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# Multimarket Contact, Strategic Alliances, and Firm Performance

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*Research on multimarket contact and firm performance has produced mixed results. To reconcile this discrepancy, we theorize how varying levels of multimarket contact may generate mutual forbearance that influences firm performance. We also examine how strategic alliances moderate the relationship between levels of multimarket contact and firm performance. Our analysis of 233 semiconductor firms across 52 markets reveals that multimarket contact has an inverted U-shaped relationship with a multimarket firm's market share. The number of strategic alliances that a firm has helps to further extend the positive effect of multimarket contact and mitigate its negative effect on the firm's market share. Accordingly, our study contributes to the literature on multimarket competition by shedding light on the conditions under which multimarket contact may increase/decrease firm performance.*

**Keywords:** *multimarket competition; strategic alliances; firm performance*

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Multimarket firms are an important part of modern economic activity. Airline carriers serve passengers on multiple routes. Insurance providers offer multiple products with various forms of coverage. Semiconductor firms produce a diverse array of components, from microprocessors to flash memory chips. By virtue of their organizational form, multimarket firms compete with the same rivals in multiple markets simultaneously. Such repeated market contact significantly shapes competitive dynamics between firms, as it allows managers to learn about rivals' behaviors and to strategize accordingly. Because of its prevalence and impact on competition, multimarket competition has received considerable attention from scholars, practitioners, and policy makers in recent decades.

To date, research in multimarket competition has posited three mechanisms through which multimarket contact affects firm behavior and ultimately firm performance: First, multimarket contact allows managers to monitor and become familiar with rivals' strategic behaviors; second, it allows managers to coordinate competitive activities with rivals across markets; and finally, it gives managers channels through which to retaliate against rivals' aggression (Jayachandran, Gimeno, & Varadarajan, 1999; Yu & Cannella, 2013). Multimarket contact therefore induces managers to engage in mutual forbearance by not behaving aggressively toward the rivals they meet in multiple markets (Bernheim & Whinston, 1990; Edwards, 1955; Simmel, 1950). Drawing on these theoretical insights, empirical studies have shown that multimarket contact influences a firm's market entry and exit decisions (e.g., Barnett, 1993; Baum & Korn, 1999; Fuentelsaz & Gomez, 2006; Haveman & Nonnemaker, 2000), pricing decisions (Evans & Kessides, 1994; Gimeno & Woo, 1999), marketing expenditures (Shankar, 1999), service quality (Prince & Simon, 2009), and competitive aggression (Young, Smith, Grimm, & Simon, 2000; Yu, Subramaniam, & Cannella, 2009). While these studies have provided insights into how multimarket contact affects firm behavior, studies of the relationship between multimarket contact and firm performance have shown inconsistent results. Some studies observed a positive main effect of multimarket contact on firm performance (Gimeno, 1999; Gimeno & Woo, 1999; Hughes & Oughton 1993; Pilloff, 1999; Shipilov, 2009). Others reported either no effect or a negative effect (Li & Greenwood, 2004; Mester, 1987; Sandler, 1988; Scott, 1982). Accordingly, our understanding of the relationship between multimarket contact and performance remains incomplete.

In this study we attempt to reconcile the inconclusive empirical results in prior studies by suggesting that the relationship between multimarket contact and firm performance is curvilinear. Further, we argue that the inconclusive empirical results may be partially explained by the existence of strategic alliances that multimarket firms have. Specifically, we theorize how the mechanisms that produce mutual forbearance may vary with the level of multimarket contact between the firm and its multimarket rivals. When the level of multimarket contact between a firm and its rivals is low, mutual forbearance is less likely to develop, as managers have few opportunities to learn about and monitor rivals' behavior and few channels that create a credible threat for cross-market retaliation. As a result, rivalry between the firm and its rivals can be intense, which adversely affects firm performance. When the level of multimarket contact is high, mutual forbearance between a firm and its rivals is difficult to develop or maintain. Understanding and monitoring behaviors of different rivals in multiple markets and coordinating across markets to avoid unintended competition with these rivals becomes more difficult when the numbers of markets and multimarket rivals are high. A high level of multimarket contact not only makes monitoring more difficult but can also decrease firms' incentives to engage in mutual forbearance, as firms' market coverage becomes more similar, making the threat of cross-market retaliation less credible (Bernheim & Whinston, 1990). Thus, the competition can become intense and have a negative impact on firm performance. We suggest that a multimarket firm's performance should benefit most from mutual forbearance when the level of multimarket contact is moderate, because learning, monitoring, and coordinating activities under these conditions are both feasible and manageable and the threat of cross-market retaliation remains credible.

We further investigate the role that strategic alliances play in moderating the effect of multimarket contact on firm performance. A multimarket firm's ability to deter its multimarket rivals' aggression plays an important role in shaping mutual forbearance between them (Jayachandran et al., 1999; Yu & Cannella, 2013). Prior research has focused on how firm characteristics and market concentration influence a firm's ability to induce forbearance from its rivals (Baum & Korn, 1999; Gimeno, 1999; Haveman & Nonnemaker, 2000). Scholars have yet to examine how the ability to induce forbearance can derive from resources embedded in other forms of interorganizational relationships, such as strategic alliances. We suggest that the failure to include strategic alliances, in addition to varying levels of multimarket contact, may help to explain some inconclusive findings. Strategic alliances give a firm access to external resources (Wassmer, 2010) that can enhance a firm's ability to compete against rivals (Chen & Miller, 2012; Gnyawali & Madhavan, 2001). We posit that a multimarket firm's strategic alliances have the potential to influence mutual forbearance between the firm and its multimarket rivals, which in turn alters the effect of multimarket contact on the firm's performance. Resources derived from alliances allow a firm to attack its rivals and/or to enhance the credibility of the threat of cross-market retaliation, further increasing the benefits of multimarket contact to its performance. Therefore, a firm's strategic alliances are likely to moderate the effect of multimarket contact on firm performance.

To test our hypotheses, we examine the effects of multimarket contact and strategic alliances on a firm's market share in the global semiconductor industry. Multimarket competition research has employed many different levels of analysis, including the firm, dyad, firm-in-market, and market levels (Yu & Cannella, 2013). Because firms' contact with rivals outside a focal market affects behavior of firms inside the market and consequently their performance in the market, the empirical analysis in this study is at the firm-in-market level. Our analysis of 233 semiconductor firms shows that the level of multimarket contact between a firm and its rivals outside a market has an inverted *U*-shaped relationship with the firm's market share in the market and that this relationship is moderated by the number of alliances the firm has. Accordingly, our study extends prior research on multimarket contact and competition by shedding light on the interplay between multimarket contact and strategic alliances in shaping firm performance.

## Theoretical Background and Hypotheses

The theoretical underpinnings of multimarket contact and competition can be traced to industrial organization economics (Edwards, 1955) and sociology (Simmel, 1950). Edwards (1955) contended that multimarket firms would hesitate to act aggressively toward their rivals in some markets if they faced potential losses from retaliatory action by those rivals in other markets. Hence, there is an incentive for firms to live and let live, to cultivate a cooperative spirit, and to recognize priorities of interest in the hope of reciprocal recognition from rivals. Multimarket firms' avoidance of aggressive competitive action against those firms they meet in multiple markets is known as mutual forbearance. Similarly, Simmel (1950) noted that the potential for cooperation between rivals increases when they interact in multiple domains, as each will gain by allowing the other to be superordinate in some domains in exchange for similar treatment in others. Both Edwards' and Simmel's arguments suggest that repeated contact across markets creates mutual dependence and restraint that reduces competition and fosters collusion between firms.

