

**Maneuvering Multimarket Competition: The Effects Of Multimarket Contact And  
Strategic Alliances On Performance Of Single-Market Firms**

You-Ta Chuang  
York University  
School of Administrative Studies  
4700 Keele Street, Toronto, Ontario Canada M3J 1P3  
Tel: (416) 736-2100 ext: 66615  
Fax: (416) 736-5963  
e-mail: [ychuang@yorku.ca](mailto:ychuang@yorku.ca)

Kelly Thomson  
York University  
School of Administrative Studies  
4700 Keele Street, Toronto, Ontario Canada M3J 1P3  
Tel: (416) 736-2100 ext: 20216  
Fax: (416) 736-5963  
[thomsonk@yorku.ca](mailto:thomsonk@yorku.ca)

*Forthcoming at Strategic Organization*

We thank Fu-Jen Catholic University and York University for their funding support. We are also indebted to Ben Lee and Allen Liao at Gartner for their generous support with data collection and to Chun-Chi Yang and Yung-Cheng Lai for data management assistance. We are grateful to Tim Rowley and two reviewers for their comments, and to Kristina Dahlin for her comments on an early draft.

# **Maneuvering Multimarket Competition: The Effects Of Multimarket Contact And Strategic Alliances On Performance Of Single-Market Firms**

## **Abstract**

Research on multimarket competition has focused on how multimarket contact shapes competitive behavior of firms that face each other in multiple markets. To date there has been little attention to how multimarket contact affects single-market firms nor how single-market firms cope with multimarket competition. In this study we examine the effects of multimarket competition and strategic alliances on single-market firms' market share. Our analysis shows that the degree of multimarket contact firms had outside of a single-market firm's market negatively affected the single-market firm's market share. Yet, the number of strategic alliances a single-market firm had and having alliances with multimarket firms helped the single-market firm to cope with competitive pressure derived from multimarket contact and enhance its market share.

Keywords: single-market firms, multimarket competition, and strategic alliances

Multimarket competition occurs when firms compete against their rivals across different markets. Such competition exists in many industries such as airlines, financial services, hotels, health care, and semiconductors. To date, scholars have contended that multimarket competition exerts a significant influence on competitive dynamics between multimarket firms (Yu and Cannella, 2013) and has implications for society as well as other firms (Edwards, 1955; Golden and Ma, 2003). Multimarket contact provides multimarket firms with opportunities to observe and become familiar with behaviors of multimarket rivals, enhancing their capacity to compete with these rivals, but at the same time creating channels that make them vulnerable to cross-market retaliation. Multimarket contact therefore induces mutual forbearance between multimarket firms and may reduce the rivalry between them (Edwards, 1955). Studies have reported that multimarket competition influences multimarket firms' behavior, including market entry and exit (e.g., Baum and Korn, 1999; Haveman and Nonnemaker, 2000), pricing (Gimeno and Woo, 1999), service quality (Prince and Simon, 2009), and competitive aggression (e.g., Young et al., 2000; Yu et al., 2009), as well as performance (e.g., Chuang et al., 2016; Gimeno, 1999; Greve, 2008).

While extant research offers valuable insights into how multimarket competition affects behavior and performance of multimarket firms, our understanding of its implications for firm performance remains incomplete. Specifically, industries often consist of both multimarket and single-market firms, i.e., firms that compete in only one market. While single-market firms are not part of multimarket contact relationships, they are significantly affected by such relationships (Haveman and Nonnemaker, 2000). For example, in the 2011 holiday shopping season, Wal-Mart and Target tacitly engaged in aggressive pricing activity to undercut

Toys”R”Us’ market share in the toy market and forced Toys”R”Us to offer completely different toy product lines to shoppers (Krugman and Wells, 2012). To date, however, only a handful of studies has examined the effect multimarket competition has on the behavior and performance of single-market firms. Bernheim and Whinston (1990) suggested that multimarket contact may benefit single-market firms if mutual forbearance derived from multimarket contact has been established among multimarket firms. However, Barnett (1993) and Baum and Korn (1999) have theorized that multimarket competition should have negative implications for single-market firms’ performance. Haveman and Nonnemaker (2000) reported that multimarket contact had no effect on single-market thrifts’ competitive aggression. In his study on firm growth, Greve (2008) reported no difference in sales growth between multimarket and single-market insurance providers (measured as growth above the industry average). Importantly, there is no direct empirical evidence regarding the effect of multimarket competition on performance of single-market firms. The relationship between multimarket competition and performance of single-market firms, therefore, warrants further systematic examination. If mutual forbearance between multimarket firms had no effect on performance of single-market firms, the concerns regarding the impact of tacit collusion derived from mutual forbearance between these firms may have been overstated (e.g., Edwards, 1955). If multimarket competition does have negative implications for performance of single-market firms, it is also important to understand if there are ways in which single-market firms can manage this competitive context to enhance their performance.

In this study, we draw on research into multimarket competition and strategic alliances to examine the effect of multimarket contact on the performance of single-market firms and how

having strategic alliances can moderate this effect. Instead of considering the growth rate of single-market firms, we investigate another indicator of performance – market share. Market share is an important indicator of a firm’s market performance and research has shown it can be influenced by multimarket competition (Chuang et al., 2016; Gimeno, 1999; Shipilov, 2009). Specifically, prior studies have found that multimarket contact between firms reduces rivalry between them (e.g., Young et al., 2000; Yu et al., 2009; see Yu and Cannella, 2013 for a recent review). Multimarket firms can divert the resources they save from not competing aggressively against each other to compete against other firms in the market (Barnett, 1993; Baum and Korn, 1999). Hence, we propose that a high degree of multimarket contact among firms should exert a negative effect on single-market firm’s market share. However, we argue that this negative effect may be mitigated by the strategic alliances a single-market firm has. Strategic alliances provide resources that can enhance a firm’s capacity to compete with rivals (e.g., Chen and Miller, 2012; Gnyawali and Madhavan, 2001). Strategic alliances also help firms and their partners to understand each other’s behaviors and capabilities (Hamel, 1991; Park and Russo, 1996) and create channels that may deter aggression from partners in the market where both firms are present. Therefore, strategic alliances should play a critical role in helping single-market firms navigate multimarket competition and enhance their market share.

To test our hypotheses we examine the effects of multimarket competition and strategic alliances on single-market firms’ market share using data from the global semiconductor industry, 2000-2009. Our analysis of 130 single-market semiconductor firms shows that the degree of multimarket contact among multimarket firms outside a single-market firm’s market had a negative effect on the firm’s market share. Yet, the number of strategic alliances a single-

market firm had buffered them from the potential negative effects on their market share. Furthermore, while the proportion of multimarket firms a single-market firm had strategic alliances with had no effect on firm performance, a single-market firm that had alliance relationships with multimarket firms in which it was the dominant partner, did not experience adverse effects to the same extent as those who held less powerful positions in alliance relationships. In other words, holding a more powerful position in strategic alliances with multimarket firms present in a single-market firm's market buffered the negative effect of multimarket competition on the firm's market share. Our study, in contrast with prior studies of firm growth (Greve, 2008; Haveman and Nonnemaker, 2000), shows the negative impact of multimarket competition on a single-market firm's market share and also how a single-market firm may reduce the negative impact on its market share by having strategic alliances. Importantly, few studies of multimarket competition have examined how other forms of interorganizational relationships can alter the dynamics of multimarket competition (Chuang et al., 2016; Shipilov, 2009). Our study contributes to the literature on multimarket competition by showing how strategic alliances between multimarket and single-market firms play an important role in shaping competitive dynamics in the context of multimarket competition.

