groups on the basis of the key control variables collected from the retailers (i.e., qualification efforts by the retailer and incentive design in the downstream relationship, respectively). We found no significant differences

between the two groups on any of the variables, which suggests that nonresponse bias is not a problem.

Our last assessment of nonresponse bias involved comparing the sample of 421 apparel companies from the first phase of data collection with the subsample of 81 apparel companies that we used to test our hypotheses. We again tested the null hypothesis of no mean difference across the two groups with respect to the key independent variables in the conceptual framework, and we found no significant differences. Together, the tests suggest that nonresponse bias is not a problem.

Measure Validation Procedure

To identify items that did not belong to the specific construct domain, we initially subjected each set of items used for our multi-item scales to an examination of item-to-total correlations. We examined the items that were deleted from the initial set and compared them with the original conceptual definitions of the constructs. In each case, we concluded that deleting the item did not significantly change the domain of the construct, as it was initially conceptualized. To verify unidimensionality, we subsequently subjected the resulting pool of items to confirmatory factor analysis with LISREL 8.3 (Jöreskog and Sörbom 1995).

In total, we used a pool of 47 items to measure the eight constructs. Because we could not include all the items in a single-factor model without violating the ratio of sample size to number of parameters (Jöreskog and Sörbom 1995), we divided the set of scales into two subgroups consisting of (1) the focal theoretical variables (i.e., apparel company

flexibility, downstream market uncertainty, contractor qualification, contractor hostages, and apparel company [upstream] hostages) and (2) the control variables (i.e., qualification by retailer, retailer hostages, and apparel company [downstream] hostages), respectively (Bagozzi and Edwards 1998). We then employed a partial disaggregation model for each subgroup of scales to increase further the ratio of sample size to number of parameters (Bagozzi and Heatherton 1994; Marsh and Hocevar 1985).

To evaluate each factor model, we used a combination of absolute fit indexes (χ^2 and root mean square error of approximation [RMSEA]) and incremental fit indexes (incremental fit index [IFI] and comparative fit index [CFI]). All indexes met or exceeded the critical values (Model 1: $\chi^2 = 107.53$, $p = .16$, RMSEA = .04, IFI = .97, and CFI = .97; Model 2: $\chi^2 = 28.45$, $p = .24$, RMSEA = .05, IFI = .99, and CFI = .99) for good model fit (Bentler 1990; Bollen 1989; Browne and Cudeck 1992).

We then assessed the reliability of the scales. We calculated coefficient alpha (Cronbach 1951) for the completely disaggregated scales and composite reliability for the partially disaggregated scales (Fornell and Larcker 1981). We also examined the parameter estimates and their associated t-values and assessed the average variance extracted for each construct (Fornell and Larcker 1981; Gerbing and Anderson 1988).

As is shown in Tables 1 and 2, the coefficient alpha levels all exceed the .7 level that Nunnally (1978) recommends. Moreover, all the factor loadings for the partially disaggregated multi-item scales are significant, and the composite

TABLE 1
Parameters for Partially Disaggregated Measurement Model: Focal Theoretical Variables^a

Items	Apparel Company Flexibility	Contractor Qualification	Contractor Hostages	Apparel Company (Upstream) Hostages	Downstream Market Uncertainty
X1	.87 (9.56)	—	—	—	—
X2	.83 (8.83)	—	—	—	—
X3	.94 (10.84)	—	—	—	—
X4	—	.85 (9.26)	—	—	—
X5	—	.81 (8.61)	—	—	—
X6	—	.70 (6.92)	—	—	—
X7	—	.92 (10.41)	—	—	—
X8	—	—	.93 (10.02)	—	—
X9	—	—	.82 (8.47)	—	—
X10	—	—	.72 (7.10)	—	—
X11	—	—	—	.83 (7.40)	—
X12	—	—	—	.76 (6.76)	—
X13	—	—	—	.64 (5.67)	—
X14	—	—	—	—	.85 (8.93)
X15	—	—	—	—	.81 (8.36)
X16	—	—	—	—	.87 (9.19)
Coefficient alpha ^b	.93	.88	.84	.74	.86
Composite reliability	.91	.89	.87	.80	.88
Variance extracted	78%	68%	69%	56%	71%
Highest shared variance	12%	14%	14%	3%	12%

^aItem loadings, t-values, coefficient alpha, composite reliability, variance extracted, and highest shared variance.

