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How to Organize Pricing? Vertical Delegation and Horizontal Dispersion of Pricing Authority

Although pricing is one of the strongest drivers of profitability, little empirical research has examined how a firm should organize pricing internally. This research draws on the information-processing view of organizational design to conceptualize a framework of how firms organize their pricing authority both within the sales function and across the sales, marketing, and finance functions. The authors find a nonlinear, inverted U-shaped relationship between the vertical delegation of pricing authority and profitability as well as a positive relationship between the horizontal dispersion of pricing authority across sales, marketing, and finance and profitability. Another key finding is a positive interaction between vertical delegation and horizontal dispersion, indicating that firms need to jointly design vertical delegation and horizontal dispersion. In addition, the results identify price-related market dynamism as a moderator of the horizontal dispersion of the pricing authority–profitability relationship and emphasis on margin-based incentives as a moderator of vertical delegation of the pricing authority–profitability relationship. The authors also analyze the relationship between the organizational design of pricing authority and sales growth.

Keywords: business-to-business marketing, pricing, pricing authority, sales management, sales force

In many business-to-business (B2B) markets, price levels erode as bargaining power shifts from suppliers to customers and customers become more skilled at exerting price pressure on their suppliers (Cave 2005; Mackintosh 2005; Simon 2005). For example, customer concentration increases, many B2B markets gradually commoditize, and customers professionalize and centralize their procurement (Malhotra and Uslay 2009). This price pressure can have dramatic consequences for B2B suppliers because their pricing significantly, directly, and immediately affects their profitability (Hinterhuber 2004; Monroe 2003; Rao 1984). For example, in the average S&P 500 company, a 1% price decrease leads to a 12.3% profit loss (Garda and Marn 1993). Consequently, suppliers face the considerable challenge of defending their price levels at the customer frontier to secure their own profitability (Frenzen et al. 2010). Thus, having appropriate organizational structures for managing price decisions is increasingly important for any firm's management (Dutta, Zbaracki, and Bergen 2003; Morgan 2011).

The key structural issue in price decision making is the locus of pricing authority, which refers to the influence of a decision unit on pricing decisions (Joseph 2001). This issue raises the central managerial question of who should hold pricing authority within the organization (Dolan and Simon 1996). Researchers still know surprisingly little about this issue, resulting in an important weakness in the current literature stream on pricing. "There is little comparative research how companies go about setting prices" (Noble and Gruca 1999b, p. 459).

We address this deficiency in the literature by drawing on the information-processing view of organizational design to develop a conceptual framework of how firms organize their pricing authority and by linking pricing authority to profitability. The theory's fundamental premise holds that organizational structures should be designed to support decision making by enhancing information flow and interpretation (Galbraith 1974, 1977). We identify two key dimensions of the organizational structure of pricing authority: the vertical delegation of authority over tactical pricing decisions within sales and the horizontal dispersion of authority over strategic pricing decisions across sales, marketing, and finance. In accordance with the contingency view of organizational design, we also consider as moderators the emphasis on margin-based incentives for salespeople and price-related market dynamism. We test our conceptual framework by employing cross-sectional survey data and supplementary archival data on 124 B2B suppliers from seven industries.

This study makes five contributions to the understanding of price management. First, it addresses calls for an empirical clarification of the relationship between vertical delegation of pricing authority and profitability across a wide range of industries (Joseph 2001). Vertical delegation

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of pricing authority refers to the extent to which local salespeople are independent from central sales management in their pricing decisions during negotiations with customers. Although several theoretical models have scrutinized the advantages and disadvantages of vertical delegation, empirical research on performance consequences of vertical delegation is sparse and conflicting. For example, whereas one early study observes a negative association between vertical delegation and performance (Stephenson, Cron, and Frazier 1979), a more recently published investigation finds a positive relationship (Frenzen et al. 2010). Such contradictory findings indicate the possibility of more complex, nonlinear relationships (Cohen et al. 2003; Ganzach 1997).

In contrast to previous empirical studies, which implicitly assume a linear relationship between vertical delegation and pricing performance, we hypothesize an inverted U shape because we posit that a trade-off exists between the advantage of salespeople's superior tacit knowledge and the disadvantage of salespeople's tendency to substitute selling effort for detrimental price discounting (Joseph 2001). The results confirm this reasoning, indicating that the relationship is more complex than previous research has assumed.

Second, this investigation extends prior research on pricing authority by conceptualizing the horizontal (i.e., cross-functional) dispersion of authority over strategic pricing issues and linking it to performance. Horizontal dispersion refers to the degree to which sales, marketing, and finance share influence on strategic pricing decisions. Thus, we address recent calls for "studying marketing leadership and decision-making that are beyond the scope of the marketing department or function" (Hult 2011, p. 530). Research has thus far neglected this horizontal dimension despite strong evidence for substantial dispersion of pricing authority across sales, marketing, and finance (Homburg, Workman, and Krohmer 1999; Mantrala et al. 2010; Verhoef and Leeflang 2009). We find that such horizontal dispersion enhances pricing performance.

A third contribution of this study is to expand the understanding of the interrelationship of the dimension of horizontal dispersion with research on the vertical delegation dimension. In line with firms' need to align their vertical and horizontal structures to enhance organizational effectiveness, we find that horizontal dispersion and vertical delegation complement one another such that horizontal dispersion enhances the advantages and mitigates the disadvantages associated with vertical delegation.

Fourth, following the contingency view of organizational design, this study identifies the emphasis on margin-based incentives for salespeople as an internal moderator and price-related market dynamism as an external moderator affecting the relationship between pricing authority structure and pricing performance. We find that an emphasis on margin-based incentives for salespeople interacts positively with vertical delegation, providing empirical evidence that the design of reward systems can mitigate the agency conflict associated with vertical delegation of pricing authority (Menguc and Barker 2003; Weinberg 1975). Moreover, dynamism of market prices increases the uncertainty of price decision making (Duncan 1972; Frenzen et al. 2010). Our results indicate that the information-processing capabilities of horizontal dispersion are more beneficial under higher uncertainty. In contrast, we do not find a significant interaction of price-related market dynamism with vertical delegation.

Finally, we reestimate our models with sales growth as the dependent variable. The results provide meaningful insights for managers. For example, the relationship between vertical delegation and sales growth is linear, indicating that greater delegation of pricing authority to salespeople is more beneficial for driving sales.

Theoretical Background and Conceptual Model

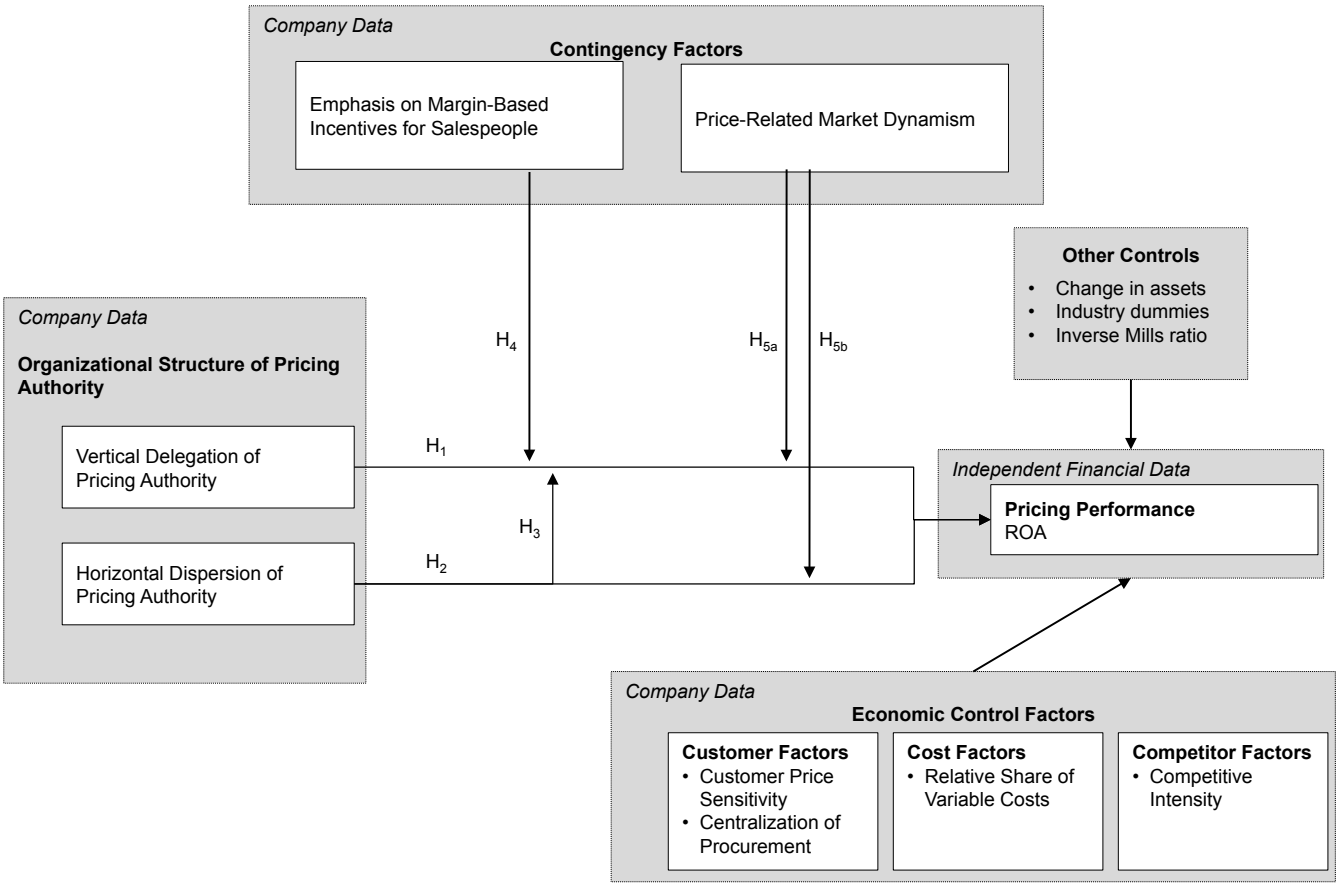
The Information-Processing View of Organizational Design

Figure 1 depicts our conceptual framework. The framework theoretically complements prior research on pricing strategy and pricing authority, which is mainly based on economic or agency theoretic perspectives (e.g., Mishra and Prasad 2004, 2005; Shankar and Bolton 2004). In contrast, we take an organizational theory perspective and ground the selection of variables for our framework in the information-processing view of organizational design. This theory is based on the assumption that organizational structures such as the locus of pricing authority should be designed to support decision making by enhancing the flow and interpretation of information (Galbraith 1974, 1977; Huber and McDaniel 1986; Tushman and Nadler 1978). Thus, the structure of organizations determines their ability to transfer information, to move information across the boundaries within an organization, and to access diverse and specific knowledge and capabilities needed for decision making (Egelhoff 1991; Nonaka 1994).