## **THEORETICAL BACKGROUND AND HYPOTHESES**

The theoretical foundation underlying the relationship between multimarket contact and competition is the notion of mutual forbearance proposed by Edwards (1955). Edwards (1955) argued that multimarket firms would hesitate to take aggressive action against their rivals in some markets if they realized that they could face potential losses from retaliatory action by those rivals in other markets. Therefore, multimarket firms tend to avoid aggressive competitive

behavior against firms they meet in multiple markets. This fundamental argument has been further developed as multimarket competition scholars have theorized the mechanisms that drive mutual forbearance and how they affect competitive interaction between multimarket firms (Yu and Cannella, 2013). Through repeated interaction across different markets, multimarket firms become aware of the strategies and tactics of their multimarket rivals, recognize their competitive interdependence, and better understand each other's motives and capabilities (Baum and Korn, 1999; Boeker et al., 1997). Repeated market contact may then make it easier for them to tacitly cooperate and coordinate their actions to avoid unintended competition.

Mutual forbearance derived from multimarket contact is also induced by a firm's ability to deter rivals' aggression (Bernheim and Whinston, 1990). The ability to deter rivals' aggression stems from repeated market contact between firms and their rivals (Jayachandran et al., 1999). While multimarket contact makes firms vulnerable to attacks by rivals, the contact also enables them to retaliate against these attacks. As firms come into contact with the same rivals in a larger number of markets, they tend to become more aware that rivalry in one market may result in cross-market retaliation. This threat of cross-market retaliation may deter multimarket firms from engaging in intense rivalry with each other. Multimarket contact therefore may create incentives to engage in tacit agreements regarding competitive interaction. These tacit agreements have been also referred to as spheres of influence whereby multimarket firms may tacitly agree to "respect" a rival's primacy in one market with the expectation that their own interests in key markets will be similarly "respected" (Edwards, 1964). This coordination of activities across markets and "respect" for territorial interests then increases the stability of mutual forbearance between multimarket firms (Gimeno, 1999). Such deterrence is amplified by

the capacity a multimarket firm has to engage in retaliation (Baum and Korn, 1999; Bernheim and Whinston, 1990; Chen, 1996; Gimeno, 1999). Yet, coordination of activities across markets and with multimarket rivals can become challenging when the degree of multimarket contact and the number of multimarket firms increase, which may lead to unintended rivalry between multimarket firms and negatively affect firm performance (Chuang et al., 2016).

Recent studies have provided abundant evidence that multimarket contact facilitates mutual forbearance, which in turn affects competitive interaction between multimarket firms. In exploring how mutual forbearance affects decisions regarding market entry and exit, for example, Baum and Korn (1999) observed that multimarket contact between California airlines had an inverted U-shaped relationship with rates of market entry and exit. A curvilinear relationship between multimarket contact and market entry was also observed among financial institutions (e.g., Fuentelsaz and Gomez, 2006; Haveman and Nonnemaker, 2000) and in the healthcare sector (Anand et al., 2009; Stephan et al., 2003). Furthermore, Gimeno and his colleagues (Gimeno, 1999; Gimeno and Woo, 1999) demonstrated that multimarket contact between airlines decreased the rivalry between them. Young and his colleagues (2000) showed that the frequency of a software firm's competitive activity decreased as its multimarket contact with rivals increased. These findings suggest that mutual forbearance derived from multimarket contact facilitates tacit cooperation and collusion between multimarket firms and reduces rivalry between them.

### **Multimarket Competition and Performance of Single-market Firms**

Despite abundant empirical evidence showing the effects of multimarket competition on



behaviors and performance of multimarket firms (Yu and Cannella, 2013), researchers have paid limited attention to empirically examining the implications of multimarket competition for performance of single-market firms. Haveman and Nonnemaker (2000) reported that the degree of multimarket contact among multimarket thrifts in a market had no effect on single-market thrifts' competitive aggression in that market (i.e., no increase or decrease in the number of branches in the market). However, the number of branches of a single-market thrift decreased as the degree of market dominance by large multimarket thrifts increased. Greve (2008) found that multimarket contact did not result in differences in the likelihood that either multimarket or single-market insurers would have sales growth above the industry average. Yet, the number of single-market insurers in a market reduced the growth rates of multimarket insurers in the market. Thus, multimarket contact does influence the relationship between multimarket and single-market firms and may affect single-market firm performance. However, there is a lack of empirical evidence that enables us to fully appreciate the effect of multimarket competition on performance of single-market firms.

Bernheim and Whinston (1990) argued that if there is mutual forbearance derived from multimarket contact among multimarket firms, multimarket firms can tacitly collude to set prices that also benefits single-market firms. Single-market firms may also be hesitant to act aggressively in the marketplace, e.g., by undercutting multimarket firms' pricing, because joint retaliation from multimarket firms could have a severe impact on their performance. Thus, the effect of multimarket contact can spill over to single-market firms and influence their behavior and performance. However, to benefit from the spillover effect, single-market firms would need to understand whether mutual forbearance has been established among multimarket firms in

their markets. We propose that, due to differences in organizational form, single-market firms may understand the dynamics of multimarket contact differently than multimarket firms do. Unlike multimarket firms that can learn about each other's behaviors through contacts in multiple markets (Jayachandran et al., 1999), a single-market firm does not have the same opportunities to become familiar with and learn about the behavior of multimarket firms across markets. It is then difficult for a single-market firm to participate in and understand the implicit "mutual forbearance" agreement among multimarket rivals in its market. This difficulty may increase as the numbers of multimarket firms in the market and their multimarket contact increase. Multimarket firms may also have less incentive to forbear from competition with single-market firms as single-market firms do not possess channels for retaliation. As a result, multimarket contact among multimarket firms may result in intense competitive pressure on single-market firms, which may negatively affect their market share.

