THE MODERATING EFFECT OF PRODUCT AND BRAND DIVERSIFICATION ON THE RELATIONSHIP BETWEEN GEOGRAPHIC DIVERSIFICATION AND FIRM PERFORMANCE IN THE HOSPITALITY INDUSTRY

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ABSTRACT

In spite of the prevalence and strategic importance of diversification for US hospitality firms, research on the effects of diversification has been insufficient in the hospitality literature. Especially, examination of the moderating effect of product or brand diversification on the relationship between geographic diversification and performance of US hospitality firms has been lacking in the hospitality field thus far. This study aims to investigate the effect of each diversification strategy on firm performance for US casino, restaurant, and lodging industries. Further, to investigate effects of diversification comprehensively by incorporating interactions between different diversification strategies, this study attempts to examine the moderating effect of product diversification on the relationship between geographic diversification and performance of US casino firms, and the moderating effect of brand diversification on the relationship between geographic diversification and performance of US restaurant and lodging firms.

To accomplish study purposes, this study employs fixed effects and fixed effects instrumental variable regressions analyses, which strictly address the endogeneity problem, thereby enhancing causality between diversification and firm performance. The sample of this study consists of 336 observations of 43 casino firms, 176 observations of 36 lodging firms, and 952 observations of 132 restaurant firms over the period 1993-2010.

The study's results indicate a positive and significant effect of geographic diversification on firm performance in the US casino and lodging industry, but an insignificant effect of geographic diversification in the US restaurant industry. For the effect of product and brand diversification, the study's analyses show no significant effect

of product diversification on firm performance in the US casino industry, a negative and significant effect of brand diversification in the US restaurant industry, and an insignificant effect of brand diversification in the US lodging industry. Regarding moderating effects, while this study finds an insignificant moderating effect of product diversification on the relationship between geographic diversification and firm performance in the US casino industry, the analyses show a negative and significant moderating effect of brand diversification in the US restaurant industry and a positive and significant moderating effect of brand diversification in the US lodging industry.

Findings of this study recommend more prudent decision-making for diversification strategies for US casino firms, brand concentration strategies for US restaurant firms, and acceleration of both geographic and brand diversification for US lodging industry.

This study fills a research gap in the hospitality literature by exhaustively examining the effect of diversification strategies on firm performance in the hospitality field by providing evidence for the moderating effects of product and brand diversification on the geographic diversification-firm performance relationship in three US hospitality industries. Further, this study enriches the whole body of diversification theory and literature by providing context-specific empirical findings for diversification's effects and investing the moderating role of brand diversification in the diversification strategy context.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1. Diversification

Firms have prevalently adopted diversification, expansion into different geographic locations or product markets, as a main corporate and business strategy (Chang and Wang, 2007; Hitt et al., 1997). For example, large publicly traded US and EU firms operate their businesses, on average, in more than three distinctive geographic markets (Bodnar et al., 1999; Pavelin and Barry, 2005). And, according to Rumelt (1986), by 1974, 86 percent of Fortune 500 firms diversified into more than one product market, and large publicly traded German, UK, and US manufacturing firms operated their businesses in more than two different product markets (Fauver et al., 2004). Moreover, in general, firms in various industries have simultaneously adopted different dimensions of diversification strategies (Denis et al., 2002: Tallman and Li, 1996).

US hospitality firms, including casino, restaurant, and lodging firms are not an exception. Most publicly traded US casino firms, emphasizing geographic diversification as their key competitive strategies, have actively diversified their businesses across more than 20 states since the 1990s, (Basham and Kwon, 2009). At the same time, most publicly traded US casino firms diversify their operations to include more than two products, such as gaming, hotel lodging, food and beverage (F&B) services, entertainment, or retail outlets (Kang et al, 2011). While US restaurant and lodging firms also adopt geographic diversification similar to casino firms, they employ brand diversification, which constitutes operation of multiple brands for homogenous product

categories, as the major business strategy, instead of product diversification. For example, as of May 2010, Darden Restaurants operates 6 different restaurant brands across 49 states in the U.S. Similarly, Marriott, currently expanded into 49 states in the U.S. lodging market, employs 19 different brands.

1.2. Diversification and Firm Performance

In accordance with the proliferation of diversification strategies in various industries, diversification has become a key research subject in strategic management, finance, and industrial organization economics (Amit and Livnat, 1988; Chang and Wang, 2007; Dennis et al., 2002; Hitt et al., 1997; Tallman and Li, 1996). One focused research subject regarding diversification is the effect of diversification on firm performance. However, theoretical viewpoints and empirical results have been mixed and inconclusive. One avenue of research found a positive impact from the degree of geographic diversification (Bodnar et al., 1999; Han et al., 1998) and product diversification on firm performance (Amit and Livnat, 1988; Nachum, 2004; Villalonga, 2004). Those studies' arguments have their foundations in the internalization theory (Buckley and Casson, 1976) and the resource-based view (Barney, 1991), which asserts that diversified firms gain economies of scope, economies of scale, and learning effects by internalizing markets and business activities within organizations.

On the other hand, a group of scholars found a negative effect from the degree of geographic diversification (Dennis et al., 2002; Fauver et al., 2004) and product diversification on firm performance (Berger and Ofek, 1995; Lang and Stulz, 1994). These findings support internal transaction cost arguments (Egelhoff, 1982; Hitt et al.,

1994; Jones and Hill, 1988) of the transaction cost theory (Williamson, 1975) and agency theory (Jensen, 1986; Jensen and Meckling, 1976). By reconciling costs and benefits from diversification, some others proposed an inverted U-shaped relationship (Kotabe et al., 2002; Tallman and Li; Hitt et al., 1997) or a U-shaped relationship (Capar and Kotabe, 2003; Ruigrok and Wagner, 2003) between geographic diversification and firm performance and an inverted U-shaped relationship between product diversification and firm performance (Palich et al., 2000; Ramírez and Espitia, 2002; Tallman and Li, 1996).

Although arguments regarding costs and benefits from employing brand diversification strategy exist in the literature (e.g., Aaker, 2004; Kapferer, 1994), empirical examinations and theoretical foundations for the effects of brand diversification on firm performance have been relatively scarce among diverse research fields. One rare study with a sample mostly composed of large manufacturing firms, conducted by Morgan and Rego (2009), found the degree of brand diversification associates with a higher Tobin's q and lower cash flow variability.

1.3. Moderating Effect of Diversification

Industry specific and country specific idiosyncrasies or methodological differences may explain the mixed findings and seemingly contradictory arguments for the effect of diversification on firm performance (Capar and Kotabe, 2003; Fauver et al., 2004; Hoskisson and Hitt, 1990; Ruigrok and Wagner, 2003; Tallman and Li, 1996). More importantly, failure to incorporate interaction effects with other dimensions of diversification may cause inconsistencies in the effects of an individual diversification

strategy (Bodnar et al., 1999; Gleason et al., 2003; Sambharya, 1995). That is, a unidimensional approach that does not consider other diversifications as potential sources of value may lead to a biased estimation. For example, Sambharya (1995) found that while both geographic and product diversifications separately have no significant effect on firm performance, an interaction effect between them significantly increases firm performance.

In this regard, some researchers (Chang and Wang, 2007; Geringer et al., 2000; Hitt et al., 1997; Tallman and Li, 1996) investigated an interaction effect between geographic and product diversification on firm performance (mostly, the moderating effect of product diversification on the relationship between geographic diversification and firm performance); however, empirical evidence is inconclusive. For example, while Hitt et al., (1997) found a positive moderating effect of product diversification on the relationship between geographic diversification on firm performance, Geringer et al. (2000) and Tallman and Li (1996) found no significant interaction effect between product diversification and geographic diversification on firm performance. Further, Chang and Wang (2007) found a positive moderating effect of related product diversification on the geographic diversification-firm performance relationship, but a negative moderating effect of unrelated product diversification.

According to those scholars, sources of the positive moderating effect of product diversification on the geographic diversification-firm performance relationship are the organizational learning effect and the synergy effects. That is, a firm can apply experience and learning from product diversification to dealing with challenges posed by geographic diversification, and by combining product and geographic diversification, a

firm enjoys increased opportunities to achieve economies of scale and scope from interdependencies among their businesses (Chang and Wang, 2007; Hitt et al., 1997). In contrast, attribution for the negative moderating effect accrues to argument that managing both geographic and product diversification incurs magnified internal transaction costs, such as monitoring, information processing, and coordination costs (Franko, 2004; Tallman and Li, 1996). The interaction effects between brand diversification and other dimensions of diversification seem to have had little investigative attention thus far.

1.4. Idiosyncrasies of Hospitality Firms' Diversification

Diversification in the hospitality industry has several unique characteristics worthy of research. First, for the effect of geographic diversification, service firms bear higher initial costs than manufacturing firms due to the simultaneity of production and consumption (Capar and Kotabe; 2003; Contractor et al., 2003). That is, for hospitality firms to perform services undeliverable to customers in distant locations, an entire value chain needs be replicated for each geographic location, which requires greater initial investments in capital that may create diseconomies of scale. Especially, when considering greater capital intensiveness of the hospitality industry than other service industries, such as commercial banking, consulting, or retailing (Schmenner, 1986), the effect of geographic diversification on firm performance for hospitality firms may be inferior to the effect for firms in other industries.

Second, for product diversification, US casino firms' product diversification spans homogeneous areas (e.g., hotel room, F&B, or entertainment business). This diversification is different from general product diversification employed by firms in

other industries that market multiple products among a variety of heterogeneous areas. In addition, US casino firms employ a hierarchical complementary diversification, in which the supplementary products (i.e., hotel, F&B, entertainment, retail, and other businesses) with complementarities contribute to reinforcing the value of the core product (i.e., gaming business). And, such complementarities may be strengthened by a time and location boundedness characteristic (i.e., consumption occurred within a relatively short time period and constrained locations) of service offerings of US casinos. Considering several benefits from diversification among homogenous areas, such as mutual forbearance and market structuration (Li and Greenwood, 2004) and from complementarities with a hierarchy of products, such as demand externalities (Siggelkow, 2003) and less significance of internal transaction costs (Golden and Ma, 2003), the effect of product diversification on firm performance of US casinos may be better than firms in other industries.

For brand diversification strategy, restaurant and lodging firms offer multiple brands for a relatively homogenous product or even for the same customer segment. These strategies are dissimilar to general brand portfolio strategies employed by firms in other industries, which offer multiple brands across diverse industries, or fewer brands within a given segment (Morgan and Rego, 2009). For example, Darden Restaurants currently concentrates all six brands in the full-service restaurant segment, and Marriott operates five different brands in the full-service lodging segment, six brands in the limited service segment, and three brands in the luxury segment. In general, marketing multiple brands in a given product category or segment may limit economies of scope (Palich et al., 2000) and generate a higher degree of cannibalization (Moorthy and Png,

1992). Considering that such negative effects may be magnified especially in a saturated, low-profit margin industry, such as the lodging and restaurant industries, the effect of brand diversification may hold less desirability for hospitality firms than firms in other industries.

The unique characteristics of geographic, product, and brand diversification of hospitality firms may justify the need for examining the moderating effect of product or brand diversification on the relationship between geographic diversification and firm performance in the hospitality industry context. First, studies examining the moderating effect of product diversification in the context of manufacturing industry, indicate, in general, a relationship between geographic diversification and firm performance to be positive and linear or, at least, inverse U-shaped (Chang and Wang, 2007; Hitt et al., 1997; Tallman and Li, 1996). Considering that geographic diversification incurs higher costs in the service industry (Brock et al., 2006; Capar and Kotabe, 2003; Contractor, et al., 2003) and especially in the hospitality industry (Schmenner, 1986), the relationship between geographic diversification and firm performance for hospitality firms may be less positive than firms in other industries. In this regard, the moderating role of product or brand diversification in the hospitality industry may be different from the results of previous studies conducted in the manufacturing context. While in previous studies, product diversification's role was accelerating the positive effect of geographic diversification on firm performance, in the current study, the moderating effect of product or brand diversification to be examined may assume the role of mitigating or exacerbating the negative impact of the degree of geographic diversification on firm performance.

Second, if subdivisions in an organization have a similar background and shared understandings, they can more efficiently and effectively learn from each other (Ghoshal, 1987; Grant, 1996; Kogut and Zander, 1992). Considering a higher degree of complementarities between products of casino firms (Kang et al., 2011) and a larger portion of communalities among brand-level subdivisions (Delacroix and Swaminathan, 1991) in lodging and restaurant firms, the expectation is achievement of more effective and efficient learning from interactions among product- or brand-level subdivisions. Therefore, hospitality firms can apply more learning from product or brand diversification more rapidly to geographic diversification than firms in other industries. That means the moderating effect of product or brand diversification on the relationship between geographic diversification and firm performance may be greater in the hospitality industry than other industries.

Third, internal or cost economies of scope may come from excess capacity in shared resources or customer information that can be used jointly for diverse outputs (Cla rk, 1988). A higher degree of complementarities among products and communalities among brands ensure a greater proportion of shared resources and customer information. These factors enable hospitality firms to achieve greater synergy in terms of economy of scope when implementing both product or brand and geographic diversifications, compared to firms in other industries. In addition, external or revenue economies of scop e (or demand externalities) exist if customers find benefit from one-stop shopping for vari ous products or services (Berger, et al., 1996; Klein and Saidenberg, 2010). Casino firms can achieve more demand externalities with diverse complementary products that stimulate extended demands and reduce shopping costs, when implementing geographic

diversification with consistent sets of products (Contractor et al., 2003) as compared to firms in other industries that have a lesser degree of complementarities among products.

The brand diversification's moderating effect in terms of revenue economies of scope may be based on the argument that multiple offerings of brands for a given product category enables a firm to achieve greater customer retention by satisfying heterogeneous needs of customers and reducing satiation with any one brand (Park et al., 1986). Thus, brand diversification may impose a greater moderating effect for the impact of geographic diversification on firm performance for lodging and restaurant firms, which can offer multiple brands for homogeneous products in each geographic location. The effect may be greater than for firms in other industries, which offer different brands for heterogeneous products.

Fourth, a higher degree of complementarities among products with a hierarchy and a higher degree of similarities among brand divisions in hospitality firms can be contribute to corporate executives' understanding of the resources and competitiveness of each unit, and each division's understanding of each other, compared to the cases of firms in other industries that have corresponding degrees of product or brand diversity. Thus, hospitality firms' costs of increasing product diversity (e.g., managerial information-processing, control, and coordination costs) when expanding geographically may be lower than the costs for firms in other industries.

1.5. Problem Statement

In spite of the proliferation and strategic importance of diversification for hospitality firms (Basham and Kwon, 2009; Kang et al., 2011), research on

diversification has been insufficient in the hospitality literature. Especially, the moderating effects of product diversification on the relationship between geographic diversification and firm performance of casino firms have not been examined in the hospitality field thus far. In addition, despite the critical role of brands as core assets in the lodging and restaurant industries (Jiang et al, 2002; Kim and Kim, 2005), research that investigates the moderating effect of brand diversification on geographic diversification-firm performance relationship also has not existed in the hospitality literature. Since examining the moderating effect of other diversification strategies can provide unbiased estimation for the effect of geographic diversification on firm performance (Bodnar et al., 1999; Gleason et al., 2003; Sambharya, 1995), investigating the moderating role of product or brand diversification strategy employed by hospitality firms is a necessary avenue for sophisticated and comprehensive diversification research in the hospitality industry.

1.6. Study Purposes

Motivated by the strategic importance of each dimension of diversification in the hospitality industry, mixed viewpoints and findings in the literature, idiosyncratic characteristics, and insufficient empirical examination of diversification strategies in the hospitality field, this study attempts to examine the effect of each diversification strategy on firm performance for US casino, restaurant, and lodging industries. Further, to investigate effects of diversification more comprehensively by incorporating interactions between different diversification strategies, this study seeks to examine the moderating effect of product diversification on the relationship between geographic diversification

and performance of US casino firms, and the moderating effect of brand diversification on the relationship between geographic diversification and performance of US restaurant and lodging firms. This study expects to contribute not only to the hospitality literature and industry by providing comprehensive evidence for effects of diversification strategies in the hospitality industry, but also contribute to the body of diversification literature and theory by adding a unique dimension.

1.7. Structure of Dissertation

Chapter 1 introduces the current implementation and importance of diversification strategies employed by hospitality firms, motivations for examining the moderating effect of diversification in the hospitality industry, and the purposes of the research. Chapter 2 comprehensively reviews extant literature, which includes theoretical backgrounds, empirical evidence, and hypotheses development for the effect of each diversification strategy on firm performance and the moderating effect of diversification. Chapter 3 provides the research methodology, which includes data, models to be tested, and measurements. Chapter 4 presents the descriptive statistics and results of hypotheses tests, and Chapter 5 concludes the dissertation with discussions and limitations.

CHAPTER 2

LITERATURE REVIEW

2.1. Theoretical Backgrounds

2.1.1. Positive Effect of Diversification

Benefits and costs of both geographic and product diversifications have a basis in common theoretical backgrounds. The internalization theory and the resource-based view explain benefits from diversification (Buckley and Strange, in press; Capar and Kotabe, 2003; Chang and Wang, 2007; Hitt et al., 1997; Tallman and Li, 1996). According to Buckley and Casson (1976), who proposed the internalization theory, diversified firms can enjoy benefits from diversification by organizing bundles of activities internally to develop and exploit firm-specific advantages in knowledge and products. More specifically, given the market failure, by internalizing the market a diversified firm can enjoy efficiencies in resource allocation in internal capital market (Khanna and Palepu, 1999) and internal labor market (Waldman, 2007; Nickerson and Zenger, 2008), which enables the firm to reap above market returns on its specific assets.

Similarly, according to the resource-based view (Barney, 1991; Wernerfelt, 1984), firms may employ diversification as a strategy for establishing resources and capabilities to achieve competitive advantages through interactions among diverse business operation s (Barringer and Harrison, 2000; Eng, 2005). Moreover, a firm's skills and knowledge deeply imbedded in the firm are difficult to sell in the market (Nelson and Winter, 1982). Selling those intangible assets involves many contracting problems (Wernerfelt, 1988; Caves, 1982). Therefore, a firm is more likely to utilize those excess resources within the

organization thorough diversification rather than sell in the market.

Based on the internalization theory and the resource-based view, performing activities internally, using accumulated resources and capabilities, enables a diversified firm to gain economies of scale, economies of scope, and learning by exploiting the interrelationships and differences among business segments and geographic areas (Hamel, 1991; Kogut, 1985; Porter, 1990). To address diversification, while the internalization theory focuses on a firm's search for efficient governance structure, the resource-based view focuses on a firm's search for competitive advantage (Cantwell, 2001; Das and Teng, 2000; Mahoney, 2001). In other words, while the internalization theory considers cost minimization as the primary logic behind diversification, the resource-based view more stresses value maximization from diversification (Das and Teng, 2000).

Additionally, as a theoretical background for diversification, managerial economists proposed the market power view, which asserts that with conglomerate power achieved from diversifying across markets, a firm can reduce competition, establish a dominant position, and gain greater bargaining power (Montgomery, 1994; Sundaram and Black, 1992). And, especially for the benefit of risk reduction through diversification, the modern portfolio theory (Lintner, 1965; Markowitz, 1952; Sharpe, 1964) may hold. That is, with diversification, a firm can reduce risk and bankruptcy costs because a firm's overall return stabilizes due to uncorrelated goods and factor markets (Kim et al., 1989), economic conditions (Rugman,1976), and regulations (Caves, 1982) across various markets in which the firm operates businesses.

For brand diversification, although the literature does not specifically refer to the previously mentioned theoretical backgrounds, some benefits of brand diversification

may be based on those theories and perspectives. For example, operating a diversified brand portfolio enables a firm to gain economies of scope by using shared marketing resources and developing specialized management capabilities for brand equity tracking, market research, and media buying (Kapferer, 1994; Aaker and Joachimsthaler, 2000). The internalization theory and resource-based view that argue achieving competitive advantages through internalizing business activities may be apply to the explanation of economies of scope benefit from brand diversification. And, it has been suggested that a diversified brand portfolio establishes an entry barrier by crowding out prospective entrants, thereby allowing remaining firms to raise prices due to lower concentrations and gain greater market shares in the industry (Bordley, 2003; Kekre and Srinivasan, 1990). These benefits have their foundation in the market power view that emphasizes the competition, dominant position, and bargaining power arising from increased size.

Empirical studies that examined the positive effects of diversification on firm performance (Amit and Livnat, 1988; Bodnar et al., 1999; Morgan and Rego, 2009; Nachum, 2004; Villalonga, 2004) support those theories and viewpoints (i.e., the internalization theory, resource-based view, market power view, and portfolio theory).

2.1.2. Negative Effect of Diversification

Costs from diversification mainly arise from the internal transaction costs argument of the transaction cost theory. According to Egelhoff (1982), Hitt et al. (1994), and Jones and Hill (1988), diversified firms are more complex and have exposure to more complicated factors, such as different regulations in various markets, cultural diversity in organizations and customer segments, and diverse natural environments. Dealing with

such factors may substantially increase internal transaction costs, such as information, coordination, and motivation costs (Buckley and Stranger, in press). Tomassen and Benito (2009) found, in their study of diversified Norwegian firms, that approximately 40 percent of the variation of subsidiaries' performances is attributable to internal transaction costs.

Similarly, the organizational evolution theory and the contingency theory of complex organization assert that as a firm diversifies into various markets, changes in environmental conditions create an organizational complexity to align internal settings with external settings (Mintzberg and Waters, 1982; Nelson and Winter, 1982). That is, to secure firm performance while adapting to new environments generated by diversification, organizational changes, which pose substantial coordination costs and information-processing demands are necessary (Henderson and Fredrickson, 1996; Hengartner, 2006; Tushman and Nadler, 1978).

From the principal-agent perspective, the agency theory also explains costs from diversification. That is, in some situations, managers may seek to act in their own self-interest at the expense of shareholders' interests (Jensen, 1986; Jensen and Meckling, 1976). For example, according to the theory of free cash flow (Jensen, 1986), mangers with large cash flows are more likely to undertake low-benefit or even value-destroying diversification to entrench their positions (e.g., conduct diversifications in a way that increases a firm' demands for managers' particular skills) (Shleifer and Vishny, 1989) and to diversify their employment risk (Amihud and Lev, 1981). Further, more powerful managers ask for larger capital allocation, which leads to inefficient overinvestment or inefficient cross-subsidization among diversified business segments (Dennis et al., 2002;

Meyer et al., 1992; Scharfstein and Stein, 2000).

Those background theories for geographic and product diversification may be applied to the brand diversification context, because operating multiple brands requires changes in the organization into one with multiple brand-level subdivisions. Such changes due to brand diversification generate organizational complexities, which, in turn, lead to higher internal transaction costs (Schwandt, 2009). Similarly, according to Hill et al. (2005), a large brand portfolio can generate inefficiency in manufacturing and marketing economies by fragmenting marketing resources without appropriate coordination. Also, Park et al. (1986) asserted that operating a diversified brand portfolio increases management and resource allocation costs, which weakens each brand's market position in the long-run (Park et al., 1986).

Studies that found the negative impact of diversification on firm performance (Dennis et al., 2002; Fauver et al., 2004; Berger and Ofek, 1995; Lang and Stulz, 1994; Wernerfelt and Montgomery, 1988) support those theories and viewpoints.

2.1.3. Moderating Effect of Diversification

The positive moderating effect is based on the organizational learning theory and the synergy effect perspective. According to the organizational learning theory, experience and learning with product diversification (or presumably brand diversification) establish managerial capabilities that can be applied for more effective management of geographic diversification (Chang and Wang, 2007; Hitt et al., 1997). For example, from past collective experience (i.e., product or brand diversification), a firm learns about how to deal with cooperation and competition among divisions (Hill et

al., 1992; Teece et al., 1997), and then applies this learning to the geographic diversification context to reduce costs of the decision-making process (Kogut and Zander, 1992). Thus, the more diversified, in terms of product or brand, a firm obtains greater learning to be applied when implementing geographic diversification, and consequently increases geographic diversification's effects on firm performance.