This foundational insight has been elaborated as scholars have theorized the mechanisms by which mutual forbearance occurs and how it affects competitive interaction between multimarket firms. Multimarket contact helps firms become familiar with and monitor rivals' behaviors (Baum & Korn, 1999; Boeker, Goodstein, Stephan, & Murmann, 1997). Contact in multiple markets creates risks of misunderstandings and difficulty monitoring the behaviors and strategic intent of rivals (Axelrod 1997; Matsushima, 2001); yet, through repeated interaction across different markets, firms may become aware of the strategies and actions of rivals, recognize their competitive interdependence, and better understand one another's motives and capabilities. It may then be easier for them to tacitly cooperate and coordinate their actions to avoid unintended competition. Multimarket contact, therefore, may increase a firm's awareness of its areas of interdependence with multimarket rivals and decrease the firm's motivation to engage in intense competition with them (Chen, 1996; Chen & Miller, 2012). Tacit collusion derived from mutual forbearance is easier to achieve in a market where concentration is relatively high (Haveman & Nonnemaker, 2000; Scott, 1982). Low concentration reduces firms' capacity to monitor one another's actions and reduces the likelihood of collusive behavior among rivals (Scott, 1982; Solomon, 1970).

Familiarity and monitoring, however, may not be sufficient to foster mutual forbearance between multimarket firms (Jayachandran et al., 1999). A firm also needs to be able to deter rivals' aggression if mutual forbearance is to develop (Jayachandran et al., 1999). Indeed, a firm's ability to deter rivals' aggression plays an important role in shaping interfirm rivalry (Chen, 1996; Chen & Miller, 2012). When a firm meets a rival in one market, the rivalry between the firm and rival is limited to that market only. As a firm comes into contact with the same rival in a larger number of markets, the firm and rival have more opportunities to hurt each other in the markets where they meet. They therefore tend to become aware that rivalry in one market may result in cross-market retaliation (i.e., retaliatory actions in other markets). The risks associated with cross-market retaliation by multimarket rivals rise as the number of market contacts between two firms increases. Increases in the number of market contacts between firms enhances each firm's ability to deter the other's aggression, as each market contact serves as a channel through which the firm can retaliate against competitive action. However, in order for this increased contact to produce mutual forbearance with multimarket rivals, firms must also effectively coordinate activities to avoid unintended competition. Coordination may become increasingly difficult as the numbers of market contacts and rivals increase (Golden & Ma, 2003; Jayachandran et al., 1999; Ma, 1998). Hence, extant theory illustrates how multimarket contact facilitates mutual forbearance by allowing firms to learn rivals' strategies, including areas of competitive interdependence, to monitor and develop the capability to tacitly coordinate competitive actions and reduces the motivation to attack multimarket rivals by implicitly threatening retaliation in markets the firms share with each another.

Empirical studies have provided abundant evidence of the effect of multimarket contact on firm behavior. In exploring how attempts to develop/maintain mutual forbearance affect market entry decisions, Baum and Korn (1999) observed that multimarket contact between 15 California airlines had an inverted *U*-shaped relationship with rates of market entry. Initial increases in multimarket contact between airlines increased the rates of market entry into each other's markets as the airlines attempted to establish mutual forbearance with their rivals across markets where they were both present. After a certain level of multimarket contact was reached, the risk of destabilizing mutual forbearance appeared to be greater than the benefits of additional market contact. Baum and Korn illustrated how, after a peak point, increases in multimarket contact decreased rates of entry into rivals' markets. These findings suggest that firms attempt to maintain their multimarket contact with rivals at a moderate level to obtain the benefits of mutual forbearance derived from multimarket contact. The curvilinear relationship between multimarket contact and market entry has also been observed in the biopharmaceutical industry (Anand, Mesquita, & Vassolo, 2009), in financial service institutions (Fuentelsaz & Gomez, 2006; Haveman & Nonnemaker, 2000), and in the California hospital sector (Stephan, Murmann, Boeker, & Goodstein, 2003). Moreover, Gimeno and colleagues demonstrated that multimarket contact between 28 U.S. airlines led the airlines to charge higher prices (Gimeno, 1999; Gimeno & Woo, 1999). Similarly, Jans and Rosenbaum (1997) observed that the propensity of a firm in the cement industry to charge higher prices increased as its multimarket contact with rivals increased. Young and his colleagues (2000) showed that the frequency of a U.S. software firm's competitive activity decreased as the firm's multimarket contact with rivals increased. Finally, Yu et al. (2009) reported that multimarket contact between multinational corporations decreased the number of competitive actions in the host countries where they were both present. Taken together, these findings suggest that mutual forbearance derived from multimarket contact facilitates tacit cooperation and collusion between firms and reduces rivalry between them. While empirical studies of multimarket contact and competitive action seem to conclusively show a relationship between the level of multimarket contact and rivalry, the link between multimarket contact and firm performance has produced mixed results.

### *Multimarket Contact and Performance of Multimarket Firms*

Research on the impact of multimarket contact on firm performance proposes that such contact between firms influences the development of mutual forbearance, reducing the rivalry between firms and enhancing their performance. Empirical studies, however, have thus far provided mixed results: Hughes and Oughton (1993), Gimeno and Woo (1999), and Pilloff (1999) all found increased profitability; Heggestad and Rhoades (1978) and Gimeno (1999) reported more stability in market share; and Shipilov (2009) found improved market share. Other studies observed either no effect or negative effects of multimarket contact on a firm's profitability and market share (Li & Greenwood, 2004; Mester, 1987; Sandler, 1988; Scott, 1982). We contend that the ways in which multimarket contact affects the mechanisms that facilitate or impede the development of mutual forbearance may be more complex than has been previously suggested. Research has illustrated that firms attempt to maintain a moderate level of contact with multimarket rivals to optimize the benefits of mutual forbearance (e.g., Baum & Korn, 1999). Extending this logic, we propose that the level of multimarket contact may exhibit an inverted *U*-shaped relationship to firm performance. In other words, firms should benefit most from mutual forbearance when the level of multimarket contact is moderate, and these benefits then manifest as better firm performance. Below, we describe how the mechanisms that promote or hinder the development of mutual forbearance are affected by varying levels of multimarket contact (low, moderate, and high) and the associated implications for firm performance.

When the level of multimarket contact between a firm and its rivals in a market is low, rivalry is likely to be more intense. The firm and rivals lack sufficient contact for familiarity to develop into mutual forbearance. A low level of multimarket contact creates less competitive interdependence and limits the opportunity for cross-market retaliation. A low level of multimarket contact may thus decrease rivals' motivation to refrain from competitive actions since there is a low risk of cross-market retaliation. Rivals are then more likely to take competitive actions, such as price cuts, new product launches, marketing campaigns, and/or changes in production output, with the intention of undercutting the firm's market share in the market and increasing their own market shares.