We argue that, for a single-market firm, the multimarket contact among its multimarket rivals may have a negative effect on its performance and on its market share in particular. Specifically, competitive pressure from multimarket firms on single-market firms depends on mutual forbearance derived from multimarket contact among multimarket firms. Initial increases in multimarket contact among multimarket firms help to develop mutual forbearance among them. Multimarket firms, seeking to develop mutual forbearance and avoid unintended competition with their multimarket rivals, are less likely to attempt to increase their market share by launching competitive actions such as undercutting each other's pricing, improving product quality, and launching new products against these rivals. To increase their market share, multimarket firms may instead deploy the resources saved from mutual forbearance to compete

against single-market firms (Barnett, 1993; cf. Baum and Korn, 1999). Multimarket firms, for example, can engage in tacit collusion by collectively reducing prices and launching new products and promotions to compete against single-market firms. Tacit collusion can also manifest as multimarket firms aggressively seeking to increase their performance at the expense of their multimarket rivals in one market while allowing rivals to have better performance in another market (cf. Edward, 1964). Single-market firms, therefore, are likely to be vulnerable to attacks by multimarket firms in their markets. However, tacit agreements regarding mutual forbearance and spheres of influence may be difficult to sustain if the degree of multimarket contact is high (Chuang et al., 2016). Coordinating activities across markets and with different multimarket rivals may make it challenging for multimarket firms to sustain mutual forbearance when the degree of multimarket contact is high. High numbers of multimarket rivals and market contact coupled with the behaviors of other firms in the markets may make it difficult to interpret the strategic intent of multimarket rivals (Axelrod, 1997; Stigler, 1964). This may lead to unintended rivalry and retaliatory actions among multimarket firms, intensifying competition for the whole market. Therefore, a single-market firm's market share will be likely to decrease as the degree of multimarket contact among firms in its market increases. The above reasoning leads to the following hypothesis:

*Hypothesis 1: A single-market firm's market share in a given market will be negatively associated with the degree of multimarket contact among firms outside the firm's market.*

### **Strategic Alliances and Performance of Single-market Firms**

Research on competitive dynamics has long contended that the resources a firm possesses have an important impact on competitive interaction (Chen, 1996; Chen and Miller, 2012). One source of resources is strategic alliances. Past studies on strategic alliances suggest that

resources saved/generated from alliances help a firm to cope with competitive pressure and enhance firm performance (Wassmer, 2010). Though strategic alliances make the firm vulnerable to opportunistic attempts by alliance partners to appropriate the firm's knowledge and resources (e.g., Hamel, 1991; Khanna, et al., 1998); strategic alliances also offer potential benefits to the firm. By enhancing cost efficiency associated with economies of scale and improvements to long-term competitive advantage, strategic alliances can add to a firm's resources, which may increase the firm's capacity to engage in inter-firm rivalry (Gnyawali and Madhavan, 2001). Indeed, research on strategic alliances suggests that potential advantages embedded in alliances, such as cost savings, shared resources, and knowledge exchange can improve a firm's capacity to cope with competitive pressure and consequently enhance the firm's performance (see Wassmer, 2010 for a recent review). Young and his colleagues (Young et al., 1996), for example, showed that the number of strategic alliances a software producer had was positively associated with its ability to undertake competitive activities. Gnyawali and his colleagues (Gnyawali et al., 2006) reported that a firm's position in its alliance network had a significant influence on its ability to launch competitive actions. Chuang and his colleagues (Chuang et al., 2016) provided evidence that having alliances helped a multimarket firm to increase the positive effect of mutual forbearance derived from its multimarket contacts by providing access to more resources enabling firms to deter multimarket rivals' aggression.

We propose that the negative effect of multimarket contact on a single-market firm's performance may be reduced by the number of strategic alliances the firm has. Compared to single-market firms without strategic alliances, a single-market firm with strategic alliances can improve its competitive advantage through access to the resources derived from its alliances.

While having strategic alliances may put the firm at risk of opportunistic behaviors by partners (e.g., Hamel, 1991; Khanna et al., 1998), resources saved or generated from joint alliance activities such as shared distribution channels, marketing activity, technology licensing, and/or research and development, can increase the firm's capacity to launch competitive actions, such as pricing and promotion, product quality improvement, and new product development. This increased capacity can help the firm to compete against other single-market firms and cope with competitive pressure derived from mutual forbearance among multimarket firms in the market. A single-market firm's alliances can help to buffer competition and therefore, enhance its market share. Thus, the adverse impact of multimarket contact on single-market firm's market share may diminish as the number of strategic alliances the firm has increases. Accordingly, we propose:

*Hypothesis 2: The negative effect of multimarket contact on a single-market firm's market share will decrease as the number of strategic alliances the firm has increases.*

### **Strategic Alliances with Multimarket Rivals**

Hypothesis 2 postulated the *overall* effect of a single-market firm's strategic alliances on the firm's performance in the context of multimarket competition by offering the firm access to external resources. Research on strategic alliances also suggests that whom a firm forms strategic alliances with has important implications for the firm's performance (e.g., Baum et al., 2000; Hamel, 1991; Lavie, 2007; Shipilov, 2009; Stuart, 2000). Shipilov (2009) reported that alliances between multimarket firms created another mechanism that enabled them to monitor each other's behavior, which in turn reinforced governance of mutual forbearance and enhanced firms' market share. Hence, it is possible that allying directly with a multimarket rival in a single-market firm's market may influence the relationship between the two firms and have

implications for the single-market firm's performance.

Specifically, an alliance between a single-market firm and its multimarket rival in its market creates collaborative interdependence between the two firms as the firms share information and resources with each other (Park and Russo, 1996). While such interdependence could expose the firm to opportunistic behaviors by the rival in the alliance, the interdependence may also reduce the rival's incentive to attack the single-market firm in the marketplace. Should the multimarket rival attack the single-market firm, the existence of an alliance can offer the single-market firm a channel for retaliation. The firm could respond to an attack by decreasing its commitment to the alliance and undermining the value of the alliance for the rival. The competitive pressure on the single-market firm from the rival may be reduced as a result. The alliance may provide the single-market firm with incremental resources, i.e. resources conserved from competing with the rival and/or new resources generated from the alliance. The single-market firm can therefore use these additional resources to compete against other multimarket and single-market firms in the market to enhance its performance.

We propose that the proportion of multimarket rivals in a single-market firm's market with which the firm has alliances may moderate the negative effect of multimarket contact on the firm's market share. A single-market firm that has established alliances with a higher proportion of multimarket rivals in its market than other single-market firms, may experience less competitive pressure from those rivals and have enhanced capacity to compete in the market. Having alliances with a higher proportion of multimarket rivals in its market not only reduces their incentives to compete aggressively against the single-market firm but also provides the

firm with resources to compete with other single-market firms and to cope with competitive pressure from other multimarket firms. Therefore, the negative effect of multimarket contact on a single-market firm's market share may decrease as the proportion of multimarket rivals with which the firm has alliances increases. Formally, we hypothesize:

*Hypothesis 3: The negative effect of multimarket contact on a single-market firm's market share will decrease as the proportion of multimarket rivals with which the firm has alliances increases.*

Prior research suggests that the nature of a firm's relationship with its alliance partner can affect the co-opetitive dynamics in the alliance (Hamel, 1991; Khanna et al., 1998; Lavie, 2007).

Whether a firm can effectively induce its alliance partner to cooperate and therefore to realize the potential benefits from the alliance depends in part on the firm's bargaining power *vis-à-vis* its partner (Hamel, 1991; Lavie, 2007). We propose that relative power may be associated with difference in firm size. Because a larger firm in an alliance has more internal resources it has alternative ways, such as internal development or acquisitions, to obtain the benefits anticipated from the alliance. A larger firm is therefore less dependent on alliances than smaller firms are. In addition, a larger sized firm may have more resources that can be deployed to alliances, creating greater potential benefits for partners. The firm may make it attractive for smaller sized partners to be cooperative because the partners are likely to be more dependent upon the benefits derived from the alliances (Khanna et al., 1998).