^bCompletely disaggregated scales.

TABLE 2
Parameters for Partially Disaggregated Measurement Model: Control Variables^a

Items	Qualification by Retailer	Retailer Hostages	Apparel Company (Downstream) Hostages
X1	.83 (8.84)	—	—
X2	.93 (10.46)	—	—
X3	.88 (9.66)	—	—
X4	—	.82 (8.29)	—
X5	—	.81 (8.14)	—
X6	—	.85 (8.67)	—
X7	—	—	.87 (9.35)
X8	—	—	.86 (9.29)
X9	—	—	.85 (9.15)
Coefficient alpha ^b	.90	.83	.89
Composite reliability	.91	.86	.90
Variance extracted	77%	68%	74%
Highest shared variance	3%	5%	5%

^aItem loadings, t-values, coefficient alpha, composite reliability, variance extracted, and highest shared variance.

^bCompletely disaggregated scales.

reliabilities range from .80 to .91, indicating acceptable levels of reliability for the scales (Fornell and Larcker 1981). The average variances extracted range between 56% and 78%, and all are greater than the recommended .50 level (Fornell and Larcker 1981).

Finally, we investigated discriminant validity by calculating the shared variance between all possible pairs of constructs and demonstrated that they were lower than the average variance extracted for the individual constructs. As is shown in Tables 1 and 2, all possible pairs of constructs passed Fornell and Larcker's (1981) test, which is evidence of discriminant validity among the measures. To assess discriminant validity further, we assessed pairs of scales in a series of two-factor confirmatory models, in line with the suggestions of Bagozzi and Phillips (1982). Following the procedure Jöreskog (1971) describes, we respecified the two-factor models by restricting the factor intercorrelations to unity, and then we performed χ^2 difference tests (with one degree of freedom) on the values we obtained for the constrained and unconstrained models. In all cases, the χ^2 was significantly higher in the constrained models, thereby indicating discriminant validity between the constructs. The results, in combination with the fit indexes for each factor model, suggest that the measurement scales are reliable and valid. Table 3 shows the correlations between our study variables. As we expected, some of the correlations between the interaction variables and their components are high. However, as Buvik and John (2000) note, significant results for higher-order interaction terms in a regression model in the presence of lower-order terms mean that the imprecision (reduced power) due to multicollinearity is not a valid threat.

Hypotheses Tests

Our research hypotheses specify that the effect of downstream uncertainty on apparel company flexibility will shift across the range of upstream qualification and incentive structure. To test the hypotheses, we estimated an ordinary least squares regression model and treated the upstream gov-

ernance mechanisms as moderators (Sharma, Durand, and Gur-Arie [1981] refer to these as "specification variables") of the relationship between uncertainty (the predictor variable) and flexibility (the criterion variable).⁴ We specified the model as follows:

$$\begin{aligned}
 (1) \text{ Apparel company flexibility} = & \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \\
 & + \beta_4 X_4 + \beta_5 X_3 X_1 + \beta_6 X_4 X_1 \\
 & + \beta_7 X_3 X_4 + \beta_8 X_1 X_2 \\
 & + \beta_9 X_3 X_1 X_4 \\
 & + \text{control variables} + \varepsilon_1,
 \end{aligned}$$

where

X_1 = downstream market uncertainty,
 X_2 = contractor qualification,
 X_3 = contractor hostages, and
 X_4 = apparel company (upstream) hostages.

Table 4 shows the estimated coefficients and associated t-statistics.⁵ First, the model explains a sufficient amount of variance to justify examination of the individual coefficients (adjusted $R^2 = .33$). Second, the prediction for H_1 is captured by the combination of the effect of downstream market uncertainty (β_1) and the interaction between contractor qualification and uncertainty (β_8) on downstream flexibility.