When a firm with product or brand diversification expands into various geographic markets, greater opportunities to achieve synergies exist. That is, the firm can gain increased economies of scale and scope by virtue of interdependencies among businesses units and greater amounts of shared resources from an integration of product (or brand) and geographic diversification (Chang and Wang, 2007; Hitt et al., 1997, Kim et al., 1989; Tallman and Li, 1996). In addition, an integrated product (or brand) and geographic diversification enables a firm to achieve profit stability due to differences in factors and goods markets (Kim et al., 1989; Hitt et al., 1997), and to attain greater bargaining power and competitive advantages with greater sources of input and increased outputs (Chang and Wang, 2007; Kogut, 1984).

In addition, from a marketing perspective, a firm that has a broader line of products or brands may have greater advantages when implementing geographic expansion by satisfying heterogeneous customer needs in each geographic region with more targeting options from diverse products or a diversified brand portfolio (Kekre and Srinivasan, 1990; Varadarajan et al., 2006).

However, according to the transaction cost theory, a higher level of diversity, in general, raises the governance cost (Williamson, 1985). That is, an integration of product (or brand) diversification and geographic diversification may generate greater task

interdependences between differentiated subunits and more complex organizational structures (Franko, 2004; Tallman and Li, 1996). This implies that internal transaction costs (e.g., information, motivation, or coordination costs) may increase rapidly beyond managerial capability. For example, when a firm conducts both product (or brand) and geographic diversification simultaneously, the problem of information asymmetry may become magnified, and more difficulties arise for executives to understand and monitor varied subunits appropriately. This forces the internal control mechanism to change from the strategic control to the financial control, which results in suboptimal compensation contracts that encourage immediate profit creation instead of productivity commitment or knowledge development (Baysinger and Hoskisson, 1989; Delios and Beamish, 1999). Thus, a combination of product (or brand) and geographic diversification may discount performance, because costs from complexities may outweigh returns to strategic resources that are applied to excessively broad scope (Hitt et al., 1997; Jones and Hill, 1988; Tallman and Li, 1996).

2.2. Hypotheses Development

2.2.1. Geographic Diversification and Firm Performance

Table 1 summarizes empirical findings of previous studies with regard to the relationship between geographic diversification and firm performance and characteristics of those studies. As shown in Table 1, empirical evidences for the effects of geographic diversification on firm performance have been mixed. For example, Grant (1987) found that profitability of 304 large British manufacturing firms positively associated with the degree of geographic diversification over the period of 1972-1984. Similarly, Han et al.

(1998), with a sample of large manufacturing firms in seven leading countries, found the positive effect of the degree of geographic diversification on a firm's profitability in 1994. And, Chang and Wang (2007) provided empirical evidence for the positive effect of geographic diversification on Tobin's q of a sample of 2,042 firms collected from the Compustat Geographic Segment tape over the period of 1996-2002.

In contrast, Siddharthan and Lall (1982) found that geographic diversification led to a lower sales growth for large manufacturing firms during 1976-1979. Denis et al. (2002), using a sample of 7,520 firms collected from the Compustat Geographic Segment tape for the period 1984-1997, found a discount effect of the degree of geographic diversification on firm value. Similarly, Fauver et al. (2004) found that geographic diversification reduced US headquartered firms' value during the period, 1991-1995.

Some studies have proposed a non-linear relationship between geographic diversification and firm performance. For example, Gomes and Ramaswamy (1999), with a sample of 95 US manufacturing firms for the period of 1990-1995, found an inverse U-shaped relationship, suggesting that a firm's performance is positive initially, gradually levels off, and becomes negative thereafter as the level of geographic diversification increases. Kotabe et al. (2002) found the same relationship, using a sample of 49 US manufacturing firms during a seven-year period ending in 1993. On the other hand, Capar and Kotabe (2003) found a U-shaped relationship between the degree of geographic diversification and firm performance from a sample of 81 major German service firms. In the hospitality industry context, Tang and Jang (2010) found a U-shaped relationship between international diversification and performance of North American hotel firms during the period of 1990-2006.

Table 1. Systematic Literature Review for the Geographic Diversification

Relationship	Author(s)	Sample	Period	Country	Diversification	Performance
Linear	Grant (1987)	Manufacturing	1972-1984	U.K	Foreign Production Ratio	Sales Growth, ROA, ROE
Positive	Buhner (1987)	Manufacturing	1966-1981	Germany	Herfindahl-based Index	Jensen's α, ROA, ROE
	Han et al. (1998)	Manufacturing	1994	7 Countries	Foreign to Total Sales	ROE
	Chang and Wang (2007)	Manufacturing	1996-2002	U.S.A	Entropy Measure	Tobin's q
	Deng and Elyasiani (2008)	Banking	1994-2005	U.S.A	Herfindahl-based Index	Tobin's q
Linear	Siddharthan and Lall (1982)	Manufacturing	1976-1979	U.S.A	Foreign to Total Sales	Sales Growth
Negative	Denis et al. (2002)	Mixed	1984-1997	U.S.A	Diversification Dummy	Excess Value
	Fauver et al. (2004)	Mixed	1991-1995	U.S.A	Herfindahl-based Index	Excess Value
Inverse U	Gomes and Ramaswamy (1999)	Manufacturing	1990-1995	U.S.A	Index from PCA	ROA, Operating Costs to Sales
	Hitt et al. (1997)	Manufacturing	1988-1990	U.S.A	Entropy Measure	ROA, ROS
	Kotabe et al. (2002)	Manufacturing	1987-1993	U.S.A	Foreign to Total Income	ROA, Sales to Operating Costs
U	Capar and Kotabe (2003)	Service	1997-1999	Germany	Foreign to Total Sales	ROS
	Tang and Jang (2010)	Service	1990-2006	U.S.A	Foreign to Total Sales	Excess Value

From Table 1, no systematic association between the geographic diversification-firm performance relationship and sampling periods, countries of origin, measures of diversification seems to exist. However, the geographic diversification-firm performance relationship seems to vary according to the sampled firms. While linear positive and inverse U-shaped relationships seem to be associated with manufacturing firms, the U-shaped relationship appears for service industries, which implies inconsistent findings may be due to industry idiosyncrasies (Capar and Kotabe, 2003). For example, Capar and Kotabe (2003) argued for the existence of a difference between manufacturing firms and service firms with regard to the effects of geographic diversification on firm performance. That is, unique characteristics of service firms, such as: 1) stricter controls of local governments over service industries, 2) need for more extensive adaptation of services firms to local markets, caused by the intangibility nature of service, and 3) higher initial investments in capital due to the simultaneity of production and consumption of services are major obstacles that lead to performance discounts of service firms at the initial stage.

To reconcile such contradictions of the direction of the geographic diversification's effect (i.e., positive vs. negative), Bausch and Krist (2007) conducted meta-analysis using a sample of 36 studies published between 1979 and 2004. They found that the effect of geographic diversification on firm performance is contingent on other factors, including product diversification, R&D intensity, country of origin, firm age, and firm size.

The current study hypothesizes the negative linear relationship between geographic diversification and firm performance in each of casino, restaurant, and

lodging industry, based on following rationales. First, considering unique characteristics of service firms with regard to geographic diversification's effect, suggested by Capar and Kotabe (2003), the relationship between geographic diversification and performance of hospitality firms may be negative at least in the initial stage (i.e., lower degree of geographic diversification). Since hospitality firms are especially capital intensive, compared to other service industries, such as commercial banking, consulting, or retailing (Schmidgall, 2006; Schmenner, 1986), the negative effects of geographic diversification for hospitality firms may be greater than for other service firms. Therefore, positive effects (e.g., learning or market power effect) from a higher degree of diversification after passing the threshold, as shown in a U-shaped geographic diversification-performance relationship found by Capar and Kotabe (2003), may be offset, thus not exist for hospitality firms. For example, as the degree of geographic diversification increases, hospitality firms have to bear greater investments in capital to replicate an entire value chain in each geographic region than other manufacturing and service firms. For hospitality firms, costs of the initial investments may still outweigh benefits from a higher degree of geographic diversification, such as economies of scale, learning effects, or market power effects.

Second, hospitality firms, which can be classified as capital-based service firms, possess several disadvantages, compared to knowledge-based service firms (e.g., accounting, advertising, or legal service firms) when implementing geographic diversification (Contractor et al., 2003). That is, hospitality firms: 1) have a higher burden of tangible assets or a higher risk from irreversible resources in each geographic region, 2) have fewer established clients in other geographic regions, and 3) have a lower

level of standardization of service, which increases costs for entry and deters rapid reaping of benefits from geographic expansion (Contractor et al., 2003). Such unique characteristics of hospitality firms associated with geographic diversification may aggravate the negative effects or mitigate the positive effects from geographic diversification to the extent that an increasing trend in firm performance at a higher degree of geographic diversification (the right-hand side of an inverse U-shaped curve) declines.

Third, according to a meta-analysis conducted by Bausch and Krist (2007), the positive effects from geographic diversification associate with greater R&D intensity and firm size. More specifically, commitment to R&D, transferable and exploitable within a geographically diversified firm, may be a key source of competitive advantage when conducting geographic diversification. And, larger firms can enjoy more positive effects from geographic diversification because of a greater degree of resource availability, required for successful implementation of geographic expansion (Bausch and Krist, 2007). Considering the lower degree of R&D intensity and firm size characteristic of hospitality firms compared to manufacturing firms (Choi et al., in press; Kang et al., in press; Meriküll et al., 2010), the effects of geographic diversification may be worse for hospitality firms than manufacturing firms.

Last, although the Tang and Jang (2010)'s study, a rare study that examined a geographic diversification-firm performance relationship in the hospitality industry context, found a U-shaped relationship, Tang and Jang's (2010) study is different in several aspects in comparison to the current research. Geographic diversification in the Tang and Jang's (2010) study is international diversification; whereas, geographic

diversification in the current study is interstate diversification or geographic diversification within the US. The current study employs within-US diversification not only because a substantial proportion of casino, restaurant, and lodging firms are diversified only within US, but also because geographic market can be disaggregated within the US in terms of customers, regulations, and natural environments (more detailed explanation appears in Chapter 3. Methodology). International diversification may have additional benefits compared to within-US diversification (Berger, 2000). First, the risk diversification effect is greater in international diversification because of higher differences in macroeconomic cycles, factors and goods markets, and policies. Second, international diversification provides more opportunities for revenue generation from multinational customers by exploiting the existing relationships established in a particular country. Revenue generation opportunities from international markets may generate a greater difference between international diversification and within-US diversification, especially in the highly competitive business environment of the US hospitality industry (Basham, 2008; Basham and Kwon, 2009). Considering those disadvantages of within-US diversification compared to international diversification, an upturn in firm performance from a higher degree of geographic diversification in a U-shaped curve in the Tang and Jang's (2010) study may be limited in the current study.

Another differentiating feature is that while the Tang and Jang's (2010) study included franchising properties, the current research only includes directly operated properties by a firm. The current study's main purpose is examining the moderating effects of product or brand diversification on the relationship between geographic diversification and firm performance, in which interrelationships between product (or

brand) and geographic units (e.g., synergy effects and inter-firm learning or complexities in management) matter significantly. Since franchised properties are managed independently by franchisees, to investigate adequately the moderating effect generated from management dynamics among organizational units, only directly operated properties are appropriate for the current study. Given that franchising is an expansion strategy that provides rapid growth without large capital investments, including franchising properties in the Tang and Jang's (2010) study may have led to a greater positive effect from a higher degree of geographic (international) diversification (i.e., the right hand side of a U-shaped curve); a similar outcome may not occur in the current study.

Supporting those rationales, a prior study conducted (Kang et al., in press) with a sample of 14 US casino firms during the period, 2000-2008 found the linear and negative effect of geographic (interstate) diversification on firm performance. Thus, based on the unique characteristics of hospitality firms with regard to geographic diversification, compared to manufacturing or other service industries, the nonexistence of potential benefits from international diversification and franchising, and a previous empirical study conducted in the similar context with this study, this study hypothesizes a negative relationship between geographic diversification and firm performance for casino, restaurant, and lodging firms.

Thus, hypotheses for the effect of geographic diversification on firm performance in three industries are:

H1a: The relationship between the degree of geographic diversification and firm performance in the US casino industry is linear and negative.

H1b: The relationship between the degree of geographic diversification and firm performance in the US restaurant industry is linear and negative.

H1c: The relationship between the degree of geographic diversification and firm performance in the US lodging industry is linear and negative.

2.2.2. Product Diversification and Firm Performance

Product diversification, an expansion into different product markets involving changes in a firm's administrative structure, systems, or managerial processes (Lopes, 2002; Montgomery, 1994), is a competitive strategy adopted by US casino firms. All the publicly traded US casino firms are reaping revenues, of varying degrees among casinos, from diverse businesses (e.g., gaming, hotel, food and beverage, entertainment, or retail businesses). Although a few US lodging firms adopt product diversification (e.g., hotel and F&B businesses), the number of products and variations among firms are limited. And, almost all US restaurants focus on one product category based on the definition of product following North American Product Classification System (NAPCS) and detailed item lists of revenue account in income statements in 10-Ks (more detailed explanation appears in Section 3.6. Measure of Product Diversification).

One of the key topics associated with product diversification in strategic management, finance, and industrial organization economics is the impact of product diversification on firm performance (Amit and Livnat, 1988; Chatterjee and Wernerfelt, 1991; Lang and Stulz, 1994; Li and Greenwood, 2004; Ramírez and Espitia, 2002; Siggelkow, 2003; Wernerfelt and Montgomery, 1988). However, the empirical results from research are inconclusive. A group of scholars found a positive effect of product

diversification on firm performance (Amit and Livnat, 1988; Jose et al., 1986; Villalonga, 2004), largely based on the internalization theory (Buckley and Casson, 1976) and the resource-based view (Barney, 1991). In contrast, other scholars (Berger and Ofek, 1995; Lang and Stulz, 1994; Wernerfelt and Montgomery, 1988) found a negative impact of product diversification on firm performance, which can be caused by increased organizational complexities and internal transaction costs (Hitt et al., 1994; Jones and Hill, 1988).

By reconciling seemingly contradictory results associated with product diversification, some scholars (Palich et al., 2000; Ramírez and Espitia, 2002; Tallman and Li, 1996) proposed and found an inverse U-shaped relationship between product diversification and firm performance. That is, as the degree of product diversification increases, firm performance enhances initially from synergies created by internalizing operations and demands externalities generated by complementarities between diversified products. However, after the degree of product diversification passes an optimal point, firm performance may decline gradually, because increased complexities and internal transaction costs (e.g., information-processing, monitoring, and coordination costs) exceed internal capability that enables a firm to enjoy benefits from product diversification (Tallman and Li, 1996).

Such inconsistency may arise from the differences in industry structures and the types of diversification (Hoskisson and Hitt, 1990; Tallman and Li, 1996). In a similar vein, Palich et al. (2000), by conducting a meta-analysis with 55 previous empirical studies of product diversification-firm performance relationship published between 1971 and 1998, found that firm performance is contingent on the type of diversification. That

is, firm performance increases as a firm shifts from concentrated product diversification to related diversification by exploiting synergy effects such as economies of scope; however, firm performance decreases as a firm expands from related diversification to unrelated diversification because of aggravated internal transaction costs and difficulties in transferring core competencies among units with heterogeneous natures (Palich et al., 2000). This result and rationale for an inverse U-shaped relationship can also apply to product diversification in the US casino industry. That is, up to a moderate level of product diversification that covers, for example, gaming, hotel room, and F&B businesses, firm performance increases, but as a casino firm excessively expands its businesses into comparatively unrelated areas (e.g., entertainment, shopping, or retail businesses), firm performance decreases because costs from product diversification may outweigh benefits.

In addition, product diversification in the US casino industry has idiosyncratic characteristics, worthy of separate examination: First, compared to general product diversification that markets diverse products across different industries (i.e., inter-industry diversification), product diversification of US casino firms represents one similar to intra-industry product diversification. That is, products in US casino firms are diversified within homogeneous industries including gambling services, accommodations, food services and drinking places, and amusements, which belong to the hospitality field. In general, compared to inter-industry diversification, within-industry diversification generates additional benefits of mutual forbearance (i.e., tacit collusion that alleviates competitive behaviors when multimarket contacts exist) and market structuration (i.e., the process that separate market niches mature into closer associations, which can maximize

inter-firm learning, supportive infrastructures, and legitimization) (Li and Greenwood, 2004). Second, product diversification in the US casino industry represents a complementary diversification with a hierarchy, in which products complement each other and the supplementary products (i.e., hotel, F&B, entertainment, retail, and other businesses) contribute to the core product (i.e., gaming business) to generate demands externalities (Siggelkow, 2003). Third, for product diversification in the US casino industry, consumption of diverse products occurs within a relatively short time period and a constrained location (i.e., time and location bounded), which may strengthen complementarities among products of US casino firms.

Motivated by those unique characteristics, Kang et al. (2011), with a sample of 15 US casino firms during the period, 2001-2008, found an inverse U-shaped relationship between product diversification and firm performance and a significant complementarity between gaming and F&B businesses. Particularly for the product diversification-firm performance of US casino firms, which is a subsidiary subject of the current study, the current study attempts to confirm the empirical evidence from the previous study by expanding the sampled firms and the sample period (more detailed explanation appears in Chapter 3. Methodology).

Thus, the hypothesis for the effect of product diversification on firm performance is:

H2a: The relationship between the degree of product diversification and firm performance in the US casino industry is a curvilinear, inverse U-shaped relationship.

2.2.3. Brand Diversification and Firm Performance

Brands have been considered important intangible assets that contribute to firm performance (Capron and Hulland, 1999; Ailawadi et al., 2001). Especially for restaurant and lodging firms, brands have played a critical role as key assets and the primary driver for a firm's growth because of their significant influence on customers' perceptions and establishment of hospitality firms' identities (Jiang et al., 2002; Kim and Kim, 2005). Brand portfolio diversity or brand diversification, defined as the extent to which a firm serves markets or operates businesses with different brands (Bahadir et al., 2008), has been a popular strategy for manufacturing and service firms. Especially, the hospitality industry has observed rapid growth of brand proliferations among hotel firms over the past 20 years (Kim, 2008), and dynamic changes in recent brand portfolios of restaurants (Basham, 2008). Accordingly, restaurant and lodging firms focus more on brand orientation than product orientation as their key corporate missions (Muller, 1998).

The marketing literature suggested that brand diversification constructs an entry barrier and lowers competition by crowding out prospective competitors, allowing the established firms to gain price premiums and larger market shares in the industry (Bordley, 2003; Kekre and Srinivasan, 1990). And, a diversified brand portfolio contributes to increased demand by satisfying heterogeneous and fickle consumers' demands and reducing satiation (Lancaster, 1990; Park, et al., 1986). In addition, operating a diversified brand portfolio enables a firm to achieve economies of scale, economies of scope, and learning effect in developing specialized management capabilities, market research, and media buying abilities thorough resource sharing and synergy creation (Aaker, 2004; Aaker and Joachimsthaler, 2000; Kapferer, 1994).

On the other hand, Quelch and Kenny (1994) and Bawa et al. (1989) suggested

that launching multiple brands may lower brand loyalty by stimulating consumers' brand switching behavior. And, brand diversification may increase price competition across different markets by providing consumers with more options for lower-priced brands (Ba wa et al., 1989) and competitors with more opportunities to match new products (Quelch and Kenny, 1994). In addition, operating multiple brands generates organizational complexities (Hengartner, 2006; Schwandt, 2009) and inefficiencies in manufacturing and marketing economies by diluting marketing resources (Hill et al., 2005). Kumar (2003) asserted that fewer than 20% of a firm's brands generate more than 80% of the firm's profits, and managing an excessive number of brands causes a firm's divergence from its core, more profitable brand.

Empirical examination of the effect of brand diversification on firm performance is rare in the literature. Morgan and Rego (2009) investigated the impact of brand diversification on performance of 72 Fortune 500 firms during the period, 1994-2003, and they found that brand diversification associated with higher Tobin's q and lower cash flow variability. In contrast, in the restaurant industry context, with a sample of 46 publicly traded US restaurants during 2003-2007, Choi et al. (in press) found the negative effect of brand diversification on Tobin's q.

Contradictory results from those two studies may be attributable to the structure of industries from which samples of each study came and from methodologies used, which are considered main factors for the generation of inconsistent empirical evidence in the diversification literature (Hoskisson and Hitt, 1990; Tallman and Li, 1996). While the sample of the Morgan and Rego's (2009) study consisted primarily of large manufacturing firms (the proportion of service firms is only 13%), Choi et al. (in press)

only sampled restaurant firms. In general, service firms require extensive customization and adaptation to target markets due to the intangible nature of service (Knight, 1999; Patterson and Cicic, 1995), which may generate higher operational costs for service firms than manufacturing firms in the course of diversification of brands. Especially, recent, massive proliferation of brands in the highly competitive lodging and restaurant industries confuses customers in distinguishing between various, similar brands (Brotherton, 2003; Kim, 2008; Basham and Kwon, 2009), which may deter successful customization of lodging and restaurant firms and the consequently incur greater costs associated with brand diversification. In addition, restaurant firms and lodging firms have actively expanded their brands through acquisitions. In general, when the acquirer and the target firm exist in the same industry, the redundancy and overlap among brands in an acquirer are greater, which inevitably leads to a higher degree of cannibalization of cash flow (Bahadir et al., 2008; Varadarajan, 2006).

Additionally, firm size may represent a possible factor for the differing results of the two studies. While the mean total assets of the sampled firms in the Morgan and Rego's (2009) study is $28,190 million, the mean total assets of the sampled restaurant firms of the Choi et al.'s (in press) study is merely $576 million. Smaller restaurant firms may have less advantage in economies of scale from brand diversification than large manufacturing firms, which, in turn, hinders, to some extent, the positive effect of brand diversification on performance of restaurant firms. The positive relationship between Tobin's q and firm size among the diversified restaurant group, a finding of Choi et al. (in press), supports this rationale.

For methodology, the Morgan and Rego's (2009) study operationalized the degree

of brand diversification with the number of brands, which may be biased if a substantial proportion of sales concentrates on a particular brand among multiple brands. Alternately, Choi et al. (in press) measured the degree of brand diversification with the Herfindahl Index, which incorporates both the number of brands and the dispersion of sales of each brand, thus being regarded as a more appropriate diversification measure. In addition, the sample period of 2003-2007 in the Choi et al.'s (in press) study, representing dynamically changing, recent brand portfolios in the restaurant industry, may lead to a different result from that of Morgan and Rego's (2009) study whose sample represents 1994 to 2003.

Thus, following the finding of Choi et al.'s (in press), study that appropriately represents characteristics of hospitality industry and employs relevant methods with regard to brand diversification, the current study hypothesizes the negative relationship between brand diversification and performance of restaurant and lodging firms.

Thus, hypotheses for the effect of brand diversification on firm performance are:

H2b: The relationship between the degree of brand diversification and firm performance in the US restaurant industry is linear and negative.

H2c: The relationship between the degree of brand diversification and firm performance in the US lodging industry is linear and negative.

2.2.4. Moderating Effect of Product Diversification

Empirical findings for the moderating effect of product diversification on the geographic diversification-firm performance relationship have been inconsistent, depending on the sample, methodology and the type of diversification. For example, while Tallman and Li (1996) and Geringer et al. (2000) found no significant interaction

effect between product diversification and geographic diversification on firm performance, Hitt et al. (1997) found a positive moderating effect of product diversification (i.e., the effect of geographic diversification on firm performance increases as the degree of product diversification increases).