Extending this logic then, it is plausible that when a single-market firm has an alliance with a multimarket firm, their respective sizes relative to each other in the market they share may affect the incentives of the two firms to compete aggressively with each other. The larger the size of

the single-market firm, compared to the multimarket rival, the greater the potential benefits the single-market firm can offer the rival. A desire to promote the single-market firm's collaboration in alliance agreements may deter the multimarket rival from aggressive action toward the single-market firm (Brandenburger and Nalebuff, 1996). The multimarket rival may then direct its resources to compete with other firms in the market. Competitive pressure on the single-market firm derived from multimarket contact among multimarket rivals may decrease. Thus, a single-market firm may benefit from having alliances with a multimarket rival when the rival has a relatively smaller market presence. It is then possible that a single-market firm's size relative to the market size of a multimarket rival/alliance partner may moderate the effect of multimarket contact on the firm's performance. Compared to other single-market firms, a single-market firm that has alliances with multimarket rivals with smaller relative market size may experience less competitive pressure from multimarket contact. The single-market firm can then deploy the resources derived from alliances with multimarket rivals to better compete against other firms and enhance its market share. Therefore, we hypothesize,

*Hypothesis 4: The negative effect of multimarket contact on a single-market firm's market share will decrease as the firm's size relative to the market size of the multimarket rival/alliance partner increases.*

## **METHOD**

### **Sample**

The sample used to test our hypotheses came from *Dataquest* database maintained by Gartner, a leading market research agency specializing in the global semiconductor industry. The global semiconductor industry provides a suitable context to test the effects of multimarket competition and strategic alliances on firm performance as the industry consists of both multimarket and single-market firms. Firms in the industry also seek collaborative relationships such as strategic



alliances to maintain their competitive advantage (Macher et al., 2008; Stuart, 2000). The *Dataquest* database has been used in prior studies on technological innovation in the semiconductor industry (e.g., Stuart, 2000). Gartner collects information on a semiconductor firm's sales in each product market segment. Though Gartner does not collect information on the sales of all firms in industry, the total sales of the firms included in *Dataquest* account for approximately 90 percent of market share in the industry. In total, our sample includes 233 multimarket firms and 130 single-market firms competing in 52 product market segments between Year 2000 and Year 2009. Examples of these product market segments include NAND flash memory chips, DRAM, photosensors, ASSP, and solar cells.

### **Dependent Variable and Analysis**

Our theoretical interest is a single-market firm's performance. We used market share to measure firm performance as market share is affected by competition and is an important performance indicator in the semiconductor industry (Macher et al., 2008).

For analysis, we used cross-sectional time series GLS models to test our hypotheses<sup>1</sup>. This estimation method addresses issues such as unobserved heterogeneity and its association with model variables in longitudinal panel analyses (Greene, 2003). We 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  $z_{it}$ . Product market and year dummy variables were also

included to control for unobserved heterogeneity across markets and years. We used xtregar procedures in *STATA 10.1* in which we included firm's market share in the prior year, product 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 looked at how the degree of multimarket contact among multimarket firms in a single-market firm's market affected the firm's market share. To test the hypothesis, we first identified each of the multimarket firms in a single-market firm's market and calculated the average degree of multimarket contact the firm had with other multimarket firms in a market by using the following formula:

Average degree of multimarket contact<sub>*im*</sub>=

$$\left( \sum_{i \neq j}^n MMC_{ij} \times s_{ij} \right) / n, \quad (1)$$

where  $n$  is the number of multimarket firms in market  $m$  with which a multimarket firm  $i$  had more than one market contact,  $MMC$  is the count of market contacts across all 52 markets between firm  $i$  and its multimarket rival  $j$ ,  $s$  is the degree of similarity between firm  $i$  and  $j$ . The degree of similarity was measured as:

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

(Sohn, 2001), where  $x_{im}$  is firm  $i$ 's sales in market  $m$ ,  $x_{jm}$  is a multimarket rival  $j$ 's sales in market  $m$ . Our measure of multimarket contact is similar to the firm-measure of multimarket contact used in prior research (e.g., Chuang et al., 2016; Li and Greenwood, 2004) and takes

into consideration the effect of similarity between multimarket rivals. Accounting for similarity is important because prior studies have suggested that similarity between multimarket rivals can reinforce the effect of mutual forbearance derived from multimarket contact on their rivalry (e.g., Jayachandran et al., 1999; Li and Greenwood, 2004). We summed the average degree of multimarket contact of all the multimarket firms operating in market *m* to capture *Degree of multimarket contact among multimarket firms* in market *m*. We re-scaled the measure by dividing by 100 for ease of presentation. To support the hypothesis, a negative coefficient estimate of *Degree of multimarket contact among multimarket firms* is required.

To test alliance related hypotheses, we collected alliance information from the *Thomson SDC* database. Though 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, et al., 2005), we constructed a five-year moving window of alliance activities starting in 1996<sup>2</sup>. Hypothesis 2 suggested the number of strategic alliances a single-market firm has would buffer the negative effect of multimarket contact on its performance. To test the hypothesis, we first counted the number of strategic alliances a single-market firm had (*Number of alliances*) in each five-year moving window of alliance activities. We also re-scaled *Number of alliances* by dividing it by 100. We then created the interaction term, *Degree of multimarket contact among multimarket firms* x *Number of alliances* to test the moderating effect of the number of strategic alliances. To support the hypothesis, a positive coefficient estimate is required.

To test Hypothesis 3 – the moderating effect of having strategic alliances with multimarket

rivals, we first constructed *Proportion of multimarket rivals with which a single-market firm had alliances* by calculating the ratio of multimarket rivals in a single-market firm’s market with which the firm had alliances over the total number of multimarket rivals in the market. We then created the interaction term, *Degree of multimarket contact among multimarket firms x Proportion of multimarket rivals with which a single-market firm had alliances*. A positive coefficient estimate will be the evidence to support the hypothesis.

Finally, for Hypothesis 4 – the moderating effect of relative difference in size between a single-market firm and its multimarket rival in alliances, we first identified a single-market firm’s multimarket rivals with which the firm had strategic alliances. We then constructed *Average relative single-market firm’s size to partner<sub>multi-market rival</sub>’s* by using the following formula:

*Average relative single-market firm’s size to partner<sub>multi-market rival</sub>’s* =

$$\left( \sum_{i \neq j}^n (\text{Totalsales}_{im}) / (\text{Sales}_{jm}) \right) / n \quad (3)$$

where  $n$  is the number of multimarket rivals in a market with which a focal firm  $i$  had strategic alliances,  $\text{Totalsales}_{im}$  is the sales of a single-market firm  $i$  in market  $m$ , and  $\text{Sales}_{jm}$  is the sales of a multimarket rival  $j$  in market  $m$ . We then created the interaction term, *Degree of multimarket contact among multimarket firms x Average relative single-market firm’s size to partner<sub>multi-market rival</sub>’s*. A positive coefficient estimate is required to support the hypothesis.

### **Control Variables**

We controlled for several firm- and market-specific factors likely to influence a single-market firm’s market share and its relationships with our theoretical variables. Since we have three

interaction terms related to a single-market firm's strategic alliances, we controlled for their main effects. We included *Patent dummy* to control for the effect of patenting activity on performance as not all firms engaged in patenting activity in our sample. Firm size may influence firm performance as large firms tend to have more resources to compete against multimarket firms (Baum and Korn, 1999; Edwards, 1955). We thus included *Firm size* by taking the natural logarithm of a firm's total sales to control for its effect on performance. Finally, we controlled for the effect of prior firm performance (*Market share<sub>t-1</sub>*) on firm performance as a firm's prior performance is likely to influence subsequent performance.