When the level of multimarket contact between a firm and its multimarket rivals in a market is moderate, mutual forbearance is more likely to develop. The moderate level of multimarket contact gives the firm and rivals more opportunities to learn about one another's behaviors and strategic intent. A moderate level of multimarket contact also makes both the firm and its rivals' more aware of their competitive interdependences and the threat of cross-market retaliation. Therefore, the motivation to engage in aggressive action against one another may decrease (Chen, 1996). A moderate level of multimarket contact also improves a firm's ability to monitor rivals' behaviors and coordinate actions to tacitly collude with rivals across markets. As such, the loss in market share derived from rivals' aggression should decrease. Resources conserved by not competing against these rivals can be deployed to enhance the firm's market share by focusing competitive action on single-market firms and any multimarket firms with which the firm has no contacts outside the market (cf. Barnett, 1993; Baum & Korn, 1999).

When the level of multimarket contact between a firm and rivals in a market is high, however, mutual forbearance between the firm and these rivals can be difficult to achieve, as both firm's and rivals' ability and motivation to forbear from competition with one another may decrease. A high level of multimarket contact provides opportunities to enhance awareness of one another's behavior and familiarity with one another's strategic intent and capabilities (Greve, 2008; Matsushima, 2001) and to expand the scope for cross-market retaliation. However, a multimarket firm's ability to engage in mutual forbearance with its rivals depends on the firm's capacity to coordinate its actions with the rivals across markets (Golden & Ma, 2003; Jayachandran et al., 1999; Ma, 1998; Yu et al., 2009). A high level of multimarket contact between the firm and its rivals can make tacit coordination of competition more difficult, as the firm needs to coordinate its activities with a large number of rivals across different markets. Understanding one another's behavior and strategic intent may become more challenging when the numbers of rivals and markets are high (Axelrod, 1997; Stigler, 1964). The high level of multimarket contact tests the limits of the firms' information-processing capacity, reducing their ability to interpret the intent of one another's competitive moves across markets (Simon, 1947) and increasing the complexity of coordinating activities across markets to sustain cooperation with multiple rivals (Golden & Ma, 2003; Jayachandran et al., 1999). Therefore, risks of misunderstanding one another's behavior can increase (Axelrod, 1997). These misunderstandings may induce unintended escalating rivalry through cross-market retaliation between the firm and these rivals.

Furthermore, a higher level of multimarket contact may decrease motivation to engage in mutual forbearance. A high degree of multimarket contact between a firm and its rivals may result in greater similarity in their markets. The increases in market similarity between the firm and rivals may make it difficult for both the firm and its rivals to enhance their performance without attacking one another. Bernheim and Whinston (1990) argued that the deterrence effect derived from multimarket contact diminishes when markets of a firm and its rivals become more alike and technology has a constant return to scale. When the firm's and its rivals' markets are more alike, they are likely to share similar pricing structures and economies of scale and scope. The motivation on the part of the firm and its rivals to engage in mutual forbearance may be lower, as differential advantages derived from differences in pricing structure and economies of scale and scope that help to deter aggression diminish (Gimeno, 1999). Therefore, competitive intensity should increase as the firm competes not only against single-market firms and multimarket firms with which it has no multimarket contact but also with those firms with which it has a high degree of multimarket contact. This heightened competition should have a negative effect on the firm's market share in the market. Hence, we hypothesize the following:

> *Hypothesis 1:* The level of multimarket contact that a multimarket firm has with its focal-market rivals will have an inverted *U*-shaped relationship with the firm's market share in the market.

### *Strategic Alliances and Performance of Multimarket Firms*

A firm's ability to deter rivals' aggression is critical to creating/maintaining forbearance with rivals (Bernheim & Whinston, 1990; Jayachandran et al., 1999). Multimarket contact between firms creates opportunities for them to attack and counterattack across markets. Yet, firms differ in their ability to compete against and deter rivals' aggression (Gimeno, 1999; Jayachandran et al., 1999; cf. Chen, 1996; Chen & Miller, 2012; Chen, Su, & Tsai, 2007). Larger firms and firms with greater market power are more likely to increase the willingness of their multimarket rivals to engage in mutual forbearance, as they have more resources to deter aggression of rivals (Baum & Korn, 1999; Haveman & Nonnemaker, 2000).

We propose that the ability to deter rivals' aggression can be enhanced by other forms of interorganizational relationships, such as strategic alliances. We suggest that strategic alliances complement multimarket contact by enhancing deterrence, thereby facilitating mutual forbearance, which in turn decreases rivalry and positively improves performance. While strategic alliances carry costs for firms, such as resources invested in the alliance, coordination with alliance partners, and vulnerability to opportunistic behavior by alliance partners (Hamel, 1991; Khanna, Gulati, & Nohria, 1998; Park & Russo, 1996), strategic alliances also provide benefits to firms, such as economies of scale (market-based alliances) and improvements to long-term competitive advantage (R&D- and technology-focused alliances). Importantly, strategic alliances can offer firms differential access to resources, such as distribution channels, marketing skills, financial capital, and R&D knowledge, which in turn influences firm capacity to engage in interfirm rivalry (Chen & Miller, 2012; Gnyawali & Madhavan, 2001). For instance, Young, Smith, and Grimm (1996) showed that the number of technology-licensing relationships, trade associations, and equity arrangements a software producer participated in was positively associated with its ability to undertake competitive activities. Gnyawali, He, and Madhavan (2006) reported that the centrality and structural autonomy of steel producers in alliance networks were positively related to their ability to launch competitive actions. Hence, resources generated from strategic alliances can enhance a firm's ability to compete aggressively and pose a more credible threat of cross-market retaliation. Therefore, the effect of multimarket contact on performance should differ disproportionately between firms with strategic alliances and those without alliances.

Specifically, when the level of multimarket contact between a firm and its rivals in a market is low, the firm may experience intense competition in the absence of mutual forbearance between the firm and its rivals. A multimarket firm with strategic alliances may have an enhanced capacity to compete against its rivals and other firms using the resources generated through joint marketing activity, shared distribution channels, outsourced production, technology licensing, and joint R&D. Compared to multimarket firms without strategic alliances, the firm with alliances may have access to more resources that enable it to cope with intense competition by undertaking competitive action to enhance its performance in the market.

When the level of multimarket contact between a firm and its rivals is moderate, the competition between the firm and its rivals may be reduced because of the development of mutual forbearance between them. Both the firm and its rivals may be more aware of their competitive interdependence and less motivated to engage in intense rivalry (Gimeno, 1999; Young et al., 2000). A multimarket firm with strategic alliances may have two specific advantages compared with multimarket firms without alliances.[1] First, the resources saved and/or generated from alliances may help further deter the aggression of its multimarket rivals by decreasing their motivation to engage in intense competition with the firm. Should the rivals defect from mutual forbearance, the firm can deploy resources derived from its strategic alliances to engage in cross-market retaliation. In other words, the impact of cross-market retaliation on rivals may be greater for firms with strategic alliances. To that end, strategic alliances can serve as an additional deterrent to reinforce mutual forbearance between the firm and its multimarket rivals, thereby enhancing the firm's performance in the market. Second, the resources saved and/or generated from alliances have the potential to increase a multimarket firm's ability to undertake competitive action (Gnyawali & Madhavan, 2001; Gnyawali et al., 2006). The firm may have an incentive to defect from mutual forbearance by launching action to increase its performance in the market.