⁴We considered two additional approaches to estimating interaction effects: indicant product and subgroup analysis. Given some of the possible limitations of these approaches, such as dichotomizing a continuous variable (see, e.g., Jaccard and Wan 1996), we chose to test the hypotheses by using product-term regression analysis.

⁵To mitigate the potential threat of multicollinearity among the interaction terms and the other variables in the regression model, we mean-centered all independent variables (Aiken and West 1991). When the focal independent and moderator variables are mean-centered, the regression coefficient for the independent variable reflects its influence on the dependent variable at the average value of the moderator variable (Jaccard and Wan 1996). The interpretations of the interaction effects remain the same.

TABLE 3
Correlation Matrix

Construct	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. ACF	1.0																			
2. CQ	.06	1.0																		
3. CH	-.05	-.30	1.0																	
4. ACUH	.02	-.07	.16	1.0																
5. MU	-.24	-.04	-.14	.06	1.0															
6. CQ × MU	.06	-.01	.03	.14	.14	1.0														
7. CH × MU	-.17	-.11	-.05	-.26	-.26	-.30	1.0													
8. ACUH × MU	-.09	.03	-.24	.00	-.18	.26	.07	1.0												
9. CH × ACUH	-.06	-.13	.10	-.48	-.24	-.06	.16	.06	1.0											
10. CH × MU × ACUH	.20	-.05	.14	.05	.06	-.26	-.16	-.73	-.03	1.0										
11. RQ	.27	-.02	-.16	-.00	-.02	-.00	.11	-.12	-.22	.11	1.0									
12. RH	.07	-.11	.13	.03	-.02	-.12	.14	.01	-.08	-.06	-.03	1.0								
13. ACDH	-.10	-.18	.16	-.02	.07	.00	.09	-.02	.01	.08	.22	-.20	1.0							
14. RH × ACDH	-.16	.05	-.18	.02	-.02	-.10	.13	.05	-.06	-.16	-.08	.13	-.13	1.0						
15. Size: apparel company > contractor	-.01	-.10	.31	-.22	.08	.05	.09	-.11	.19	-.02	-.02	-.15	.22	-.11	1.0					
16. Size: apparel company > retailer	-.23	-.08	-.14	-.16	.02	.23	-.10	.15	.07	-.21	-.22	-.12	-.33	-.01	-.12	1.0				
17. Postponement	.06	.04	.02	-.17	-.20	-.13	-.07	.03	-.03	-.10	.07	-.00	.07	-.05	-.11	-.10	1.0			
18. Inventory	.15	.12	-.16	.02	-.02	.05	-.04	.20	-.15	-.16	.05	.15	-.11	.08	-.03	-.05	.21	1.0		
19. Garment	.32	-.02	-.13	-.02	-.15	.06	-.01	.03	-.00	-.02	-.15	-.27	-.25	.07	-.13	-.16	-.24	-.08	1.0	
20. Retailer concentration	.17	-.06	.03	-.01	-.05	.12	-.06	.05	-.09	-.17	-.24	-.01	-.23	.01	-.20	-.13	-.12	.24	-.13	1.0
Mean	5.35	4.79	3.59	3.61	3.65	-.05	.24	.10	.37	-.70	4.80	3.36	3.62	.60	.38	-.36	3.35	4.25	3.4	27.4
S.D.	1.1	1.1	1.6	1.5	1.1	1.3	1.9	1.9	2.7	4.0	1.4	1.7	1.8	3.1	.8	.8	1.9	1.8	1.1	24.9

Notes: R > .22 are significant at $p < .05$ (two tailed) for $n = 81$. Acronyms are defined as in the Appendix.