At the market level, we included three market characteristics as control variables. First, we controlled for the level of competition from single-market firms in a market by including *Single-market firm density* (measured by the number of single-market firms in a market). Second, research suggests that market concentration can affect the relationship between multimarket contact and firm behavior (Jayachandran et al., 1999; Haveman and Nonnemaker, 2000). Accordingly, we included *Market concentration* (measured by Herfindahl index using firm market share in a market) to control its effect. Demand characteristics such as the growth rate of the market are likely to influence competitive intensity and firm performance (Gimeno and Woo, 1999). We therefore controlled for the effect of *Market growth* (the natural logarithm of the ratio of market size in a given year and that of the prior year) on firm performance. Descriptive statistics are given in Table 1. We further examined if there were threats from multicollinearity by conducting VIF tests. All VIF indices are below 10 (see Table 2).

<<Insert Tables 1 and 2 about here>>

## **Results**

Model 1 in Table 2 presents the baseline model where we included only control variables. We entered theoretical variables in order of our theoretical discussion. Hypothesis 1 suggested that multimarket contact between multimarket firms in a market would have a negative effect on a single-market firm's market share. The coefficient estimates of *Degree of multimarket contact among multimarket firms* in Model 2 is marginally significant in the predicted direction (-1.157  $p < .10$  in Model 2). The finding suggests that a unit increase in the degree of multimarket contact among multimarket firms leads to a 1.157 decrease in a single-market firm's market share. Hypothesis 2 proposed that the number of strategic alliances a single-market firm has would weaken the negative effect of multimarket contact on its market share. The positive coefficient estimate of *Degree of multimarket contact among multimarket firms x Number of alliances* in Model 3 provides support for the hypothesis (10.878,  $p < .05$  in Model 3)<sup>3</sup>.

Model 4 includes the interaction term, *Degree of multimarket contact among multimarket firms x Proportion of multimarket rivals with which a single-market firm had alliances* to test Hypothesis 3. The hypothesis suggested that the proportion of multimarket rivals in a single-market firm's market with which the firm had alliances would mitigate the negative effect of multimarket contact on a single-market firm's market share. While the coefficient estimate for *Degree of multimarket contact among multimarket firms x Proportion of multimarket rivals with which a single-market firm had alliances* is positive, it is not significant, providing little support for the hypothesis.

Turning to Hypothesis 4, the hypothesis proposed that the market size of a single-market firm relative to its multimarket rival/alliance partner would help to mitigate the negative effect of

multimarket contact on the firm's market share. The significant coefficient estimate for *Degree of multimarket contact among multimarket firms* x *Average relative single-market firm's size to partner<sub>multi-market rival</sub>'s* in Model 5 provides evidence to support the hypothesis (.158,  $p < .05$ ).

Together with the results of Hypothesis 2, our findings suggest that strategic alliances helped single-market firms to maneuver multimarket competition to enhance their performance by providing access to external resources and by deterring multimarket rivals' aggression through forming alliances with them.

To gain additional insight into the two interaction effects we graphed the effects by using the correspondent coefficients in Models 3 and 5 to show their effects on a single-market firm's market share in our sample. Figure 1 shows three lines (No alliances, Mean, and Mean+ 1 s.d.) to illustrate the interaction of multimarket contact and the number of strategic alliances a single-market firm had on the firm's market share. Overall, the effect of multimarket contact among multimarket firms in a market has a negative effect on the market share of a single-market firm. Yet, the slope of Mean+1 s.d. is the flattest, suggesting that the number of strategic alliances a single-market firm has helps to buffer it from competitive pressure derived from multimarket contact and enhances its market share. In other words, the negative effect of multimarket contact on single-market firm performance decreases as the number of strategic alliances a firm has increases.

<<Insert Figures 1 and 2 about here>>

Figure 2 shows three lines (No alliances with multimarket rivals, Mean, and Mean+1 s.d.) to illustrate the moderating effect of relative difference in size between a single-market firm and its

multimarket rival in alliances. Similar to the effects in Figure 1, the effect of multimarket contact among multimarket firms in a market has a negative effect on the market share of a single-market firm. Yet, the slope of Mean+1 s.d. is the flattest, suggesting that having strategic alliances with multimarket firms that had smaller market presence helped a single-market firm to buffer competitive pressure derived from multimarket contact and enhance its market share. The greater the difference in market size between a single-market firm and its multimarket rival/alliance partner, the less negative the effect of multimarket contact on its market share.

Turning to the results of control variables in our analysis, firm size, market concentration of a single-market firm's market, and market growth had no effect on the firm's market share in our sample. Prior studies have reported that firm size, market concentration, and market growth significantly influenced the growth rates of multimarket and single-market firms (Greve, 2008; Haveman and Nonnemaker, 2000). Our results suggest that it was multimarket competition and a single-market firm's alliance activity that affected the firm's market share. It is also possible that compared to these previous studies, the ranges of these variables in our data were narrower (i.e., smaller standard deviations) making it difficult to detect their effects.

## **DISCUSSION AND CONCLUSION**

The variety of ways in which multimarket contact affects competition has attracted significant scholarly attention in recent decades (Yu and Cannella, 2013). Nevertheless, the discussion of its impact on single-market firms has been relatively limited and there has been little systematic investigation focusing directly on single-market firms. Our theoretical arguments rest on the premise that while it has been argued that mutual forbearance derived from multimarket contact



among multimarket firms may benefit single-market firms (Bernheim and Whinston, 1990), it may be particularly difficult for single-market firms to sufficiently understand the dynamics of multimarket contact to realize these benefits as their organizational form, by definition, restricts their activities to a single market. To improve their performance, multimarket firms are likely to deploy resources derived from mutual forbearance to compete against single-market firms (Barnett, 1993; Baum and Korn, 1999). As a result, single-market firms are likely to experience intense competitive pressure from multimarket firms and exhibit poor performance. Our analysis of the market share of 130 single-market firms in the semiconductor industry showed that, as Edwards (1955) postulated, multimarket contact had a negative effect on the market share of single-market firms. Our study is one of few studies focusing specifically on the effects of multimarket competition on single-market firms and our results offer empirical evidence illustrating the effects of multimarket competition specifically on the performance of single-market firms.

Our findings also offer an important contribution to the literature on multimarket competition by showing that the effect of multimarket contact is not uniform. We showed how strategic alliances moderated the relationship between multimarket contact and performance of single-market firms. The ability to compete with and to deter multimarket rivals' aggression by creating an implicit threat of cross-market retaliation is an important factor that leads to reduction in rivalry between multimarket firms (Jayachandran et al., 1999; Yu and Cannella, 2013). However, single-market firms have no contact with multimarket rivals except in the market they both share. To enhance their ability to compete in the context of multimarket competition, single-market firms can expand their access to resources beyond firm boundaries

by having other forms of interorganizational relationships, such as strategic alliances. Further, by forming strategic alliances specifically with multimarket rivals in their market, single-market firms create an implicit threat of retaliation. An alliance relationship creates a channel for single-market firms to retaliate against potential aggressive competitive actions by multimarket rivals. Single-market firms with alliances with multimarket rivals could retaliate against competitive aggression not by counter-attacking in other markets as multimarket firms can, but instead by threatening to withhold their contributions to alliances. In addition to offering a channel to counter competitive threats from multimarket rivals, alliances also offer single-market firms access to additional resources that can enhance their capacity to cope with multimarket competition.