Because information-processing capabilities are relevant for price decision making, we believe the information-processing view provides an appropriate theoretical background for examining the organizational structure of pricing authority. Price decision making is complex and information intense (Dutta, Zbaracki, and Bergen 2003; Farley, Hulbert, and Weinstein 1980), involving various specialized yet interdependent departments, with each holding specific relevant information (Verhoef and Leeflang 2009). In addition, firms must consider diverse customer, competitor, and cost information from a variety of sources to determine optimal prices (Ingenbleek 2007).

We follow prior empirical research that states that the rather abstract information-processing capabilities are difficult to measure directly, and thus more observable organizational design features must be employed (Egelhoff 1982, 1991). The information-processing view suggests two discrete structural design issues: the vertical, intradepartmental dimension and the horizontal, interdepartmental dimension (Tushman and Nadler 1978). Thus, we conceptualize two key dimensions of the structure of pricing authority: (1) vertical decentralization (i.e., delegation) of pricing authority within the sales function and (2) horizontal decentralization (i.e., dispersion) of pricing authority across the sales,

FIGURE 1
Information-Processing View of the Organizational Design of Pricing Authority



marketing, and finance functions (Galbraith 1977; Nonaka and Nicosia 1979).

These two dimensions differ in their purpose and perspective. The vertical dimension captures pricing authority over tactical, frequent issues such as the negotiation of final terms and conditions with customers. Usually, the sales function makes these decisions because customers in B2B markets claim rebates and negotiate prices individually during direct interactions with the sales department (Dutta, Zbaracki, and Bergen 2003; Frenzen et al. 2010). In contrast, the horizontal dimension focuses on strategic, less frequent, long-term, and fundamental decisions about the price–value positioning over the product life cycle. Sales, marketing, and finance decide on these issues at the core of the headquarters (Egelhoff 1982, 1991; Huber and McDaniel 1986).

Organizational Structure of Pricing Authority

Vertical delegation of pricing authority. The vertical dimension of the structure of pricing authority captures the hierarchical decentralization of authority within the sales function (Egelhoff 1991; Joseph 2001; Randolph and Dess 1984). It focuses on the proximity of tactical price-setting decisions to the customer, which is the extent of discretion that salespeople at the periphery of the customer frontier have on deciding on price levels (Joseph 2001; Mishra and Prasad 2004, 2005). Accordingly, we define vertical delegation of pricing authority as the vertical decentralization of pricing authority within sales, such as the delegation of pricing authority from central management to decentralized salespeople. In contrast, under centralized pricing authority, field representatives must obtain sales managers' approval of their price quotations, such as granting higher rebates (Stephenson, Cron, and Frazier 1979).

Horizontal dispersion of pricing authority. In line with open systems theory, the information-processing view assumes that organizations are composed of specialized and differentiated subunits (Duncan 1972; Galbraith 1977; Randolph and Dess 1984). However, these subunits are interdependent and work on joint tasks such as pricing. Thus, the horizontal dimension of the structure of pricing authority captures the interdepartmental centralization of pricing authority (Farley, Hulbert, and Weinstein 1980; Galbraith 1977; Tushman and Nadler 1978). More specifically, horizontal dispersion of pricing authority refers to the extent to which firms spread influence over strategic pricing issues across sales, marketing, and finance. Such issues encompass the strategic price positioning of new products, the adoption of product prices during the life cycle, the design of the system of discount and bonus terms, and the monitor-

ing and analysis of prices.[1] Horizontal dispersion of pricing authority is maximal when sales, marketing, and finance have an equal say with respect to pricing. In contrast, dispersion is minimal if pricing authority is completely concentrated in one function. This conceptualization of horizontal dispersion is consistent with prior research on dispersion of marketing-related activities (Krohmer, Homburg, and Workman 2002) and on interfunctional influence on marketing activities (Verhoef and Leeflang 2009).

Moderators of the Link Between Organizational Design of Pricing Authority and Pricing Performance

As Tushman and Nadler (1978, p. 613) state, "the generally accepted view of organizational design that has evolved is that the structure of an organization should match or fit characteristics of certain variables both inside and outside the organizational system." Therefore, we include two central price-related contingencies in our conceptual framework: internal design of reward systems (i.e., emphasis on margin-based incentives) and external environmental uncertainty (i.e., price-related market dynamism).

The information-processing view suggests that reward systems motivate employees to draw on relevant information (Galbraith 1977).[2] For salespeople, compensation is the most important financial reward (John and Weitz 1989). Agency theory emphasizes that a variable pay component linked to achieved gross margins aligns the interests of salespeople and the firm (Chen 2005). Thus, we consider the moderating role of an emphasis on margin-based incentives, which refers to the extent to which achieved profitability, rather than sales volume, drives the variable pay component of salespeople (Coughlan and Sen 1985).

In addition, task-specific uncertainty may influence the information-processing effectiveness of related organizational structures (Galbraith 1974; Hill and Hoskisson 1987; Lawrence and Lorsch 1967). Therefore, we consider the role of environmental dynamism, which constitutes a major determinant of uncertainty (Duncan 1972; Tushman and Nadler 1978). Specifically, price-related market dynamism increases a firm's uncertainty associated with tactical and strategic price decision making, and firms must adapt their structure to cope with higher levels of this task-related uncertainty. We define price-related market dynamism as the extent to which prices in the firm's market change frequently.

Pricing Performance

In the current study, the key outcome variable is profitability, defined as the operating profit divided by assets, or return on assets (ROA). Three main factors motivated our choice of this outcome measure. First, pricing decisions have a direct impact on the firm's profitability (Monroe 2003; Rao 1984). Second, ROA is an objective outcome measure (Van Bruggen, Lilien, and Kacker 2002). Third, while salespeople's behavior may also drive sales, we focus on profitability because our research objective is to provide insights into how firms can achieve profitable sales by defending their price levels. In contrast, cutting prices would allow firms to boost sales. However, such a practice may cause detrimental price wars, which destroy the price levels in many B2B industries and undermine profitability (Uslay, Malhotra, and Allvine 2006). Therefore, we consider ROA because it is of greatest relevance for B2B managers facing pricing decisions.

Controls

Our conceptual framework focuses on variables derived from an organizational theory perspective. However, research rooted in economics and pricing strategy suggests that customer-, cost-, and competitor-related factors are central in determining optimal prices (Guiltinan 2011; Noble and Gruca 1999a). Although we do not concentrate on these perspectives, we include a set of variables in our model to control for these factors and to avoid model underspecification.[3]

Regarding customer-related factors, we include customers' price sensitivity to control for their price elasticity (Bolton and Myers 2003). This variable refers to the extent to which customers rely on prices in choosing their suppliers. Moreover, in many industries, customers bundle their bargaining power by shifting their procurement from a local to a global level and establish centralized purchasing departments, which enables them to exert more pressure on their suppliers to capture a larger portion of the economic rent (Kotabe and Murray 2004). Thus, we control for the centralization of customers' purchasing, which refers to the extent to which the firm's customers bundle price information and price negotiations on a central level.

Regarding cost-related factors, we control for the relative share of variable costs that determines the lower floor of the pricing window and thus limits the discretion of price decisions (Noble and Gruca 1999a). Relative share of variable costs refers to the percentage of variable costs relative to the sales volume. Regarding competitor-related factors, we include competitive intensity, which we define as the extent to which competitors' activities place pressure on the firm. Firms operating in industries with high competitive intensity may be forced to lower their margin to counter competitive price pressure. We also control for changes in the firm's asset structure that may affect ROA. Finally, we include industry dummies to control for differing interindustry market conditions that may affect asset intensity and, thus, the ROA of the firms in our sample (Narasimhan, Surendra, and Dutta 2006).

[1]We thank an anonymous reviewer for pointing out that vertical delegation of pricing authority focuses on tactical decisions, while horizontal dispersion of pricing authority focuses on more strategic issues.

[2]We thank the editor, the area editor, and two anonymous reviewers for suggesting that we include the emphasis on margin-based incentives for salespeople in our conceptual framework.

[3]In addition to the reported controls, we included the following variables in prior versions of our models: price–value relative to competition, pricing aggressiveness, price-related performance monitoring, price differentiation, methodological support of pricing, perceived managerial knowledge of willingness to pay, size of the sales force, capacity utilization, and market growth. Our results remain robust to these alternative model specifications. Following suggestions from the area editor and two anonymous reviewers, we excluded these controls from our final models.