TABLE 4
Ordinary Least Squares Regression Model

Independent Variables	Unstandardized Coefficients	Standardized Coefficients	t-Value
MU	-.35	-.34	-3.21***
CQ	.03	.03	.29
CQ × MU	.20	.23	2.07***
CH	.03	.05	.38
ACUH	-.02	-.03	-.21
CH × MU	-.12	-.20	-1.78**
ACUH × MU	.06	.10	.70
CH × ACUH	.01	.03	.26
CH × MU × ACUH	.09	.32	2.06***
Retailer Governance Efforts			
RQ	.22	.26	2.49***
RH	.04	.06	.59
ACDH	-.15	-.23	-2.06***
RH × ACDH	-.02	-.07	-.65
Other Controls			
Apparel company inventory (speculation)	.01	.01	.12
Delayed product differentiation (postponement)	.11	.19	1.63*
Garment characteristic, dummy 1 (designer)	1.52	.41	2.84***
Garment characteristic, dummy 2 (bridge/difference)	2.22	.43	3.54***
Garment characteristic, dummy 3 (better)	.91	.37	2.16***
Garment characteristic, dummy 4 (moderate)	.77	.34	2.01***
Size: apparel company > contractor	.09	.06	.56
Size: apparel company > retailer	-.39	-.29	-2.62***
Retailer concentration	.01	.18	1.60*
Adjusted R ²	.33		

* $p < .1$ (one-tailed test).

** $p < .05$ (one-tailed test).

*** $p < .025$ (one-tailed test).

Notes: Dependent variable is apparel company's flexibility toward retailer ($n = 81$). Acronyms are defined as in the Appendix.

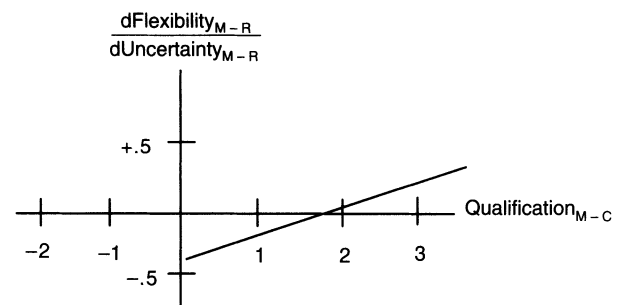
As we predicted, the effect of uncertainty on flexibility is significant and negative ($t = -3.21$, $p < .025$), and the effect of the interaction between contractor qualification and uncertainty is significant and positive ($t = 2.07$, $p < .025$). Together, the effects provide support for H_1 .

Our contingency prediction (i.e., the effect of downstream uncertainty on apparel company flexibility will shift in a nonmonotonic way over the range of contractor qualification) can be examined more formally by graphing the partial derivative of the regression equation (Equation 1) following the procedure that Schoonhoven (1981) suggests. As is evident in Figure 2, downstream market uncertainty has a negative effect on apparel company flexibility for lower levels of contractor qualification and a positive effect for higher levels of contractor qualification. This indicates that upstream qualification efforts increase the apparel company's ability to accommodate the ongoing need for flexibility under uncertain market conditions.

The prediction for H_2 is captured by the combination of (1) the two-way interaction between downstream market uncertainty and contractor hostages (β_5) and (2) the three-way interaction among uncertainty, contractor hostages, and apparel company hostages (β_9) on flexibility. As is evident in Table 4, the two-way interaction between uncertainty and contractor hostages is significant and negative ($t = -1.78$, $p < .05$), which is consistent with our theoretical argument about

FIGURE 2
Impact of Contractor Qualification on the Relationship Between Downstream Market Uncertainty and Apparel Company Flexibility

$$\frac{d\text{Flexibility}_{M-R}}{d\text{Uncertainty}_{M-R}} = -.35 + .20 (\text{Qualification}_{M-C})$$



unilateral hostages. The three-way interaction captures our expectation that the ability to secure flexibility downstream by means of upstream hostages requires that a hostage exchange takes place. As we predicted, the interaction is sig-

nificant and positive ($t = 2.06, p < .025$), which, together with the negative two-way interaction, provides support for H_2 .