Our study therefore contributes to recent findings on multimarket competition and firm performance by illustrating how strategic alliances can help firms to cope with the effects of mutual forbearance derived from multimarket contact (Chuang et al, 2016). Specifically, we illustrate how, for single-market firms, an alliance relationship enables them to manage competitive pressure from multimarket competition in two important ways. A single-market firm's alliances help the firm to mitigate the negative effect of mutual forbearance among multimarket firms by offering access to resources that enhance its capacity to compete. Further, alliances with multimarket rivals who have a smaller presence in the shared market can enable single-market firms to operate with less competitive pressure from these rivals, and to significantly enhance their 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 performance (Wassmer, 2010). The question of how strategic alliances may mitigate the impact of competition on firm performance has received less attention. Chuang and his colleagues (Chuang et al., 2016) showed that alliances helped multimarket firms to extend the benefits of its multimarket contact with multimarket rivals by providing additional resources that deter aggression toward the firm. The findings of this study suggested that strategic alliances also helped a single-market firm to manage competitive pressure derived from multimarket competition. Importantly, this study demonstrated that single-market firms forming alliances with multimarket rivals created a channel through which they could counter multimarket rivals' aggression, if they were threatened. Research on strategic alliances has highlighted how opportunities for learning, access to information and resources, and synergy creation can benefit firms (e.g., Baum et al., 2000; Lavie, 2007; Stuart, 2000). Our study showed that for a single-market firm, alliances offered distinctive benefits that can be particularly valuable in countering the competitive pressures that resulted from mutual forbearance among multimarket firms.

In addition, our findings suggest that the distribution of power in the alliance relationship has a significant impact on firm performance. For single-market firms, having alliances with smaller multimarket rivals may provide an advantage as these alliances offer channels for retaliation that can deter aggression from multimarket firms. Our findings however showed that for single-market firms, the benefits of alliances were sensitive to differentials in power between firms. In our study, single-market firms were able to benefit from having alliances with multimarket

rivals when they had a larger market presence than the multimarket rivals/partners did in the market. This study therefore, suggests that the benefits of strategic alliances may be more nuanced than previous studies have suggested; our findings suggest that differentials in power, in our case illustrated through differences in firm size is an important factor affecting the capacity of the firm to generate performance gains through alliances.

Multimarket competition is a common phenomenon across industries. Our study therefore has implications for practice. Our findings suggest a strategic response for managers of single-market firms facing multimarket competition is the formation of strategic alliances. Resources saved/generated through alliance activities can improve a firm's capacity to maneuver multimarket competition and mitigate the impact of competition on performance. Furthermore, our study suggests that it is important for managers to consider their firm's relative power when entering into strategic alliances with multimarket rivals. Having these relationships gives a firm influence over rivals and can deter rivals' aggression toward their firm in the marketplace. Competing in only one market means that single-market firms have fewer opportunities to induce mutual forbearance from multimarket rivals. While managers in single-market firms might consider entering new markets to become multimarket firms (Haveman and Nonnemaker, 2000), they could also consider forming strategic alliances as a way to foster cooperative interdependence with rivals, reducing the threat of competitive aggression from them and the negative impact on their performance.

Our study sheds light on the impact of multimarket contact on single-market firm's market share and how a single-market firm can enhance its market share in the context of multimarket

competition. Market share is one indicator of firm performance. Future research examining the effect of multimarket competition on other performance indicators can help to advance our understanding of the variety of ways in which multimarket competition may impact single-market firms. Moreover, Bernheim and Whinston (1990) suggested that mutual forbearance derived from multimarket contact could have a positive spillover influence on single-market firm's performance. Haveman and Nonnemaker (2000) reported a positive spillover effect of multimarket contact on single-market firm's behavior (entering a new market to become a multimarket firm) and no effect on a single-market firm's aggression in its market. In contrast, our study showed a negative spillover effect of multimarket contact on the market share of single-market firms. Importantly this suggests, that in order to realize the potential positive spillover benefits of mutual forbearance among multimarket firms, single-market firms will need to understand the dynamics of mutual forbearance derived from multimarket contact. Future research exploring the conditions that help single-market firms to understand the dynamics of mutual forbearance and multimarket contact and to realize the positive spillover effect is warranted. Finally, our study showed single-market firms experienced less competitive pressure from multimarket competition when they had alliances with multimarket firms in their markets. Recent studies on strategic portfolios have suggested that the composition of alliance partners and the form these relationships take matter to firm performance (e.g., Lavie, 2007). We wonder if there are other types of alliance partners and relationship structures that may affect how a single-market firm can maneuver multimarket competition. Exploring these questions could provide a more complete picture of the consequences of multimarket competition for behavior and performance of single-market firms.

## FOOTNOTES

1. Because our dependent variable, market share, is a percentage variable, GLS models might produce biased estimation (Papke and Wooldridge, 2008). We ran fractional logit models and the results were similar to the ones reported in Table 2.
2. We also conducted sensitivity analysis using 3-year and 4-year durations of alliances to test our hypotheses. The results were mostly consistent with the ones reported here.
3. It is possible that the types of alliances a single-market firm has may also moderate the effect of the degree of multimarket contact among multimarket firms on the firm's market share. To examine this possibility, we constructed the proportion of R&D alliances in a single-market firm's alliances and interacted it with *Degree of multimarket contact among multimarket firms* to examine its effect. The proportion of R&D alliances was used here because R&D activities are important in the semiconductor industry and require significant resource commitment (see Macher et al., 2008 for example). However, the interaction term was not significant. It is also possible that the alliance portfolio a single-market firm has may offer the firm access to different resources to mitigate competitive pressure derived from multimarket competition. We constructed *Alliance diversity* by using the Herfindal index measure based on the types of alliances a firm has (licensing, manufacturing, marketing, and R&D) and interacted it with *Degree of multimarket contact among multimarket firms*. Our analysis showed that while the main effect of *Alliance diversity* was positive, the interaction effect was not significant. These findings suggest that it is the overall resources generated/saved from alliances that helped single-market firms to mitigate the negative effect of multimarket competition on the firm's market share in our sample.