Different from other studies that used a sample of US manufacturing firms, Geringer et al. (2000) used the sampled Japanese manufacturing firms that have different cultures, strategic goals, and control systems, which may result in a different finding from that of Hitt et al. (1997) (i.e., the positive moderating effect). For example, collapse of equity and property markets in Japan during the early 1990s might mask the benefits from product diversification when implementing geographic diversification (Geringer et al., 2000). And, although both Tallman and Li used similar samples, the methodologies employed were different. While Hitt et al. (1997) used the entropy measure that incorporates the weight of each component, Tallman and Li (1996) used the number of geographic locations as the proxy for the degree of geographic diversification and used the Herfindahl-based measure for the degree of product diversification. Considering that only using the number of components for the operationalization of diversification failed to reflect the level of the dispersion of components (Jose et al., 1986; Sullivan, 1994), the Tallman and Li's (1996) result (i.e., an insignificant moderating effect) may be biased especially if the weights of each geographic location are substantially different.

Further, Chang and Wang (2007) found that while related product diversification positively moderates the relationship between geographic diversification and firm performance, unrelated diversification negatively moderates the geographic diversification-firm performance relationship. That is, the impact of the degree of

geographic diversification on firm performance increases as the degree of product diversification increases for the case of related product diversification, but for the unrelated product diversification case, the impact of the degree of geographic diversification decreases as the level of product diversification increases.

The main rationale for the positive moderating effect of product diversification is that benefits of learning effects (i.e., applying leaning from product diversification to the geographic diversification setting) and synergy effects between product diversification and geographic diversification (e.g., increased economies of scale and scope) outweigh costs from increased organizational complexities (i.e., internal transaction costs, including information-processing, coordination, and motivation costs). In this regard, a moderating effect of casino firms' product diversification may be positive with greater significance and magnitude, compared to the cases of other industries.

First, benefits from the degree of product diversification may be greater in the US casino industry. According to the organizational learning theory (Ghoshal, 1987; Kogut a nd Zander, 1992), if subdivisions have similar backgrounds and shared understandings, they can more efficiently and effectively learn from each other (Grant, 1996). Considering a higher degree of knowledge relatedness and shared understanding among different product-level subdivisions within the organizations of US casino firms due to complementarities between products (Kang et al., 2011), US casino firms are likely to apply more learning achieved from managing product diversification more rapidly to geographic diversification settings than firms in other industries.

Second, casino firms may enjoy greater synergetic effects between product and geographic diversification. Internal or cost economies of scope may be generated from

excess capacity of shared resources or customer information that can be jointly used for various products (Clark, 1988). A higher degree of complementarities among products implies a greater proportion of shared resources and customer information, which enables casino firms to achieve greater synergy effects in terms of economy of scope when implementing both product and geographic diversification than firms in other industries. In addition, a hierarchy among products in US casino firms (i.e., supplementary products such as hotel, F&B, or entertainment operations contribute to the main product, gaming) may magnify the synergy effects. For example, benefits of internal capital markets are greater for firms with a more consolidated hierarchy, because these firms can access internal capital markets without the additional costs of managing a decentralized organization (Klein and Saidenberg, 2010). Thus, when exploiting synergetic effects from using internal capital markets generated by integration of product and geographic diversification, casino firms with a hierarchical structure of product operations can enjoy more benefits with fewer additional costs.

Third, in addition to the arguments regarding the positive moderating effect of product diversification from previous studies, external or revenue economies of scope (or demand externalities) may occur especially for US casino firms. Revenue economies of scope can be created from reduced shopping costs due to the presentation of one-stop shopping for various products or services (Berger, et al., 1996; Klein and Saidenberg, 2010). Casino firms can achieve more demand externalities with diverse complementary products (Siggelkow, 2003) and location- and time-boundedness of consumption than firms in other industries. That implies a greater positive moderating effect of US casino firms' product diversification than firms in other industries. When implementing

geographic diversification, a firm with a higher degree of product diversification may enjoy greater impact of geographic diversification on firm performance than a firm with a lower degree of product diversification due to more demand externalities from product diversification. And, such an effect may be greater for casino firms that have higher complementarities among products and usually implement the same set of products at each geographic location (Contractor et al., 2003), compared to firms in other industries that do not contain complementarities and launch different products in each geographic location.

Fourth, costs from integration of product and geographic diversification may be less significant in the US casino industry. While increasing product diversity, a higher degree of complementarities and hierarchy among product divisions may be helpful for corporate executives to understand more about resources and competitiveness of each unit and for divisions to understand more about each other, compared to cases of firms in other industries. Thus, when hospitality firms expand geographically, incremental costs (e.g., costs of managerial information-processing demands, coordination, and control) from increased product diversification may be less than those for firms in other industries.

Thus, the hypothesis for the moderating effect of product diversification is:

H3a: Product diversification in the US casino industry significantly and positively moderates the impact of geographic diversification on firm performance.

2.2.5. Moderating Effect of Brand Diversification

Although research on the moderating effect of brand diversification on the geographic diversification-firm performance relationship seems not to exist in the

literature, the rationales of the product diversification case are applicable to the brand diversification context. Further, given that brand diversification occurs within homogenous businesses in the US restaurant and lodging industries (i.e., within restaurant businesses for the restaurant industry and lodging businesses for the lodging industry), communalities among subdivisions are greater than for the product diversification case. That implies a higher degree of shared knowledge, understanding, and resources, which, in turn, may lead to greater learning effects and synergy creation and lower internal transaction costs when implementing both brand and geographic diversification compared to both product and geographic diversification. For example, when a firm with brand diversification conducts geographic diversification, the firm can enjoy greater marketing economies of scope due to more shared marketing resources focusing on homogenous products than a firm that markets several different products through product diversification.

Additionally, offering multiple brands for a given product category, as in the US restaurant and lodging industry, helps a firm to achieve greater customer retention by satisfying heterogeneous and fickle needs of customers and reducing satiation with one brand (Park et al., 1986). Thus, brand diversification may impose a greater positive moderating effect on the relationship between geographic diversification and firm performance than product diversification, especially when the firm expands into new geographic areas.

On the other hand, in general, costs of adding new brands are less than costs of launching new products. While adding a new brand involves little more than a labeling or less significant line extension, an increase in products requires a detectable alteration

of production processes and a substantial restructuring of an organization (Delacroix and Swaminathan, 1991). Thus, inevitable costs for enjoying benefits from the interaction between brand and geographic diversification are less significant than from the interaction between product and geographic diversification.

Thus, hypotheses for the moderating effect of brand diversification are:

H3b: Brand diversification in the US restaurant industry significantly and positively moderates the impact of geographic diversification on firm performance, and such moderating effect is greater than the moderating effect of product diversification in the US casino industry.

H3c: Brand diversification in the US lodging industry significantly and positively moderates the impact of geographic diversification on firm performance, and such moderating effect is greater than the moderating effect of product diversification in the US casino industry.

CHAPTER 3

METHODOLOGY

3.1. Data Collection

This study samples publicly traded US casino, restaurant, and lodging firms, based on the North American Industry Classification System (NAICS) codes: 721120 (casino hotels) and 713210 (casinos except casino hotels) for casino firms, 722110 (full-service restaurants) and 722211 (limited-service restaurants) for restaurant firms, and 721110 (hotels except casino hotels and motels) for lodging firms. Data for geographic, product, and brand diversification (i.e., square footage for casino firms and the number of properties for lodging and restaurant firms) are collected from each firm's 10-K. And, other financial data that compose firm performance and control variables are collected from the Compustat database.

The sample period spans fiscal years 1993 to 2010 to include all publicly traded firms filing their 10-K reports in the Electronic Data Gathering, Analysis, and Retrieval system (EDGAR). The data availability in EDGAR is a relevant criterion for deciding the initial year for the sample period, because the provision of accounting information on the Internet and the timely dissemination of information may significantly affect the financial markets' responses (Asthana and Balsam, 2001), which influence firms' stock prices, and thus, firm performance measures for this study.

After removing firms that do not provide diversification data in 10-Ks and financial data through the Compustat database, this study obtained 336 observations for 43 casino firms, 176 observations for 36 lodging firms, and 952 observations for 132

restaurant firms.

3.2. Models

To examine hypotheses, this study employs regression models. To represent comprehensively firm performance, each model adopts Tobin's q, a financial market-based measure of firm performance and ROA, an accounting-based measure of firm performance or profitability. The Berry-Herfindahl index is the main diversification measure for all of casino, restaurant, and lodging firms. For casino firms' geographic diversification, the modified Berry-Herfindahl index, which reflects the degree of within-state diversification, is, in turn, used as an alternative measure of geographic diversification (more detailed explanation appears in Section 3.5. Measure of Geographic Diversification). And, the entropy index ($\sum S_i \ln(1/S_i)$) is alternately used to check validity of the Berry-Herfindahl index. For additional analyses that examine the source of diversification's effect, the Berry-Herfindahl index is divided into two components, the number of entities and the size dispersion across entities, which replace the degree of diversification in each model (more detailed explanation appears in Section 3.4. Measure of Diversification in General). Each model includes relevant control variables, based on the diversification literature and justifications for needs to control for the hospitality industry specific factors.

Represented models for main analyses are (excluding firm dummies and time dummies when using the fixed effects method):

H1a: Tobin's q (ROA) = $\alpha_0 + \alpha_1 DOGD + \alpha_2 SIZE + \alpha_3 LEV + \alpha_4 DIV + \alpha_5 DOI + \alpha_6 DOC + \alpha_7 GO + \varepsilon$,

H1b: Tobin's q (ROA) = $\alpha_0 + \alpha_1$DOGD + α_2SIZE + α_3LEV + α_4DIV + α_5DOI + α_6DOC + α_7DOF + α_8GO + ε,

H1c: Tobin's q (ROA) = $\alpha_0 + \alpha_1$DOGD + α_2SIZE + α_3LEV + α_4DIV + α_5DOI + α_6DOC + α_7DOF + α_8GO + ε,

H2a: Tobin's q (ROA) = $\alpha_0 + \alpha_1$DOPD + α_2DOPD^2 + α_3SIZE + α_4LEV + α_5DOI + α_6DOC + α_7GO + ε,

H2b: Tobin's q (ROA) = $\alpha_0 + \alpha_1$DOBD + α_2SIZE + α_3LEV + α_4DIV + α_5DOI + α_6DOC + α_7DOF + α_8BS + α_9GO + ε,

H2c: Tobin's q (ROA) = $\alpha_0 + \alpha_1$DOBD + α_2SIZE + α_3LEV + α_4DIV + α_5DOI + α_6DOC + α_7DOF + α_8BS + α_9GO + ε,

H3a: Tobin's q (ROA) = $\alpha_0 + \alpha_1$DOGD + α_2DOPD + α_3DOGD×DOPD + α_4SIZE + α_5LEV + α_6DIV + α_7DOI + α_8DOC + α_9GO + ε,

H3b: Tobin's q (ROA) = $\alpha_0 + \alpha_1$DOGD + α_2DOBD + α_3DOGD×DOBD + α_4SIZE + α_5LEV + α_6DIV + α_7DOI + α_8DOC + α_9DOF + α_{10}BS + α_{11}GO + ε,

H3c: Tobin's q (ROA) = $\alpha_0 + \alpha_1$DOGD + α_2DOBD + α_3DOGD×DOBD + α_4SIZE + α_5LEV + α_6DIV + α_7DOI + α_8DOC + α_9DOF + α_{10}BS + α_{11}GO + ε,

where, Tobin's q represents firm performance measured by the market value to book value ratio; ROA represents return on assets measured by operational income before depreciation and amortization divided by total assets; DOGD represents the degree of geographic diversification measured, in turn, by the Berry-Herfindahl index ($1-\sum S_i^2$), the entropy index ($\sum S_i \ln(1/S_i)$), where S_i is the proportion of casino square footage of properties (for casino firms) or the number of properties (for restaurant and lodging firms) in each geographic unit in which a firm operates, and the modified Berry-

Herfindahl index calculated based on the weighted average of the within-state 3-digit zip code level Herfindahl index; DOPD represents the degree of product diversification measured, in turn, by the Berry-Herfindahl index ($1-\sum S_i^2$) and the entropy index ($\sum S_i \ln(1/S_i)$) in which S_i is the sales proportion of each business in a casino firm; $DOPD^2$ represents the squared term of DOPD; DOBD represents the degree of brand diversification measured, in turn, by the Berry-Herfindahl index ($1-\sum S_i^2$) and the entropy index ($\sum S_i \ln(1/S_i)$), in which S_i is the proportion of number of properties for each brand a firm markets; SIZE represents a firm's size measured by the log of total assets; LEV represents a firm's capital structure measured by debt-to-equity ratio; DIV represents dividend payments; DOI represents the degree of internationalization measured by sum of casino square footage (the number of restaurant or lodging properties) of international locations divided by total casino square footage (total number of properties); DOC represents the degree of competition measured by the weighted average across the ratios of the number of properties (including competitors' properties) to the population densities adjusted by per capita income indices in each state, in which a firm operates; DOF represents the degree of franchising measured by the number of franchised properties divided total number of properties; BS represents a brand strategy dummy, assigned 0 if a firm employs a corporate brand strategy, and 1 if a firm employs a house-of-brand strategy, and 2 if a firm employs a mixed branding strategy; GO represents growth opportunity measured by capital expenditure divided by sales.

3.3. Estimation Methods

For the coefficient estimation, this study that uses panel data compares among

estimations from the pooled OLS, fixed effects, instrumental variable, and fixed effects instrumental variable regressions. Since the pooled OLS estimation may be biased and be inconsistent due to omitted variable bias when using panel data, this study employs the fixed effects methods to mitigate omitted variable bias by taking into account unobservable firm-specific and time-specific heterogeneities (Gujarati, 2003; Wooldridge, 2002).

In addition, to address the endogeneity or causality issue that may occur in relation to diversification, this study uses a two-stage least squares estimator (2SLS). For example, while the degree of diversification affects firm performance, which is the assumed causality in this study, it is also probable that a high (low) firm performance may motivate diversification to extend competitive advantages into various markets (to avoid intense competition in existing markets) (Miller, 2006). The endogeneity issue generated by this kind of causality problem may lead to biased and inconsistent estimations of regression coefficients (Campa and Kedia, 2002; Wooldridge, 2002). To decide whether or not to use instrumental variable methods, this study conducts the Hausman test that tests endogeneity by comparing 2SLS estimation with OLS estimation (Wooldridge, 2002).

The 2SLS method has been considered an appropriate estimation method to resolve the endogeneity problem in many studies, including diversification research (Kumar, 2009; Villalonga, 2004). For 2SLS estimation, in the first stage, the fitted values are found by running the OLS regression of the independent variable on all available exogenous variables including additional instrumental variables, and in the second stage, a coefficient is estimated by running the OLS regression of the dependent variable on the

fitted values identified in the first stage.

This study employs additional instrumental variables for the first stage regression, based on the diversification literature that used 2SLS regressions (e.g., Campa and Kedia, 2002; Villalonga, 2004). In a study that examines the effect of diversification on firm performance, to mitigate the endogeneity problem Campa and Kedia (2002) identified relevant instrumental variables that do not correlate with the error but correlate with diversification. Excluding industry characteristic-related instrumental variables (because this study samples firms in homogenous industries), this study uses six instrumental variables identified by Campa and Kedia (2002).

More specifically, to instrument macroeconomic factors and business cycles, this study employs real growth rates of gross domestic product (GDP) for each year. In addition, to instrument a firm's characteristics with regard to the diversification decision, this study uses a stock exchange variable (EX) assigned 1 if a firm is listed on AMEX, NYSE, or Nasdaq, and 0 otherwise. EX is used an instrumental variable because listing on major stock exchanges may facilitate diversification by generating increased visibility and reducing information asymmetries, which in turn, provide greater opportunity for external financing (Campa and Kedia, 2002). Another dummy variable, SNP, assigned 1 if a firm belongs to the S&P industrial index and 0 otherwise, is included as an instrumental variable to account for liquidity that may affect the decision to diversify. To include instrumental variables for other firm-specific characteristics, this study also uses the average value of a firm's size (the log of total assets), profitability (operational income/sales), and growth opportunity (capital expenditure/sales) within the sample period. To confirm the validity of incremental variable estimation, this study conducts

the Anderson canonical correlations test to check underidentification, and tests overidentification with Hansen's J statistic (Baum et al., 2007) for every regression that uses 2SLS. Last, this study conducts fixed effects instrumental variable estimation that integrates fixed effects methods and 2SLS regression to address, as much as possible, omitted variable issues and the consequent endogeneity problem.

For estimations of standard errors, this study adopts Newey-West heteroscedasticity and autocorrelation consistent (HAC) standard errors in the panel data setting to account for possible autocorrelations and heteroscedasticity (Gujarati, 2003).

3.4. Measure of Diversification in General

The Berry-Herfindahl index, $(1-\sum S_i^2)$, has been considered an appropriate measure of diversification (Amit and Livnat, 1988; Denis et al., 2002; Gollop and Monahan, 1991; Hitt et al., 1997), because it incorporates both the number of entities and the weight of each entity. An alternative measure of the degree of diversification is the entropy index, $(\sum S_i \ln(1/S_i))$, that also reflects both the number of entities and the level of dispersion across entities. Since the entropy index highly correlates with the Berry-Herfindahl index and the results from using those two indices are very similar (Amit and Livnat, 1988), this study uses the entropy index to confirm construct validity of the Berry-Herfindahl index.

For additional examinations, the Berry-Herfindahl index measurement for DOGD, DOPD, and DOBD in each model that examines the effects of geographic, product, and brand diversification is divided into two components (i.e., number and dispersion components) to examine whether the number of entities or the dispersion of entities (or

both) is (are) the significant source of diversification's effect (Gollop and Monahan, 1991; Jose et al., 1986). For example, by adding and subtracting 1/n in the equation of DOGD, DOGD $(1-\sum S_i^2)$ equals to $(1- 1/n) - \sum [S_i^2 - (1/n)^2]$, which is denoted by DOGDN - DOGDD, where DOGDN represents the degree of geographic diversification's number component and DOGDD represents the degree of geographic diversification's dispersion component. And, for example, an equation for an additional examination in the context of geographic diversification of the sampled casino firms is: Tobin's q (ROA) = $\alpha_0 + \alpha_1$DOGDN + α_2DOGDD + α_3SIZE + α_4LEV + α_5DIV + α_6DOI + α_7DOC + α_8GO + ε.

3.5. Measure of Geographic Diversification

Especially for geographic diversification of casino firms, this study employs three different levels of measurement to compare the effects of geographic diversification based on the unit of geographic markets: 1) the state level, 2) the three-digit zip code level, and 3) the state level incorporating the three-digit zip code level measurement (the state-zip level measurement). For restaurant and lodging firms, because they do not provide detailed information for the disaggregated level of geographic locations (i.e., the three-digit zip level geographic locations), this study only considers the state level measure of geographic diversification for the restaurant and lodging industries' analyses.

First, this study adopts state as the unit of geographic region for firms in all three industries not only because of the scope of business operations of sampled casino firms as a whole, but also because of distinctive characteristics of states as separate geographic markets. For example, only 5 of 40 sampled US casino firms actively engaged in

international expansion. Similarly, a substantial portion of sampled US restaurant and lodging firms employed interstate diversification, not international diversification. And, each state in the US is distinguishable as a distinctive geographic market in terms of demands and supplies, regulations, and natural environments. For example, states developed as tourism destinations (e.g., Nevada that includes Las Vegas) may have different customer bases from other states whose major customers are local residents. For restaurant firms, the negotiation with regional suppliers to ensure quality, freshness, and competitive prices is a critical factor for businesses (Basham, 2008). These characteristics of may vary across states, depending on availability of raw materials and the firm's bargaining power with suppliers. In addition, state fees and taxes on gaming revenue vary from less than 10% to more than 20%, and each state may apply different rates of special taxes, such as room taxes for lodging customers (Basham and Kwon, 2009). Similarly, according to the 10-Ks of US restaurant firms (e.g., The Cheese Cake Factory Incorporated and Darden Restaurants INC), US restaurants are subject to state regulations regarding alcoholic beverage control, health, sanitation, and environments. Last, different natural environments among states may significantly affect projects of US hospitality firms. For example, substantial building foundations are a requirement in Mississippi after Hurricane Katrina, and local zoning affects the location and size of properties, which is a key to success for hospitality firms (Bashan and Kwon, 2009).

The zip code level of geographic diversification measure for casino firms allows inclusion of geographic markets that may vary even within a particular state. For example, business environments for casino firms in Lake Tahoe or Reno (local market) should be different from those on the Las Vegas strip (tourist market), although they are

in the same state, Nevada. Zip codes may represent relevant micro-level geographic markets because they have been used not only for tracking mails but also for gathering geographical statistics by, for example, the US Census Bureau and diverse marketing purposes (Blattberg, 1987; Goss, 1995). For example, according to Hillberry and Hummels (2008), unlike state or other political borders (e.g., county), allocation of zip codes is according to proportional population density, thus associate with predictable industrial demands. Kaufman (1999), when analyzing net accessibility (i.e., a ratio of ava ilable store sales to potential food spending by households) of grocery stores in rural areas, used the zip code as a criterion of geographic markets. Similarly, studies using samples of casino firms employed the zip code to distinguish geographic markets. For example, Przybylski and Littlepage (1997) conducted a zip code level analysis to address the economic impact of casinos (e.g., demand creation) on local communities in the US.

More specifically, this study employs the 3-digit zip code as a unit of geographic markets for the zip code level measurement, because less than 3-digit zip codes are not substantially different from states, and 5-digit zips are too disaggregated to be differentiated from the number of properties of each sampled firm (i.e., almost no firm in this study's sample has multiple properties in any 5-digit zip). Currently, the US has approximately 900 3-digit zip codes, and according to the Waldfogel's (2008) study, the mean radius of 3-digit zip areas is 15.1 miles. For this zip code level measurement, when calculating the Berry-Herfindhal index ($1-\sum S_i^2$), S_i represents the proportion of aggregated casino square footage of properties in each 3-digit zip code area.

For the state level measurement incorporating zip code level measurement, because both the state and zip code level measurement of geographic diversification have

a particular implication (e.g., the zip code level measurement alone cannot reflect a specific effect of state regulation, a critical factor for business operations according to 10-Ks of the sampled casino firms and industry reports), this study creates a measurement that incorporates both the state and zip code level geographic diversification by modifying the Berry-Herfindahl index.

Essentially, this state-zip level measurement is calculated based on the weighted average of the 3-digit zip code level Herfindahl index (the degree of concentration) within each state in which a firm operates. The specific calculation process is:

Step1: calculating the Herfindahl index (the degree of concentration) for each state in which a firm operates ($SC_i = \sum Z_t^2$, Z_t represents the proportion of the aggregated number of properties or square footage of properties in a 3-digit zip code area t within state i).

Step 2: creating the adjustment factor using the weighted average based on the share of each state ($Adj = \sum (SC_i \times W_i)$, where SC_i represents the Herfindahl index in state i and W_i represents the share of state i based on the aggregated number of properties or square footage of properties in each state. The Adj represents the difference between the original Herfindahl index ($\sum S_i^2$, S_i represents the proportion of aggregated sales or square footage of properties in each state), the degree of concentration of a firm according to the state level measurement, and the modified Herfindahl index, the degree of concentration of a firm according to the state-zip level measurement.

Step 3: calculating the modified Herfindahl index for a firm by multiplying the original state level Herfindahl index ($\sum S_i^2$, S_i represents the proportion of aggregated sales or square footage of properties in each state) by Adj.

Step 4: subtracting the value in Step 3 (the modified Herfindahl index for a firm) from 1

to calculate the modified Berry-Herfindahl index, the state level measurement of geographic diversification for a firm incorporating the 3-digit zip code level measurement.