Figure 3 shows the contingency prediction that underlies H_2 more formally through partial derivatives, which is similar to our previous analysis. However, because H_2 involves a higher-order interaction, the graph in Figure 3 is based on the partial derivative of the former equation (Figure 2) (i.e., the second derivative of the original regression equation [Equation 1], per Fisher's [1988] procedure). Specifically, Figure 3 shows how apparel company hostages enable contractor hostages to promote flexible adaptation to uncertainty. As is evident in Figure 3, when contractor hostages are not accompanied by hostages from the apparel company (i.e., a condition of unilateral supplier lock-in), downstream market uncertainty has a negative effect on apparel company flexibility. However, the effect turns positive for higher levels of apparel company hostages (i.e., a shift toward mutual lock-in). This suggests that the effect of hostages as governance devices depends on both the level at which a focal hostage is deployed and the match with the other party's hostage.

For the control variables, as we expected, qualification by the retailer has a positive and significant effect on apparel company flexibility ($t = 2.49, p < .025$), and apparel company (downstream) hostages have a significant and negative effect on apparel company flexibility ($t = -2.06, p < .025$). Retailer hostages do not have a significant effect on apparel company flexibility. With respect to the impact of inventory (speculation) and delayed product differentiation (postponement), we found a positive and significant effect of postponement ($t = 1.63, p < .1$), whereas apparel company inventory had no significant effect on the dependent variable. As we expected, higher-fashion garments (relative to the baseline category), measured through the dummy variables, give rise to apparel company flexibility in the downstream market (all t -values $> 1.98, p < .025$). Finally, both

size (measured in the downstream market) and retailer concentration have significant effects on apparel company flexibility (size: $t = -2.62, p < .05$; retailer concentration: $t = 1.60, p < .1$) in the expected directions.⁶

Discussion

The predominant focus in previous research on interfirm relationships has been on individual dyadic relationships. Recently, scholars have suggested that to understand fully the nature of dyadic relationships, greater attention must be directed to the network context in which they exist. In this study, we drew on emerging perspectives on interfirm governance and networks to develop a theoretical framework of connections between relationships at different levels in a vertical supply chain network. Our starting point was a particular governance process, namely, adaptation to uncertainty (Williamson 1985). Using established TCA logic, we argued that uncertain market conditions require that relational elements (i.e., flexibility) be built into a focal relationship to facilitate adaptation to changing circumstances (Macneil 1980; Williamson 1991). However, drawing on the network literature, we augmented the basic TCA model by positing that the actual ability to build flexibility into a dyadic relationship may depend on how other connected relationships in the firm's larger supply chain are governed.

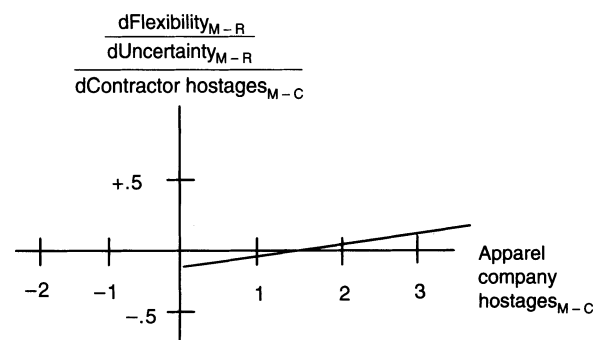
We tested our conceptual arguments in supply chain networks that consisted of relationships (1) between a manufacturer and an independent (downstream) customer and (2) between the manufacturer and an independent (upstream) supplier. We identified two specific governance strategies for the upstream supply market: supplier qualification and incentive design. We then described the effect of the governance strategies on a manufacturer's ability to adapt to uncertainty in a flexible manner in the downstream market.