## REFERENCES

- Anand J, Mesquita LF and Vassolo RS (2009) The dynamics of multimarket competition in exploration and exploitation activates. *Academy of Management Journal* 52: 802-821.
- Barnett WP (1993) Strategic deterrence among multipoint competitors. *Industrial and Corporate Change* 2: 249-278.
- Baum JAC, Calabrese T and Silverman BS (2000) Don't go it alone: alliance networks and startup performance in Canadian Biotechnology. *Strategic Management Journal* 21: 267-294.
- Baum JAC and Korn HJ (1999) Dynamics of dyadic competitive interaction. *Strategic Management Journal* 20: 251-278.
- Baum JAC, Rowley TJ, Shipilov A and Chuang YT (2005) Dancing with strangers: aspiration performance and the search for underwriting syndicate partners. *Administrative Science Quarterly* 50: 536-575.
- Bernheim BD and Whinston, MD (1990) Multi-market contact and collusive behavior. *The RAND Journal of Economics* 21: 1-26.
- Boeker W, Goodstein J, Stephan J and Murmann JP (1997) Competition in a multimarket environment: The case of market exit. *Organization Science* 8: 126-142
- Brandenburger, A.M., and Nalebuff, B.J. (1996) *Co-opetition*. New York: Doubleday.
- Chen MJ (1996) Competitor analysis and interfirm rivalry: Toward a theoretical integration. *Academy of Management Review* 21: 100-134.
- Chen MJ and Miller D (2012) Competitive dynamics: Themes, trends, and a prospective research platform. *Academy of Management Annals* 6: 135-210.
- Chuang YT, Dahlin K, Thomson K, Lai YC and Yang CC (2015) Multimarket contact, strategic

- alliances, and firm performance. *Journal of Management*. Epub ahead of print 13 November 2015. DOI:10.1177/0149206315615399.
- Edwards CD (1955) Conglomerate bigness as a source of power. In *NBER conference report, Business concentration and price policy*. Princeton University Press: Princeton, NJ; 331-352.
- Edwards CD (1964) *Testimony to the Hearings on Economic Concentration: Part 1. Overall and Conglomerate Aspects*, before the Subcommittee on Antitrust and Monopoly of the Committee of the Judiciary, pursuant to S. Res. 262, U.S. Government Printing Office, Washington, DC, pp. 36–56.
- Fuentelsaz L and Gomez J (2006) Multipoint competition, strategic similarity and entry into geographic markets. *Strategic Management Journal* 27: 477-499.
- Gimeno J (1999) Reciprocal threats in multimarket rivalry: staking out spheres of influence in the US Airline industry. *Strategic Management Journal* 20: 101-128.
- Gimeno J and Woo CY (1999) Multimarket contact, economies of scope, and firm performance. *Academy of Management Journal* 43: 239-259.
- Gnyawali DR, He J and Madhavan R (2006) Impact of Co-Opetition on firm competitive behavior: An empirical examination. *Journal of Management* 32: 507-530.
- Gnyawali DR and Madhavan R (2001) Cooperative networks and competitive dynamics: a structural embeddedness perspective. *Academy of Management Review* 26: 431-445.
- Golden BR and Ma H (2003) Mutual forbearance: The role of intrafirm integration and rewards. *Academy of Management Review* 28: 479-493.
- Greene W (2003) *Econometric Analysis*. 5<sup>th</sup> ed. Prentice Hall, Englewood Cliffs.
- Greve HR (2008) Multimarket contact and sales growth: evidence from insurance. *Strategic*



- Management Journal* 29: 229–249.
- Hamel G (1991) Competition for competence and interpartner learning within international strategic alliances. *Strategic Management Journal*, 12(S1): 83-103.
- Haveman HA and Nonnemaker L (2000) Competition in multiple geographic markets: The impact on growth and market entry. *Administrative Science Quarterly* 45: 232-267.
- Jayachandran S, Gimeno J and Varadarajan PR (1999) The theory of multimarket competition: The synthesis and implications for marketing strategy. *Journal of Marketing* 63: 49-66.
- Khanna T, Gulati R and Nohria N (1998) The dynamics of learning alliances: competition, cooperation, and relative scope. *Strategic Management Journal* 19: 193-210.
- Krugman P and Wells R (2012) *Microeconomics*. 3<sup>rd</sup> edition, New York: Worth Publishers.
- Lavie D (2007) Alliance portfolios and firm performance: a study of value creation and appropriation in the U.S. software industry. *Strategic Management Journal* 28: 1187-1212.
- Li SX and Greenwood R (2004) The effect of within-industry diversification on firm performance: synergy creation, multi-market contact and market structuration. *Strategic Management Journal* 25: 1131-1153.
- Macher JT, Mowery DC and Minin DA (2008) *Innovation in global industries: U.S. firms competing in a new world*. Washington, DC: The National Academies Press.
- Papke LE and Wooldridge JM (2008) Panel data methods for fractional response variables with an application to test pass rates. *Journal of Econometrics* 145: 121-133.
- Park SH and Russo MV (1996) When competition eclipses cooperation: an event history analysis of joint venture failure. *Management Science* 42: 875-890.
- Prince J, and Simon DH (2009) Multimarket contact and service quality: Evidence from on-time performance in the U.S. airline industry. *Academy of Management Journal* 52: 336-354.

- Shipilov A (2009) Firm scope experience, historic multimarket contact with partners, centrality, and the relationship between structural holes and performance. *Organization Science* 20: 85-106.
- Sohn MW (2001) Distance and cosine measures of niche overlap. *Social Networks* 23: 141-165.
- Stephan J, Murmann JP, Boeker W and Goodstein J (2003) Bringing managers into theories of multimarket competition: CEOs and the determinants of market entry. *Organization Science* 14: 403-421.
- Stuart TE (2000) Interorganizational alliances and the performance of firms: a study of growth and innovation rates in a high technology industry. *Strategic Management Journal* 21: 791-811.
- Wassmer U (2010) Alliance portfolios: a review and research agenda. *Journal of Management* 36: 141-171.
- Young G, Smith KG, Grimm CM and Simon D (2000) Multimarket contact and resource dissimilarity: a competitive dynamics perspective. *Journal of Management* 26: 1217-1236.
- Young G, Smith KG and Grimm CM (1996) Austrian and industrial organization perspectives on firm-level competitive activity and performance. *Organization Science* 7: 243-254.
- Yu T and Cannella AA (2013) A comprehensive review of multi-market competition research. *Journal of Management* 39: 76-109.
- Yu T, Subramaniam M and Cannella AA (2009) Rivalry deterrence in international markets: contingencies governing the mutual forbearance hypothesis. *Academy of Management Journal* 52: 127-147.

Figure 1. The Moderating Effect Of The Number Of Strategic Alliances On The Relationship Between Multimarket Contact And Market Share Of Single-Market Firms.