When the level of multimarket contact is high, rivalry between a firm and its rivals may increase because of unintended escalating rivalry caused by coordination difficulties and/or lower motivation to engage in mutual forbearance due to decreases in differential advantage. The impact of a high level of multimarket contact may not have the same adverse effect on a multimarket firm with strategic alliances compared to multimarket firms without strategic alliances, as strategic alliances may offer resources that enhance the firm's capacity to respond to rivals' attacks and therefore to enhance its performance. Resources from strategic alliances also allow the firm to take advantage of coordination difficulties to attack rivals and thereby enhance its performance. In addition, while a high level of multimarket contact may reduce rivals' motivation to engage in mutual forbearance, the resources available to the firm with strategic alliances may act as an additional deterrent to rivals' aggression. Hence, strategic alliances may help a multimarket firm cope with the negative effect of a high level of multimarket contact on its performance. The above reasoning suggests that the number of strategic alliances a multimarket firm has will enhance the positive effect of multimarket contact on its performance by further deterring rivals' aggression and weakening the negative effect of multimarket contact by providing more resources to cope with competitive pressure. Formally, we hypothesize the following:

*Hypothesis 2:* The number of strategic alliances that a multimarket firm has will moderate the inverted *U*-shaped relationship between the level of multimarket contact and the firm's market share. A larger number of strategic alliances will increase the positive effect of multimarket contact and decrease the negative effect of multimarket contact on the firm's market share.

## Method

### *Sample*

The global semiconductor industry is a suitable context for testing the effects of multimarket contact and strategic alliances on firm performance. The industry is subject to multimarket competition in which firms compete on timing of new product launches, product pricing, technological innovation, and production volumes across market segments. The industry is facing shrinking product life cycles, increasing variety of individual small products that use semiconductor components, and increasing horizontal and vertical specialization in value chains. Since the late 1990s, the emergence of new uses for semiconductors and the gradual decline in demand in the personal computer market have led to fragmentation of the industry (Macher, Mowery, & Minin, 2008). Meanwhile, the prices of semiconductor components decline dramatically when new generations come to market. However, as product life cycles contract, it is increasingly difficult for firms to achieve scale economies in single products and to predict demand for those products. As such, firms often compete for market share in an attempt to increase scale economies. Fixed costs in manufacturing have also increased significantly due to the complexity of advanced product designs. Some firms, such as Qualcomm, Texas Instruments, and NVidia, have responded to these trends by diversifying into different product segments and outsourcing production. Other firms, such as Intel and Samsung Electronics, have diversified into different product segments while maintaining their own production. As a result, approximately 60% of firms in the industry operate in more than one product segment. For example, STMicroelectronics, Fairchild Semiconductor, Samsung Electronics, Atmel, and Intel have competed in markets such as static random-access memory, embedded microprocessor units, and flash memory devices. STMicroelectronics and SanDisk have competed in product segments such as NOR-based and NAND flash memory chips and in markets for application-specific standard products (ASSP). Furthermore, firms seek collaborative relationships, such as strategic alliances, to maintain their competitive advantage (Macher et al., 2008). Strategic alliances help firms to secure production and distribution channels, develop R&D pipelines, access funds for R&D, and market new products. Strategic alliances in the industry are common and important sources of competitive advantage that shape the competitive landscape and firm performance (Stuart, 2000). For instance, Intel and Micron Technology formed an alliance to produce NAND flash memory chips in 2005. This alliance put competitive pressure on Hynix, Samsung, Toshiba, and other firms in the NAND flash memory chip product segment.

The sample used to test our hypotheses came from the semiconductor section in the Dataquest database maintained by Gartner, a market research firm that specializes in industries related to information technology. The database has been used in prior studies on technological innovation in the semiconductor industry (Podolny, Stuart, & Hannan, 1996; Stuart, 2000). Gartner collects information on a semiconductor firm's sales in each market segment. The total sales of the firms included in Dataquest account for approximately 90% of market share in the industry. Because Gartner reclassified market segments in Dataquest in 2000, we chose 2000 as the first year of our observations and included all firms in the database between 2000 and 2009. In total, there were 233 multimarket firms competing in 52 market segments. Examples of these market segments include NAND flash memory chips, DRAM, photosensors, ASSP, and solar cells.

## *Dependent Variable and Analysis*

Our theoretical interest is a firm's performance in a given market. We used market share to measure firm performance because market share is affected by competition and is an important performance indicator in the semiconductor industry (Macher et al., 2008). We obtained information on the firms' sales in each of 52 market segments from Dataquest to compute individual firms' market shares in a given market.

We used cross-sectional time-series generalized least squares (GLS) models to test our hypotheses. This estimation method addresses issues such as unobserved heterogeneity and its association with model variables in longitudinal panel analyses (Greene, 2003). The level of analysis in our study is the firm in a given market in a given year. For the analysis of multimarket firms, we pooled yearly observations of a multimarket firm in each of the markets where the firm was active to estimate the effects of theoretical variables on the firm's market share. Accordingly, the analysis is potentially subject to biases from nonindependence of observations—repeated observations on each firm at each point in time. To remedy these potential biases, we followed the approach used in prior studies and included firm fixed effects and firm characteristics as control variables (Gimeno, 1999). We further included market and year dummy variables to control for unobserved heterogeneity across markets and years. We also treated potential autocorrelation by including first-order autoregressive errors in the models, assuming correlation of errors across adjacent years. The models reported below took the form $y_{i,\,t+1} = a + b{*}X_{i,\,t} + u_i + e_{it}$, where $X_{i,\,t}$ contains a vector of theoretical and control variables, $e_{it} = \rho{*}e_{i,\,t-1} + z_{it}$, and $-1 < \rho < 1$, and $\rho$ is the autoregressive AR(1) parameter with a zero-mean, homoscedastic, and serially uncorrelated error term, $z_{it}$. We used xtregar procedures in Stata 10.1 in which we included firm's market share in the prior year, firm fixed effects, market and year dummies, and a first-order autoregressive coefficient to estimate the effects of theoretical and control variables on a firm's market share.