Literature Review

Vertical Delegation of Pricing Authority

The literature extensively covers the issue of vertical delegation of pricing authority, with widely varying results (see Table 1). While early theoretical insights evaluate vertical delegation positively (Weinberg 1975), empirical results argue against delegating pricing authority to sales personnel (Stephenson, Cron, and Frazier 1979). Subsequently, researchers have built theoretical models to accommodate the contradictory results of the early empirical and theoretical work. Some models find high vertical delegation to be at least as profitable as low vertical delegation in some situations (Joseph 2001; Lal 1986). Other studies arrive at a less convincing evaluation of vertical delegation and find low vertical delegation to be at least as profitable as high vertical delegation in most situations (Mishra and Prasad 2004, 2005). Recent empirical research finds a positive relationship between vertical delegation and pricing performance (Frenzen et al. 2010).

Because the empirical studies are contradictory and have focused on narrow sets of industries, we designed the current study to accommodate the findings and to provide more general insights. Specifically, we employ a cross-industry sample to more closely investigate the functional form of the relationship between vertical delegation of pricing authority and pricing performance across a broad range of industries under ceteris paribus conditions.

Horizontal Dispersion of Pricing Authority

As Table 1 shows, literature on horizontal dispersion of pricing activities is scarce and essentially descriptive. However, two studies of marketing's influence within the firm provide strong evidence for substantial horizontal dispersion of pricing authority across functions (see Table 2) and demonstrate that sales, marketing, and finance are the most influential functions regarding pricing (Homburg, Workman, and Krohmer 1999; Verhoef and Leeflang 2009). Indeed, "rarely is there a single organizational function with formal responsibility for pricing decisions" (Smith 1995, p. 28). Thus, horizontal dispersion of pricing authority is a major dimension of the organizational structure of pricing authority in contemporary organizations (Hult 2011; Verhoef and Leeflang 2009). However, to the best of our knowledge, no study has conducted a rigorous empirical test of hypotheses pertaining to outcomes of the horizontal dispersion of pricing authority. Parallel literature on overall horizontal dispersion of marketing activities has found a positive performance association (Krohmer, Homburg, and Workman 2002), albeit without a specific focus on pricing.

Hypotheses Development

Organizational Structure of Pricing Authority

Vertical delegation of pricing authority. Vertical delegation of pricing authority is associated with both advantages and disadvantages (Dolan and Simon 1996; Joseph 2001; Nagle and Hogan 2006). We hypothesize that across firms, after a certain threshold, increasing disadvantages associated with delegating pricing authority overwhelm the advantages. This effect would result in a curvilinear, inverted U-shaped functional form of the relationship between vertical delegation and profitability.[4]

From an information-processing view, salespeople span the organizational boundary between the firm and its customers (Nonaka 1994). Salespeople are close to the customer market frontier because they spend most of their work time in the field and interact with customers regularly (Mishra and Prasad 2004; Zbaracki 2007). From these interactions, salespeople gain context-rich tacit information about customers and competitors: "Good salespeople know what customers need and want and the sales prospects of the market they serve" (Chen 2005, p. 60; see also Bhardwaj 2001; Joseph 2001). Such tacit knowledge mostly resides lower in the organizational hierarchy, at the salesperson level, because it is difficult to formalize or communicate to the central sales management. Tacit knowledge is deeply rooted in the context of the specific salesperson–customer relationship and its history of interactions (Huber and McDaniel 1986; Nonaka 1994). Therefore, the "salesperson seems to have a better understanding of the selling environment than the sales manager, who is significantly removed from the scene of action" (Lal 1986, p. 166). The integration of such knowledge is critical to the successful negotiation of prices with customers and, subsequently, defense of the firm's price level and profitability (Nonaka 1994).

However, centralizing pricing authority at the sales management level restricts salespeople during customer interactions because they have no discretion to grant rebates. Without further approval from their sales managers, salespeople can only close deals with customers willing to pay the firm's list price, and such hierarchical approvals are time-consuming and hinder salespeople's flexibility (Galbraith 1977). Speed of response is crucial in B2B settings because the majority of final purchase decisions are made during direct negotiations between salespeople and customers (CMO Council 2008; Farley, Hulbert, and Weinstein 1980). Customers could perceive the need for central price approvals as a manipulative negotiation tactic (Fisher, Ury, and Patton 1991) and may feel affronted when the supplier's salespeople have insufficient pricing authority to close the deal (Frenzen et al. 2010).

In contrast, vertical delegation increases salespeople's autonomy and flexibility in pricing decisions (Frenzen et al. 2010; Joseph 2001). Such perceived autonomy motivates salespeople to draw on their customer-related tacit knowledge and increases their self-efficacy, which may help them succeed in negotiating prices (Nonaka 1994; Wang and Netemeyer 2002).

The most important disadvantage of vertical delegation of pricing authority is the increasing information asymmetry of sales managers regarding the salespeople's selling effort (Chen 2005). At low levels of vertical delegation,

[4]It is important to note that we developed our hypotheses across firms in different markets and not within firms. We thank an anonymous reviewer for suggesting that we clarify this issue.

TABLE 1
Selected Research on the Horizontal Dispersion and Vertical Delegation of Pricing Authority

Authors	Methodological Approach	Selected Insights
Horizontal Dispersion of Pricing Authority		
Homburg, Workman, and Krohmer (1999) Krohmer, Homburg, and Workman (2002)	Survey of 514 business units from 3 industry sectors (consumer packaged goods, electrical equipment and components, mechanical machinery) in the United States and Germany	Sales has the highest influence on pricing decisions (41/100), followed by marketing (30/100), finance/accounting (16/100), manufacturing (9/100), and research and development (4/100).
Lancioni, Schau, and Smith (2005)	Survey of 125 U.S. companies from 30 industries	Finance is the greatest roadblock to the development of general pricing strategies in firms (45/125), followed by accounting (37/125), sales (20/125), and production (12/125).
Verhoef and Leeflang (2009)	Survey of 123 Dutch companies from various industries	Sales has the highest influence on pricing (48/100), followed by marketing (20/100), finance (18/100), and research and development (13/100).
Vertical Delegation of Pricing Authority		
Bhardwaj (2001)	Game theoretic model	Under intense price competition, firms delegate the pricing decision to the sales representative, and the representatives set a higher price. When firms adjust their commission rates, the increase in risk premium is more than compensated for by the higher price, leading to a higher profit.
Joseph (2001)	Decision theoretic model	Providing the salesperson with full authority is not always optimal. In some environments, full pricing authority is best. In others, limiting pricing authority is appropriate because it forces the salesperson to target high-valuation customers. When pricing authority is limited, the commission rate should be higher, not lower.
Frenzen et al. (2010)	Survey of 181 companies from two German industries	Greater information asymmetry and greater difficulty of input measurement lead to a higher degree of delegation of pricing authority to salespeople. Higher risk aversion of salespeople leads to a lower degree of delegation of pricing authority to salespeople. Uncertainty and customer heterogeneity do not have significant effects on delegation of pricing authority to salespeople. Delegating pricing authority to salespeople positively influences performance. This effect is stronger under conditions of high information asymmetry and high uncertainty. This effect is not significantly moderated by customer heterogeneity.
Lal (1986)	Agency theoretic model	Delegating the price responsibility to the salesperson is as profitable as centralization when the salesperson and the sales manager have identical information about the selling environment. When the salesperson's information is superior to that of the sales manager, delegation may be more profitable if the gains from price customization exceed the information rents that need to be paid to the salespeople.
Mishra and Prasad (2004)	Agency theoretic model	For a broad class of situations, it is no worse for the firm to set prices centrally than to delegate the pricing authority.
Mishra and Prasad (2005)	Agency theoretic model	In a competitive market, centralization and decentralization are equally preferable under symmetric information. Under asymmetry, an equilibrium always exists when all firms use centralized pricing, regardless of the intensity of competition.
Stephenson, Cron, and Frazier (1979)	Survey of 108 wholesalers of medical supplies and equipment in the United States	Delegating pricing authority to the sales force generates the lowest sales and profit performance.
Weinberg (1975)	Agency theoretic model	If commissions are paid as a percentage of gross margin, the salesperson can be given control of price.
The current study	Survey of 124 companies from various B2B industries in Germany	Vertical delegation of pricing authority has a nonlinear, inverted U-shaped relationship to profitability. Horizontal dispersion of pricing authority has a linear positive relationship to profitability. Horizontal dispersion of pricing authority positively moderates the relationship between vertical delegation of pricing authority and profitability. Price-related market dynamism positively moderates the relationship between horizontal dispersion of pricing authority and profitability. Emphasis on margin-based incentives positively moderates the relationship between vertical delegation of pricing authority and profitability.

TABLE 2
Decision Influence Across Functions

	Sales	Marketing	Finance
Overall Influence on Pricing			
Homburg, Workman, and Krohmer (1999)	41	30	16
Verhoef and Leeflang (2009)	48	20	18
The Current Study			
Overall influence on strategic pricing	51	28	21
Specific influence on…			
…Strategic price positioning of new products	45	37	18
…Adaption of list prices/price guidelines	52	31	17
…Design of discount and bonus terms	70	17	13
…Monitoring and analyzing prices	38	27	35

Notes: Scores are based on respondents' allocation of 100 points. The scores of Verhoef and Leeflang (2009) and Homburg, Workman, and Krohmer (1999) do not sum up to 100 because (1) Homburg, Workman, and Krohmer (1999) also measured research and development (4/100) and operations (9/100) influence on pricing and (2) Verhoef and Leeflang (2009) also measured research and development (13/100) influence on pricing.

sales managers must approve salespeople's price discounts. Delegating more pricing authority to salespeople increases their autonomy to decide on prices without further approvals and fosters the sales manager's information asymmetry. In particular, sales managers have difficulty observing whether an erosion of price levels in a specific sales area is caused by salespeople's insufficient effort to defend the firm's profit margin or by other factors, such as aggressive competitors. In short, information asymmetry may tempt salespeople to "play it safe to get the order" (Dolan and Simon 1996, p. 313; see also Joseph 2001; Langerak 2001; Stephenson, Cron, and Frazier 1979). For example, to avoid lengthy and stressful negotiations with a customer, a salesperson with greater pricing authority may grant an unnecessary rebate. Requiring approval for such a rebate from central sales management allows sales management to inquire about the reason for the intended rebate, decreasing management's information asymmetry. Consequently, fewer suboptimal rebates are likely to be granted when vertical delegation is low (Dolan and Simon 1996; Hansen, Joseph, and Krafft 2008; Joseph 2001).