While the original Berry-Herfindahl index considers only diversification across state-level geographic markets, the modified Berry-Herfindhal index, as a measure of a firm's degree of geographic diversification, appropriately represents diversification across both state-level and disaggregated zip code-level geographic markets. In addition, the modified Berry-Herfindahl index reflects the relative importance of each state in which a firm operates its businesses.

3.6. Measure of Product Diversification

The definition of product in this study considers both demand and supply sides for product classification. Product categorization of this study is based on the North American Product Classification System (NAPCS) of the US Census Bureau. The NAPCS is a comprehensive demand-oriented product classification system, developed through expansive collaboration with researchers and industry experts from US, Canada, and Mexico. NAPCS provides the distinctive 71 product lists, in which gambling services, accommodation, food services and drinking places, and amusement are considered distinctive products.

Although NAPCS, a product classification system, associates with NAICS, an industry classification system, they do not have exact correspondence. The products in NAPCS may range from 2-digit (e.g., NAICS code 52 for Finance and Insurance in NAPCS) to 5-digit NAICS code (e.g., NAICS code 51113 for Book Publishers in NAPCS). In addition, for some products, NAPCS covers several different digits of

NAICS codes. For example, Transportation Goods in NAPCS includes eight different digits of NAICS codes (i.e., 48112, 481212, 482, 483, 484, 486, 491, and 492).

Those product categories in NAPCS correspond to distinctive revenue sources (gaming, hotel room, F&B, and entertainment) provided as detailed items of revenue accounts in the 10-Ks of US casino firms' income statements. That is, products from a logical grouping considering demand side (NAPCS) are also recognized as differentiated products by suppliers, casino firms. Practically, products used for the entity in the measure of product diversification, the Berry-Herfindahl index (S_i in $1-\sum S_i^2$), correspond to item lists in income statements' revenue account.

Following this definition, diversified restaurant services (e.g., full-service, limited service, or fast food restaurants) may represent types, not products. All those variations belong to food services and drinking places in NAPCS and performances of them are recorded as one item, restaurant sales, under revenue account in income statement provided in each restaurant firm's 10-K. And, although some lodging firms report different revenue sources in 10-Ks, those items are limited only to hotel room and F&B revenues, thus product diversification, is, apparently, a non-major strategy for lodging firms.

3.7. Measure of Brand Diversification

In this study, brands are operationalized as the trademarks explicitly identified in 10-Ks of each firm. According to the American Marketing Association (AMA), a brand can be defined as a name, term, design, symbol, or any other feature that identifies one seller's goods or services as distinct from those of other sellers. Similarly, Farquhar

defined a brand as a name, symbol, logo, or mark that enhances a product's value beyond its functional value.

A trademark is a legal concept of a brand, and the terms trademark and brand are often used interchangeably (Florek and Insch, 2008; Kotler et al., 2005; Sargent et al., 2001). According to intellectual property law, a trademark can is a word, letter, symbol, number, or shape (Florek and Insch, 2008). A brand gains legal protection under the trademark law, once registered.

Likewise, in 10-Ks of firms belonging to a sample of this study, brands are mostly synchronized with trademarks. Those two terms are used interchangeably, and brands reported in segment reporting section are mostly identical to trademarks in 10-Ks. Following this definition, although some casino firms operate diverse brands or trademarks (e.g., MGM), only 37.5% of 40 casino firms in a sample operate more than two brands. Thus, brand diversification is not an apparently prevalent strategy among US casino firms.

3.8. Firm Performance Measure

This study employs Tobin's q, a financial market-based measure of firm performance or firm value, and ROA, an accounting-based measure of firm performance or profitability, in turn, as measures of firm performance to enhance construct validity by mitigating mono-operation bias.

A group of scholars (Jose et al., 1986; Lang and Stulz, 1994; Wernerfelt and Montgomery, 1988) asserted that Tobin's q, a firm performance measure at a point in time, is an unbiased estimate of the present value of the firm's cash flow divided by the

replacement cost of its assets (Lang and Stulz, 1994). That is, Tobin's q remains unaffected by the possible influence of risk on return and not disturbed by the influence of unexpected changes during the sample period. These two circumstances are problematic when using accounting performance that measures firm performance over a certain historical period.

On the other hand, Bettis and Mahajan (1985) argued that an accounting-based measure can compensate for a financial market-based measure of firm performance. That is, while investors' forecasts of future cash flow and macro economic factors may influence a stock market-based measure, an accounting-based measure more directly reflects a firm's return (Bettis, 1983; Bettis and Mahajan, 1985).

To facilitate data collection and computational simplicity, this study employs the approximate Tobin's q proposed by Chung and Pruitt (1994). The calculation is:

Approximate Tobin's q = (MVE + PS + DEBT) / TA,

where MVE is a firm's fiscal year-end stock price multiplied by the number of common shares outstanding; PS represents the liquidating value of outstanding preferred stock; DEBT is the value of short-term liabilities net of short-term assets plus the book value of long-term debt, and TA represents the book value of total assets.

For a firm's return, a component of ROA, this study adopts operational earnings before depreciation and amortization (OIBDA) to appropriately reflect the fundamental power of a firm's operations instead of net income, which can be distorted by non-operating factors (Kang et al., 2010).

3.9. Control Variables

Firm size (SIZE), measured by the natural logarithm of total assets, controls for effects of scale economies and market power associated with a firm's size (Hitt et al., 1997; Lang and Stulz, 1994; Nachum, 2004; Tallman and Li, 1996).

A firm's leverage (LEV) controls for benefits, such as the tax-shield effect (McConnell and Servaes, 1990), and costs, such as a negative market perception of a firm's financial viability (Brealey and Myer, 2003) from a firm's capital structure. Dividend payout (DIV) is another factor that should be controlled for in the diversification study context (Lang and Stulz, 1994). According to the dividend signaling model and the over-investment hypothesis, dividend payout conveys favorable information about the future cash flow of a firm, which, in turn, affects firm performance (Black, 1976; Denis et al., 1994).

The degree of internationalization (DOI), a proportion of international operations of each firm, controls for possible advantages or disadvantages from international markets (Doukas and Lang, 2003), because some large firms in the sample actively operate their businesses in international markets.

The degree of competition (DOC) controls for the effect of competition on firm performance. To create DOC, first, intrastate competition for each year is measured with the formula, [the number of properties ÷ (population ÷ square miles) × per capita income index)], which reflects the level of rivalry adjusted by area, population, and purchasing power of each location. The second step is allocating the degree of competition for each observation (i.e., each firm in each year) by using the weighted average of the intrastate competition across states in which each firm operates. The measurement of the share of each state for a firm is the sum of square footage (or the number of properties) of a firm

in each state divided by total square footage (or the number of properties) of a firm in the US. For construct validity, in the hospital industry context, Wilson and Jadlow (1982) measured the degree of competition by including hospital density (i.e., the number of hospitals per square mile), and Propper et al. (2004) measured the degree of competition by normalizing the number of players by population of the area.

The degree of franchising (DOF), measured by franchise sales divided by total sales, controls for the effects from a hospitality firm specific expansion strategy (especially for large restaurants and hotels). For example, Srinivasan (2006) found the degree of franchising increases Tobin's q for some firms, but decreases Tobin's q for others, when combined with other characteristics of firms. And, Koh et al. (2009) found an inverse U-shaped relationship between the degree of franchising and Tobin's q in the restaurant industry.

Brand strategy (BS) controls for the effects of different branding strategy of each restaurant and lodging firm. For example, while some firms employ a corporate brand strategy that uses a brand related to the name of a corporation (e.g., McDonalds), others conduct a house-of-brands strategy with which they use different names for each brand (e.g., Darden Restaurants). Further, some firms use a mixed branding strategy, which is a combination of a house-of-brands strategy and a corporate branding strategy (e.g., Marriott). According to Rao et al. (2004), these strategies differ in terms of costs and benefits that affect firm value. For example, while the house-of-brands strategy earns advantages of distinctive customization and lower cannibalization, it is inferior to the mixed branding strategy in economies of scale in marketing.

Growth opportunity (GO) controls for any confounding effect that may influence

diversification strategy and firm performance. According to the resource-based view (Barney, 1991), a firm diversifies, pursuing new markets, to exploit excess resources and growth opportunities within the organization. That is, growth opportunities within a firm may motivate diversification and influence firm performance at the same time. On the other hand, a firm may diversify because existing operations provide fewer growth opportunities, and diversification may further shrink growth by exercising growth options within a firm (Deng et al., 2007, Stowe and Xing, 2006). In this case, growth opportunities may negatively relate to the degree of diversification and firm performance simultaneously. Operationalization of growth opportunity, in this study, is the ratio of capital expenditure to sales, which reflects a firm's own investments in future growth opportunities (Tang and Jang, 2010).

CHAPTER 4

ANALYSES AND RESULTS

This study establishes six hypotheses to examine the unidimensional effect of geographic diversification on firm performance in the US casino, restaurant, and lodging industries, product diversification on firm performance in the US casino industry, and brand diversification on firm performance in the US restaurant and lodging industries. Testing of the last three hypotheses investigate the moderating effect of product diversification on the geographic diversification-firm performance relationship in the US casino industry, and the moderating effect of brand diversification on the geographic diversification-firm performance in the US restaurant and lodging industries. This chapter, following descriptive statistics that summarize the distribution of data and the relationship across variables, provides the results of main and additional analyses.

4.1. Descriptive Statistics

4.1.1. Descriptive Statistics for Casino Firms

Table 2 summarizes descriptive statistics of variables included in main analyses for casino firms. Tobin's q, a financial market-based measure of firm performance, ranges from 0.121 to 4.981 with a mean of 1,174 and a standard deviation of 0.649. ROA, an accounting-based measure of firm performance, varies from -0.723 to 0.362 with a mean of 0.117 and a standard deviation of 0.081. The degree of geographic diversification at the state level (DOGDS), 3-digit zip level (DOGDZ), and the state level that incorporates within-state diversification across 3-digit zip (DOGDSZ) all have

substantial variations in the sample. Minimum values of 0 in the degree of geographic diversification variables imply that a firm (in a particular year) concentrates its operations on a specific geographic markets (i.e., state or 3-digit zip). All control variables seem to have the substantial amount of variations enough to account for respective factors when examining the relationship of interest.

Table 2. Summary of Descriptive Statistics for Casino Firms[†]

Variable	N	Mean	Std. Dev.	Min	Max
Tobin's q	336	1.174	0.649	0.121	4.981
ROA	336	0.117	0.081	-0.723	0.362
DOGDS	336	0.291	0.299	0.000	0.815
DOGDZ	336	0.383	0.336	0.000	0.908
DOGDSZ	336	0.429	0.369	0.000	0.950
DOPD	336	0.432	0.191	0.000	0.773
SIZE	336	6.215	1.927	1.439	10.059
LEV	336	0.557	0.241	0.000	1.895
DIV	336	11.211	63.684	0.000	686.149
DOI	336	0.056	0.157	0.000	0.867
DOC	336	1155.873	1024.183	0.443	3666.517
GO	336	0.185	0.250	0.003	2.065

[†] Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOGDZ represents 3-digit zip code level degree of geographic diversification; DOGDSZ represents state-zip level degree of geographic diversification; DOPD represents the degree of product diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

Table 3 presents Pearson's correlations for the sampled casino firms. Table 3 excludes zip code level and state-zip code level measures of geographic diversification. Correlations among three different measure of geographic diversification appear separately in Table 4. Tobin's q and ROA do not seem to correlate with each other, implying that a market-based measure of firm value correlates with accounting-based profitability for publicly traded US casino firms.

Table 3. Summary of Pearson's Correlation for Casino Firms[†]

	Tobin's q	ROA	DOGDS	DOPD	SIZE	LEV	DIV	DOI	DOC	GO
Tobin's q	1									
ROA	0.012	1								
DOGDS	-0.117**	0.175***	1							
DOPD	0.116**	0.011	-0.287***	1						
SIZE	0.121**	0.0696	0.479***	0.270***	1					
LEV	0.0491	-0.143***	0.223***	-0.0835	0.132**	1				
DIV	0.180***	-0.0459	-0.0232	0.0838	0.241***	-0.0054	1			
DOI	0.218***	-0.110**	-0.179***	-0.0869	0.0911	-0.140**	0.331***	1		
DOC	0.119**	0.0515	-0.317***	0.77***	0.138**	-0.117**	0.0757	-0.0825	1	
GO	0.299***	-0.220***	-0.117**	0.151***	0.192***	0.0974	0.0859	0.203***	0.138**	1

[†] ** and *** denote the 5% and 1% significance level, respectively. Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOPD represents the degree of product diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity

State level geographic diversification seems to negatively and significantly correlate with Tobin's q, but positively and significantly correlate with ROA. That implies the possibility that while an increase in the degree of geographic diversification may positively affect profitability, it may negatively influence a firm's market value to book value ratio. The degree of product diversification appears to correlate positively with Tobin's q, but not to correlate significantly with ROA.

A firm's size (SIZE), dividend payments (DIV), degree of internationalization (DOI), degree of competition (DOC), and growth opportunity (GO) seem to associate positively and significantly with Tobin's q. On the other hand, a firm's leverage (LEV), degree of internationalization (DOI), and growth opportunity (GO) negatively and significantly correlate with ROA.

Table 4 summarizes correlations among the state level, zip code level, and state-zip code level measures of geographic diversification for the sampled casino firms. All three different measures highly and positively correlate with each other.

Table 4. Correlations among Different Measures of Geographic Diversification[†]

	DOGDS	DOGDZ	DOGDSZ
DOGDS	1		
DOGDZ	0.913***	1	
DOGDSZ	0.834***	0.985***	1

[†] ** and *** denote the 5% and 1% significance level, respectively.
DOGDS represents the state level degree of geographic diversification;
DOGDZ represents the 3-digit zip level degree of geographic diversification;
DOGDSZ represents the state-zip level degree of geographic diversification.

Those correlations imply that firms that expand across diverse states, on average, do not severely diversify across different 3-digit zip code areas within each state.

Apparently, although disaggregation of casino markets in some major states (e.g., Nevada) makes some differences between the state level measure and the other measures, most of business operations still concentrate in a particular casino market within each state (e.g., Las Vegas).

4.1.2. Descriptive Statistics for Restaurant Firms

For the sampled restaurant firms, Tobin's q spans 0.08 to 11.006 with a mean of 1.365 and a standard deviation of 0.983. ROA varies from -0.96 to 0.336 with a mean of 0.129 and a standard deviation of 0.135. Compared to the sampled casino firms, while restaurant firms' average values of Tobin's q and ROA are similar (1.365 vs. 1.174 for Tobin's q and 0.129 vs. 0.117 for ROA), variations are substantially greater (i.e., standard deviations are 0.983 vs. 0.649 for Tobin's q and 0.135 vs. 0.081 for ROA).

The degree of geographic diversification (DOGD) ranges from 0 to 0.957 with sufficient variation (0.293) for analyses. The mean value of the degree of geographic diversification of the sampled restaurant firms (0.638) is a significantly higher than that of the sampled casino firms (0.291), which implies that within-US geographic expansion of restaurant firms is substantially greater than that of casino firms. The degree of brand diversification varies from 0 to 0.955 with a mean of 0.192 and a standard deviation of 0.248.

All control variables seem to have sufficient variation to allow analyses. The sampled restaurant firms' average size (SIZE), measured by the log of total assets (2.007), is smaller than that of casino firms (6.215). The average values of leverage (LEV), dividend payments (DIV), and internationalization (DOI) are also lower than those of the

sampled casino firms (0.313 vs. 0.557, 2.734 vs. 11.211, and 0.027 vs. 0.056, respectively). Directly comparing the degree of competition (DOC) of restaurant firms with that of casino firms may not be appropriate because measurement of restaurants' DOC is according to the number of properties, while the basis for casino firms' DOC is square footage. The degree of franchising (DOF) has a mean of 0.210 with a standard deviation of 0.289. A mean for a brand strategy dummy, 0.706, implies that the sampled restaurant firms tend to employ a corporate brand strategy more than a house-of-brands strategy or a mixed brand strategy.

Table 5. Summary of Descriptive Statistics for Restaurant Firms[†]

Variable	N	Mean	Std. Dev.	Min	Max
Tobin's q	953	1.365	0.983	0.080	11.006
ROA	953	0.129	0.135	-0.960	0.336
DOGD	953	0.683	0.293	0.000	0.957
DOBD	953	0.192	0.248	0.000	0.955
SIZE	953	2.007	0.747	-0.421	3.720
LEV	953	0.313	0.461	0.000	9.628
DIV	953	2.734	10.122	0.000	140.000
DOI	953	0.027	0.075	0.000	0.565
DOC	953	4.543	3.036	0.098	21.741
GO	953	0.134	0.093	0.000	0.560
DOF	953	0.210	0.289	0.000	0.995
BS	953	0.706	0.829	0.000	2.000

[†] Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGD represents the degree of geographic diversification; DOBD represents the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a business strategy dummy variable.

Table 6 presents bivariate correlations among continuous variables included in regression analyses for the sampled restaurant firms. Tobin's q and ROA appear to correlate positively and significantly with each other.

Table 6. Summary of Pearson's Correlation for Restaurant Firms[†]

	Tobin's q	ROA	DOGD	DOBD	SIZE	LEV	DIV	DOI	DOC	GO	DOF
Tobin's q	1										
ROA	0.147***	1									
DOGD	0.108***	0.305***	1								
DOBD	-0.130***	0.011	0.030	1							
SIZE	0.0848***	0.434***	0.707***	0.018	1						
LEV	0.268***	-0.083**	-0.091***	-0.002	-0.155***	1					
DIV	0.054	0.093***	0.197***	0.104***	0.418***	-0.016	1				
DOI	0.061	0.060	0.043	-0.033	0.247***	0.029	0.246***	1			
DOC	-0.025	0.063	-0.201***	-0.015	-0.074**	-0.107***	-0.078**	-0.069**	1		
GO	0.218***	0.063	0.103***	-0.038	0.010	-0.206***	-0.091***	-0.108***	0.026	1	
DOF	0.100***	0.193***	0.041	-0.283***	0.217***	-0.018	0.128***	0.362***	-0.012	-0.149***	1

[†] ** and *** denote the 5% and 1% significance level, respectively. Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOBD represents the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising

While DOGD positively associates with both Tobin's q and ROA at the 1% significance level, DOBD negatively and significantly correlate with Tobin's q. The correlation between DOGD and DOBD is insignificant, implying that the implementation of geographic diversification does not associate with the implementation of brand diversification for the sampled restaurant firms.

Firm size (SIZE) positively and significantly correlates both with Tobin's q and ROA. On the other hand, while leverage (LEV) positively and significantly associates with Tobin's q, it negatively and significantly correlates with ROA. Growth opportunity (GO) appears to correlate positively and significantly with Tobin's q, and the degree of franchising (DOF) shows positive and significant relationships with both Tobin's q and ROA.

4.1.3. Descriptive Statistics for Lodging Firms

Table 7 provides overview of variables included for the analyses of the sampled lodging firms. Compared to the sampled casino and restaurant firms, the sampled lodging firms' average values (0.935 for Tobin's q and 0.089 for ROA, respectively) and standard deviations (0.359 for Tobin's q and 0.047 for ROA, respectively) are substantially smaller.

The average degree of geographic diversification (DOGD) of lodging firms (0.690) is considerably greater than that of casino firms (0.291) and similar to that of restaurant firms (0.683). And, lodging firms' average level of brand diversification is approximately two times greater than restaurant firms' average degree of brand diversification.

The mean (5.682) and standard deviation (1.913) of lodging firms' size (SIZE) are much greater than those for restaurant firms (mean of 2.007 and standard deviation of 0.747), but a slightly smaller than those for casino firms (mean of 6.215 and standard deviation of 1.927). Similarly, the mean (0.515) for lodging firms' leverage (LEV) is substantially greater than that for restaurant firms (0.313), but comparable with that of casino firms (0.557). The mean of dividend payments (11.603), which is similar to average dividends payments of casino firms (11.211), is much higher than that of restaurant firms (2.734). The degree of internationalization (DOI) shows the smallest mean value (0.019) among the three industries. The sampled lodging firms' average degree of competition (0.418) is ten times less severe than restaurant firms' mean degree of competition (4.543).

Table 7. Summary of Descriptive Statistics for Lodging Firms[†]

Variable	N	Mean	Std. Dev.	Min	Max
Tobin's q	176	0.935	0.359	0.010	2.492
ROA	176	0.089	0.047	-0.108	0.223
DOGD	176	0.690	0.320	0.000	0.959
DOBD	176	0.366	0.309	0.000	0.857
SIZE	176	5.682	1.913	1.451	9.180
LEV	176	0.515	0.254	0.000	1.229
DIV	176	11.603	39.043	0.000	204.403
DOI	176	0.019	0.076	0.000	0.498
DOC	176	0.418	0.309	0.017	1.841
GO	176	5.763	70.982	0.000	941.972
DOF	176	0.113	0.205	0.000	0.914
BS	176	0.943	0.812	0.000	2.000

[†] Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGD represents the degree of geographic diversification; DOBD represents the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a business strategy dummy variable.

Table 8 presents bivariate correlations among continuous variables included in the regression analyses of the sampled lodging firms. Tobin's q and ROA appear to correlate positively but insignificantly with each other. That means, the sampled lodging firms' market value to book value ratio, based on the evaluation of financial market, does not seem to be significantly related with profitability.

The correlation between the degree of geographic diversification (DOGD) and firm performance is not significant at the 5% significance level. On the other hand, the degree of brand diversification (DOBD) negatively and significantly correlates with Tobin's q, as it does for restaurant firms. The correlation between DOGD and DOBD is positive and significant, implying that the sampled lodging firms that increase the degree of geographic diversification tend to increase the degree of brand diversification simultaneously.

A firm's size (SIZE) negatively and significantly correlates with ROA, which is opposite to restaurant firms. However, similar to restaurant firms, a firm's leverage (LEV) positively and significantly associates with Tobin's q. In contrast to the positive correlation between dividend payments (DIV) and firm performance among casino and restaurant firms, DIV of lodging firms does not associate with firm performance at the 5% or lower significance level. While the correlations between a firm's size and performance, and between leverage and performance in the lodging sample are dissimilar to that of the casino sample, the degree of internationalization (DOI) positively and significantly associates with Tobin's q, as it does for the casino sample. The degree of competition, growth rate, and the degree of franchising do not show significant correlations with firm performance.

Table 8. Summary of Pearson's Correlation for Lodging Firms[†]

	Tobin's q	ROA	DOGD	DOBD	SIZE	LEV	DIV	DOI	DOC	GO	DOF
Tobin's q	1										
ROA	0.106	1									
DOGD	0.112	0.057	1								
DOBD	-0.157**	-0.089	0.524***	1							
SIZE	0.136	-0.170**	0.639***	0.486***	1						
LEV	0.239***	0.082	0.121	0.128	-0.105	1					
DIV	0.112	0.019	0.157**	0.227***	0.416***	-0.009	1				
DOI	0.176**	0.021	0.132	0.202***	0.299***	-0.093	0.533***	1			
DOC	-0.065	-0.030	-0.067	-0.089	-0.108	-0.107	-0.094	-0.207***	1		
GO	0.002	-0.068	0.016	-0.023	-0.007	-0.032	-0.023	0.165**	0.010	1	
DOF	-0.005	-0.066	0.248***	-0.038	0.225***	-0.153**	0.301***	0.246***	0.038	-0.042	1

[†] ** and *** denote the 5% and 1% significance level, respectively. Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGD represents the state level degree of geographic diversification; DOBD represents the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising.

4.2. Results of Main Analyses

To test nine hypotheses, this study employs regression analyses, in which for each model, ordinary least squares (OLS) estimations and fixed effects (FE) estimations are compared. In addition, instrumental variable (IV) estimation and fixed effects instrumental variable (FE-IV) estimation are conducted, if relevant (i.e., in case of detecting significant endogeneity from the Hausman test). Appendix A summarizes the results of the Hausman test of main variables among all three industries. According to results, instrumental variables are used in ROA models for geographic diversification and product diversification in the casino industry, all Tobin's q models in the restaurant industry, and both Tobin's q model and ROA model for geographic diversification in the lodging industry.