Overall, the empirical results show good support for our theoretical arguments that individual relationships in a larger network are connected and the ability to adapt to uncertainty in one relationship depends in part on a firm having deployed particular governance mechanisms (quali-

FIGURE 3

Impact of Apparel Company Hostages on the Ability of Contractor Hostages to Promote Flexibility Under Downstream Market Uncertainty

$$\frac{\frac{d\text{Flexibility}_{M-R}}{d\text{Uncertainty}_{M-R}}}{d\text{Contractor hostages}_{M-C}} = -.12 + .09 (\text{apparel company hostages}_{M-C})$$



⁶As is consistent with our theoretical arguments, we found support for a model in which the effect of downstream uncertainty on apparel company flexibility was contingent on the firm's upstream governance efforts. However, it may be useful also to consider a competing model in which uncertainty is a direct antecedent of upstream governance mechanisms (i.e., the governance mechanisms are mediators, rather than moderators, of the relationship between uncertainty and flexibility). We examined this possibility by estimating two path models; the governance mechanisms served as complete and partial mediators, respectively. Neither model showed acceptable levels of fit. Although we hesitate to emphasize individual parameters in light of poor overall model fit, we note that none of the mediating paths were significant. Overall, this suggests that governance decisions at one level in a supply chain network are not directly driven by market conditions at another level and do not in themselves affect flexibility across relationships. Moreover, the results indicate that both governance mechanisms conform to the psychometric definition of a pure moderator variable (Sharma, Durand, and Gur-Arie 1981).

fication and hostages) in another. However, we note that the process by which hostages promote adaptation is considerably more complex than the one for qualification. In general, incentives and selection seem to work in different ways. Governance deployment is a complex matter, and additional research into the properties and effects of alternative mechanisms is a priority. We return to this issue in the "Limitations and Further Research" section.

In general, this study emphasizes the importance of broadening the unit of analysis, both in transaction cost theory and in relationship research. We note, however, that proponents of TCA have actually acknowledged this themselves. For example, Williamson (1985, p. 393) suggests that because TCA normally examines each trading nexus separately, "interdependencies among a series of related contracts may be missed or underevaluated as a consequence." However, to date, this idea has received little attention in the governance literature. An exception is Antia and Frazier (2001), who document how contract enforcement in a particular dyad is influenced by factors outside of the dyad itself. Another exception is Heide and John (1988), who describe how agents' bonding efforts in one (customer) relationship serve to discourage opportunism in another (i.e., by a principal). Finally, Mishra, Heide, and Cort (1998) show how the strategies used to manage relationships with end customers influence how a firm manages its employee relationships.

Our current research builds on these studies. By drawing on extant network perspectives, our study highlights the important implication of accounting for "related contracts," namely, their effect on the ability to respond in a given relationship in accordance with TCA's prescriptions.

Managerial Implications

Supply chain management has emerged in recent years as a key source of competitive advantage. As companies continue to outsource business activities, they are realizing that practicing relationship management involves more than managing an individual relationship (Byrnes 2001; *The Economist* 2002). For example, many manufacturers are recognizing that their downstream customer relationships are often constrained by other relationships in the larger supply chain (*The Economist* 2001). Our study has two key implications for managers. First, we identify specific strategies that can be used to manage supply chain relationships. Second, we describe the effects of these strategies across levels in an overall chain.

Consider a manufacturer's ability to meet a downstream customer's (e.g., a retailer's) continuously changing needs. Although a manufacturer cannot accurately predict future conditions in the downstream market (and the specific needs for adaptation), it nevertheless can make proactive efforts to structure the supply chain. Specifically, the manufacturer needs to consider possible constraints throughout the supply chain that may affect its ability to meet customers' needs. The constraints include possible governance problems due to incompatible goals and/or opportunism in the upstream supply market. On the basis of an assessment of the potential problems, the manufacturer can deploy particular gover-

nance mechanisms in the relationship. In this study, we show how supplier qualification programs and incentive structures increase a manufacturer's ability to adapt in a flexible manner to uncertainty in the downstream customer relationship.

Although flexibility is one of the most commonly noted dimensions of strong customer relationships (e.g., Achrol and Kotler 1999), it is not a goal in itself. Because promoting flexibility requires investments on a firm's part (e.g., qualification programs involve substantial costs), a firm should make such efforts selectively. However, whenever a manufacturer seeks downstream flexibility, promoting support throughout a supply chain becomes an important part of a firm's overall strategy.