Therefore, ceteris paribus, we hypothesize that increasing vertical delegation improves profitability across firms, though after a certain threshold it results in negative profitability outcomes. We expect this hypothesis to be stable across a variety of B2B industries, because in most markets, firms rely heavily on salespeople to negotiate individual net prices with customers (Frenzen et al. 2010). Consequently, we state our first hypothesis as follows:

H_1: Across firms, a nonlinear, inverted U-shaped relationship exists between vertical delegation of pricing authority and ROA.

Horizontal dispersion of pricing authority. The information-processing view proposes that cross-functional interactions between organizational subunits during decision making enhance a firm's information-processing capabilities (Galbraith 1977; Nonaka 1994). More specifically, a greater cross-functional dispersion of influence over strategic pricing issues involves sales, marketing, and finance more strongly in the decision-making process, such that these functions interact more often and more intensely. These frequent and intense interactions enhance the quality of price decision making because each function pays attention to specific kinds and sources of new information, tends to interpret situations through different lenses and methods, and decides on prices according to its own thought world (Hall and Saias 1980; Homburg and Jensen 2007; Zbaracki 2007).

Furthermore, information sources for price decision making become more diverse with increasing horizontal dispersion of pricing authority. For example, marketing draws product, market, and customer information from formal market analyses to develop long-term strategies. Finance and accounting hold precise and timely accounting data for setting cost-oriented price floors (Lancioni, Schau, and Smith 2005; Zinkhan and Verbrugge 2000). From direct customer interactions, the sales department obtains information about competitors' list prices and rebates that may otherwise not be available (Dutta, Zbaracki, and Bergen 2003).

In addition, the diversity of information interpretation methods steadily increases as "hard" technical methods—such as market segmentation with conjoint analysis by the marketing department and financial cash flow modeling methods of the finance department—can be combined or contrasted with "soft" contextual interpretation of tacit sales know-how (Bolton and Myers 2003; Rouzies et al. 2009). Furthermore, the richness of perspectives in price decision making continues to grow as sales, marketing, and finance each have different thought worlds (Homburg and Jensen 2007). For example, research shows that sales tends to be short term and customer oriented, marketing long term and product oriented, and finance short term and capital market oriented (Dougherty 1992; Homburg and Jensen 2007; Lancioni, Schau, and Smith 2005). Contrasting such thought worlds can be beneficial regarding profitability (Homburg and Jensen 2007).

Therefore, horizontal dispersion of pricing authority increases the information flow and interpretation by more diverse types and sources of information, of interpretation methods, and of thought worlds. Furthermore, dispersion induces a climate of cross-functional communication and information exchange, which helps mitigate the isolation of

functional areas (Rouzies et al. 2009). Such exchange yields price-related information-processing capabilities that are superior to focusing on individual perspectives: "If diverse orientations enter the discussion, more arguments are processed, more alternatives are pondered, different skills are shared, and the quality of decisions increases" (Homburg and Jensen 2007, p. 128; see also Eisenhardt and Schoonhoven 1990; Jehn and Mannix 2001). Such diversity has also been shown to increase profitability (Balasubramanian and Bhardwaj 2004). Specifically, "wrong pricing decisions can be avoided if the voices of marketing, sales and finance are all taken into consideration" (Krohmer, Homburg, and Workman 2002, p. 455). We believe that this hypothesis holds across a wide range of B2B industries under ceteris paribus conditions as pricing authority is dispersed across sales, marketing, and finance in most B2B firms (Verhoef and Leeflang 2009). Thus:

H_2: Across firms, horizontal dispersion of pricing authority is positively related to ROA.

Vertical delegation of pricing authority and horizontal dispersion of pricing authority. The coherence between different organizational structures is a primary determinant of organizational effectiveness (Galbraith 1977). Thus, firms should jointly design the horizontal dispersion and vertical delegation of pricing authority to align top-level strategic pricing decisions with tactical pricing decisions within sales. We hypothesize that higher levels of horizontal dispersion and vertical delegation are complementary.

Under conditions of greater horizontal dispersion, the central advantage of vertical delegation diminishes more slowly. For higher levels of horizontal dispersion, the enhanced diversity of price-related information at the core of the headquarters complements salespeople's tacit knowledge. As we stated previously, salespeople with more authority to decide on their prices are also more motivated to draw on such task-related information (Nonaka 1994; Wang and Netemeyer 2002). For example, salespeople may overcome biases regarding their own firm's competitive positioning because marketing can provide detailed competitor profiles. Moreover, as the firm streamlines the strategic price–value proposition of the firm, developed at the headquarters, and the sales tactics at the customer interface, the firm's offering becomes more consistent. Consistency is beneficial; currently, many firms struggle with frictions between their marketing strategy and their sales approach (CMO Council 2008). In contrast, when strategic pricing authority is concentrated within one function, the diversity of price-related information is lower, and salespeople benefit less from other functional perspectives.

Under conditions of greater horizontal dispersion, the risk of salespeople trading off selling effort for price discounting, which is the central disadvantage of vertical delegation, increases more slowly. Greater horizontal dispersion implies that various functional areas monitor and analyze prices, helping control the match between realized net prices and the list prices. For example, integrating precise customer account data from finance and accounting fosters the detection of individual salespeople who deviate from list prices frequently (Dutta, Zbaracki, and Bergen 2003), potentially reducing the information asymmetry between sales management and individual salespeople. In contrast, when horizontal dispersion is low, information asymmetry cannot be additionally mitigated, because the boundaries of the functional silos are not spanned. Thus:

H_3: Across firms, the degree of horizontal dispersion of pricing authority positively moderates the relationship between vertical delegation of pricing authority and ROA.

Moderators of the Link Between Organizational Structure of Pricing Authority and Pricing Performance

Emphasis on margin-based incentives. When salespeople are able to act autonomously, the direction of their effort is a major determinant of their sales performance. The information-processing view holds that firms can install reward systems to motivate individual employees to draw on their task-specific knowledge (Galbraith 1977). Similarly, agency theory suggests including incentives in salespeople's compensation plans to increase their motivation to invest their effort according to the firm's goals (Menguc and Barker 2003; Weitz, Sujan, and Sujan 1986). Specifically, margin-based incentives should motivate salespeople to strive harder for the firm's profitability because these incentives establish a direct link between salespeople's performance and their financial rewards (Basu et al. 1985; Coughlan and Sen 1985; Lal 1986; Weinberg 1975). Moreover, such margin-based incentives are especially effective for difficult-to-observe activities conducted outside the firm's organizational boundaries, such as negotiating prices with customers (Joseph and Thevaranjan 1998). Thus, across firms, the disadvantage arising from salespeople's tendency to trade off selling effort for price discounting increases more slowly, and we hypothesize the following:

H_4: Across firms, the use of margin-based incentives for salespeople positively moderates the relationship between vertical delegation of pricing authority and ROA.

Price-related market dynamism. Prior research has shown that market-related uncertainty positively moderates a linear relationship between vertical delegation of pricing authority and performance because greater vertical delegation at the customer frontier allows the firm to match changing prices more quickly (Frenzen et al. 2010). Allowing salespeople to act more autonomously adds to their flexibility and their motivation to acquire and interpret new information more quickly and to react to changing circumstances (Nonaka 1994). This advantage is even more pronounced in highly dynamic markets, in which pricing decisions at the customer frontier must be made quickly because the opportunity to contact central sales management may not be present at all (Mishra and Prasad 2004). Thus, salespeople's ability to react rapidly and decide quickly on tactical pricing issues is more valuable. Accordingly, we offer the following hypothesis:

H_{5a}: Across firms, price-related market dynamism positively moderates the relationship between vertical delegation of pricing authority and ROA.

The literature contains two conflicting opinions on the moderating role of market dynamism for the relationship between horizontal dispersion and pricing authority. One argument is that in rapidly changing markets, dispersion of decision making across functions is not worth its cost, because the required time and managerial effort outweigh its benefits (Krohmer, Homburg, and Workman 2002). We opt for the second view—that horizontal dispersion of pricing authority is more beneficial in highly dynamic markets because the law of requisite variety states that organizations must match highly uncertain environments with more complex and comprehensive information-processing structures (Ashby 1956; Tushman and Nadler 1978). More dynamic markets are characterized by high uncertainty and thus call for more lateral, cross-functional involvement and participation of various departments in strategic price decision making (Galbraith 1977; Siggelkow and Rivkin 2005). This approach allows a more comprehensive evaluation of price-related information to determine optimal prices (Maltz and Kohli 1996) and also generates more alternatives for price decision making, which has been shown to be especially beneficial in turbulent markets (Eisenhardt and Bourgeois 1988). Therefore, across firms, higher levels of dynamism require more dispersion of authority over strategic pricing issues:

H_{5b}: Across firms, the degree of price-related market dynamism positively moderates the relationship between horizontal dispersion of pricing authority and ROA.