## *Theoretical Variables*

Hypothesis 1 addresses how the level of contact between a multimarket firm and other multimarket firms in a given market affected the firm's market share in that market. To test the hypothesis, we first identified all firms in a market that had contact with a focal firm in more than one market. We then measured level of multimarket contact for a focal multimarket firm *i* in market *m* as

$$\text{Level of multimarket contact}_{im} = \sum_{i \neq j}^{n} MMC_{ij} \times s_{ij}, \tag{1}$$

where $n$ is the number of rivals in market $m$ with which a focal firm $i$ had more than one market contact, $MMC$ is the count of market contacts between firm $i$ and its multimarket rival $j$, and $s$ is the level of similarity between firms $i$ and $j$. The level of similarity was measured as

$$s_{ij} = \frac{\sum_{m=1}^{52} x_{im} \min(x_{im}, x_{jm})}{\sum_{m=1}^{52} x_{im}^2} \tag{2}$$

(Sohn, 2001), where $x_{im}$ is firm $i$'s sales in market $m$, and $x_{jm}$ is a multimarket rival $j$'s sales in market $m$. Our firm-in-market measure of multimarket contact is similar to the firm measure of multimarket contact used in prior research (e.g., Li & Greenwood, 2004) and takes into consideration the effect of similarity between multimarket rivals on multimarket competition (Jayachandran et al., 1999). To facilitate presentation, we rescaled level of multimarket contact by dividing it by 100. We further centered level of multimarket contact to its mean before we created level of multimarket contact squared to make it easier to interpret the results of the interaction term for Hypothesis 2 (Cohen, Cohen, West, & Aiken, 2003). To support Hypothesis 1, a positive coefficient estimate for level of multimarket contact and a negative coefficient estimate for level of multimarket contact squared are required.

To test the moderating effect of strategic alliances proposed in Hypothesis 2, we collected alliance information from the Thomson SDC database, one of the most comprehensive alliance databases (Schilling, 2009). Although the SDC provides comprehensive coverage of alliance activity, its information on the duration of alliance activity is incomplete. Following the approach used in prior research (e.g., Baum, Rowley, Shipilov, & Chuang, 2005), we constructed a 5-year moving window of alliance networks starting with 1996.[2] In total, there were 4,004 alliances among our sampled firms from 1996 to 2008. To test Hypothesis 2, we first counted the number of strategic alliances a multimarket firm had (number of strategic alliances) in each 5-year moving window of alliance networks. To facilitate presentation, we rescaled number of strategic alliances by dividing it by 100. We then centered number of strategic alliances to its respective mean and interacted it with level of multimarket contact.

## *Control Variables*

To rule out major alternative explanations for our results, we controlled for several firm- and market-specific factors likely to influence a firm's market share and its relationships with our theoretical variables. Since our theoretical interests were the interaction of multimarket contact and strategic alliances on firm performance, we controlled for the main effect of strategic alliances (number of strategic alliances). Given that the resource sharing and commitments for R&D-oriented strategic alliances may be significantly different from other types of strategic alliances, it is possible that their effect on the relationship between the level of multimarket contact and firm performance could be disproportionally different from other types of strategic alliances. Accordingly, we included proportion of R&D alliances, measured as the number of R&D alliances over total alliances, to control its effect. Past studies of technological innovation in the semiconductor industry suggested that firms in the industry compete for technological innovation to enhance their survival chances (Macher et al., 2008; Podolny et al., 1996). It is possible that the technological relationship between firms may affect the relationship between multimarket contact and firm performance. Thus, we included two measures of technological similarity to control for its effect. Specifically, we used their patenting activity to capture technological similarity between firms. Prior research has suggested that the impact of semiconductor patents lasts approximately 5 years (Podolny et al., 1996). Accordingly, we used a 5-year moving window to calculate technological similarity measures. Specifically, we first obtained patent information for sampled firms between 1996 and 2008 from the U.S. Patents and Trademark Office. In total, 309,317 patents were granted to the sampled firms. We identified the frequency of international patent classes of each sampled firm in each 5-year moving window. We then used Equation (2) to compute average level of technological similarity with multimarket rivals and average level of technological similarity with others for both multimarket and single-market firms. We also included a patent dummy to control for the effect of patenting activity on performance, since not all firms in our sample engaged in patenting activity.

We further included firm-characteristic control variables. First, we included market importance (measured as the ratio of a focal firm's sales in a focal market to the firm's total sales), since it may affect a firm's aggression in a given market (Chen, 1996). Second, the degree of diversification can significantly influence firm performance (Li & Greenwood, 2004) and may affect the level of multimarket contact with other firms (Gimeno & Woo, 1999). Accordingly, we included degree of market diversification by computing the entropy measure of diversification to control for its effect on firm performance. Third, firm size may influence firm performance in that large firms tend to have more resources to compete against other multimarket firms (Baum & Korn, 1999; Edwards, 1955). We thus included two size measures—firm's market size and firm size—by taking the natural logarithm of a firm's sales in a given market and its total sales to control for their respective effects on performance. Finally, we further controlled for the effect of prior firm performance (market share$_{t-1}$) on firm performance, as a firm's prior performance is likely to influence subsequent performance.

At the market level, we included four market characteristics as control variables. First, market concentration can affect the relationship between multimarket contact and firm behavior (Jayachandran et al., 1999; Scott, 1982). Accordingly, we included market concentration (measured by Herfindahl index using firm market share in a given market) to control its effect. Second, we controlled for the level of competition in a given market by including market density (measured by the number of firms in a given market). Demand characteristics, such as market size and market growth rate, are likely to influence competitive intensity and firm performance (Gimeno & Woo, 1999). We therefore controlled for the effects of market size (the natural logarithm of total sales generated by firms in a market) and market growth (the natural logarithm of the ratio of market size of a given year to that of the prior year) on firm performance. Descriptive statistics are provided in Table 1. We examined whether there were threats from multicollinearity by conducting variance inflation factor (VIF) tests and found none (the highest average VIFs in the models reported below are about 2.3).

## Results

Table 2 presents the GLS models of market shares of multimarket firms. Model 1 presents the baseline model with control variables. We entered theoretical variables to test our hypotheses in order of our theoretical discussion and derived the full model, Model 3. Hypothesis 1

## Table 1
**Descriptive Statistics and Correlations for Theoretical and Control Variables**

| Variable | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Market share$_{t-1}$ | 4.66 | 8.30 | — | | | | | | | | | | | | | | | |
| 2. Level of multimarket contact (centered) | 0.00 | 0.34 | −.21*** | — | | | | | | | | | | | | | | |
| 3. Level of multimarket contact squared (centered) | 0.11 | 0.17 | .02 | .55*** | — | | | | | | | | | | | | | |
| 4. Number of strategic alliances (centered) | 0.00 | 0.63 | .11*** | .25*** | .23*** | — | | | | | | | | | | | | |
| 5. Proportion of R&D alliances | 0.14 | 0.21 | .11*** | .08*** | .03* | .05*** | — | | | | | | | | | | | |
| 6. Average level of technological similarity with multimarket rivals | 0.29 | 0.24 | .01 | −.04** | −.04** | −.03* | .07*** | — | | | | | | | | | | |
| 7. Average level of technological similarity with others | 0.08 | 0.16 | −.08*** | −.13*** | −.06*** | −.16*** | −.06*** | .48*** | — | | | | | | | | | |
| 8. Patent dummy | 0.81 | 0.39 | .12*** | −.02 | .06*** | .14*** | .20*** | .60*** | .23*** | — | | | | | | | | |
| 9. Market importance | 0.14 | 0.21 | .12*** | −.09*** | −.03* | −.21*** | −.14*** | .01 | .22*** | −.16*** | — | | | | | | | |
| 10. Degree of market diversification | 1.74 | 0.77 | .14*** | .43*** | .18*** | .32*** | .32*** | −.04*** | −.28*** | .21*** | −.52*** | — | | | | | | |
| 11. Firm’s market size | 3.91 | 1.69 | .52*** | .00 | .10*** | .15*** | .15*** | −.02 | −.04** | .16*** | .37*** | .16*** | — | | | | | |
| 12. Firm size | 6.99 | 1.69 | .34*** | .03* | .12*** | .34*** | .34*** | −.03* | −.26*** | .35*** | −.41*** | .65*** | .48*** | — | | | | |
| 13. Market concentration | 0.13 | 0.10 | .34*** | −.30*** | −.01 | .05*** | .05*** | .14*** | −.02 | .07*** | −.07*** | .05*** | −.05*** | .12*** | — | | | |
| 14. Market density | 34.74 | 25.68 | −.28*** | .27*** | .11*** | −.12*** | −.12*** | −.23*** | −.03* | −.17*** | .22*** | −.26*** | .05*** | −.22*** | −.46*** | — | | |
| 15. Market size | 8.20 | 1.19 | −.26*** | .28*** | .13*** | −.06*** | −.06*** | −.10*** | .07*** | −.07*** | .31*** | −.22*** | .27*** | −.09*** | −.33*** | .72*** | — | |
| 16. Market growth | 0.03 | 1.57 | −.18*** | .22*** | .10*** | .00 | .00 | −.01 | .07*** | .00 | .17*** | −.01 | .21*** | .00 | −.25*** | .43*** | .65*** | — |