Limitations and Further Research

The results of our study must be interpreted in view of certain limitations. For theory-testing purposes, we decided to test our hypotheses in a particular (and homogeneous) context: the U.S. apparel industry. Restricting our sample in this way served the dual purposes of controlling for extraneous sources of variation and developing grounded measures. At the same time, caution should be used in extrapolating our results to other contexts.

Furthermore, as is evident from our previous discussion, in our hypotheses testing, we faced certain challenges that pertained to our (1) using matched apparel company–retailer pairs (because of the need to obtain the dependent and independent variables from different parties), (2) controlling for many variables, and (3) testing a three-way interaction. A joint effect of the three challenges was that we needed to estimate a relatively complex model with a somewhat modest sample size, which may raise concerns about the robustness of our results. To increase confidence in our findings, we undertook a validation task based on a regression procedure that Anderson and Weitz (1989) previously used. The procedure involved estimating a model that included all the focal variables used to test the two research hypotheses and then regressing the residuals from the first model against all the control variables (including the remaining second-order terms). Finally, we included the significant variables in the second model in a reestimation of the first model. The results from this model, which has a more modest set of parameters (and raises fewer concerns about potential overfitting), were almost identical to the model in Table 4 and suggest that our results are not sensitive to model specification.

We also limited our study to two specific governance aspects of the manufacturer–supplier relationship: qualification and incentive design. A natural extension of our study would be to consider whether other governance mechanisms that may facilitate downstream adaptation exist. For example, a key construct in the general literature on governance is monitoring. Unfortunately, as Wathne and Heide (2000) note, the role of monitoring in interfirm relationships has not always been stated clearly. More specifically, it is not entirely clear whether monitoring (as a governance strategy) matches up with specific governance problems (e.g., adaptation to uncertainty). Thus, a significant topic for further

research is to specify in greater detail the range of governance mechanisms that can be used to manage supply chain relationships and the properties of each mechanism with respect to specific governance problems.

Further research could also be usefully directed toward exploring particular supply chain initiatives, such as quick response and efficient consumer response. Unfortunately, because these are umbrella terms, there is little consensus about their meaning. For example, in recent literature (e.g., Coughlan et al. 2001; Dunne, Lusch, and Griffith 2002; Levy and Weitz 2001), some authors use the terms interchangeably and some try to develop distinctions. However, at a conceptual level, our understanding of the terms is that there are potentially three different components involved in each one: (1) production and inventory management, (2) relationship management, and (3) information technology (for a similar categorization, see Handfield and Nichols 1998).

In our model, we capture the first two components through the operational strategies variables (i.e., postponement and speculation) and the governance mechanisms (i.e., supplier qualification and incentive design), respectively. To address the third component, we estimated an additional model that included a measure of electronic data interchange implementation in the relationships (1) between the apparel company and the (downstream) retailer and (2) between the apparel company and the (upstream) contractor, respectively. None of the variables has a significant effect in the model. Although our a priori expectation was that both variables would have an effect on downstream flexibility, we recognize that we may not have fully captured the phenomenon in our measure. Thus, an important topic for further research is to specify in greater detail other components of supply chain initiatives, such as quick response and efficient customer response, to describe how each will manifest itself in a network and, most important, to outline the function of each component with respect to specific governance problems.

Finally, a promising avenue for further research is expansion of the current model to include network effects at the customer level. Conceivably, the way a manufacturer manages a focal customer relationship may affect, and be affected by, the firm's other customers. We hope that future projects will be directed toward extending the unit of analysis in relationship research in this and other directions.

Appendix Response Formats and Scale Items

Downstream Market Uncertainty (MU; Seven-Point Semantic-Differential Scale: Predictable/Unpredictable)

- Consumer demand
- Sales forecasts
- Retail sales
- Consumer style preferences

Apparel Company Flexibility (ACF; Seven-Point Likert-Type Scale: Completely Inaccurate/Accurate Description of Apparel Company)

- Flexibility in response to requests for changes is a characteristic of this apparel company.