Method

Main Sample

To test our hypotheses on a broad empirical basis, we conducted a cross-sectional mail survey in Germany. The unit of analysis is a business unit within a firm or, if the firm has only one business unit, the entire firm. We obtained a random sample of 2150 business units and firms from a commercial list provider. We then contacted these organizations by telephone to identify the executive with the best overview of price setting. In this process, we excluded 276 organizations as inappropriate for the study. After a personalized mailing and follow-up telephone calls, the appropriate executive in 351 of the remaining 1874 organizations returned a questionnaire, for a response rate of 19%. Armstrong and Overton's (1977) suggested tests yielded no significant differences between the responses from early versus late respondents for all our constructs and for key demographic variables, indicating that nonresponse bias is not a problem in our data. To further ensure the appropriateness of the respondents, the questionnaire asked for their professional experience, and we excluded nine respondents because their experience was less than 5 years. Respondents' average job experience in marketing and sales was 18.78 years, with a median of 18 years. Finally, an open-ended question asked whether the questionnaire omitted an important pricing challenge that their firm is facing. We excluded 13 respondents because they mentioned omissions. Table 3 describes the composition of the remaining respondents.

Second Informant Data

For further validation, we asked the respondents to name a second informant within their organization (Van Bruggen, Lilien, and Kacker 2002). We obtained 77 contacts, of whom 52 (68%) responded. We again probed for a potential nonresponse bias. Table 3 compares the composition of the second informants with the main sample and reports chi-square goodness-of-fit tests. For none of the three demographic variables is the null hypothesis of equal proportions rejected, which indicates no major bias. Because the compositions of the main sample and the validation sample are comparable, we can proceed to scrutinize the level of agreement between first and second informants. We used the average deviation from the mean (AD_M) to measure (dis)agreement, with an acceptable range of [0; 1] for the six-point scales (Burke and Dunlap 2002). As the Appendix shows, AD_M across respondents does not exceed the acceptable level for any of the items of our perceptual variables. In addition, AD_M across scale items does not exceed the acceptable level for any respondent. Thus, these measures indicate no validity problems within our main sample of key informants.

Independent Financial Data

To measure pricing performance and to mitigate common method variance (Podsakoff et al. 2003), we obtained independent financial data on ROA for 124 firms from annual reports, from financial databases, and from the firms' websites (Morgan, Vorhies, and Mason 2009). We computed ROA one year after our questionnaire (Rindfleisch et al. 2008). Unfortunately, because public disclosure requirements are less comprehensive in Europe than in the United States, we could not obtain financial performance data for many family-, foundation-, and state-owned companies. For strategic business units, to ensure a consistent unit of analysis, we retrieved data from unconsolidated statements at the lowest available organizational level (Homburg, Grozdanovic, and Klarmann 2007). To test whether we had captured the appropriate level of analysis, we employed sales volume as a proxy for organizational size and correlated the archival data on sales volume with the self-reported data on sales volume. This correlation is positive and significant ($r = .95$, $p < .01$), indicating that the unit of analysis is consistent in terms of size.

To assess a potential availability bias, we compared the proportions of industries, respondent positions, and revenues with the main sample using a chi-square goodness-of-fit test. As Table 3 reports, the null hypothesis of equal proportions is not rejected for any of the three demographic variables. In addition, we compared construct means for observations with and without independent data. None of the perceptual variables showed significant differences ($p > .05$). Thus, we find no indication of a major availability bias. Nevertheless,

TABLE 3
Sample Composition

	Main Sample (%)	Independent Financial Data (%)	Second Informant Data (%)
Industry			
Machinery	32	39	27
Chemical	21	15	25
Electronics	16	15	15
Building materials	11	15	15
Plastics and rubber	8	6	8
Medical equipment	5	5	8
Other B2B	7	5	2
Goodness of fit with main sample H_0: equal distribution as in main sample		$\chi^2 = 8.2$ ($p = .22$)	$\chi^2 = 4.3$ ($p = .64$)
Position of Respondent			
Head of sales	28	29	26
Member of management board	24	28	18
Head of marketing	13	16	22
Head of business unit	10	8	16
Corporate staff	4	3	4
Head of product management	4	2	6
Head of finance/accounting	3	5	2
Price manager	2	2	2
Other	12	8	4
Goodness of fit with main sample H_0: equal distribution as in main sample		$\chi^2 = 6.1$ ($p = .63$)	$\chi^2 = 9.0$ ($p = .35$)
Revenues (in Millions of Euros)			
< 25	14	10	6
25–49	19	21	21
50–99	25	23	20
100–199	18	22	19
200–499	14	14	16
500–999	4	5	12
1000–2000	4	5	6
> 2000	2	2	2
Goodness of fit with main sample H_0: equal distribution as in main sample		$\chi^2 = 4.55$ ($p = .71$)	$\chi^2 = 11.3$ ($p = .13$)

we specify a two-step Heckman selection model to account for a potential selection bias (Heckman 1979).

Measurement

We designed the questionnaire after reviewing the literature and examining the results from qualitative interviews with 59 managers. We adapted as many scale items as possible from existing literature, but owing to sparseness of empirical research on both vertical delegation and horizontal dispersion of pricing authority, we also had to develop original measures. We pretested our measures and refined items according to comments from practitioners and academics. We used two types of perceptual measures: reflective scales and formative indexes. The Appendix provides items and properties of our measures.

Reflective measures. A reflective measurement model is appropriate if the observed variables can be viewed as interchangeable manifestations of an underlying construct (Bagozzi and Baumgartner 1994). We apply a reflective model to measure vertical delegation of pricing authority, the emphasis on margin-based incentives, price-related market dynamism, customers' price sensitivity, centralization of purchasing, and competitive intensity. We assessed the reflective measures using confirmatory factor analysis, and each construct exhibits a composite reliability of at least .75 (Bagozzi and Yi 1988). As Table 4 shows, for any pair of latent variables, the square roots of average variances extracted are higher than the correlation, which supports the discriminant validity of the reflective measures (Fornell and Larcker 1981). In addition, the fit of a confirmatory factor analysis containing all reflective constructs is satisfactory (χ^2/d.f. = 1.86, comparative fit index = .95, root mean square error of approximation = .05, and standardized root mean square residual = .05).

Formative indexes. A formative measurement model is appropriate if a construct is a summary index of observed variables that define and determine the construct without necessarily being correlated (Jarvis, MacKenzie, and Podsakoff 2003). We use a formative index to measure horizontal dispersion of pricing authority because, for example, domination of strategic price positioning of new products by marketing does not imply that marketing also dominates the adaptation of list prices and price guidelines. Moreover, treating influence as an index has a long tradition in management research (Eisenhardt and Bourgeois 1988; Hinings et al. 1974) and in marketing organization research (Homburg, Workman, and Krohmer 1999; Piercy 1989) and has

TABLE 4
Descriptive Statistics and Correlations

Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1. ROA	.08	.08	—								
2. Vertical delegation of pricing authority	3.49	1.21	.21*	(.87)							
3. Horizontal dispersion of pricing authority	44.01	19.06	.13	–.16	—						
4. Margin orientation of incentives	2.95	1.43	.09	.12	.08	(.79)					
5. Price-related market dynamism	3.61	1.16	–.25*	–.20*	.13	–.04	(.76)				
6. Customers' price sensitivity	4.10	.95	–.12	–.09	–.02	–.02	.49*	(.83)			
7. Centralization of procurement	3.84	1.20	–.17	–.14	.13	–.03	–.09	.34*	(.79)		
8. Relative share of variable costs	43.05	18.56	–.11	–.07	–.06	.01	–.04	.04	.03	—	
9. Competitive Intensity	4.52	.87	–.24*	–.06	.15	–.08	.60*	.40*	.31*	.09	(.72)

*$p < .05$.
Notes: Values in parentheses on the main diagonal show the square root of average variance extracted.

recently been recognized as a state-of-the-art measure (Verhoef and Leeflang 2009).

Four critical issues in the construction of formative indexes are content specification, indicator specification, indicator collinearity, and external validity (Diamantopoulos and Winklhofer 2001). With regard to content specification, we carefully defined each construct. We specified the indicators on the basis of these definitions, our literature review, and the 59 interviews. The items that constitute the dispersion measure cover the core strategic pricing issues in the product life cycle: defining the initial price for a new product, adapting the list price in the course of time, defining a system for customer-specific discounts on this list price, and monitoring and analyzing the achieved prices.

Indicator collinearity is a problem in formative index construction if one item is an almost perfect linear combination of the other. In that case, the item is likely to contain redundant information and be a candidate for exclusion from the index (Bollen and Lennox 1991; Diamantopoulos and Winklhofer 2001). To assess the extent of redundant information, we computed the squared bivariate interindicator correlations. The highest value that occurred was .43 (dispersion of strategic price positioning of new products vs. dispersion of adaption of list prices). Given this extent of shared variance, we concluded that the exclusion of items is not indicated.

To assess the external validity of the four items of horizontal dispersion of pricing authority, we correlated each item to an external constant-sum measure of horizontal dispersion of pricing authority (Diamantopoulos and Winklhofer 2001). All correlations are significant at a .01 level, which supports the external validity of the measures (Dillon 2001).

For each of the four pricing items, the respondents assessed the influence of sales, marketing, and finance by dividing 100 points among these functions. We focused on the sales, marketing, and finance functions because they have been shown to be the most influential functions regarding pricing (see Table 2). For example, sales, marketing, and finance accounted for 86% (Verhoef and Leeflang 2009) or 87% (Homburg, Workman, and Krohmer 1999) of the influence on pricing decisions. We followed established procedures to calculate horizontal dispersion (Krohmer, Homburg, and Workman 2002). We first determined the standard deviation of the influence ratings for each item of horizontal dispersion, and then, to obtain an aggregate measure across the four items, we determined the mean of these standard deviations. Finally, we reversed the measure such that higher values indicate higher dispersion.

For the regression models, we computed composite measures of the reflective and formative multi-item measures by calculating the average of the items. All variables were centered on their mean to facilitate meaningful interpretation of interaction coefficients (Cohen et al. 2003).