When using instrumental variables (i.e., IV and FE-IV estimation), this study checks validity of instrumental variables through both underidentification and overidentification tests. By conducting the Anderson canonical correlations test for checking underidentification and the Sargan-Hansen test with Hansen's J statistic for testing overidentification, this study found no significant underidentification or overidentification (at the 5% significance level) of instrumental variables used for IV and FE-IV estimations among all models. Appendix B provides the results of the Anderson underidentification test and the Sargan-Hansen overidentification test for the casino, restaurant, and lodging industries. For the estimations of standard errors for each model, this study uses the Newey-West standard error, which is robust to heteroskedasticity and autocorrelation.

F-statistics for checking goodness of fit among models in this study are significant at the 1% significance level, implying that all models fit the data well. Tobin's q, a financial market-based measure, and ROA, an accounting-based measure, in turn, measure firm performance. The Berry-Herfindahl index and the entropy measure determine the degree of diversifications (i.e., geographic, product, and brand diversifications). However, the entropy measure in the study's samples highly correlates with the Berry-Herfindahl index (correlations are above 93% among all models) and the results using two indices are very similar, which supports the Amit and Livnat's (1988) finding. Thus, this study reports only results using the Berry-Herfindahl index as a measure of diversification.

4.2.1. Results of Main Analyses for the Casino Industry

This study establishes three hypotheses (H1a, H2a, and H3a) regarding the effects of diversification strategies on performance of the sampled casino firms. Accordingly, H1a hypothesizes that the degree of geographic diversification has a negative impact on firm performance. H2a suggests an inverse U-shaped relationship between product diversification and firm performance. For the moderating effect of product diversification H3a hypothesizes the positive moderating effect of product diversification on the relationship between geographic diversification and firm performance. To check functional form (linear vs. curvilinear) for H1a, this study tested the significance of incremental F-statistic of the squared term of geographic diversification measures after including the squared term in each model (i.e., OLS, FE, IV, and FE-IV model). None of the incremental F-values were significant, which means that contribution of the squared

term is not significant, and a curvilinear form does not fit the data well for each model.

4.2.1.1. Effect of Geographic Diversification for Casino Firms

Table 9 presents the results of analyses for the effect of geographic diversification on performance of the sampled casino firms with OLS estimations.

Table 9. OLS: Effect of Geographic Diversification for Casino Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS Tobin's q	OLS Tobin's q	OLS ROA	OLS ROA	OLS ROA
DOGDS	-0.209			0.0572***		
	(0.141)			(0.0204)		
DOGDZ		-0.149			0.0515***	
		(0.150)			(0.0174)	
DOGDSZ			-0.128			0.0406***
			(0.144)			(0.0153)
SIZE	0.0247	0.0233	0.0224	0.000830	-3.88e-05	0.000729
	(0.0251)	(0.0280)	(0.0287)	(0.00344)	(0.00350)	(0.00356)
LEV	0.174	0.160	0.157	-0.0556	-0.0522	-0.0509
	(0.212)	(0.212)	(0.212)	(0.0306)	(0.0302)	(0.0303)
DIV	0.000951	0.000918	0.000911	-3.37e-05	-1.86e-05	-1.88e-05
	(0.000602)	(0.000618)	(0.000626)	(4.38e-05)	(4.34e-05)	(4.35e-05)
DOI	0.547	0.566	0.573	-0.0203	-0.0211	-0.0252
	(0.560)	(0.539)	(0.534)	(0.0282)	(0.0297)	(0.0299)
DOC	3.74e-05	4.66e-05	5.01e-05	9.59e-06	8.08e-06	6.57e-06
	(4.88e-05)	(4.29e-05)	(4.20e-05)	(5.51e-06)	(5.12e-06)	(5.01e-06)
GO	0.584***	0.594***	0.597***	-0.0614***	-0.0624***	-0.0639***
	(0.169)	(0.168)	(0.168)	(0.0164)	(0.0166)	(0.0167)
Constant	0.792***	0.792***	0.792***	0.128***	0.130***	0.129***
	(0.219)	(0.223)	(0.224)	(0.0314)	(0.0315)	(0.0316)
Observations	336	336	336	336	336	336
F-value	7.84***	7.72***	7.71***	6.13***	6.09***	5.80***
Adj. R-square	0.1251	0.1232	0.1230	0.0968	0.0962	0.0912

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least squares estimation. Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOGDZ represents 3-digit zip code level degree of geographic diversification; DOGDSZ represents state-zip level degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

The degree of geographic diversification is, in turn, measured by the measurement of geographic diversification with state as a unit (DOGDS), 3-digit zip as a unit (DOGDZ), and state as a unit incorporating within-state diversification (DOGDSZ).

According to OLS estimations, the effect of geographic diversification on Tobin's q appears to have no significant effect among all three different measures of geographic diversification. On the other hand, the effect of geographic diversification seems to have a positive and significant impact on ROA at the 1% significance level among all three different measures of geographic diversification. Among control variables, only growth opportunity (GO) shows a positive (at the 1% significance level) effect on Tobin's q and a negative (at the 1% significance level) on ROA.

Since OLS estimation does not account for the unobservable firm specific and time specific heterogeneities, which may lead to the omitted variable bias, this study conducts the fixed effects regressions for each model. The results of which appear in Table 10. Firm dummies and time dummies are excluded due to the limited space. Fixed effects estimations show no significant effect of geographic diversification both on Tobin's q and ROA of the sampled casino firms among the three different measurements for geographic diversification. These results may be more reliable than OLS estimation, because unobservable time (firm)-invariant firm (time) specific effects are controlled for through the fixed effects methods.

Firm size (SIZE) seems to relate negatively with Tobin's q at the 1% significance level among all three different measures for geographic diversification. Leverage (LEV) appears to positively relate with Tobin's q at the 5% significance level for the state-level measure of geographic diversification (DOGDS) and negatively relate with ROA at the

5% significance level among all three measures for geographic diversification. The degree of internationalization (DOI) shows a positive and significant effect on Tobin's q, but no significant effect on ROA. While growth opportunity (GO) positively and significantly affects Tobin's q in the model with state-level geographic diversification, it negatively affects ROA at the 1% significance level among all three measures of geographic diversification.

Table 10. FE: Effect of Geographic Diversification for Casino Firms[†]

ESTIMATION VARIABLES	FE Tobin's q	FE Tobin's q	FE Tobin's q	FE ROA	FE ROA	FE ROA
DOGDS	0.0851			-0.00416		
	(0.253)			(0.0326)		
DOGDZ		0.260			0.0159	
		(0.217)			(0.0363)	
DOGDSZ			0.255			0.0184
			(0.170)			(0.0329)
SIZE	-0.488***	-0.512***	-0.521***	-0.00588	-0.00777	-0.00870
	(0.0880)	(0.0923)	(0.0928)	(0.0201)	(0.0219)	(0.0225)
LEV	0.442**	0.407	0.397	-0.0652**	-0.0684**	-0.0696**
	(0.219)	(0.226)	(0.227)	(0.0297)	(0.0290)	(0.0288)
DIV	-2.83e-05	6.72e-05	8.86e-05	-7.80e-05	-7.09e-05	-6.82e-05
	(0.000604)	(0.000580)	(0.000578)	(6.25e-05)	(6.60e-05)	(6.70e-05)
DOI	0.717***	0.716***	0.712***	-0.0505	-0.0500	-0.0503
	(0.249)	(0.253)	(0.256)	(0.0461)	(0.0460)	(0.0458)
DOC	-4.91e-05	-4.16e-05	-5.28e-05	-5.38e-06	-3.69e-06	-4.29e-06
	(8.14e-05)	(7.41e-05)	(7.28e-05)	(1.25e-05)	(1.20e-05)	(1.21e-05)
GO	0.207	0.227	0.234**	-0.0784***	-0.0767***	-0.0760***
	(0.117)	(0.118)	(0.116)	(0.0208)	(0.0220)	(0.0224)
Constant	3.449***	4.204***	4.618***	0.201**	0.185	0.268
	(0.499)	(0.664)	(0.582)	(0.101)	(0.166)	(0.143)
Observations	336	336	336	336	336	336
F-value	9.06***	9.13***	9.16***	6.12***	6.13***	6.14***
Adj. R-square	0.6100	0.6120	0.6130	0.4981	0.4986	0.4992

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. Firm dummies and time dummies are excluded. FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOGDZ represents 3-digit zip code level degree of geographic diversification; DOGDSZ represents state-zip level degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

To decide whether or not to use instrumental variable (IV) estimation, this study conducted the Hausman test that compare OLS estimation with 2SLS estimation. While F-values for the Tobin's q models were not significant, all F-values for the ROA models were significant at the 5% significance level. Thus, this study uses IV and FE-IV estimations only for models with ROA as a firm performance measure.

Table 11 presents results of IV and FE-IV estimations regarding the effect of geographic diversification on ROA for the sampled casino firms.

Table 11. IV and FE-IV for ROA: Geographic Diversification for Casino Firms[†]

ESTIMATION VARIABLES	IV ROA	IV ROA	IV ROA	FE-IV ROA	FE-IV ROA	FE-IV ROA
DOGDS	0.150**			0.531**		
	(0.0627)			(0.214)		
DOGDZ		0.121**			0.233**	
		(0.0490)			(0.106)	
DOGDSZ			0.110**			0.167**
			(0.0453)			(0.0850)
SIZE	-0.00752	-0.00816	-0.00820	-0.00725	-0.0234	-0.0213
	(0.00825)	(0.00846)	(0.00862)	(0.0197)	(0.0246)	(0.0215)
LEV	-0.0654**	-0.0557**	-0.0532	-0.125***	-0.119***	-0.121***
	(0.0286)	(0.0281)	(0.0285)	(0.0323)	(0.0340)	(0.0366)
DIV	-1.02e-05	2.15e-05	3.13e-05	3.27e-05	0.000138	0.000123
	(5.57e-05)	(6.31e-05)	(6.70e-05)	(5.92e-05)	(0.000124)	(0.000127)
DOI	0.0161	0.00819	0.00454	0.0120	-0.0166	-0.0232
	(0.0338)	(0.0350)	(0.0363)	(0.0573)	(0.0521)	(0.0493)
DOC	2.00e-05***	1.47e-05***	1.23e-05**	8.19e-05***	2.92e-05**	1.94e-05
	(6.80e-06)	(5.36e-06)	(5.09e-06)	(2.11e-05)	(1.48e-05)	(1.34e-05)
GO	-0.0461**	-0.0510**	-0.0521**	-0.0455	-0.0437	-0.0442
	(0.0227)	(0.0212)	(0.0213)	(0.0250)	(0.0275)	(0.0269)
Constant	0.141***	0.144***	0.145***	0.0375	0.231	0.225
	(0.0371)	(0.0383)	(0.0391)	(0.120)	(0.129)	(0.121)
Observations	336	336	336	336	336	336

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. Firm dummies and time dummies are excluded. IV represents instrumental variable estimation; FE-IV represents fixed effects instrumental variable estimation; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOGDZ represents 3-digit zip code level degree of geographic diversification; DOGDSZ represents state-zip level degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

Firm and time dummies for the FE-IV models are excluded from the table. F-values and adjusted R-squares are not reported because the model's residuals are computed, affected by additional instrumental variables, not just by the actual repressors. Among all models with IV and FE-IV estimation, the effect of geographic diversification on ROA is positive and significant at the 1% significance level. This result seems to be reliable because FE-IV estimation addresses omitted variable bias and endogeneity issues including causality.

Overall, while leverage (LEV) negatively and significantly relates with ROA, the degree of competition (DOC) seems to relate positively and significantly with ROA both in IV and FE-IV estimations. Growth opportunity (GO) negatively and significantly associates with ROA only in IV estimations.

In summary, analysis does not support H1a, the hypothesis for the negative effect of geographic diversification on firm performance in the US casino industry. According to the results, the degree of geographic diversification does not have any significant effect on Tobin's q among all models. Rather, geographic diversification seems to affect positively and significantly ROA from OLS, IV, and FE-IV estimations. Especially, from the most rigorous FE-IV estimation (among estimations in this study) after accounting for firm and time specific factors and other endogeneity issues including causality, geographic diversification has a significant, negative effect on ROA, an accounting-based measure of firm performance. And, these results are consistent when excluding a significant influence from Harrah's, a market leader in the US casino industry. The results of this sensitivity analysis, without observations from Harrah's in the sample, appear in Appendix C.

4.2.1.2. Effect of Product Diversification for Casino Firms

Table 12 summarizes the results from the analyses regarding the relationship between product diversification and performance of the sampled casino firms. Although the hypothesis contends the relationship between product diversification and firm performance is an inverse U-shape, the incremental F-values for the squared term of product diversification ($DOPD^2$) are not significant at the 5% significance level for both Tobin's q and ROA. Thus, this study also presents linear Models (1), (3), (5), and (7) in addition to a curvilinear Models (2), (4), (6), and (8) regarding examination of the effects of product diversification.

According to OLS and FE estimations, none of the values for $DOPD^2$ are significant, implying that a curvilinear relationship between product diversification and firm performance does not seem to exist. Rather, from an FE estimation for a linear model, the degree of product diversification (DOPD) seems to affect negatively and significantly ROA.

Firm size (SIZE) positively and significantly relates with ROA in a linear model from an OLS estimation, but negatively and significantly relates with Tobin's q both in linear and curvilinear models with FE estimation. While leverage (LEV) positively and significantly associates with Tobin's q in a linear model with FE estimation, it negatively and significantly relates with ROA both in a linear and curvilinear model with FE estimation. The degree of internationalization appears to affect positively Tobin's q in a linear model with FE estimation. And, growth opportunity (GO) positively (negatively) relates with Tobin's q (ROA) in both linear and curvilinear models with OLS estimation,

and negatively associates with ROA in both linear and curvilinear models with FE estimation at the 1% significance level.

Table 12. OLS and FE: Effect of Product Diversification for Casino Firms[†]

ESTIMATION VARIABLES	OLS (1) Tobin's q	OLS (2) Tobin's q	OLS (3) ROA	OLS (4) ROA	FE (5) Tobin's q	FE (6) Tobin's q	FE (7) ROA	FE (8) ROA
DOPD	0.105	0.110	-0.0477	0.104	0.356	1.726	-0.114**	-0.0807
	(0.312)	(0.728)	(0.0387)	(0.113)	(0.313)	(1.060)	(0.0543)	(0.227)
DOPD2		-0.00680		-0.183		-1.822		-0.0445
		(0.882)		(0.117)		(1.383)		(0.261)
SIZE	0.00417	0.00412	0.00678**	0.00547	-0.489***	-0.485***	-0.00463	-0.00454
	(0.0227)	(0.0230)	(0.00339)	(0.00330)	(0.0849)	(0.0847)	(0.0193)	(0.0193)
LEV	0.155	0.155	-0.0507	-0.0534	0.473**	0.430	-0.0724**	-0.0735***
	(0.214)	(0.218)	(0.0316)	(0.0318)	(0.211)	(0.222)	(0.0287)	(0.0280)
DIV	0.00100*	0.00100	-4.80e-05	-4.64e-05	-5.09e-05	-3.61e-05	-7.39e-05	-7.36e-05
	(0.000603)	(0.000602)	(4.25e-05)	(4.23e-05)	(0.000617)	(0.000620)	(5.73e-05)	(5.72e-05)
DOI	0.635	0.635	-0.0458	-0.0480	0.674**	0.508	-0.0382	-0.0422
	(0.562)	(0.561)	(0.0265)	(0.0261)	(0.268)	(0.323)	(0.0471)	(0.0551)
DOC	4.63e-05	4.63e-05	9.75e-06	1.03e-05	-6.60e-05	-5.70e-05	-3.03e-06	-2.81e-06
	(6.85e-05)	(6.94e-05)	(5.63e-06)	(5.57e-06)	(7.14e-05)	(7.08e-05)	(1.16e-05)	(1.19e-05)
GO	0.616***	0.616***	-0.0696***	-0.0665***	0.192	0.207	-0.0745***	-0.0742***
	(0.175)	(0.178)	(0.0165)	(0.0157)	(0.114)	(0.119)	(0.0209)	(0.0209)
Constant	0.803***	0.802***	0.129***	0.112***	4.442***	4.162***	0.297**	0.290**
	(0.214)	(0.216)	(0.0349)	(0.0382)	(0.563)	(0.562)	(0.138)	(0.147)
Observations	336	336	336	336	336	336	336	336
F-value	7.56***	6.59***	5.02***	4.73***	9.12***	9.05***	6.38***	6.26***
Adj. R-square	0.1205	0.1178	0.0775	0.0817	0.6117	0.6132	0.5106	0.5089

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. Firm dummies and time dummies are excluded. OLS represents ordinary least squares estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOPD represents the degree of product diversification; DOPD2 represents the squared term of the degree of product diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

Since the Hausman test detects significant endogeneity only in a linear model with ROA as a dependent variable, this study conducts IV and FE-IV estimations only for that model. Table 13 presents the results. Although the effect of the degree of product diversification (DOPD) seems to be negative and significant from IV estimation, the effect disappears when using FE-IV estimation that accounts for firm and time specific heterogeneities. In IV models, while firm size (SIZE) and the degree of competition (DOC) positively and significantly associates with ROA, the degree of

internationalization (DOI) and growth opportunity (GO) negatively and significantly relates with ROA. From FE-IV estimation, only GO negatively associates with ROA.

Table 13. IV and FE-IV: Effect of Product Diversification for Casino Firms[†]

ESTIMATION VARIABLES	IV ROA	FE-IV ROA
DOPD	-0.330**	0.393
	(0.134)	(0.254)
SIZE	0.0116***	-9.39e-05
	(0.00360)	(0.0205)
LEV	-0.0574	-0.0642
	(0.0345)	(0.0403)
DIV	-4.69e-05	-9.54e-05
	(4.43e-05)	(8.49e-05)
DOI	-0.0638**	-0.110
	(0.0322)	(0.0621)
DOC	4.84e-05***	-2.08e-06
	(1.74e-05)	(1.67e-05)
GO	-0.0631***	-0.0921***
	(0.0224)	(0.0196)
Constant	0.180***	-0.0283
	(0.0499)	(0.122)
Observations	336	336

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. Firm dummies and time dummies are excluded. IV represents instrumental variable estimation; FE-IV represents fixed effects instrumental variable estimation; ROA represents return on assets; DOPD represents the degree of product diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

In conclusion, analysis does not support H2, which hypothesizes an inverse U-shaped relationship between product diversification and performance of US casino firms. Further, the linear effect of product diversification on firm performance does not seem to

exist as well. From FE and IV estimations, product diversification appears to have a linear and negative effect. However, this effect is not reliable because it does not exist after accounting for both fixed effects and other possible endogeneity issues, as shown from the analysis with FE-IV estimation. And, these results are consistent when excluding the substantial influence from Harrah's, a market leader in the US casino industry. The results of analyses after removing observations of Harrah's from the sample appear in Appendix D.

4.2.1.3. Moderating Effect of Product Diversification for Casino Firms

Table 14 presents the results from analyses of the moderating effect of product diversification on the geographic diversification-firm performance relationship for the sampled casino firms, using OLS estimation. To examine the moderating effect, the respective models include an interaction term between the degree of product diversification and geographic diversification among the three different measures (i.e., DOGDS × DOPD, DOGDZ × DOPD, and DOGDSZ × DOPD).

According to OLS regressions, as a whole, a statistically significant moderating effect of product diversification does not exist among all three measures of geographic diversification, except in the model with a state-level measure of geographic diversification and ROA as a dependent variable. Interpreting the coefficients of each individual constituent (DOGDS, DOGDZ, DOGDSZ, or DOPD) composing the moderating effect terms and their significances are not meaningful, because they just describe a conditional slope (effect) when the other constituent for the moderating effect term is 0 (Friedrich, 1982).

Table 14. OLS: Moderating Effect of Product Diversification for Casino Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS Tobin's q	OLS Tobin's q	OLS ROA	OLS ROA	OLS ROA
DOGDS	-0.237			0.148**		
	(0.304)			(0.0591)		
DOGDZ		-0.349			0.116**	
		(0.258)			(0.0495)	
DOGDSZ			-0.355			0.100**
			(0.238)			(0.0441)
DOPD	-0.0272	-0.108	-0.130	0.0289	0.0225	0.0176
	(0.346)	(0.356)	(0.361)	(0.0584)	(0.0598)	(0.0591)
DOGDS × DOPD	0.0713			-0.259**		
	(0.814)			(0.129)		
DOGDZ × DOPD		0.528			-0.173	
		(0.648)			(0.104)	
DOGDSZ × DOPD			0.552			-0.149
			(0.540)			(0.0885)
SIZE	0.0250	0.0206	0.0208	0.00194	0.00125	0.00165
	(0.0301)	(0.0345)	(0.0343)	(0.00324)	(0.00335)	(0.00328)
LEV	0.173	0.163	0.164	-0.0521	-0.0533	-0.0532
	(0.210)	(0.212)	(0.213)	(0.0304)	(0.0300)	(0.0301)
DIV	0.000952	0.000950	0.000943	-3.97e-05	-2.96e-05	-2.83e-05
	(0.00061)	(0.00064)	(0.00065)	(3.98e-05)	(4.25e-05)	(4.27e-05)
DOI	0.542	0.558	0.564	-0.0133	-0.0199	-0.0245
	(0.554)	(0.531)	(0.527)	(0.0312)	(0.0314)	(0.0317)
DOC	3.93e-05	4.28e-05	4.36e-05	1.08e-05	1.09e-05	1.06e-05
	(6.64e-05)	(6.58e-05)	(6.68e-05)	(5.84e-06)	(5.73e-06)	(5.71e-06)
GO	0.587***	0.613***	0.615***	-0.0711***	-0.069***	-0.069***
	(0.175)	(0.174)	(0.174)	(0.0188)	(0.0186)	(0.0182)
Constant	0.800***	0.850***	0.857***	0.109***	0.113***	0.115***
	(0.231)	(0.231)	(0.228)	(0.0406)	(0.0413)	(0.0408)
Observations	336	336	336	336	336	336
F-value	6.07***	6.08***	6.12***	5.63***	5.44***	5.27***
Adj. R-square	0.1198	0.1200	0.1210	0.1107	0.1067	0.1028

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least squares estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOGDZ represents 3-digit zip code level degree of geographic diversification; DOGDSZ represents state-zip level degree of geographic diversification; DOPD represents the degree of product diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

That is, for example, Tobin's $q=\alpha_0 + (\alpha_1+ \alpha_2 DOPD)\times DOGDS$, if holding other variables constant, and a partial derivative of the equation is $(\alpha_1+ \alpha_2 DOPD)$ that indicates

α_1, the coefficient of individual term (i.e., DOGDS), is the slope of Tobin's q on DOGDS, only when DOPD is 0. Thus, significant coefficients of DOGDS, DOGDZ, and DOGDSZ do not have practical meanings for examining the hypotheses, which relates to a change in the effect of degree of geographic diversification (e.g., DOGDS) on firm performance (e.g., Tobin's q), contingent on a change in the degree of product diversification (e.g., DOPD). Among control variables, only growth opportunity (GO) positively and significantly relates with Tobin's q and negatively and significantly associates with ROA.

Table 15 summarizes the results of FE regressions, which control for unobservable firm and time specific factors, to examine the moderating effect. According to the results, all coefficients of interaction terms (i.e., DOGDS × DOPD, DOGDZ × DOPD, and DOGDSZ × DOPD) are not statistically significant. That means the moderating effect of product diversification on the relationship between geographic diversification and firm performance does not exist among all three different measures of geographic diversification.