- In this relationship, the apparel company is open to the idea of making changes, even after we have made an agreement.
- In this relationship, the apparel company makes it possible for us to make adjustments to cope with changing circumstances.
- This apparel company is open to modifying our agreement if unexpected events occur.
- If a situation arises in which we have different assumptions about our agreement, this apparel company is open to working out a new deal that is acceptable to both of us.
- When unexpected situations arise and we disagree on how to proceed, this apparel company is open to working out a new deal that is acceptable to both of us.
- If our views differ regarding events in our relationship, this apparel company is open to developing a common understanding.

Contractor Qualification (CQ; Seven-Point Likert-Type Scale: Minimal/Extensive Qualification Effort)

- Garment quality (e.g., ability to meet specifications)
- Technical capability (e.g., technical expertise)
- Manufacturing capability (e.g., capacity)
- Financial strength
- Labor conditions (e.g., workers are treated fairly)
- Price competitiveness
- Contractor's performance in other relationships
- Contractor's general business philosophy
- Contractor's reputation among other apparel companies
- Contractor's reputation among other contractors
- Contractor's reputation for on-time delivery

Contractor Hostages (CH; Seven-Point Likert-Type Scale: Strongly Disagree/Agree)

- If we canceled our sourcing agreement with this contractor, the contractor would be required to write off substantial investments.
- If we canceled our sourcing agreement with this contractor, it would hurt this contractor's operations in the season in question.
- If we canceled our sourcing agreement with this contractor, the contractor would have difficulty finding another apparel company to source for in the season in question.
- If we canceled our sourcing agreement with this contractor, finding another apparel company to source for in the same season would have a negative impact on the price this contractor could charge.

Apparel Company (Upstream) Hostages (ACUH; Seven-Point Likert-Type Scale: Strongly Disagree/Agree)

- Replacing this contractor for this particular garment would require us to write off substantial investments.
- If we canceled our sourcing agreement with this contractor, we would have difficulty shipping the required quantity of this garment to the retailer on time for the season in question.
- If we canceled our sourcing agreement with this contractor, we would be forced to compromise on the quality of this garment for the season in question.
- If we canceled our sourcing agreement with this contractor, it would be difficult to find another contractor for this particular garment in the same season.

Qualification by Retailer (RQ; Seven-Point Likert-Type Scale: Minimal/Extensive Qualification Effort)

- Garment quality
- Manufacturing capability (e.g., capacity)
- Financial strength
- Price competitiveness
- Apparel company's general business philosophy
- Apparel company's reputation among other apparel companies
- Apparel company's reputation among other retailers
- Apparel company's quality reputation
- Apparel company's reputation for on-time delivery

Retailer Hostages (RH; Seven-Point Likert-Type Scale: Strongly Disagree/Strongly Agree)

- Replacing this apparel company for this particular garment would require us to write off substantial investments.
- If we canceled our purchase agreement with this apparel company, we would have difficulty obtaining the required quantity of this garment on time for the season in question.

- If we canceled our purchase agreement with this apparel company, we would be forced to compromise the quality of this garment for the season in question.
- If we canceled our purchase agreement with this apparel company, it would be difficult to find another apparel company for this particular garment in the same season.

Apparel Company (Downstream) Hostages (ACDH; Seven-Point Likert-Type Scale: Strongly Disagree/Strongly Agree)

- If we canceled our purchase agreement with this apparel company, the apparel company would be required to write off substantial investments.
- If we canceled our purchase agreement with this apparel company, it would hurt this apparel company's operations in the season in question.
- If we canceled our purchase agreement with this apparel company, the apparel company would have difficulty finding another retailer to sell to in the season in question.
- If we canceled our purchase agreement with this apparel company, finding another retailer to sell to in the same season would negatively impact the price this apparel company could charge.

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