Model Specification

As mentioned previously, our regression estimates may be biased owing to our selection process, because in the analysis of the relationship between the independent variables and profitability, we included only firms for which independent financial data were available. To address this issue, we employed a two-stage Heckman (1979) selection model. In the first stage, we estimated a probit model with the availability of independent financial data on ROA as the binary dependent variable. All variables included in subsequent models and additional variables (i.e., legal form and size) constitute the set of independent variables (Wooldridge 2009). From this model, we compute the inverse Mills ratio, defined as the ratio of the probability density function to the cumulative density function, and include this inverse Mills ratio in the subsequent regressions to account for a potential selection bias.[5]

In the second stage of the model, we test our hypotheses. The dependent variable is ROA and the predictors are the variables capturing the structure of pricing authority, the interaction terms, the inverse Mills ratio, and control variables. To analyze H_1, we include a quadratic term of vertical delegation. As stated previously, we centered vertical delegation on its mean before creating the quadratic term for easier interpretation of the coefficients (Cohen et al. 2003) without altering the functional form of the relationship (Echambadi and Hess 2007). We include a quadratic term of horizontal dispersion to control for a potential nonlinear relationship. Thus, we specify our regression model as follows:

$$\begin{aligned}ROA = {} & \beta_0 + \beta_1 \times VER + \beta_2 \times VER^2 + \beta_3 \times HOR + \beta_4 \times HOR^2 \\ & + \beta_5 \times VER \times HOR + \beta_6 \times VER^2 \times HOR \\ & + \beta_7 \times VER \times MAR + \beta_8 \times VER^2 \times MAR \\ & + \beta_9 \times VER \times DYN + \beta_{10} \times VER^2 \times DYN \\ & + \beta_{11}\, HOR \times DYN + \beta_{12} \times \lambda + \beta_{controls} CONTROLS + \varepsilon,\end{aligned}$$

where ROA is return on assets, VER is the vertical delegation of pricing authority, HOR is the horizontal dispersion of pricing authority, MAR is the emphasis on margin based incentives, DYN is the price-related market dynamism, λ is the inverse Mills ratio, and CONTROLS includes the following variables: emphasis on margin based incentives, price-related market dynamism, customer price sensitivity, centralization of purchasing, relative share of variable costs, competitive intensity, changes in assets, and industry dummies.

[5]We specify the model as follows: $AVA = \beta_0 + \beta_1 \times VER + \beta_2 \times VER^2 + \beta_3 \times HOR + \beta_4 \times HOR^2 + \beta_5 \times SIZ + \beta_6 \times LEG + \beta_{controls} Controls + \varepsilon$, where AVA is a binary variable indicating whether independent financial data are available, VER is the vertical delegation of pricing authority, HOR is the horizontal dispersion of pricing authority, SIZ is the size of the company measured as the number of employees, LEG is the legal form of the company and is 1 if the company is a public limited company, and Controls includes the following variables: emphasis on margin-based incentives, price-related market dynamism, customer price sensitivity, centralization of purchasing, relative share of variable costs, and competitive intensity. The results show that vertical delegation of pricing authority ($\beta_1 = 1.23$, $p < .01$), the squared term of vertical delegation of pricing authority ($\beta_2 = .88$, $p < .05$), the squared term of horizontal dispersion of pricing authority ($\beta_4 = 1.00$, $p < .10$), legal form ($\beta_6 = 2.83$, $p < .01$), and competitive intensity ($\beta = .87$, $p < .10$) are significantly associated with the availability of independent financial data. The model shows acceptable fit indexes (pseudo $R^2 = .15$; Wald $\chi^2 = 59.31$, $p > \chi^2 = .01$).

Results

Descriptive Results

Table 2 depicts the influence of sales, marketing, and finance on overall and specific pricing decisions. On a constant-sum scale of 100 points, the mean influence of sales on overall pricing decisions is 51, the mean influence of marketing is 28, and the mean influence of finance is 21, a rank order consistent with prior findings (Homburg, Workman, and Krohmer 1999; Verhoef and Leeflang 2009). Regarding influence on specific pricing decisions, the sales function is by far the most influential in the design of discount and bonus systems (70 of 100 points). The marketing function has its greatest influence on the strategic price positioning of new products (37 of 100 points) and on the adaptation of list prices and price guidelines (31 of 100 points). The finance function is primarily influential in monitoring and analyzing prices (35 of 100 points). Overall, the results confirm substantial horizontal dispersion of pricing authority across sales, marketing, and finance.[6]

Table 5 shows the mean value for the vertical structure of pricing authority, which is 3.48 on a six-point scale (6 = "high level," and 1 = "low level"). This value is close to the

[6]In a previous version of this article, we also included another item: negotiation of prices and discounts with customers. We thank an anonymous reviewer for pointing out that this item deals with transactional pricing, which is inconsistent with the more strategic pricing issues covered by the other four items. In line with this reasoning, the results show that sales dominates this decision (84 of 100 points), indicating that such decisions are rarely influenced by other functions to a substantial extent. Therefore, we excluded this item from the measure of horizontal dispersion of pricing authority.

TABLE 5
Results of Hypotheses Tests

Dependent Variable: ROA	Model 1	Model 2	Model 3	Model 4	Model 5
Vertical delegation of pricing authority	.41***	.34***	.46***	.41***	.40***
(Vertical delegation of pricing authority)^2	–.34***	–.34***	–.27**	–.43***	–.30**
Horizontal dispersion of pricing authority	.23***	.45***	.23***	.25***	.42***
(Horizontal dispersion of pricing authority)^2	.09	.04	.12	–.08	–.02
Vertical delegation of pricing authority × Horizontal dispersion of pricing authority		.25*			.27**
(Vertical delegation of pricing authority)^2 × Horizontal dispersion of pricing authority		–.61***			–.55***
Vertical delegation of pricing authority × Emphasis on margin-based incentives			.30**		.26**
(Vertical delegation of pricing authority)^2 × Emphasis on margin-based incentives			–.39**		–.33**
Vertical delegation of pricing authority × Price-related market dynamism				.00	.01
(Vertical delegation of pricing authority)^2 × Price-related market dynamism				–.04	.06
Horizontal dispersion of pricing authority × Price-related market dynamism				.26***	.17*
Moderators					
Emphasis on margin-based incentives	–.01	–.01	.08	.02	.08
Price-related market dynamism	.00	.02	–.03	.08	–.02
Customer Controls					
Customers' price sensitivity	.04	.07	.06	–.01	.07
Centralization of procurement	–.22**	–.21**	–.22**	–.19**	–.21**
Cost Controls					
Relative share of variable costs	.06	.06	.08	.09	.08
Competitor Controls					
Competitive intensity	–.16**	–.20***	–.16**	–.18**	–.20***
Other Controls					
Change in assets	.05	.03	.07	.04	.04
Inverse Mills ratio	.17*	.16	.17*	.23**	.20*
Industry dummies	Included	Included	Included	Included	included
Observations	124	124	124	124	124
R^2	.24	.29	.28	.29	.34
Adjusted R^2	.12	.16	.14	.15	.18
F	1.98**	2.25***	2.08**	2.07***	2.16***
ΔR^2	.13	.05	.04	.05	.10

*$p < .10$.
**$p < .05$.
***$p < .01$.
Notes: Standardized coefficients are shown; the incremental R^2 for Model 1 refers to a baseline model with controls only; the baseline model for the Models 2, 3, 4, and 5 is Model 1.

middle of the scale and is consistent with prior research (Frenzen et al. 2010; Stephenson, Cron, and Frazier 1979).

Hypotheses Tests

In Model 1, the coefficient of vertical delegation ($\beta_1 = .41$, $p < .01$) is significant and positive, indicating a positive relationship with ROA at the average level of vertical delegation (see Table 5). The squared term of vertical delegation is significant and negatively related to ROA ($\beta_2 = -.34$, $p < .01$), indicating an inverted U-shaped relationship, in support of H_1.

Regarding horizontal dispersion, the linear coefficient is significant and positive ($\beta_3 = .23$, $p < .01$), whereas the squared term of horizontal dispersion is not significant ($\beta_4 = .09$, $p > .10$), in support of the hypothesis of a linear relationship between horizontal dispersion and ROA. Additional tests show that neither the cubic term of vertical delegation ($p > .10$) nor the cubic term of horizontal dispersion ($p > .10$) is significant, and the inclusion of these terms leads to little improvement in R-square.

As Model 2 shows, H_3 is supported: The linear interaction term of vertical delegation and horizontal dispersion ($\beta_5 = .25$, $p < .10$) is significant and positive, and the interaction between the squared term of vertical delegation and horizontal dispersion is significant and negative ($\beta_6 = -.61$, $p < .01$). Model 3 shows that the relationship between vertical delegation of pricing authority and pricing performance is positively moderated by the emphasis on margin-based incentives (linear interaction term: $\beta_7 = .30$, $p < .05$; quadratic interaction term: $\beta_8 = -.39$, $p < .05$), in support of H_4 (Cohen et al. 2003). These results indicate that vertical delegation is more beneficial under conditions of higher horizontal dispersion and when margin-based incentives are used more intensely.

In contrast, Model 4 shows that neither the linear interaction term ($\beta_9 = .00$, $p > .10$) nor the quadratic interaction term ($\beta_{10} = -.04$, $p > .10$) of vertical delegation and price-related market dynamism is significant, suggesting that we must reject H_{5a}. In contrast, the relationship between horizontal dispersion of pricing authority and pricing performance is positively moderated by price-related market dynamism ($\beta_{11} = .26$, $p < .01$), indicating a stronger association between horizontal dispersion and pricing performance in more dynamic markets, in support of H_{5b}.

Regarding controls, centralization of procurement and competitive intensity are negatively associated with pricing performance. These relationships are consistent with prior research, which argue that increasing bargaining power of customers allows them to capture higher rents and decreases the profit of the supplier and that competitive intensity lowers the firm's profit margin.