Firm size (leverage) seems to negatively and significantly affect Tobin's q (ROA); the degree of internationalization (DOI) positively and significantly relates with Tobin's q, and growth opportunity (GO) negatively and significantly associates with ROA. Since the Hausman test reveals no statistically significant endogeneity for all the moderating effect terms at the 5% significance level, this study conducts no IV estimations for H3a.

In summary, the analysis does not support H3a, the hypothesis considering the positive moderating effect of product diversification on the relationship between geographic diversification and performance of the sampled casino firms.

Table 15. FE: Moderating Effect of Product Diversification for Casino Firms[†]

ESTIMATION VARIABLES	FE Tobin's q	FE Tobin's q	FE Tobin's q	FE ROA	FE ROA	FE ROA
DOGDS	0.0947			-0.0484		
	(0.642)			(0.0692)		
DOGDZ		0.224			-0.0510	
		(0.456)			(0.0557)	
DOGDSZ			0.177			-0.0459
			(0.366)			(0.0476)
DOPD	0.372	0.407	0.391	-0.127	-0.135**	-0.136**
	(0.361)	(0.359)	(0.352)	(0.0665)	(0.0655)	(0.0641)
DOGDS × DOPD	0.0938			0.0540		
	(1.251)			(0.116)		
DOGDZ × DOPD		0.193			0.110	
		(0.858)			(0.0919)	
DOGDSZ × DOPD			0.249			0.113
			(0.678)			(0.0788)
SIZE	-0.496***	-0.523***	-0.532***	-0.00319	-0.00451	-0.00577
	(0.0902)	(0.0945)	(0.0949)	(0.0197)	(0.0216)	(0.0223)
LEV	0.457**	0.418	0.407	-0.0711**	-0.0755**	-0.0773***
	(0.226)	(0.234)	(0.233)	(0.0296)	(0.0293)	(0.0290)
DIV	-3.68e-05	6.46e-05	7.82e-05	-7.92e-05	-8.03e-05	-7.77e-05
	(0.000614)	(0.000591)	(0.000591)	(5.83e-05)	(6.26e-05)	(6.31e-05)
DOI	0.681**	0.680**	0.683**	-0.0376	-0.0320	-0.0301
	(0.270)	(0.282)	(0.285)	(0.0482)	(0.0496)	(0.0498)
DOC	-4.74e-05	-4.31e-05	-5.65e-05	-5.55e-06	-2.08e-06	-1.85e-06
	(8.37e-05)	(7.63e-05)	(7.46e-05)	(1.16e-05)	(1.10e-05)	(1.12e-05)
GO	0.199	0.222	0.230	-0.0748***	-0.072***	-0.0710***
	(0.118)	(0.119)	(0.118)	(0.0215)	(0.0227)	(0.0230)
Constant	3.330***	3.468***	4.537***	0.247**	-0.0848	0.315**
	(0.512)	(0.608)	(0.569)	(0.107)	(0.117)	(0.146)
Observations	336	336	336	336	336	336
F-value	8.80***	8.89***	8.92***	6.16***	6.18***	6.20***
Adj. R-square	0.6092	0.6120	0.6131	0.5078	0.5087	0.5098

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOGDZ represents 3-digit zip code level degree of geographic diversification; DOGDSZ represents state-zip level degree of geographic diversification; DOPD represents the degree of product diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

Although from OLS estimation the negative moderating effect on ROA exists in the model with state- level measure of geographic diversification, this result is not robust

to FE estimation that mitigates omitted variable bias by controlling for unobservable firm and time specific heterogeneities. And, the results of an insignificant moderating effect are consistent when conducting a sensitivity analysis by excluding observations of Harrah's, a market leader in the US casino industry from the sample. The results of this sensitivity analysis appear in Appendix E.

4.2.2. Results of Main Analyses for the Restaurant Industry

This study establishes three hypotheses (H1b, H2b, and H3b) to examine the effects of diversification strategies on performance of the sampled restaurant firms. Accordingly, H1b hypothesizes a negative effect of the degree of geographic diversification on firm performance. Also, for brand diversification of restaurant firms, this study establishes H2b, which hypothesizes a negative impact of brand diversification on firm performance. Last, this study proposes H3b, hypothesizing a positive moderating effect of brand diversification on the relationship between geographic diversification and firm performance in the US restaurant industry.

To check functional form (linear vs. curvilinear) for H1b and H2b that propose a linear relationship, this study tested the significance of the incremental F-statistic of the squared term in each model (i.e., OLS, FE, IV, and FE-IV model). For OLS H1b (geographic diversification-firm performance) model with Tobin's q as a dependent variable and OLS H2b (brand diversification-firm performance) model with ROA as a dependent variable, this study found significant incremental F-statistics. That means that curvilinear forms fit data better in those models, thus this study reports both linear and curvilinear models for those two cases.

4.2.2.1. Effect of Geographic Diversification for Restaurant Firms

Table 16 presents the results of analyses using OLS and FE estimations regarding the effect of geographic diversification on performance of the sampled restaurant firms. Although the bases for measurement of geographic diversification are three different units for geographic region (i.e., state, 3-digit zip, and state considering within-state 3-digit zip codes) for the sampled casino firms, the basis for measurement of geographic diversification of restaurant and lodging firms is the state as a unit because most restaurant and lodging firms do not provide the disaggregated level (i.e., 3-digit zip code level) of historical property information. Even if providing information of property locations, for example, more than 1,000 properties, this data would not be relevant for analyses because of extremely low variation among observations. That is, the properties tend to be almost evenly distributed among 3-digit zip codes (i.e., one properties in one 3-digit zip code), which clusters the Berry-Herfindahl indices for all observations 95% or higher.

Since this study finds significant (at the 5% significance level) incremental F-statistics for the squared term of the degree of geographic diversification (DOGD2) from OLS estimation for the Tobin's q model, this study shows both forms (i.e., linear and curvilinear forms). However, because the incremental F-statistics for the squared term included in OLS estimation for the ROA model and FE estimations for both models are not significant, reporting includes only linear forms for those models.

Table 16. OLS and FE: Effect of Geographic Diversification for Restaurant Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA
DOGD	0.253**	-1.439***	0.00158	-0.339	0.0781
	(0.127)	(0.417)	(0.0288)	(0.270)	(0.0413)
DOGD2		1.802***			
		(0.444)			
SIZE	0.0582	-0.0157	0.0823***	-0.546***	0.0269
	(0.0660)	(0.0654)	(0.0144)	(0.166)	(0.0263)
LEV	0.740***	0.711***	0.00556	0.928***	-0.0124
	(0.222)	(0.214)	(0.00950)	(0.153)	(0.0129)
DIV	0.00392	0.00306	-0.00123***	0.00357	-0.000237
	(0.00277)	(0.00270)	(0.000424)	(0.00202)	(0.000244)
DOI	0.277	0.213	-0.139**	-0.0247	0.0989
	(0.693)	(0.663)	(0.0656)	(1.117)	(0.0944)
DOC	0.00964	0.00468	0.00390	0.0347	0.00479
	(0.0108)	(0.00982)	(0.00224)	(0.0296)	(0.00360)
GO	3.241***	3.202***	0.0928	1.913***	0.0511
	(0.557)	(0.561)	(0.0550)	(0.304)	(0.0380)
DOF	0.404***	0.392***	0.0723***	1.213***	0.131***
	(0.141)	(0.137)	(0.0161)	(0.377)	(0.0378)
BS	-0.0425	-0.0514	0.00793	-0.0393	-0.00742
	(0.0424)	(0.0421)	(0.00463)	(0.0459)	(0.00566)
Constant	0.292**	0.651***	-0.0824***	1.532***	0.0589
	(0.146)	(0.151)	(0.0284)	(0.501)	(0.0716)
Observations	952	952	952	952	952
F-value	24.23***	24.41***	30.89***	15.41***	18.16***
Adj, R-square	0.1802	0.1975	0.2205	0.7041	0.7391

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least squares estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGD represents the degree of geographic diversification; DOGD2 represents the squared term of DOGD; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

From OLS estimation the degree of geographic diversification (DOGD) seems to have a significant linear and positive impact on Tobin's' q, but not on ROA. In addition, in a curvilinear form, a better model specification, apparently, a U-shaped relationship

between DOGD and Tobin's q is evident, based on the positive and significant coefficient of the square of DOGD (i.e., DOGD2). However, from FE estimates that account for firm and time fixed effects, contribution of the squared DOGD was not significant at the 5% significance level. Thus this study found no significant effect of DOGD on both Tobin's q and ROA from FE estimations is evident.

While firm size (SIZE) positively and significantly relates with ROA from OLS estimation, it seems to negatively and significantly associate with Tobin's q from FE estimation. Leverage (LEV) and growth opportunity (GO) appear to have a positive relationship with Tobin's q among linear forms with OLS and FE estimations and in a curvilinear form with OLS estimation. The degree of internationalization (DOI) negatively associates only with ROA from OLS estimation at the 5% significance level. The degree of franchising (DOF) positively and significantly relates with firm performance among all models with OLS and FE estimations. Since the Hausman test detects significant endogeneity only for OLS (linear model) and FE models with Tobin's q as a dependent variable, this study conducts IV and FE-IV estimations to examine the effect of geographic diversification on performance of the sampled restaurant firms. Table 17 presents the results.

From IV estimation, the effect of geographic diversification on firm performance seems to be positive and significant at the 1% significance level. However, this effect does not exist from FE-IV estimation after controlling for firm and time fixed effects in addition to the IV method.

Table 17. IV and FE-IV: Effect of Geographic Diversification for Restaurant Firms[†]

ESTIMATION VARIABLES	IV Tobin's q	FE-IV Tobin's q
DOGD	4.551***	6.160
	(1.348)	(3.806)
SIZE	-1.253***	-1.406***
	(0.438)	(0.531)
LEV	0.661***	0.778***
	(0.253)	(0.207)
DIV	0.0165***	0.00727***
	(0.00576)	(0.00280)
DOI	2.053**	2.651
	(0.996)	(1.645)
DOC	0.0755***	0.107
	(0.0249)	(0.0589)
GO	2.222***	2.264***
	(0.699)	(0.400)
DOF	0.681***	0.360
	(0.210)	(0.645)
BS	-0.0633	-0.175
	(0.0610)	(0.0961)
Constant	-0.271	-0.989
	(0.275)	(1.859)
Observations	952	952

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. IV represents instrumental variable estimation; FE-IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; DOGD represents the degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

While firm size (SIZE) negatively and significantly associates with Tobin's q, leverage (LEV) seems to positively and significantly relate with Tobin's q from both IV and FE-IV estimations as do dividend payments (DIV) and growth opportunity (GO). The degree of internationalization (DOI) and the degree of competition (DOC) appear to

associate positively and significantly with Tobin's q only from IV estimation.

In conclusion, the hypothesis, H1b, regarding the negative effect of geographic diversification on firm performance in the US restaurant industry remains unsupported. Although a statistically significant and positive relationship and a U-shaped relationship between geographic diversification on firm performance are apparent from OLS and IV estimations, this finding is not robust to FE and FE-IV estimations that control for unobservable firm and time specific factors. Since the significant effect of geographic diversification is absent from the most rigorous FE-IV method (among all estimates in this study), which substantially accounts for endogeneity issues including causality, the effect of geographic diversification on performance of the sampled restaurant firms does not seem to exist.

4.2.2.2. Effect of Brand Diversification for Restaurant Firms

Table 18 provides analyses results using OLS and FE estimations to investigate the effect of brand diversification on firm performance in the US restaurant industry. For the OLS model with ROA as a dependent variable, the squared term of brand diversification (DOBD2) is included to examine a curvilinear relationship between brand diversification and ROA because the incremental F-statistic of the squared term of product diversification (DOBD2) was significant at the 5% significance level. For other models, the incremental F-values were not significant, implying that a linear form may produce a better fit to the data.

Table 18. OLS and FE: Effect of Brand Diversification for Restaurant Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS ROA	OLS ROA	FE Tobin's q	FE ROA
DOBD	-0.453***	0.0256	-0.135	-0.0858	-0.0795**
	(0.162)	(0.0232)	(0.0771)	(0.345)	(0.0401)
DOBD2			0.212**		
			(0.0897)		
SIZE	0.121**	0.0836***	0.0837***	-0.593***	0.0474
	(0.0588)	(0.0103)	(0.0103)	(0.179)	(0.0282)
LEV	0.750***	0.00529	0.00708	0.921***	-0.00982
	(0.212)	(0.00972)	(0.00929)	(0.155)	(0.0127)
DIV	0.00425	-0.00129***	-0.00132***	0.00384	-0.000145
	(0.00272)	(0.000410)	(0.000416)	(0.00199)	(0.000237)
DOI	0.118	-0.137**	-0.128**	0.0810	0.0809
	(0.680)	(0.0642)	(0.0640)	(1.086)	(0.0952)
DOC	0.00543	0.00390	0.00403	0.0385	0.00421
	(0.0104)	(0.00225)	(0.00221)	(0.0294)	(0.00367)
GO	3.207***	0.0985	0.104	1.920***	0.0424
	(0.553)	(0.0535)	(0.0536)	(0.298)	(0.0380)
DOF	0.326**	0.0757***	0.0721***	1.138***	0.124***
	(0.145)	(0.0168)	(0.0171)	(0.364)	(0.0401)
BS	0.0367	0.00353	0.0144**	-0.0327	0.00493
	(0.0528)	(0.00516)	(0.00722)	(0.0642)	(0.00903)
Constant	0.411***	-0.0871***	-0.0864***	1.635***	0.0207
	(0.138)	(0.0298)	(0.0299)	(0.517)	(0.0747)
Observations	952	952	952	952	952
F-value	25.09***	31.12***	28.97***	15.36***	7.19***
Adj. R-square	0.1857	0.2218	0.2272	0.7033	0.5054

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least squares estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOBD represents the degree of brand diversification; DOBD2 represents the squared term of DOBD; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

OLS estimations, apparently, produce a negative effect of brand diversification on Tobin's q and a U-shaped relationship between brand diversification and ROA, based on the positive and significant coefficient of the square of DOBD (DOBD2). However, from

FE estimation controlling for firm and time specific heterogeneities, the effect of brand diversification on Tobin's q is not statistically significant. The effect of brand diversification on ROA is negative and linear at the 5% significance level.

Firm size (SIZE) positively and significantly relates with firm performance except in the FE model with ROA as a dependant variable. Leverage (LEV) positively and significantly associates with Tobin's q in both OLS and FE models. Dividend payments (DIV) and the degree of internationalization (DOI) appear to relate negatively and significantly with ROA in both OLS linear and curvilinear models. While growth opportunity (GO) positively and significantly associates with Tobin's q from both OLS and FE estimations, the degree of franchising seems to have a positive relationship with both Tobin's q and ROA among all models, as apparent in Table 18.

Since, according to the Hausman test, this study detects significant endogeneity for models with Tobin's q as a dependent variable, IV and FE-IV estimations are conducted to more rigorously examine the effect of brand diversification on firm performance. Table 19 shows the results. From both IV and FE-IV estimations, the degree of brand diversification has a negative effect on Tobin's q.

Firm size seems (SIZE) to have a negative and significant impact on Tobin's q from FE-IV estimation. Leverage (LEV), dividend payments (DIV), and growth opportunity (GO) have positive and significant effects on Tobin's q from both estimations. Brand strategy (BS) appears to positively and significantly associate with Tobin's q only from IV estimation.

Table 19. IV and FE-IV: Effect of Brand Diversification for Restaurant Firms[†]

ESTIMATION VARIABLES	IV Tobin's q	FE-IV Tobin's q
DOBD	-5.861***	-2.168**
	(1.893)	(0.942)
SIZE	-0.0571	-0.368***
	(0.116)	(0.137)
LEV	0.815***	0.941***
	(0.145)	(0.143)
DIV	0.0170**	0.00716***
	(0.00668)	(0.00237)
DOI	-0.526	-0.0315
	(0.748)	(0.969)
DOC	0.00157	0.0470
	(0.0168)	(0.0272)
GO	2.080***	1.800***
	(0.789)	(0.293)
DOF	-0.411	0.640
	(0.318)	(0.385)
BS	0.967***	0.253
	(0.336)	(0.143)
Constant	1.433***	1.604***
	(0.441)	(0.405)
Observations	952	952

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. IV represents instrumental variable estimation; FE-IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; DOBD represents the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

In summary, the results do not support H2b, which suggests a negative effect from brand diversification on firm performance. Given the insignificant Hausman test result for models with ROA and insignificant incremental F-statistic, a linear model with FE estimation may be the best alternative for robustly examining the effect of brand

diversification on ROA. For a model with Tobin's q, for which the endogeneity needs to be mitigated from the instrumental variable method, based on the results from the Hausman test, using the IV-FE model seems appropriate, which addresses omitted variable bias and endogeneity as much as possible. Since the effect of brand diversification on both ROA and Tobin's q appears to be negative and significant, based those models' rigorous specification and estimation, H2b seems to gain strong support.

4.2.2.3. Moderating Effect of Brand Diversification for Restaurant Firms

Table 20 summarizes the results from analyses examining the moderating effect of brand diversification on the relationship between geographic diversification and firm performance for the sampled restaurant firms from OLS and FE estimations. To investigate the moderating effect, each model includes an interaction term between the degree of brand diversification and geographic diversification (DOGD×DOBD).

According to OLS regressions, no significant moderating effect of brand diversification appears in both Tobin's q and ROA models. After controlling for firm and time specific heterogeneities by using FE estimation, this study finds a negative and significant moderating effect of brand diversification on the relationship between geographic diversification and Tobin's q. However, the moderating effect in the ROA model is insignificant from FE estimation.

Based on significant endogeneity, detected from the Hausman test, of the degree of geographic diversification (DOGD), the degree of brand diversification (DOBD), and the interaction term (DOGD×DOBD) in both OLS and FE models with Tobin's q, this study conducts IV and FE-IV estimations for models with Tobin' s q as a dependent

variable. For models with ROA, the Hausman test reveals no significant endogeneity at the 5% significance level for diversification variables.

According both to IV and FE-IV estimations, the coefficient of the DOGD×DOBD is negative and significant at the 1% significance level (-3.239 for IV and -8.208 for FE-IV estimations), which implies a negative moderating effect from brand diversification on the relationship between geographic diversification and Tobin's q. That is, as brand diversification increases, the effect of geographic diversification on Tobin's q decreases. Interpreting the coefficients of individual constituents of the interaction term (DOGD and DOBD) is not meaningful for this study, because the coefficient of one constituent represents a conditional effect on firm performance, when the other constituent is 0 (Friedrich, 1982).

Among control variables, firm size (SIZE) relates positively and significantly with ROA from OLS estimation, and negatively and significantly associates with Tobin's q with FE estimation. Leverage (LEV) and growth opportunity (GO) seem to affect positively and significantly Tobin's q among all estimations, and dividend payments (DIV) have a positive and significant relationship with both Tobin's q and ROA among all diverse estimations except FE estimation for a model with ROA as a dependant variable. While the degree of franchising (DOF) positively and significantly affects both Tobin's q and ROA among all estimations, the degree of internationalization negatively relates only with ROA from OLS estimation at the 5% significance level.

Analyses results presented in Table 20 do not support H3b, the positive moderating effect of brand diversification on the geographic diversification-firm performance relationship with a greater magnitude than product diversification.

Table 20. Moderating Effect of Brand Diversification for Restaurant Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA	IV Tobin's q	FE-IV Tobin's q
DOGD	0.353***	0.00744	-0.153	0.0827**	1.324***	0.558
	(0.131)	(0.0308)	(0.276)	(0.0407)	(0.215)	(0.418)
DOBD	0.0155	0.0513	1.317	-0.0402	2.309**	5.725***
	(0.395)	(0.0664)	(0.774)	(0.0942)	(0.959)	(1.306)
DOGD×DOBD	-0.711	-0.0391	-2.011**	-0.0555	-3.939***	-8.208***
	(0.505)	(0.0855)	(0.902)	(0.114)	(1.284)	(1.667)
SIZE	0.0471	0.0832***	-0.464**	0.0367	-0.0878	0.234
	(0.0651)	(0.0146)	(0.183)	(0.0284)	(0.0743)	(0.264)
LEV	0.755***	0.00577	0.936***	-0.0114	0.786***	0.986***
	(0.215)	(0.00987)	(0.152)	(0.0130)	(0.222)	(0.155)
DIV	0.00564**	-0.00125***	0.00492**	-8.10e-05	0.0097***	0.00710***
	(0.00279)	(0.000418)	(0.00197)	(0.000242)	(0.00325)	(0.00228)
DOI	0.220	-0.136**	0.0475	0.106	0.441	-0.0643
	(0.685)	(0.0657)	(1.109)	(0.0943)	(0.715)	(1.131)
DOC	0.0105	0.00399	0.0358	0.00505	0.0238	0.0536
	(0.0107)	(0.00233)	(0.0301)	(0.00361)	(0.0132)	(0.0350)
GO	3.113***	0.0962	1.824***	0.0432	2.871***	1.600***
	(0.553)	(0.0552)	(0.303)	(0.0383)	(0.546)	(0.297)
DOF	0.327**	0.0750***	1.186***	0.112***	0.313**	1.188***
	(0.145)	(0.0171)	(0.403)	(0.0367)	(0.149)	(0.460)
BS	0.0390	0.00373	-0.0264	0.00364	0.0235	-0.0740
	(0.0528)	(0.00521)	(0.0613)	(0.00888)	(0.0542)	(0.0606)
Constant	0.302**	-0.0915***	1.182**	0.0378	-0.141	0.141
	(0.139)	(0.0335)	(0.562)	(0.0786)	(0.188)	(0.680)
Observations	952	952	952	952	952	952
F-value	21.07***	25.45***	15.50***	18.10***	n/a	n/a
Adj. R-square	0.1884	0.2205	0.7080	0.7409	n/a	n/a

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least square estimation; FE represents fixed effects estimation; IV represents instrumental variable estimation; FE-IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGD represents the degree of geographic diversification; DOBD represents the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

Rather, while the moderating effect of brand diversification on the relationship between geographic diversification and ROA is insignificant among all of the different estimations, the moderating effect on the relationship between geographic diversification on Tobin's is negative and significant. The negative moderating effect results for Tobin's

q are robust to omitted variable bias and endogeneity problem (e.g., causality), considering that the results are consistent across FE, IV, and FE-IV estimations. Unfortunately, the comparison between the magnitude of brand diversification's moderating effect and that of product diversification is not feasible from this study's analyses due to an insignificant moderating effect of product diversification for the sampled casino firms.

4.2.3. Results of Main Analyses for the Lodging Industry

To investigate the effects of diversification strategies on performance of the sampled lodging firms, this study establishes three hypotheses, H1c, H2c, and H3c. H1c refers to the negative effect of the degree of geographic diversification on firm performance in the US lodging industry. For H2b, this study proposes a negative effect of brand diversification on performance of US lodging firms. And, for the examination of the moderating effect, this study tests H3b, which concerns the positive moderating effect of brand diversification on the relationship between geographic diversification and firm performance in the US lodging industry.

For the model specification, this study checked functional forms of all models for the sampled lodging firms by testing the significance of incremental F-values of the squared term of the diversification variable and found that none of the incremental F-statistics of the squared term of geographic and brand diversification is statistically significant. That implies a better fit of a linear form for each model for the sample of lodging firms.

4.2.3.1. Effect of Geographic Diversification for Lodging Firms

Table 21 presents the results of analyses from OLS and FE estimations for the effect of geographic diversification on performance of the sampled lodging firms. Since, similar to the sampled restaurant firms, most sampled lodging firms do not provide 3-digit zip code property information, this study measures the degree of geographic diversification, based only on the state-level as the unit of the measurement.