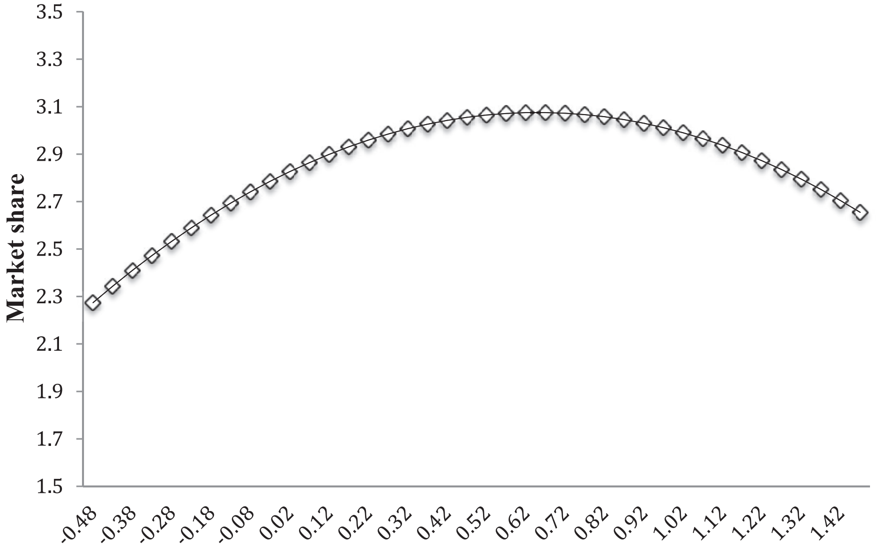
*Note:* $N = 8{,}208$.
*$p < .05$.
**$p < .01$.
***$p < .001$.

**Table 2**
**Generalized Least Squares AR(1) Models for Market Share of Multimarket Firms**

| Variable | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| Theoretical variables | | | |
| Hypothesis 1 (∩) | | | |
| Level of multimarket contact (centered) | | 0.82*** (0.22) | 0.75*** (0.23) |
| Level of multimarket contact squared (centered) | | −0.63** (0.27) | −0.44* (0.33) |
| Hypothesis 2 (+) | | | |
| Level of Multimarket Contact (centered) x Number of Strategic Alliances (centered) | | | 0.54** (0.22) |
| Level of Multimarket Contact Squared (centered) x Number of Strategic Alliances (centered) | | | −5.48E-03* (3.25E-03) |
| Firm-level control variables | | | |
| Number of strategic alliances (centered) | −0.06 (0.15) | −0.10 (0.15) | −0.14 (0.16) |
| Proportion of R&D alliances | 0.26 (0.19) | 0.23 (0.19) | 0.23 (0.19) |
| Average level of technological similarity with multimarket rivals | −0.13 (0.24) | −0.23 (0.24) | −0.23 (0.24) |
| Average level of technological similarity with others | −0.18 (0.22) | −0.11 (0.22) | −0.12 (0.22) |
| Patent dummy | 0.09 (0.14) | 0.12 (0.14) | 0.12 (0.14) |
| Market importance | 0.43 (0.24) | 0.38 (0.24) | 0.40 (0.24) |
| Degree of market diversification | −0.04 (0.18) | −0.27 (0.19) | −0.30 (0.19) |
| Firm's market size | 0.05 (0.04) | 0.04 (0.04) | 0.04 (0.04) |
| Firm size | −0.36** (0.12) | −0.31** (0.12) | −0.35** (0.12) |
| Market share$_{t-1}$ | 0.90*** (0.01) | 0.90*** (0.01) | 0.90*** (0.01) |
| Market-level control variables | | | |
| Market concentration | −0.18 (0.56) | 0.16 (0.56) | 0.11 (0.56) |
| Market density | −0.01*** (2.22E-03) | −0.01*** (2.22E-03) | −0.01*** (2.22E-03) |
| Market size | 0.11* (0.06) | 0.06 (0.06) | 0.07 (0.06) |
| Market growth | −0.02 (0.02) | −0.02 (0.02) | −0.02 (0.02) |
| Firm fixed effects | Included | Included | Included |
| Market fixed effects | Included | Included | Included |
| Year fixed effects | Included | Included | Included |
| Constant | 0.43 (2.38) | 1.20 (2.38) | 1.16 (2.38) |
| Observations | 8,208 | 8,208 | 8,208 |
| Number of multimarket firms | 233 | 233 | 233 |
| Wald chi-square | 64825*** | 65028*** | 65092*** |
| AR(1) | 0.23 | 0.23 | 0.23 |
| Modified Bhargava et al. Durbin-Watson | 1.71 | 1.71 | 1.71 |
| Baltagi-Wu LBI | 2.07 | 2.07 | 2.07 |

*Note:* Standard errors in parentheses. LBI = locally best invariant.
*$p$ < .05.
**$p$ < .01.
***$p$ < .001.

**Figure 1**
**The Relationship Between Multimarket Contact and Market Share of Multimarket Firms**




proposed that multimarket contact has an inverted *U*-shaped relationship with a multimarket firm's market share in a market. We followed Haans, Pieters, and He's (in press) suggestions to test the hypothesis. Specifically, they suggested that tests of an inverted *U*-shaped relationship should meet three conditions: (a) Coefficients are in the expected direction, (b) the slope of the curve is sufficiently steep at both ends of the range of the variable of interest, and (c) the turning point of the inverted *U* curve is located well within the data range. As shown in Model 2, the positive coefficient estimate of level of multimarket contact (0.82, $p < .001$) and the negative coefficient estimate of level of multimarket contact squared (–0.63, $p < .01$) provide evidence to satisfy the first condition. We split the data in halves at the turning point of the curve, computed as 0.65 (= –0.82 / [2*(–0.63)]), to determine whether the second condition was met. To meet the second condition, for linear regression analysis, the coefficient estimate of level of multimarket contact should be positive for the values below the turning point and negative for those above the turning point. We ran two GLS regressions on the split data sets (i.e., one with values of the level of multimarket contact ≤0.65 and the other with values >0.65). The results showed a positive coefficient estimate of level of multimarket contact for the values less than or equal to 0.65 (0.59, $p < .01$) and a negative coefficient estimate for the values greater than 0.65 (–1.05, $p < .05$). These findings satisfy the second condition. To examine the third condition, we plotted the inverted *U*-shaped graph by using the coefficient estimates in Model 2 with the full data range of level of multimarket contact in our sample. As shown in Figure 1, the turning point, 0.65, is located within the data range (–0.48 to 1.47). It is also located within the 95% confidence interval of the data range of level of multimarket contact ([–0.20, 1.21]). Therefore, the third condition was satisfied.