To diagnose whether outliers distort our findings, we computed Cook's D. As a rule of thumb, values greater than 1 indicate that an observation is influential (Cohen et al. 2003). The maximum Cook's D for our observations is well below that limit (maximum Cook's D = .28 in Model 2). Thus, we conclude that outliers do not distort our findings. To test for multicollinearity, we computed variance inflation factors (VIFs) and condition numbers. The maximum VIF is associated with vertical delegation of pricing authority in Model 5 (VIF = 3.39) and is below the threshold value of 5. Moreover, all condition numbers are below the threshold of 15 (Hair et al. 2006), indicating that our data have no severe multicollinearity problems (Wooldridge 2009). In addition, tests of regression specification error suggest no further nonlinear relationships ($F(3, 96) = .17$, $p > .92$; Ramsey 1969). Finally, we find no evidence for heteroskedasticity as indicated by White's test ($\chi^2 = 124.00$, d.f. = 123, $p > .46$).

Additional Analysis with Sales Growth as the Dependent Variable[7]

In certain situations, such as the launch of innovations or entry into new market segments, managers focus on driving sales. Therefore, we also analyze the relationship between the organizational design of pricing authority and sales growth across firms. We obtained independent data on sales growth in the year after the questionnaire for a sample of 187 firms. We reestimated the models with sales growth as the dependent variable. Table 6 depicts the results of this additional analysis. The results show that the coefficient of vertical delegation ($\beta = .29$, $p < .01$) is significant and positive, whereas the squared term of vertical delegation is not significant ($\beta = .04$, $p > .10$). This result indicates a linear relationship.

Similarly, for horizontal dispersion, the linear coefficient is significant and positive ($\beta = .27$, $p < .01$), whereas the squared term of horizontal dispersion is not significant ($\beta = .06$, $p > .10$). Again, this result indicates a linear relationship between horizontal dispersion of pricing authority and sales growth. Moreover, the interaction between vertical delegation and horizontal dispersion is significant and positive ($\beta = .17$, $p < .05$), suggesting that the linear relationship between vertical delegation and sales growth is stronger under conditions of greater horizontal dispersion of pricing authority. The interaction between vertical delegation and the emphasis on margin-based incentives is not significant ($\beta = -.02$, $p > .10$). Finally, the interaction of price-related market dynamism is positive and significant with both vertical delegation ($\beta = .24$, $p < .01$) and horizontal dispersion ($\beta = .19$, $p < .05$). Therefore, vertical delegation and horizontal dispersion are more strongly associated with sales growth under conditions of higher price-related market dynamism. Regarding controls, centralization of procurement and customers' price sensitivity are positively associated with sales growth, while price-related market dynamism is negatively related to sales growth. We discuss the results in the next section.

Discussion

In many B2B markets, managers are puzzled as to who within the firm should have authority for defending price levels, especially because insight is lacking regarding how firms should organize their pricing authority (Mantrala et

[7]We thank the area editor and an anonymous reviewer for suggesting that we incorporate this additional analysis.

TABLE 6
Results with Sales Growth as the Dependent Variable

Dependent Variable: Sales Growth	Model 1	Model 2	Model 3	Model 4	Model 5
Vertical delegation of pricing authority	.29***	.27***	.29***	.37***	.38***
(Vertical delegation of pricing authority)^2	.04				
Horizontal dispersion of pricing authority	.27***	.27***	.25***	.35***	.43***
(Horizontal dispersion of pricing authority)^2	.06				
Vertical delegation of pricing authority × Horizontal dispersion of pricing authority		.17**			.14**
Vertical delegation of pricing authority × Emphasis on Margin-based Incentives			−.02		−.09
Vertical delegation of pricing authority × Price-related market dynamism				.24***	.23***
Horizontal dispersion of pricing authority × Price-related market dynamism				.19**	.20**
Moderators					
Emphasis on margin-based incentives	.05	.03	.05	.05	.04
Price-related market dynamism	−.17*	−.17**	−.17*	−.27***	−.31***
Customer Control					
Customers' price sensitivity	.12*	.13*	.11*	.11	.13*
Centralization of procurement	.21***	.19***	.22***	.23***	.20***
Cost Controls					
Relative Share of variable costs	−.01	−.01	−.00	−.04	−.06
Competitor Controls					
Competitive Intensity	−.06	−.07	−.06	−.04	−.03
Other Controls					
Inverse Mills ratio	.02	.01	.03	.12	.21*
Industry dummies	Included	Included	Included	Included	Included
Observations	187	187	187	187	187
R^2	.18	.20	.18	.22	.24
F	2.32***	2.86***	2.43***	2.97***	2.98***
ΔR^2	.08	.02	.00	.04	.06

*$p < .10$.
**$p < .05$.
***$p < .01$.
Notes: Standardized coefficients are shown; the incremental R^2 for Model 1 refers to a baseline model with controls only; and the baseline model for the Models 2, 3, 4, and 5 is Model 1.

al. 2010). The issue of vertical delegation of tactical pricing authority is one of tension for firms, and prior research has neglected the issue of horizontal dispersion of strategic pricing authority. Furthermore, little is known about how these vertical and horizontal organizational dimensions are interrelated and how internal and external contingencies moderate these relationships. To address these issues, we take an organizational theory perspective and draw on the information-processing view to develop a conceptual framework of the organizational design of pricing authority. In the following sections, we summarize the implications of our study for research and offer managers some guidelines for organizing pricing. We also discuss the study's limitations and suggest further research to enrich our framework.

Research Implications

Our study's findings advance research on pricing authority in several ways. First, in contrast to prior investigations, this study provides evidence for a nonlinear, inverted U-shaped relationship between vertical delegation of pricing authority to salespeople and pricing performance. Rather than being merely positively or negatively related to performance, greater vertical delegation is beneficial to a certain threshold, after which the disadvantages of incremental delegation outweigh the advantages. Although this finding may seem logical, it contrasts with prior empirical research hypothesizing either positive or negative linear relationships. Thus, we add to research on pricing authority by showing that this relationship is more complex than prior empirical studies have indicated.

Furthermore, we show that this relationship is contingent on the reward systems of the firm and specifically on the emphasis of margin-based incentives for salespeople. Vertical delegation is more beneficial when firms emphasize margin-based variable pay components that align the goals of the salespeople and the firm and reduce the tendency of salespeople to trade off effort for price discounts. This empirical finding confirms suggestions from agency theoretic research (Weinberg 1975) and may stimulate further research on pricing authority and salesperson control systems, such as behavior-based reward systems (Ahearne et al. 2010).

In addition, in acknowledging empirical findings that pricing authority is shared across functions (Verhoef and Leeflang 2009), this study conceptualizes the horizontal dimension of pricing authority, whereas prior studies have focused solely on vertical delegation. Our results suggest that horizontal dispersion of pricing authority is positively asso-

ciated with pricing performance. Thus, in designing the organization of pricing authority, firms face not only the issue of how tactical pricing authority should be delegated vertically within sales but also the question of whether strategic pricing authority should be dispersed horizontally across organizational functions. This finding may be of great interest for further research in this area. For example, agency theoretic models may be extended beyond vertical principal–agent relationships to include horizontal organizational structures. Importantly, however, horizontal dispersion focuses on strategic pricing decisions jointly influenced by sales, marketing, and finance, whereas vertical delegation focuses on the sales department's tactical decisions during direct negotiations with customers.

Another key finding of this study is that horizontal dispersion and vertical delegation of pricing authority are not isolated in their relationship to pricing performance. Instead, they are complementary such that the horizontal dispersion of strategic pricing decisions positively moderates the relationship between vertical delegation of tactical pricing authority and pricing performance. For example, we have argued that greater dispersion aligns the strategic price value proposition of the firm with its tactical sales approach, ensuring a more consistent appearance of the firm at the customer frontier. Therefore, for high levels of horizontal dispersion of strategic pricing authority, greater vertical delegation of tactical pricing authority to salespeople is optimal. This finding emphasizes the need to consider horizontal dispersion and vertical delegation as distinct yet complementary dimensions of the organizational structure of pricing authority.

We also find that market dynamism positively moderates the relationship between horizontal dispersion of pricing authority and pricing performance. Thus, firms benefit additionally from horizontal dispersion under conditions of higher market dynamism, suggesting that a broader diversity of information and perspectives is more valuable for strategic pricing decisions when external uncertainty is greater. This result contrasts with Krohmer, Homburg, and Workman (2002); however, their study investigates horizontal dispersion of various marketing activities, such as new product development, sales, and pricing, whereas we specifically examine pricing, which may partially explain the differing results. For strategic pricing decisions, incorporating information from various functions may be more valuable in uncertain markets because price decision making strongly benefits from the access to diverse pricing information (Ingenbleek 2007).

In contrast, we find no support for our hypothesis that price-related market dynamism moderates the relationship between vertical delegation of pricing authority over tactical pricing issues and pricing performance. One possible explanation may be that such dynamism also increases the information asymmetry of sales managers because salespeople's effort becomes even more difficult to observe, an effect that may offset the increased beneficial aspects of greater vertical delegation, such as greater flexibility for salespeople.

Finally, the additional analysis with sales growth as the dependent variable provides notable results. Whereas vertical delegation has a nonlinear, inverted U-shaped relationship with profitability, the relationship with sales growth is positive and linear, indicating that after a certain threshold, greater vertical delegation may foster sales growth at the expense of profitability. Thus, conceptualizing performance outcomes of vertical delegation on a fine-grained level is important (Stephenson, Cron, and Frazier 1979). This finding is in contrast to recent empirical research that employs aggregate measures of relative business performance comprising a firm's operating results, revenue, and market share (Frenzen et al. 2010). Logically, the moderating role of margin-based incentives is not present for the link between vertical delegation and sales growth. However, horizontal dispersion positively moderates the relationship between vertical delegation such that the greater diversity of lenses also benefits salespeople's greater authority in terms of additional sales. Finally, both greater vertical delegation and greater horizontal dispersion are more strongly related to sales growth in more price dynamic markets. This finding indicates that in such dynamic environments, firms can also benefit from more autonomous salespeople and a greater diversity of lenses within strategic price decision making.