According to the pooled OLS estimation, the degree of geographic diversification (DOGD) seems to affect positively and significantly both Tobin's q and ROA. However, when using FE to account for firm and time specific heterogeneities, this study finds an insignificant effect of geographic diversification on firm performance. FE estimation is considered more rigorous than OLS estimation when using a panel sample, because FE estimation partials out unobserved firm specific characteristics (e.g., a firm's management philosophy) and time specific factors (e.g., macroeconomic effect), which otherwise leads to an inconsistent and biased coefficient estimation form, for example, OLS estimation (Wooldridge, 2002).

While a firm's size (SIZE) negatively and significantly relates only with Tobin's q from FE estimation, leverage (LEV) positively and significantly associates with both Tobin's q and ROA in both OLS and FE estimations. Dividend payments (DIV) have a significant, positive relationship with ROA with FE estimation. Growth opportunity (GO) seems to have a negative and significant impact on ROA from OLS and FE estimations, but a positive and significant impact on Tobin's q from FE estimation.

A brand strategy dummy variable (BS) negatively and significantly associates with both Tobin's q and ROA from OLS estimation, rendering the possibility that a

corporate brand strategy is superior to a house-of-brands strategy or a mixed brand strategy, and a house- of-brands strategy is better than a mixed brand strategy in terns of enhancing firm performance.

Table 21. OLS and FE: Effect of Geographic Diversification for Lodging Firms[†]

ESTIMATION VARIABLE	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA
DOGD	0.389**	0.0582***	0.188	-0.0116
	(0.153)	(0.0181)	(0.262)	(0.0409)
SIZE	0.00783	-0.00333	-0.256***	0.0131
	(0.0207)	(0.00329)	(0.0671)	(0.0163)
LEV	0.282**	0.0556***	0.709***	0.0742**
	(0.141)	(0.0169)	(0.196)	(0.0302)
DIV	0.000200	8.10e-05	0.00260	0.000420**
	(0.00114)	(0.000103)	(0.00258)	(0.000181)
DOI	0.821	0.0837	0.119	-0.0786
	(0.544)	(0.0426)	(1.811)	(0.0928)
DOC	-0.111	0.0105	0.0668	-0.0144
	(0.111)	(0.0132)	(0.0796)	(0.0208)
GO	0.000135	-8.56e-05***	0.0951***	-0.00758**
	(0.000110)	(9.54e-06)	(0.0146)	(0.00295)
DOF	-0.173	-0.0272	-0.0401	-0.0713**
	(0.215)	(0.0249)	(0.213)	(0.0349)
BS	-0.246***	-0.0230***	-0.0206	-0.00692
	(0.0495)	(0.00474)	(0.0560)	(0.00620)
Constant	0.758***	0.0575**	-87.74***	7.097**
	(0.141)	(0.0254)	(13.87)	(2.832)
Observation	176	176	176	176
F-value	8.10***	7.03***	21.48***	6.09***
Adj. R-square	0.2674	0.2367	0.8735	0.6319

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least squares estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGD represents the degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

Since the Hausman test for models both with Tobin's and ROA detects a significant endogeneity of a main regressor, the degree of geographic diversification (DOGD), this study conducts IV and FE-IV estimations to mitigate endogeneity and enhance causality of the relationship between geographic diversification and firm performance. Table 22 summarizes the results.

From IV and FE-IV estimations, this study finds a positive and significant effect of the degree of geographic diversification (DOGD) on both Tobin's q and ROA of the sampled lodging firms. Especially, those results exist after addressing both the firm and time fixed effects and other endogeneity issues by using the FE-IV method.

Firm size (SIZE) appears to associate negatively and significantly with ROA from IV estimation and Tobin's q from FE-IV estimation. Leverage (LEV) seems to relate positively and significantly with both Tobin's q and ROA from FE-IV estimation. While dividend payment (DIV) has a positive and significant relationship with ROA when estimated with the IV method, growth opportunity (GO) seems to have the negative and significant effect both on Tobin's q and ROA from IV estimation and on ROA from FE-IV estimation. The degree of franchising (DOF) negatively and significantly relates with ROA from IV estimation and positively and significantly associates with both Tobin's q and ROA from FE-IV estimation. The business strategy dummy variable consistently shows the negative and significant relationship with firm performance among IV and FE-IV estimations.

In conclusion, H1c, the negative effect of geographic diversification on performance in the US lodging industry, is not supported. Rather, this study finds, from robust estimation methods, a significant positive impact from the degree of geographic

diversification on performance of the sampled lodging firms.

Table 22. IV and FE-IV: Effect of Geographic Diversification for Lodging Firms[†]

ESTIMTION	IV	IV	FE-IV	FE-IV
VARIABLE	Tobin's q	ROA	Tobin's q	ROA
DOGD	1.297***	0.262***	2.577***	0.355**
	(0.389)	(0.0834)	(0.795)	(0.150)
SIZE	-0.0844	-0.0241***	-0.455***	-0.0318
	(0.0447)	(0.00927)	(0.138)	(0.0347)
LEV	0.0246	-0.00233	0.960***	0.0861**
	(0.182)	(0.0383)	(0.242)	(0.0434)
DIV	0.00154	0.000382**	0.00247	0.000531
	(0.00127)	(0.000166)	(0.00226)	(0.000276)
DOI	0.790	0.0769	1.623	0.0339
	(0.533)	(0.0533)	(1.519)	(0.185)
DOC	-0.186	-0.00646	-0.0706	-0.0325
	(0.116)	(0.0177)	(0.101)	(0.0199)
GO	-0.000251**	-0.000112***	0.0256	-0.0173***
	(0.000113)	(1.69e-05)	(0.0256)	(0.00552)
DOF	-0.436	-0.0864**	1.010***	0.0850**
	(0.237)	(0.0383)	(0.276)	(0.0427)
BS	-0.368***	-0.0504***	-0.282***	-0.0406***
	(0.0641)	(0.0143)	(0.0865)	(0.0141)
Constant	0.950***	0.101***	0.0527	-0.121
	(0.158)	(0.0372)	(0.443)	(0.104)
Observation	176	176	176	176

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. IV represents instrumental variable estimation; FE-/IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGD represents the degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

That is, by rigorously addressing the omitted variable bias and other endogeneity issues, such as causality from FE-IV estimation, an increase in the degree of geographic diversification seems to lead to enhancement of firm value and profitability in the US

lodging industry.

4.2.3.2. Effect of Brand Diversification for Lodging Firms

Table 23 presents OLS and FE estimations of the effect of brand diversification on performance of the sampled lodging firms. According to the pooled OLS analysis, the degree of brand diversification (DOBD) shows a negative and statistically significant effect on Tobin's q, a financial market-based measure of firm performance. However, after controlling for firm and time specific heterogeneities, brand diversification seems to have an insignificant effect both on Tobin's q and ROA of the sampled lodging firms.

Among control variables, firm size (SIZE) positively and significantly relates with Tobin's q from OLS estimation, but negatively relates with Tobin's q from FE estimation. Leverage (LEV) positively and significantly associates with both Tobin's q and ROA from OLS and FE estimations. While growth opportunity (GO) has a negative and significant relationship with ROA from both estimations, it positively and significantly relates with Tobin's q from FE estimation. A brand strategy dummy variable (BS) negatively and significantly associates with both Tobin's q and ROA only from OLS estimations. Since Hausman test detects no significant endogeneity, this study does not conduct IV and FE-IV regressions.

In summary, the proposed H2c, a negative effect of brand diversification on firm performance in the US lodging industry, is not supported. From the rigorous estimation accounting for firm and time specific heterogeneities with FE estimation, the conclusion is that the effect of brand diversification on both financial market-based and accounting-based performance of the sampled lodging firms is statistically insignificant.

Table 23. OLS and FE: Effect of Brand Diversification for Lodging Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA
DOBD	-0.251**	0.000965	-0.0142	0.0208
	(0.122)	(0.0149)	(0.181)	(0.0300)
SIZE	0.0610***	0.00252	-0.215***	0.0155
	(0.0201)	(0.00341)	(0.0555)	(0.0203)
LEV	0.434***	0.0719***	0.985***	0.0928***
	(0.120)	(0.0171)	(0.119)	(0.0312)
DIV	-0.000322	-4.96e-06	0.000680	0.000302
	(0.00107)	(0.000103)	(0.00162)	(0.000208)
DOI	0.968	0.0852	-1.469	-0.0891
	(0.550)	(0.0444)	(1.193)	(0.113)
DOC	-0.0558	0.0152	0.0696	-0.0295
	(0.109)	(0.0145)	(0.0870)	(0.0301)
GO	-0.000136	-7.80e-05***	0.0873***	-0.00846**
	(0.000111)	(1.03e-05)	(0.0140)	(0.00366)
DOF	-0.120	-0.0101	-0.0608	0.00944
	(0.227)	(0.0249)	(0.223)	(0.0461)
BS	-0.149***	-0.0153***	-0.0442	-0.0152
	(0.0386)	(0.00447)	(0.0544)	(0.00844)
Constant	0.620***	0.0454*	0.854***	0.0409
	(0.126)	(0.0263)	(0.120)	(0.0403)
Observation	176	176	176	176
F-value	7.28***	5.1***	20.94***	5.97***
Adj. R-square	0.2442	0.1741	0.8724	0.6301

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least squares estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOBD represents the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

4.2.3.3. Moderating Effect of Brand Diversification for Lodging Firms

Table 24 provides the results of OLS and FE analyses for the moderating effect of brand diversification on the geographic diversification-performance relationship in the

US lodging industry. From the OLS estimation, the coefficient of the term for examining the moderating effect of brand diversification (i.e., DOGD×DOBD) is positive and significant at the 5% significance level only for a model with ROA as a dependent variable. However, FE estimation shows a positive and significant moderating effect of brand diversification on both Tobin's q and ROA; the coefficients of DOGD×DOBD are positive and significant for both models with Tobin's q and ROA as a dependant variable.

Firm size (SIZE) seems to affect negatively and significantly Tobin's q as FE estimation shows. On the other hand, leverage (LEV) positively and significantly affects both ROA and Tobin's q from both OLS and FE estimations. The degree of internationalization (DOI) positively and significantly relates with ROA from OLS estimation. While growth opportunity (GO) negatively and significantly relates with ROA from OLS estimation, it positively and significantly associates with Tobin's q from FE estimation. The coefficient of a brand strategy dummy variable is negative and significant in models with both Tobin's q and ROA from OLS estimation and a model with Tobin's q from FE estimation. Using the Hausman test, this study did not find a significant endogeneity problem (at the 5% significance level) for models examining the moderating effect, and therefore did not conduct IV and FE-IV estimations.

In conclusion, H3c, the positive moderating effect of brand diversification on the geographic diversification-firm performance relationship in the US lodging industry with a greater magnitude than the moderating effect of product diversification, is partially supported. The positive direction and significance of the moderating effect of brand diversification of the sampled lodging firms corresponds to H3c.

Table 24. Moderating Effect of Brand Diversification for Lodging Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA
DOGD	0.494***	0.0818***	0.239	0.0496
	(0.134)	(0.0158)	(0.131)	(0.0343)
DOBD	-0.335***	-0.0181	0.0172	0.0277
	(0.111)	(0.0141)	(0.164)	(0.0258)
DOGD×DOBD	0.267	0.109**	0.795**	0.192**
	(0.315)	(0.0502)	(0.312)	(0.0836)
SIZE	0.0227	-0.00176	-0.214***	0.0167
	(0.0206)	(0.00325)	(0.0623)	(0.0219)
LEV	0.316**	0.0551***	0.948***	0.0839***
	(0.131)	(0.0167)	(0.127)	(0.0285)
DIV	0.000204	3.08e-05	0.000479	0.000247
	(0.00124)	(0.000107)	(0.00152)	(0.000156)
DOI	0.977	0.0846**	-1.114	-0.00636
	(0.535)	(0.0421)	(1.253)	(0.119)
DOC	-0.0896	0.00996	0.0660	-0.0298
	(0.103)	(0.0125)	(0.0879)	(0.0303)
GO	-0.000192	-8.23e-05***	0.0951***	-0.00637
	(0.000111)	(9.90e-06)	(0.0157)	(0.00388)
DOF	-0.249	-0.0244	-0.00887	0.0190
	(0.264)	(0.0262)	(0.240)	(0.0433)
BS	-0.196***	-0.0213***	-0.0469	-0.0150**
	(0.0452)	(0.00461)	(0.0618)	(0.00725)
Constant	0.860***	0.0823***	-87.84***	5.912
	(0.206)	(0.0281)	(14.88)	(3.714)
Observation	176	176	176	176
F-value	7.77***	6.31***	21.14***	6.14***
Adj. R-square	0.2985	0.2502	0.8771	0.6454

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least square estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGD represents the degree of geographic diversification; DOBD represents the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

That is, as the degree of brand diversification increases, the effect of geographic diversification on performance (both on Tobin's q and ROA) of the sampled lodging

firms also increases. This finding exists after accounting for firm and time fixed effects and checking the possibility of other endogeneity issues. However, because of insignificant moderating effect of product diversification of the sampled casino firms, a comparison between the magnitude of moderating effect of brand diversification and that of product diversification may not be feasible in this study.

4.3. Results of Additional Analyses: Source of Diversification's Effect

In addition to the main analyses (i.e., the effect of geographic, product, and brand diversification on performance and the moderating effects of product and brand diversification on the geographic diversification-firm performance relationship), this study conducts an investigation of the source of diversification's effect on firm performance. That is, to examine whether or not the number of entities or the dispersion across entities that compose the measurement of the degree of diversification is the source of the effect of diversification, this study divides the Berry-Hefindhal index ($1-\sum S_i^2$) into two components $(1- 1/n) - \sum [S_i^2 - (1/n)^2]$ by subtracting from and adding 1/n to the original formula (Gollop and Monahan, 1991; Jose et al., 1986). The first term, (1-1/n), represents the number component of the Berry-Herfindahl index, the degree of diversification, and is denoted by DOGDN (for example, in the geographic diversification context) in this study. The second term, $- \sum [S_i^2 - (1/n)^2]$, represents the dispersion component of the Berry-Herfindahl index and is denoted by DOGDD in this study. These two terms appear in the equations for main analyses by replacing DOGD ($1-\sum S_i^2$) in the geographic diversification context. For the product and brand diversification context, the number and dispersion components as for geographic

diversification replace the Berry-Herfindahl index, the measure of the degree of diversification. By separately examining the direction and significance of the coefficients of the number and dispersion components, this study expects to find the source (i.e., the number, dispersion or both) of the effect of each dimension of diversification.

The main analyses compare coefficients estimations from different methods (i.e., OLS, FE, IV, and FE-IV). For the standard error estimation, Newey-West HAC (heteroscedasticity autocorrelation consistent) standard errors are used.

4.3.1. Source of Diversification's Effect for Casino Firms

Table 25 summarizes OLS and FE estimations for the examination of the source of diversification's effect in the US casino industry's geographic diversification context. This study examines the source of the effect of geographic diversification both with states and 3-digit zip codes as a unit of geographic markets. Exclusion of the state-level measure incorporating within-state diversification is inevitable because the measure, which is based on the adjustment factor reflecting the weighted average across the Herfindhal indices of each state, may not allow appropriate division of the Berry-Herfindahl index into the number and dispersion components through the equation used for the state and 3-digit zip code level measures for geographic diversification. Model (1), (3), (5), and (7) use a state as a unit of geographic diversification, in which DOGDNS (DOGDDS) represents the number (dispersion) component. Model (2), (4), (6), and (8) employ 3-digit zip code as a unit of geographic diversification, in which DOGDNZ (DOGDDZ) represents the number (dispersion) component.

Table 25. Source of Geographic Diversification's Effect for Casino Firms[†]

ESTIMATION VARIABLES	OLS (1) Tobin's q	OLS (2) Tobin's q	OLS (3) ROA	OLS (4) ROA	FE (5) Tobin's q	FE (6) Tobin's q	FE (7) ROA	FE (8) ROA
DOGDNS	-0.214		0.056***		0.0201		-0.00389	
	(0.148)		(0.0210)		(0.251)		(0.0321)	
DOGDDS	-0.109		0.0843**		-0.594		-0.00134	
	(0.289)		(0.0379)		(0.579)		(0.0612)	
DOGDNZ		-0.152		0.0532***		0.234		0.0141
		(0.163)		(0.0190)		(0.196)		(0.0356)
DOGDDZ		-0.106		0.0269		-1.169***		-0.0833
		(0.443)		(0.0470)		(0.383)		(0.0563)
SIZE	0.0294	0.0248	0.00212	-0.000912	-0.530***	-0.596***	-0.00570	-0.0136
	(0.0336)	(0.0368)	(0.00455)	(0.00454)	(0.0960)	(0.101)	(0.0225)	(0.0248)
LEV	0.179	0.164	-0.0543	-0.0543	0.432*	0.338	-0.0651**	-0.0732**
	(0.212)	(0.216)	(0.0314)	(0.0318)	(0.221)	(0.240)	(0.0297)	(0.0284)
DIV	0.000924	0.000911	-4.12e-05	-1.41e-05	7.00e-05	6.27e-05	-7.84e-05	-7.12e-05
	(0.00063)	(0.00061)	(4.8e-05)	(4.69e-05)	(0.00053)	(0.00057)	(6.6e-05)	(6.54e-05)
DOI	0.534	0.560	-0.0239	-0.0180	0.773***	0.814***	-0.0507	-0.0433
	(0.544)	(0.515)	(0.0278)	(0.0307)	(0.246)	(0.251)	(0.0485)	(0.0482)
DOC	3.69e-05	4.69e-05	9.46e-06	7.87e-06	-3.48e-05	-4.26e-05	-5.44e-06	-3.76e-06
	(4.8e-05)	(4.4e-05)	(5.4e-06)	(5.21e-06)	(8.4e-05)	(7.2e-05)	(1.2e-05)	(1.17e-05)
GO	0.575***	0.591***	-0.064***	-0.0607***	0.230	0.278**	-0.078***	-0.073***
	(0.170)	(0.170)	(0.0186)	(0.0187)	(0.118)	(0.113)	(0.0217)	(0.0234)
Constant	0.774***	0.785***	0.123***	0.134***	3.962***	6.014***	-0.0327	0.331**
	(0.242)	(0.251)	(0.0350)	(0.0352)	(0.696)	(0.807)	(0.104)	(0.156)
Observations	336	336	336	336	336	336	336	336
F-value	6.86***	6.74***	5.41***	5.35***	9.00***	9.43***	6.00***	6.10***
Adj. R-square	0.1227	0.1205	0.0953	0.0941	0.6119	0.6241	0.4963	0.5010

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least square estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDNS represents the number component of the degree of the state level geographic diversification; DOGDDS represents the dispersion component of the degree of the state level geographic diversification; DOGDNZ represents the number component of the degree of the 3-digit zip level geographic diversification; DOGDDZ represents the dispersion component of the degree of the 3-digit zip level geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

According to OLS estimation, while both the number component (DOGDNS) and dispersion component (DOGDDS) positively and significantly affect ROA in the state-level measure of geographic diversification, only the number component (DOGDNZ) positively and significantly affects ROA in the 3-digit zip code level measure of geographic diversification. However, from FE estimation that accounts for firm and time fixed effects, only the degree of dispersion negatively and significantly affects Tobin's q.

Since the Hausman test detects no significant endogeneity for both the number and dispersion component variables, this study does not conduct IV and FE-IV regressions for the examination of the source of the geographic diversification's effect for the sampled casino firms.

Table 26 provides the results of the OLS and FE analyses for examining the source of the product diversification's effect for the sampled casino firms. Similar with the geographic diversification case, the Hausmant test does not reveal any significant endogeneity at the 5% significance level; FE estimation seems to be an appropriate estimation that addresses omitted variable bias as much as possible. From both OLS and FE estimations, the number component of product diversification (DOPDN) has a negative and significant effect on ROA, the profitability of a firm. Conversely, the number component (DOPDN) seems to affect positively Tobin's q, a market-to-book value ratio of a firm. The dispersion component (DOPDD) does not show any significant effect on firm performance from either estimation methods.

In summary, for the source of the geographic diversification's effect in the US casino industry, apparently, the number component of geographic diversification does not affect significantly firm performance and the dispersion component has a negative and significant relationship with Tobin's q when measuring geographic diversification by 3-digit zip codes as a unit of measurement. That is, although the effect of geographic diversification as a whole is insignificant (H1a) in the main analyses, perhaps, the more business operations distribute evenly across 3-digit zip codes, the worse financial-market based firm performance is for the sampled casino firms.

Table 26. Source of Product Diversification's Effect for Casino Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA
DOPDN	-0.0405	-0.0875**	0.692**	-0.162***
	(0.346)	(0.0387)	(0.342)	(0.0550)
DOPDD	0.186	-0.0254	0.0224	-0.0664
	(0.334)	(0.0513)	(0.411)	(0.0723)
SIZE	0.00973	0.00830	-0.507***	-0.00201
	(0.0276)	(0.00448)	(0.0881)	(0.0197)
LEV	0.154	-0.0509	0.476**	-0.0729**
	(0.214)	(0.0314)	(0.209)	(0.0290)
DIV	0.000955	-6.14e-05	3.04e-05	-8.56e-05
	(0.000628)	(5.09e-05)	(0.000605)	(5.91e-05)
DOI	0.646	-0.0427	0.451	-0.00626
	(0.568)	(0.0278)	(0.229)	(0.0480)
DOC	3.99e-05	7.99e-06	-4.22e-05	-6.42e-06
	(6.70e-05)	(5.86e-06)	(7.54e-05)	(1.15e-05)
GO	0.613***	-0.0704***	0.201	-0.0758***
	(0.175)	(0.0168)	(0.115)	(0.0208)
Constant	0.910***	0.158***	4.168***	0.336**
	(0.155)	(0.0243)	(0.547)	(0.133)
Observations	336	336	336	336
F-value	6.66***	4.69***	9.05***	6.35***
Adj. R-square	0.1191	0.0809	0.6134	0.5129

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least square estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOPDN represents the number component of the degree of product diversification; DOPDD represents the dispersion component of the degree of product diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

On the other hand, the number component of product diversification appears to negatively affect ROA, but positively affect Tobin's q in FE estimation. That is, an increase of the number of products of a casino firm causes a negative effect on profitability, but eventually enhances a firm's market value relative to the replacement costs of physical assets. The effect of dispersion component on both Tobin's q and ROA

is statistically insignificant, implying that the share of each product does not affect firm performance significantly. Although the product diversification as a whole does not have any significant effect on firm performance, according to the most rigorous estimation methods (i.e., FE for a model with Tobin's q and IV-FE for a model with ROA), the number component of product diversification appears to have some significant effects on performance of the sampled casino firms.

4.3.2. Source of Diversification's Effect for Restaurant Firms

Table 27 presents the OLS and FE regression analyses for examining the source of the effect of geographic diversification on firm performance for the sampled restaurant firms. From a pooled OLS estimation, only the dispersion component of geographic diversification (DOGDD) seems to affect positively and significantly Tobin's q. However, when controlling for firm and time specific heterogeneities through FE estimation, both the number (DOGDN) and dispersion (DOGDD) components of geographic diversification do not show any statistically significant effect on firm performance.