Accordingly, Hypothesis 1 is fully supported.[3] This finding suggests that multimarket contact has an inverted *U*-shaped relationship with a multimarket semiconductor firm's market share in the observed time period.

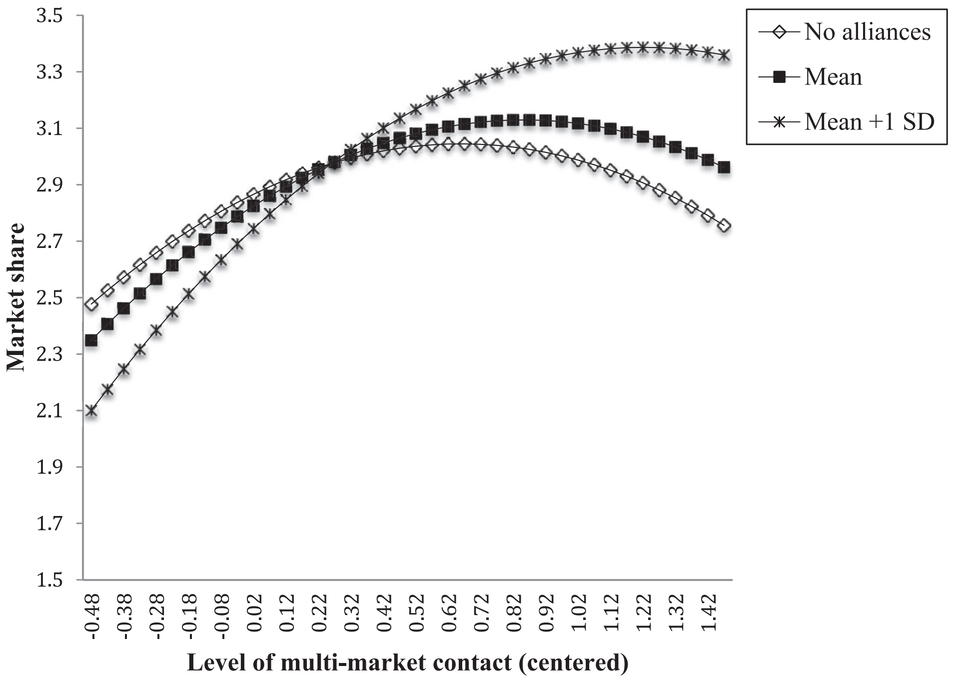
Model 3 included the interaction terms Level of Multimarket Contact × Number of Strategic Alliances and Level of Multimarket Contact Squared × Number of Strategic Alliances to test the moderating effect of the number of strategic alliances postulated in Hypothesis 2. The significant coefficient estimates of Level of Multimarket Contact × Number of Strategic Alliances (0.54, $p < .01$) and Level of Multimarket Contact Squared × Number of Strategic Alliances (–0.00543, $p < .05$) in Model 3 suggest that the number of strategic alliances positively moderated the relationship between multimarket contact and a multimarket firm's market share by steepening the inverted *U* curve (Haans et al., in press). To fully appreciate the moderating effect, it is important to examine whether there is a significant shift in the turning point. To evaluate the effect of moderation on the turning point, we calculated the new turning point of 0.85 by using the coefficient values from Model 3 and the mean of the moderator, number of strategic alliances (centered). Since the turning point at the mean of number of strategic alliances (0.85) is higher than the original turning point of 0.65 and all respective coefficients are statistically significant in the expected directions, these results suggest that the number of strategic alliances a multimarket firm had moderated the effect of multimarket contact on the firm's market share.

To better appreciate the interaction effects, we used the coefficients in Model 3 to estimate the interaction effects of the number of strategic alliances and the level of multimarket contact on a firm's performance in our sample by plotting three lines: no alliances, mean, and (mean + 1 standard deviation). As shown in Figure 2, the effect exhibits an inverted *U*-shaped relationship; yet, the relationship changes as the number of strategic alliances the firm has increases. Specifically, the line of (mean + 1 standard deviation) has the steepest positive slope before reaching its peak point. Although the line reaches the peak point more slowly than the other two lines do, the turning point (level of multimarket contact) and the peak point (market share) of the line are higher than for the other two lines. After the peak point, the line also descends more slowly than the other two lines do. These findings suggest that the number of strategic alliances positively moderates the effect of multimarket contact on a multimarket semiconductor firm's market share in the observed period. Strategic alliances help the firm enhance mutual forbearance derived from multimarket contact by deterring its rivals' aggression and increasing its market share. Importantly, the market share of a multimarket firm with a higher number of strategic alliances (i.e., mean + 1 standard deviation) is lowest when the average level of multimarket contact is low. It is plausible that alliances require managers in the firm to coordinate and allocate resources that could have been used to compete for market share in order to realize the potential benefits of the alliances. Nevertheless, as the level of multimarket contact increases, the resources generated from the alliances appear to help the firm deter its multimarket rivals' aggression, enhancing its market share (before the peak point of multimarket contact) and mitigating the impact of increasing competition on the firm's market share (after the peak point).

## Discussion and Conclusion

The proliferation of multimarket contact and its impact on firm behavior and performance have drawn considerable attention from scholars of strategic management, economics, and

**Figure 2**
**The Moderating Effect of the Number of Strategic Alliances on the Relationship Between Multimarket Contact and Market Share of Multimarket Firms**




organizational theory. To date, research has shown that multimarket contact has an inverted *U*-shaped relationship with rates of market entry and exit by multimarket firms (Baum & Korn, 1999; Fuentelsaz & Gomez, 2006; Haveman & Nonnemaker, 2000). Research has also identified factors that affect the relationship between multimarket contact and interfirm rivalry (Gimeno & Woo, 1999; Jayachandran et al., 1999, Stephan et al., 2003; Yu et al., 2009). Studies of how multimarket contact and competition influence firm performance, however, have produced mixed results and focused primarily on how the characteristics of the firm and the market potentially influence the relationship between multimarket contact and firm performance (Gimeno, 1999; Li & Greenwood, 2004; Mester, 1987; Scott, 1982). In this study, we moved beyond prior research on multimarket competition and firm performance by examining the curvilinear effect of multimarket contact and exploring how strategic alliances moderated the effect on firm performance, taking into consideration varying levels of multimarket contact. Accordingly, our theoretical framework and empirical analyses provide valuable additions to knowledge about multimarket competition and strategic alliances and have important managerial implications.