Managerial Implications

Our study offers several insights for managers dealing with the question of how to organize pricing authority to defend their prices. We believe these findings to be implementable because managers can actively influence the dimensions of our conceptual framework: Organization design is "the outcome of a process of strategic choices made by key organization members" (Randolph and Dess 1984, p. 115). In addition, the organizational structure of pricing authority becomes increasingly important for managers of B2B firms as their customers focus increasingly on prices during negotiations and become more professional at exerting price pressure. We further believe that these findings are relevant across a broad range of B2B industries because customers usually negotiate prices on an individual level in such markets.

Our first goal is to broaden the perspective of managers on the scope of the organization of pricing authority. Instead of concentrating solely on the vertical delegation of tactical pricing authority, managers need to be aware that pricing authority over strategic issues is systematically dispersed within the organization, giving sales, marketing, and finance each a say. Our results show that vertical delegation is not a complete answer as to how to organize pricing authority. Rather, in line with prior research on the dispersion of marketing activities (Verhoef and Leeflang 2009), we find a substantial horizontal dispersion of strategic pricing authority for issues such as strategic price positioning of new products, adaptation of list prices or price guidelines, design of discount and bonus terms, and monitoring and analyzing prices. Managers must be cognizant of this important dimension of organizational pricing design, which seems to have beneficial profitability implications across a wide variety of markets and firms. Thus, they might establish regular meetings of sales, marketing, and finance executives to decide on strategic pricing issues systematically.

We also find that price-related market dynamism interacts positively with horizontal dispersion. However, this interaction is not obvious. Prior research has argued for a negative moderation effect of dynamism on the link between cross-functional dispersion of marketing activities and firm performance (Krohmer, Homburg, and Workman 2002). Moreover, in dynamic environments, managers tend to focus on their own departments instead of getting involved in interdepartmental issues. In contrast, the results of this study suggest that a greater variety of price-related information helps managers cope with the challenges of more dynamic markets. Therefore, firms should involve various functional areas in strategic price decision making, even when some functions' employees may be reluctant to invest time and may complain about resource constraints.

The finding that the strategic and tactical dimensions of pricing authority are complementary is of great managerial relevance and suggests that managers should not make separate decisions regarding the horizontal and vertical organizational dimensions but rather should design these structures coherently. More specifically, managers can mitigate the downsides of vertically delegating pricing authority by increasing the dispersion of pricing authority at headquarters. For example, firms can enhance the influence of the finance and accounting function on the monitoring of price enforcement, which helps sales managers obtain more precise information on the effort of their individual salespeople and thus more effectively supervise their subordinates.

In contrast to popular sales wisdom, which has compared vertical delegation of pricing authority to letting the "fox [guard] the chicken coop" (Kern 1989, p. 44), and to empirical research that has hypothesized a positive relationship (Frenzen et al. 2010), our results warn managers that vertical delegation of pricing authority is a twofold issue. The current study cautions managers not to follow the frequently given advice to either maximize or minimize the authority of their sales force to decide on prices within customer negotiations. Rather, this investigation shows that a balance between centralizing and delegating tactical pricing authority within sales yields the optimal results for the firm in terms of profits. Extremely low vertical delegation can hinder the flexibility of salespeople. However, extremely high vertical delegation tempts salespeople to trade off selling effort for price discounting and to drive their sales results by rebating heavily at the cost of the firm's profitability.

Nevertheless, managers must be cautious when centralizing tactical pricing authority. A problematic issue might be that salespeople are loss averse, and they may interpret a reduction of their pricing authority as a heavy loss of job autonomy, which may subsequently reduce their motivation. Our results offer sales managers an alternative route: an emphasis on margin-based incentives for their salespeople. However, sales managers tend to focus on tracking lost deals or monitoring behavior rather than rewarding salespeople for defending margins, leading salespeople to focus on sales growth by closing additional deals rather than defending the firm's profit margin. In contrast, margin-based goals present managers with an incentive scheme to align salespeople's motivation to invest more effort into price negotiations with the firm's objective to strive for profits.

However, managers who strive for faster sales growth should delegate more pricing authority to their salespeople because the results of our study indicate that a "the more the better" approach to vertical delegation of pricing authority enhances sales growth. It is evident that margin-based incentives are not important regarding sales growth. Nevertheless, managers should be aware that after a certain threshold, increasing vertical delegation may lead to unprofitable sales growth by sacrificing the firm's profit margin. Furthermore, salespeople can additionally benefit from greater pricing authority in terms of sales growth in more price-dynamic markets and under conditions of higher dispersion of strategic pricing authority.

Limitations and Avenues for Further Research

The limitations of this study suggest several opportunities for further research. Because we focus on organizational structures, we do not address organizational culture, which may be complementary to the organizational structure of pricing authority (Homburg, Grozdanovic, and Klarmann 2007). Furthermore, in contrast to previous research (Frenzen et al. 2010), we could not establish a moderating relationship of uncertainty on the link between vertical delegation and pricing authority. This result may be due to differences in the conceptualization of the performance measure (profitability vs. general performance), the conceptualization of the moderator (price-related market dynamism vs. market uncertainty), the measurement of performance (objective vs. subjective), or the specified functional form of the relationship between vertical delegation and performance (nonlinear vs. linear). Because uncertainty is a major obstacle for price decision making in B2B markets, further research should scrutinize this relationship to provide clear insights.

In addition, examining the role of information technology systems might provide further understanding of the effectiveness of organizational structures of pricing authority. Information technology systems may be a useful complement to organizational structures, as computer-assisted intelligence could supply a greater amount of information for strategic price decision making (Ahearne, Hughes, and Schillewaert 2007; Huber 1990). However, overreliance on codified and explicit information may constrain the inclusion of more tacit forms of knowledge, such as salespeople's implicit customer knowledge, and thus inhibit the variety of perceptions sought by more horizontal dispersion. Moreover, salespeople could be reluctant to utilize such systems if they perceive them to be overly complex or think they have been installed to monitor their behavior (Rouzies et al. 2009).

Finally, owing to the cross-sectional nature of our study, we cannot draw causal inferences. For example, profitability may also influence the organizational design of pricing authority. Therefore, further research could complement this study by employing longitudinal data (Rindfleisch et al. 2008). Nevertheless, organizational design of decision rights tends to be slow moving, making endogeneity concerns less important (Van Lent 2007).

APPENDIX: PERCEPTUAL MEASURES

Construct	Measurement	Items	Standardized Factor Loading	AD_M	Standardized α	CR	AVE
Structure of Pricing Authority							
Vertical delegation of pricing authority	•Reflective measure •Six-point scale •Anchors: 1 = "do not agree at all," and 6 = "fully agree"	In our business unit/company, •Sales employees in the decentralized/local units are autonomous in their pricing decisions •The sales force has much freedom to decide setting of discounts •Sales employees can make pricing decisions quite independently and flexibly	.75 .66 .83	.54 .58 .46	.79	.79	.56
Horizontal dispersion of pricing authority	•Constant-sum scale •Three categories, four items •Sum of influence of sales/service, marketing/product management, finance/accounting = 100	What is the relative influence of the three functional units? •Sales/service •Marketing/product management •Finance/accounting On the following decision areas in price management: •Strategic price positioning of new products •Adaptation of list prices/price guidelines •Design of discount and bonus terms •Monitoring and analyzing prices			Index		
Moderators							
Emphasis on margin-based incentives	•Reflective measure •Six-point scale •Anchors: 1 = "do not agree at all," and 6 = "fully agree" (6)	•The incentive system for our salespeople rewards the enforcement of high prices. •Our salespeople are paid according to contribution margins, and not only according to revenues. •For our salespeople, it is more rewarding to enforce high prices and margins than to sell high volumes.	.73 .84 .80	.46 .57 .58	.83	.83	.63
Price-related market dynamism	•Reflective measure •Six-point scale •Anchors: 1 = "do not agree at all," and 6 = "fully agree"	•Prices in our market are very unstable. •Market prices are volatile. •Prices in our market change frequently. •Prices in our market develop highly dynamically.	.75 .66 .93 .68	.72 .77 .69 .65	.84	.85	.58
Controls							
Customers' price sensitivity	•Reflective measure •Six-point scale •Anchors: 1 = "do not agree at all," and 6 = "fully agree"	•For our customers in our market, prices are very important. •Customers change suppliers even for small price differences. •Our customers' buying center decides mostly based on price. •Customers in our market are very price sensitive.	.84 .82 .82 .82	.42 .56 .43 .44	.89	.89	.69
Centralization of procurement	•Reflective measure •Six-point scale •Anchors: 1 = "do not agree at all," and 6 = "fully agree"	•Customers in our market have centralized procurement. •At our customers, prices are negotiated by headquarters. •Our customers bundle their purchase volumes centrally.	.87 .95 .80	.44 .44 .48	.90	.83	.62
Competitive intensity	•Reflective measure •Six-point scale •Anchors: 1 = "do not agree at all," and 6 = "fully agree"	•Competition in our industry is cutthroat. •Our industry is characterized by intense competition. •New competitive activities are reported almost daily.	.71 .88 .51	.34 .40 .56	.69	.75	.52
Change in assets	•Change in firm's assets as percentage	•Archival data					
Relative share of variable costs	•Single item	•The average share of variable costs as a percentage of sales in the respective industry		5.2			

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