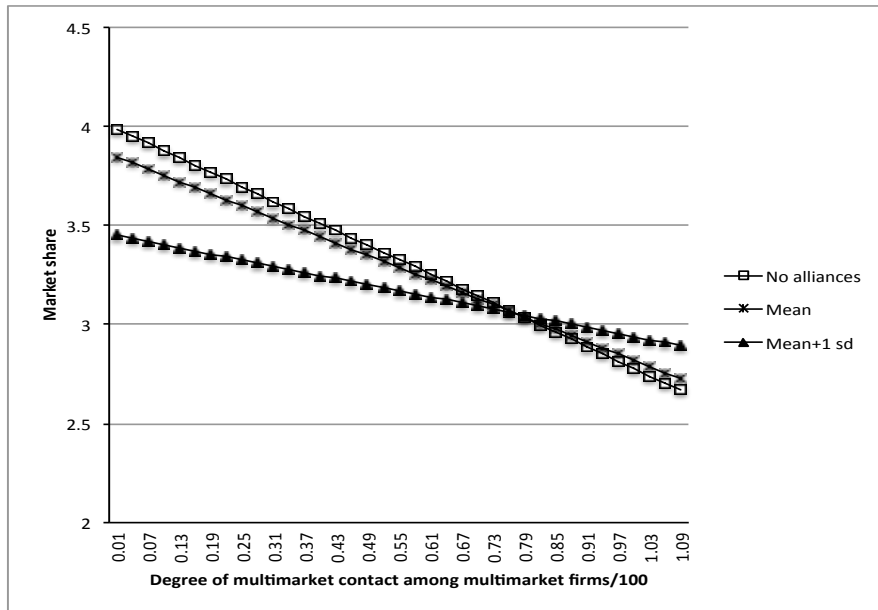
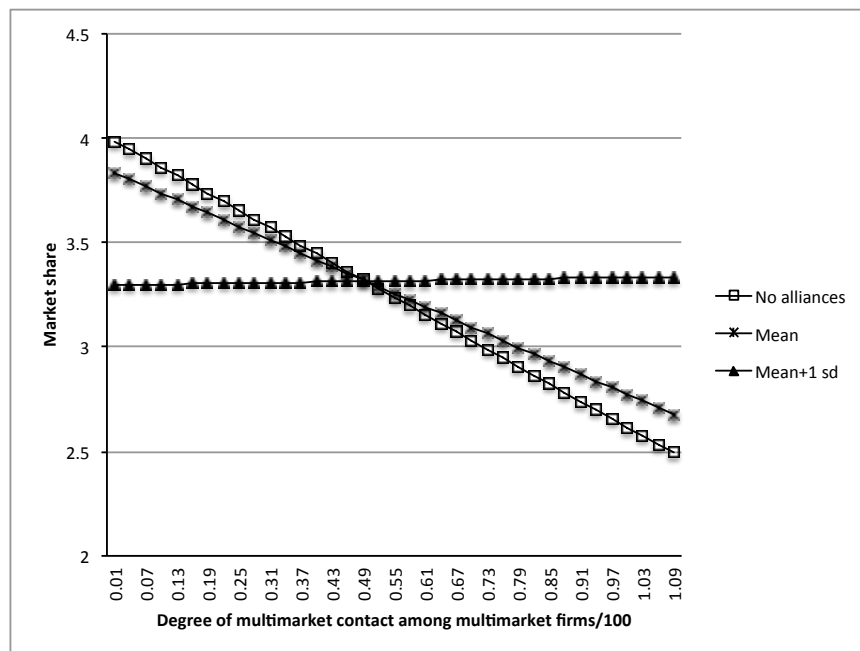


Figure 2. The Moderating Effect Of The Average Relative Single-market Firm's Size to The Market Size of Multimarket rival/partner On The Relationship Between Multimarket Contact And Market Share Of Single-Market Firms.



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

Variable	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9
1 Market share	4.208	8.337	1.000								
2 Degree of multimarket contact among multimarket firms/100	0.559	0.315	-0.443	1.000							
3 Number of alliances/100	0.017	0.050	0.345	-0.070	1.000						
4 Proportion of multimarket firms with which a single-market firm had alliances	1.641	4.296	-0.003	-0.143	0.353	1.000					
5 Average relative single-market firm's size to partner <sub>multi-market rival</sub> 's	1.984	6.833	-0.002	-0.106	0.102	0.517	1.000				
6 Patent dummy	0.546	0.499	0.290	-0.326	0.234	0.220	0.175	1.000			
7 Firm size	4.772	1.335	0.529	-0.160	0.347	0.214	0.353	0.400	1.000		
8 Single-market density	8.671	7.596	-0.187	0.551	0.082	-0.030	-0.042	-0.236	0.009	1.000	
9 Market concentration	0.121	0.091	0.499	-0.734	0.032	0.093	0.079	0.280	0.161	-0.415	1.000
10 Market growth	0.399	2.565	-0.057	0.086	-0.016	0.006	-0.012	-0.057	-0.032	-0.015	-0.047

**Table 2**  
**GLS AR(1) Models for Market Share of Single-market Firms**

	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Theoretical variables</b>					
H1 (-)					
Degree of multimarket contact among multimarket firms/100		-1.157† (0.699)	-1.222† (0.692)	-1.207† (0.696)	-1.384* (0.696)
H2 (+)					
Degree of multimarket contact among multimarket firms/100 x Number of alliances/100			10.878* (4.964)		
H3 (+)					
Degree of multimarket contact among multimarket firms/100 x Proportion of multimarket firms with which a single-market firm had a				0.117 (0.073)	
H4 (+)					
Degree of multimarket contact among multimarket firms/100 x Average relative single-market firm's size to partner <sub>multi-market rival</sub> 's					0.158* (0.068)
<b>Firm-level control variables</b>					
Number of alliances/100	-1.419 (1.873)	-1.134 (1.835)	-8.404 -7.794	-1.572 (1.848)	-1.863 (1.837)
Proportion of multimarket firms with which a single-market firm had a	0.010 (0.022)	0.010 (0.022)	0.024 (0.022)	-0.022 (0.029)	0.017 (0.022)
Average relative single-market firm's size to partner <sub>multi-market rival</sub> 's	-0.015 (0.015)	-0.020 (0.014)	-0.019 (0.014)	-0.020 (0.014)	-0.078 (0.069)
Patent dummy	0.056 (0.158)	0.024 (0.158)	0.050 (0.157)	0.034 (0.157)	0.023 (0.156)
Firm size	-0.026 (0.087)	-0.031 (0.085)	-0.078 (0.087)	-0.052 (0.086)	-0.038 (0.085)
Market share <sub>t-1</sub>	1.034** (0.016)	1.033** (0.016)	1.043** (0.016)	1.034** (0.015)	1.033** (0.016)
<b>Market-level control variables</b>					
Single-market firm density	0.003 (0.013)	0.011 (0.013)	0.008 (0.013)	0.009 (0.013)	0.009 (0.013)
Market concentration	2.114 (1.974)	-0.653 (2.583)	-0.932 (2.560)	-0.347 (2.583)	-0.763 (2.537)
Market growth	-0.007 (0.022)	-0.005 (0.022)	-0.006 (0.022)	-0.007 (0.022)	-0.005 (0.022)
Product market fixed-effects	included	included	included	included	included
Year fixed-effects	included	included	included	included	included
Constant	-0.291 (0.505)	0.752 (0.814)	0.957 (0.811)	0.783 (0.811)	0.882 (0.804)
Firm-year observations	377	377	377	377	377
Number of single-market firms	130	130	130	130	130
Wald chi <sub>2</sub> -square	10035**	10774**	11180**	11086**	11044**
degree of freedom	39	40	41	41	41
Diff in chi-square		739**	406**	312**	270**
		M2vsM1	M3vsM2	M4vsM2	M5vsM2
Maximum VIF	2.27	2.75	7.3	3.29	6.63
Average VIF	1.59	1.81	2.81	2.09	2.65
AR(1)	0.299	0.293	0.287	0.299	0.237
Modified Bhargava et al. Durbin-Waston	1.656	1.659	1.660	1.646	1.705
Baltag-Wu LBI	2.290	2.294	2.293	2.285	2.268

Standard errors in parentheses

\*\* p<0.01, \* p<0.05, † p<0.1