Our analysis of the market share of 233 multimarket semiconductor firms suggested that the level of multimarket contact a firm had with its multimarket rivals in a market had an inverted *U*-shaped relationship with the firm's market share in the market. This finding is consistent with the arguments offered to explain the observed inverted *U*-shaped relationship between multimarket contact and market entry and exit decisions in prior studies (e.g., Baum & Korn, 1999; Haveman & Nonnemaker, 2000). These studies suggested that firms seek to keep multimarket contact with their rivals at a moderate level, as this balances the benefits of mutual forbearance with rivals without the threat of destabilizing the cooperative relationship. Importantly, our finding in this study helps to explain the mixture of positive and negative effects of multimarket contact on firm performance reported in prior studies (e.g., Mester, 1987; Shipilov, 2009). Although the inconsistent results in these studies may be due in part to different performance measures and idiosyncratic research settings, our results demonstrated that multimarket firms benefited most from multimarket contact when the level of contact was moderate. Too little multimarket contact was insufficient to induce mutual forbearance from rivals. Too much multimarket contact, on the other hand, increased the difficulty of developing/sustaining mutual forbearance and reduced incentives for mutual forbearance, which potentially resulted in intense competition and the attendant deleterious effects on firm performance.

Our finding on the effect of strategic alliances on the relationship between multimarket contact and firm performance also helps reconcile the inconclusive results of prior studies and has important theoretical implications. The result showed that the number of strategic alliances a semiconductor firm had made a difference to firm performance in a context characterized by multimarket competition. Strategic alliances helped the firm navigate multimarket competition and acted as an additional deterrent that enhanced the mutual forbearance derived from multimarket contact, improving the firm's market share. A firm's ability to compete against its rivals is a critical factor that affects rivals' motivation to engage in intense competition with the firm (Chen, 1996; Chen & Miller, 2012) and is therefore theoretically important. Studies of multimarket competition have focused primarily on firm characteristics and market characteristics to theorize the mechanisms that influence a firm's ability to compete against or engage in mutual forbearance with its multimarket rivals (Baum & Korn, 1999; Bernheim & Whinston, 1990; Gimeno, 1999; Haveman & Nonnemaker, 2000; Yu et al., 2009). Prior studies have not considered how a firm's ability to compete against its multimarket rivals and/or reinforce mutual forbearance can derive from other forms of relationships such as strategic alliances. Our finding on the moderating effect of strategic alliances helps to explain why some studies reported a positive effect of multimarket contact on firm performance while others showed either no effect or a negative effect. Our study has therefore generated a significant new theoretical direction that may have important implications for understanding how mutual forbearance between multimarket firms is generated and sustained. More broadly, our study sheds light on how other forms of interorganizational relationships affect the capacity of firms to leverage multimarket contact to improve firm performance.

Our study also has important implications for research on strategic alliances. Research on the relationship between strategic alliances and firm performance has focused mostly on how differences in types of strategic alliances, firm and partner characteristics, and alliance portfolios influence firm performance (Wassmer, 2010). Research has also emphasized the benefits of alliances associated with mutual learning, cost reduction, accessibility of information and resources, synergy creation, and managing competitive interdependence (e.g., Lavie, 2007; Pfeffer & Nowak, 1976; Stuart, 2000; Wassmer, 2010). The theoretical account and empirical analysis put forward here suggest that strategic alliances helped a firm mitigate competitive pressure derived from multimarket competition by increasing its ability to attack its rivals and pose a more credible threat of retaliation to them.

Multimarket competition is a common phenomenon in many industries. Therefore, our findings have important implications for practice. While having multiple market contacts with rivals gives managers the opportunity to engage in tacit cooperation with rivals, managers may need to avoid too much multimarket contact. Further, the findings of our study suggest that a strategic response for managers facing multimarket competition is to form strategic alliances. Through alliances, such as production outsourcing, joint marketing activity, product development, and technology licensing, managers can increase their firm's capacity to maneuver multimarket competition and mitigate its impact on the firm's performance.

In this study we have demonstrated that the relationship between multimarket contact and firm performance may have an inverted *U*-shape for semiconductor firms. Future research to replicate our findings in other research settings can explore the generalizability of our findings to other contexts. Importantly, we have theorized the mechanisms that may underlie the curvilinear relationship between multimarket contact and firm performance. We have suggested how the insights of previous scholars examining why multimarket firms appear to seek out a level of contact with multimarket rivals that increases to a peak and then diminishes may have important implications for firm performance. We have elaborated these arguments, theorizing how low, moderate, and high levels of contact affect firm performance in particular ways. Future research could attempt to more directly examine how mechanisms leading to mutual forbearance between multimarket firms vary with levels of multimarket contact and how forbearance in turn affects firm performance. In addition, this study rested on the proposition that multimarket contact leads to mutual forbearance, which in turn affects firm performance. Our data prevented us from conducting a closer test of this proposition by empirically measuring mutual forbearance. Future research with more detailed, comprehensive data on firm competitive activity and performance may allow us to better understand the relationships between multimarket contact, mutual forbearance, and firm performance.

Our focus on the effect of the number of strategic alliances on the relationship between multimarket competition and firm performance also suggests avenues for future research. Research on multimarket competition posits that similarity between multimarket firms can influence the level of mutual forbearance between them and therefore rivalry and their performance (Jayachandran et al., 1999). It is possible that similarity in alliance portfolios between multimarket firms plays an important role in the relationship between mutual forbearance and firm performance. Furthermore, strategic alliance research has contended that a firm's relationship with its alliance partners plays an important role in resource generation and firm performance (Wassmer, 2010). Through strategic alliances, a firm may also better understand its partners' strategic intents and capabilities (e.g., Hamel, 1991; Park & Russo, 1996). It is possible that mutual forbearance derived from a firm's multimarket contact with its rivals may be affected if the firm also has strategic alliances with those rivals, depending upon the nature of their relationship. More broadly, our understanding of the phenomenon has been limited to how multimarket contact itself affects the development of mutual forbearance and, consequently, firm performance. Our study shows that it is important to go beyond multimarket contact to consider other forms of interorganizational relationships and how they may alter the impact of multimarket competition on firm performance. This study, therefore, could be the first step in the exploration of how the wide variety of relationships between firms may shape firm behaviors and outcomes.

## Notes

1. We are grateful to an anonymous reviewer for encouraging us to consider the implications of strategic alliances on the relationship between multimarket contact and firm performance.

2. We also conducted sensitivity analysis using 3-year and 4-year windows of alliance networks to test our hypotheses. The results were mostly consistent with the ones reported here.

3. Following Haans and colleagues' suggestions (Haans, Pieters, & He, in press), we conducted robustness tests by using alternative specifications to determine whether the relationship between the level of multimarket contact and market share was indeed an inverted *U* curve. Specifically, we used two alternative specifications: a specification with logarithmic transformation of the level of multimarket contact and a cubic specification. The coefficient estimates were not significant for either specification. We also examined whether the results reported in Table 2 were driven by outliers by excluding the outliers from our analysis and found that they were not.

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