Table 27. OLS and FE: Source of Geographic Diversification for Restaurants[†]

ESTIMSTION VARIABLES	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA
DOGDN	0.0756	0.0127	-0.344	0.0780
	(0.140)	(0.0315)	(0.268)	(0.0419)
DOGDD	1.208***	-0.0580	-0.0350	0.0821
	(0.235)	(0.0490)	(0.498)	(0.0706)
SIZE	0.0869	0.0805***	-0.545***	0.0269
	(0.0659)	(0.0145)	(0.166)	(0.0263)
LEV	0.725***	0.00650	0.930***	-0.0123
	(0.218)	(0.00959)	(0.151)	(0.0129)
DIV	0.00244	-0.00114***	0.00353	-0.000238
	(0.00270)	(0.000417)	(0.00203)	(0.000244)
DOI	0.275	-0.139**	-0.0731	0.0983
	(0.662)	(0.0658)	(1.130)	(0.0964)
DOC	0.0121	0.00375	0.0346	0.00479
	(0.0106)	(0.00227)	(0.0295)	(0.00360)
GO	3.261***	0.0915	1.917***	0.0511
	(0.553)	(0.0553)	(0.304)	(0.0381)
DOF	0.373***	0.0742***	1.184***	0.130***
	(0.139)	(0.0164)	(0.385)	(0.0380)
BS	-0.0404	0.00780	-0.0389	-0.00741
	(0.0420)	(0.00459)	(0.0461)	(0.00568)
Constant	0.479***	-0.0941***	1.678***	0.0608
	(0.149)	(0.0297)	(0.532)	(0.0762)
Observations	952	952	952	952
F-value	23.97***	20.65***	15.31***	7.12***
R-squared	0.1945	0.1712	0.7039	0.5042

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least square estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDN represents the number component of the degree of geographic diversification; DOGDD represents the dispersion component of the degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

Since the Hausman test detects significant endogeneity of the number and dispersion components, to address endogeneity issues including causality problem, this study conducts IV and FE-IV estimations for examining the source of the geographic

diversification's effect for the sampled restaurant firms. Table 28 summarizes the results.

Table 28. IV and FE-IV: Source of Geographic Diversification for Restaurants[†]

ESTIMATION VARIABLES	IV Tobin's q	IV ROA	FE-IV Tobin's q	FE-IV ROA
DOGDN	4.576***	-0.0565	8.836	2.757
	(1.371)	(0.222)	(6.303)	(1.884)
DOGDD	9.124***	-1.778**	-3.872	-0.0835
	(2.865)	(0.710)	(7.772)	(1.985)
SIZE	-1.363***	0.139	-1.836**	-0.321
	(0.451)	(0.0751)	(0.850)	(0.283)
LEV	0.587**	0.0345	0.639**	-0.0900
	(0.241)	(0.0206)	(0.294)	(0.0634)
DIV	0.0127**	5.71e-05	0.00927**	0.00128
	(0.00643)	(0.000871)	(0.00414)	(0.00115)
DOI	2.352**	-0.273	4.618	1.405
	(1.168)	(0.225)	(3.011)	(0.858)
DOC	0.0967***	-0.00489	0.137	0.0357
	(0.0298)	(0.00643)	(0.0964)	(0.0261)
GO	2.128***	0.140	2.169***	0.150
	(0.738)	(0.105)	(0.614)	(0.152)
DOF	0.606**	0.0975***	1.050	-0.0280
	(0.242)	(0.0363)	(0.919)	(0.249)
BS	-0.0586	0.00637	-0.221	-0.0603
	(0.0678)	(0.0107)	(0.162)	(0.0435)
Constant	0.383	-0.324***	-3.761	-1.784*
	(0.480)	(0.0979)	(3.837)	(1.070)
Observations	952	952	952	952

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. IV represents instrumental variable estimation; FE-IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDN represents the number component of the degree of geographic diversification; DOGDD represents the dispersion component of the degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

From IV estimation, while both the number component (DOBDN) and the dispersion component (DOBDD) appear to affect positively and significantly Tobin's q,

the dispersion component seems to influence negatively and significantly ROA. However, those effects disappear when accounting for firm and time fixed effects in the IV estimation context through the FE-IV method, which is a more rigorous estimation.

Table 29. OLS and FE: Source of Brand Diversification for Restaurants[†]

VARIABLES	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA
DOBDN	-0.395**	0.0191	0.178	-0.0688
	(0.163)	(0.0255)	(0.379)	(0.0465)
DOBDD	-0.678**	0.0510	-0.408	-0.0926**
	(0.310)	(0.0389)	(0.366)	(0.0399)
SIZE	0.115	0.0842***	-0.618***	0.0464
	(0.0594)	(0.0104)	(0.177)	(0.0286)
LEV	0.752***	0.00503	0.925***	-0.00963
	(0.212)	(0.00971)	(0.151)	(0.0125)
DIV	0.00407	-0.00127***	0.00343	-0.000162
	(0.00272)	(0.000409)	(0.00202)	(0.000240)
DOI	0.110	-0.136**	-0.0499	0.0756
	(0.684)	(0.0642)	(1.123)	(0.0965)
DOC	0.00671	0.00375	0.0435	0.00442
	(0.0103)	(0.00224)	(0.0301)	(0.00371)
GO	3.212***	0.0979*	1.902***	0.0416
	(0.553)	(0.0535)	(0.294)	(0.0381)
DOF	0.349**	0.0730***	1.177***	0.126***
	(0.145)	(0.0177)	(0.361)	(0.0402)
BS	-0.0149	0.00936	-0.157	-0.000108
	(0.0729)	(0.0100)	(0.0996)	(0.0120)
Observations	952	952	952	952
F-value	22.71***	28.09***	13.69***	18.38***
Adj. R-square	0.1859	0.2217	0.6654	0.7315

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least square estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOBDN represents the number component of the degree of brand diversification; DOBDD represents the dispersion component of the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

Table 29 presents the OLS and FE regression analyses for examining the source of brand diversification's effect on firm performance for the sampled restaurant firms. According to a pooled OLS regression, while both the number component (DOBDN) and the dispersion component of brand diversification (DOBDD) negatively and significantly relate with Tobin's q, they have no significant relationship with ROA. However, from FE estimation that addresses omitted variable bias by controlling for firm and time specific factors, only the dispersion component (DOBDD) negatively associates with ROA.

Because the Hausman test detects the potential causality issue, this study conducts 2SLS estimation through IV and FE-IV methods for investigating the source of brand diversification's effect for the sampled restaurant firms. The results of IV and FE-IV analyses appear in Table 30.

From both of IV and FE-IV regressions, consistently, the number component of brand diversification (DOBDN) negatively and significantly affects both Tobin's q and ROA of the sampled restaurant firms. On the other hand, the dispersion component of brand diversification (DOBDD) negatively and significantly affects only Tobin's q.

In summary, for geographic diversification of the sampled restaurant firms, both the number and dispersion components seem to have no significant effect on firm performance from FE-IV estimation that would account for firm and time fixed factors and other possible endogeneity issues including a causality problem. This is consistent with the previous analyses results regarding the insignificant impact of geographic diversification, as a whole, on performance of the sampled restaurant firms (H1b).

Table 30. IV and FE-IV: Source of Brand Diversification for Restaurants[†]

ESTIMATION VARIABLES	IV Tobin's q	IV ROA	FE-IV Tobin's q	FE-IV ROA
DOBDN	-5.713***	-1.201***	-1.712**	-1.998**
	(2.083)	(0.426)	(0.746)	(0.868)
DOBDD	-3.159***	0.495	-1.468***	-5.501
	(1.078)	(0.601)	(0.544)	(3.101)
SIZE	0.0177	0.0897***	-0.410***	0.300**
	(0.0973)	(0.0268)	(0.131)	(0.146)
LEV	0.786***	0.00241	0.933***	0.0548
	(0.155)	(0.0208)	(0.145)	(0.0473)
DIV	0.0171**	0.00187	0.00648***	0.00283
	(0.00679)	(0.00140)	(0.00218)	(0.00204)
DOI	-0.369	-0.190	0.0773	-0.615
	(0.681)	(0.123)	(0.926)	(0.631)
DOC	-0.00947	-0.00438	0.0431	0.0478
	(0.0173)	(0.00416)	(0.0275)	(0.0335)
GO	2.170***	-0.118	1.857***	-0.303
	(0.772)	(0.145)	(0.278)	(0.275)
DOF	-0.531	-0.185**	0.756**	-0.485
	(0.392)	(0.0838)	(0.343)	(0.364)
BS	1.318**	0.464***	0.225	-0.252
	(0.542)	(0.142)	(0.162)	(0.311)
Constant	1.406***	0.146	1.599***	-0.437
	(0.468)	(0.0901)	(0.411)	(0.416)
Observations	952	952	952	952

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. IV represents instrumental variable estimation; FE-IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOBDN represents the number component of the degree of brand diversification; DOBDD represents the dispersion component of the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

On the other hand, this study found that the number component of brand diversification negatively and significantly affect both Tobin's q and ROA in FE-IV estimation. Given that the effect of brand diversification, as a whole, imposes a negative effect on performance of the sampled restaurant firms (H2b), an increase in the number of brands is a significant source of the negative effect of brand diversification on firm

performance. However, the dispersion component appears to influence negatively and significantly only Tobin's q. The implication is that while both the number and dispersion of brands are a significant source of negative effect of brand diversification on Tobin's q, a firm's value, only the degree of even distribution of brands, not the number of brands, may be a significant source of negative effect of brand diversification on ROA, a firm's profitability, in the US restaurant industry.

4.3.3. Source of Diversification's Effect for Lodging Firms

Table 31 presents the OLS and FE regression analyses for investigating the source of the geographic diversification's effect on firm performance for the sampled lodging firms. From OLS estimation, the number component of geographic diversification (DOGDN) seems to relate positively and significantly both with Tobin's q and ROA of the sampled lodging firms. However, from FE estimation that controls for firm and time fixed effects, the number component does not have a significant relationship with firm performance. The dispersion component of geographic diversification (DOGDD) does not show any significant effect on firm performance, consistently, from both OLS and FE estimations.

Since the Hausman test detects insignificant endogeneity that may bring about causality problem between geographic diversification and firm performance, this study conducts IV and FE-IV methods with 2SLS estimation; the results appear in Table 32. Similar to the results from the OSL regressions, from IV estimation only the number component (DOGDN) positively and significantly affects both Tobin's q and ROA.

Table 31. OLS and FE: Source of Geographic Diversification for Lodging Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA
DOGDN	0.429***	0.0604***	0.196	0.0362
	(0.158)	(0.0186)	(0.175)	(0.0461)
DOGDD	1.146	0.0982	0.962	0.222
	(0.609)	(0.0709)	(0.748)	(0.129)
SIZE	0.00723	-0.00337	-0.244***	0.0102
	(0.0207)	(0.00330)	(0.0576)	(0.0228)
LEV	0.290**	0.0559***	0.996***	0.0920***
	(0.139)	(0.0169)	(0.122)	(0.0321)
DIV	9.58e-05	7.56e-05	0.000769	0.000285
	(0.00113)	(0.000103)	(0.00163)	(0.000188)
DOI	0.780	0.0816	-1.458	-0.116
	(0.536)	(0.0423)	(1.163)	(0.102)
DOC	-0.105	0.0108	0.0308	-0.0392
	(0.107)	(0.0130)	(0.0895)	(0.0302)
GO	-9.47e-06	-7.90e-05***	0.0815***	-0.00969***
	(0.000139)	(1.41e-05)	(0.0142)	(0.00368)
DOF	-0.152	-0.0261	-0.0254	-0.00319
	(0.214)	(0.0251)	(0.213)	(0.0498)
BS	-0.255***	-0.0234***	-0.0661	-0.0146
	(0.0492)	(0.00493)	(0.0440)	(0.00794)
Constant	0.772***	0.0583**	-74.80***	9.103**
	(0.145)	(0.0259)	(13.44)	(3.522)
Observations	176	176	176	176
F-value	7.56***	6.34***	20.91***	5.95***
Adj. R-Square	0.2728	0.2337	0.8741	0.6332

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least square estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDN represents the number component of the degree of geographic diversification; DOGDD represents the dispersion component of the degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

However, after accounting for firm and time specific heterogeneities with FE-IV estimation in addition to the IV method in which instrumental variables may correlate with firm and time specific attributes, both the number (DOGDN) and the dispersion (DOGDD) components positively and significantly affect Tobin's q.

Table 32. IV and FE-IV: Source of Geographic Diversification for Lodging Firms[†]

ESTIMATION VARIABLES	IV Tobin's q	IV ROA	FE-IV Tobin's q	FE-IV ROA
DOGDN	1.281***	0.148**	1.961**	0.484
	(0.398)	(0.0580)	(0.829)	(0.275)
DOGDD	0.965	0.429	13.67**	-1.944
	(1.831)	(0.222)	(6.672)	(1.730)
SIZE	-0.0844	-0.0111	-0.523***	-0.0182
	(0.0453)	(0.00580)	(0.152)	(0.0569)
LEV	0.0205	0.0375	1.135***	0.0497
	(0.183)	(0.0274)	(0.205)	(0.0787)
DIV	0.00159	0.000149	0.00100	0.000835
	(0.00127)	(0.000119)	(0.00184)	(0.000605)
DOI	0.808	0.0654	-0.810	0.541
	(0.552)	(0.0423)	(1.962)	(0.408)
DOC	-0.189	0.00677	-0.379**	0.0312
	(0.118)	(0.0133)	(0.186)	(0.0575)
GO	-0.000306	-4.59e-05	0.0293	-0.0181
	(0.000329)	(3.76e-05)	(0.0265)	(0.00941)
DOF	-0.446	-0.0402	0.0988	0.274
	(0.231)	(0.0305)	(0.620)	(0.171)
BS	-0.364***	-0.0364***	-0.243***	-0.0485
	(0.0630)	(0.00964)	(0.0873)	(0.0280)
Constant	0.944***	0.0789***	2.710	-0.672
	(0.171)	(0.0283)	(1.463)	(0.473)
Observations	176	176	176	176

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. IV represents instrumental variable estimation; FE-IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDN represents the number component of the degree of geographic diversification; DOGDD represents the dispersion component of the degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

However, both the number and the dispersion components of geographic diversification do not significantly affect ROA from FE-IV estimation.

Table 33 summarizes OLS and FE estimation for the investigation of the source of the brand diversification's effect on firm performance for the sampled lodging firms.

Table 33. OLS and FE: Source of Brand Diversification for Lodging Firms[†]

ESTIMATION VARIABLES	OLS Tobin's q	OLS ROA	FE Tobin's q	FE ROA
DOBDN	-0.188	0.00633	-0.124	-0.0143
	(0.110)	(0.0150)	(0.170)	(0.0322)
DOBDD	-0.585**	-0.0274	0.131	0.0671
	(0.270)	(0.0269)	(0.208)	(0.0346)
SIZE	0.0525***	0.00180	-0.191***	0.0230
	(0.0181)	(0.00339)	(0.0610)	(0.0202)
LEV	0.390***	0.0682***	0.982***	0.0919***
	(0.119)	(0.0169)	(0.117)	(0.0300)
DIV	-0.000242	1.83e-06	0.000404	0.000214
	(0.00104)	(0.000105)	(0.00159)	(0.000207)
DOI	0.997	0.0877**	-1.423	-0.0745
	(0.536)	(0.0435)	(1.227)	(0.120)
DOC	-0.0923	0.0121	0.0636	-0.0315
	(0.100)	(0.0135)	(0.0862)	(0.0295)
GO	-0.000344**	-9.56e-05***	0.0866***	-0.00869***
	(0.000173)	(1.57e-05)	(0.0131)	(0.00327)
DOF	-0.204	-0.0173	-0.0651	0.00807
	(0.249)	(0.0266)	(0.223)	(0.0461)
BS	-0.187***	-0.0186***	-0.0225	-0.00825
	(0.0479)	(0.00515)	(0.0523)	(0.00720)
Constant	0.661***	0.0488*	0.817***	0.0291
	(0.122)	(0.0259)	(0.126)	(0.0402)
Observations	176	176	176	176
F-value	7.29***	4.83***	20.84***	6.12***
Adj. R-Square	0.2644	0.1794	0.8736	0.6407

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. OLS represents ordinary least square estimation; FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOBDN represents the number component of the degree of brand diversification; DOBDD represents the dispersion component of the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

From the pooled OLS regression analyses, only the dispersion component of brand diversification (DOBDD) appears to positively and significantly associate with

Tobin's q. On the other hand, after controlling for firm and time specific heterogeneities with the FE method, none of the number (DOBDN) and the dispersion (DOBDD) components of brand diversification shows a significant impact on firm performance for the sampled lodging firms.

Since the Hausman test detects significant endogeneity of the number and dispersion components, this study conducts the IV and FE-IV regressions to account for potential endogeneity problems that may not be accounted for by using FE estimation. Table 34 presents the results and shows that from IV estimation, coefficients of both the number (DOBDN) and the dispersion (DOBDD) components of brand diversification are statistically insignificant. However, after partialling out firm and time fixed effects with FE-IV estimation, the degree of dispersion of brands (DOBDD) positively and significantly affect both Tobin's q and ROA, while the number component (DOBDN) does not seem to have a significant impact on firm performance.

In summary, for the investigation of the source of diversification's effect on firm performance for the sampled lodging firms, both the number and dispersion components appear to be significant sources of the positive effects from geographic diversification on Tobin's q, and only the dispersion component of brand diversification seems to positively and significantly affect both Tobin's q and ROA.

Given that geographic diversification, as a whole (i.e., in combination of the number and dispersion factors), affects positively both Tobin's q and ROA of the sampled lodging firms (H3a), it seems that contribution of an increase in the number of geographic areas to enhancing Tobin's q, regardless of the share of each geographic area, is significant. And, although the number and dispersion components of geographic

diversification, in combination, may positively affect ROA, each of them does not have a significant effect on ROA individually.

Table 34. IV and FE-IV: Source of Brand Diversification for Lodging Firms[†]

ESTIMATION VARIABLES	IV Tobin's q	IV ROA	FE-IV Tobin's q	FE-IV ROA
DOBDN	0.344	-0.0124	0.245	0.0382
	(0.597)	(0.111)	(0.408)	(0.0619)
DOBDD	1.918	0.368	4.151**	0.521**
	(3.233)	(0.488)	(1.628)	(0.220)
SIZE	0.0486	0.00807	0.135	0.0466**
	(0.0407)	(0.00695)	(0.133)	(0.0197)
LEV	0.467	0.106***	1.240***	0.122***
	(0.277)	(0.0357)	(0.344)	(0.0465)
DIV	-0.000812	-9.11e-05	-0.00111	7.18e-05
	(0.00159)	(0.000182)	(0.00264)	(0.000362)
DOI	0.400	0.0319	1.738	0.0437
	(0.901)	(0.127)	(2.299)	(0.264)
DOC	0.0121	0.0459	0.0540	-0.0179
	(0.285)	(0.0426)	(0.179)	(0.0256)
GO	0.000859	0.000130	0.0865***	-0.00888***
	(0.00162)	(0.000240)	(0.0229)	(0.00296)
DOF	0.414	0.0814	1.369***	0.127***
	(0.828)	(0.125)	(0.390)	(0.0454)
BS	-0.147	0.0133	-0.102	-0.0171
	(0.133)	(0.0213)	(0.141)	(0.0204)
Constant	0.645**	0.0171	-1.001	-0.248**
	(0.258)	(0.0427)	(0.762)	(0.110)
Observations	176	176	176	176

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. IV represents instrumental variable estimation; FE-IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOBDN represents the number component of the degree of brand diversification; DOBDD represents the dispersion component of the degree of brand diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity; DOF represents the degree of franchising; BS represents a brand strategy dummy.

These results are based on the FE-IV estimation that strictly addresses firm and

time specific heterogeneity and other transitory endogeneity problems to enhance causality of the relationship.

For the source of brand diversification's effect, although brand diversification, as a whole, does not significantly affect firm performance, the dispersion component, individually, seems to have a positive effect both on Tobin's q and ROA. That is, regardless of the number of brands, the degree of even distribution of brands may enhance firm performance. And, apparently the influence from the number of brands may compromise the positive effect of the dispersion across brands on firm performance for the sampled lodging firms.

4.4. Summary of the Results

From the most rigorous estimations in this study's analyses (i.e., FE or FE-IV if relevant) that ensures causality as much as possible, no significant effect exists for geographic diversification on Tobin's q, a financial-market based measure of firm performance in the US casino industry. On the other hand, the degree of geographic diversification appears to have a positive effect on ROA, an accounting-based measure of firm performance in the US casino industry. Thus, the analyses do not support hypothesis, H1a (the negative effect of geographic diversification on firm performance in the US casino industry).

For the effect of product diversification for the sampled casino firms, the study's analyses show no significant effect of product diversification on firm performance either linear or curvilinear models. Consequently, H2a (an inverse U-shaped relationship between product diversification and firm performance in the US casino industry) remains

unsupported.

This study found an insignificant moderating effect of product diversification on the relationship between geographic diversification and firm performance for the sampled casino firms among diverse measures of the degree of geographic diversification. Thus, the analysis of this study does not support H3a (the positive moderating effect of product diversification in the US casino industry).

For the source of geographic diversification's effect in the US casino industry, while the number component of the geographic diversification does not significantly affect firm performance, the possibility exists that the dispersion component has a negative impact on Tobin's q when measurement of geographic diversification uses 3-digit zip codes. On the other hand, the number component of product diversification seems to negatively affect ROA, but positively affect Tobin's q. However, the effect of the dispersion component of product diversification on firm performance is statistically insignificant.

For the US restaurant industry, the effect of geographic diversification on both Tobin's q and ROA is not significant, and the analysis does not support H1b (the negative effect of geographic diversification on firm performance in the US restaurant industry).

On the other hand, this study finds a negative and significant effect of brand diversification both on Tobin's q and ROA for the sampled restaurant firms thereby supporting H2b, which proposes a negative effect of brand diversification on firm performance in the US restaurant industry.

The study's analyses find a negative moderating effect of brand diversification on the relationship between geographic diversification and performance of the sampled

restaurant firms. This result is contradictory to H3b.

Regarding additional analyses that examine the source of the effect of diversification, both the number and dispersion components appear to have no significant effect on firm performance for the sampled restaurant firms. On the other hand, this study finds that the number component of brand diversification negatively affects both Tobin's q and ROA and the dispersion component negatively affects only Tobin's q.

For the effect of geographic diversification of the sampled lodging firms, this study finds a positive effect from the degree of geographic diversification on both Tobin's q and ROA. Thus, the analysis does not support H1c, the negative effect of geographic diversification on firm performance.

And, this study finds no significant effect of brand diversification on both Tobin's q and ROA. Consequently no support accrues to H2c that proposes a negative effect of the degree of brand diversification on performance in the US lodging industry.

Regarding the moderating effect of brand diversification, this study finds a positive and significant moderating effect of brand diversification on the relationship between geographic diversification and Tobin's q (and ROA). This result provides support for H3c, while the comparison between the magnitude of the coefficient for the moderating effect of brand diversification in the US lodging industry and the moderating effect of product diversification in the US casino industry is not feasible.

For the investigation of the source of diversification's effect for the sampled lodging firms, both the number and dispersion components seems to be significant sources of the positive effects from geographic diversification on Tobin's q. And, for brand diversification, only the dispersion component positively and significantly affects

both Tobin’s q and ROA.

CHAPTER 5

DISCUSSION AND CONCLUSION

The purpose of this study is to examine the effects of diversification strategies on firm performance in the US casino, restaurant and lodging industries. Specifically, to more comprehensively investigate the interactions between different diversification strategies in the US hospitality field, this study examines the moderating effect of product diversification on the geographic diversification-firm performance relationship in the US casino industry and the moderating effect of brand diversification on the geographic diversification-firm performance relationship in the US restaurant and lodging industries.

This study uses the Berry-Herfindahl index that incorporates both the number and weight of entities to measure the degree of diversification. Firm performance is measured, in turn, by Tobin's q, a financial market-based measure of firm performance, and ROA, an accounting-based measure of firm performance. To accomplish the study's purposes, this study conducts regression analyses that rigorously address the endogeneity problem and autocorrelation and heteroscedasticity of standard errors.

This study finds inconsistent results among different diversification dimensions, regression estimations, and industries. This chapter provides detailed discussion of results of analyses, practical implications, and contributions. Limitations of the study and suggestions for future research finalize the discussion.

5.1. Discussion of Results

5.1.1. Effect of Geographic Diversification on Firm Performance

This study finds different effects from geographic, product, and brand diversifications on firm performance and moderating effects from product and brand diversifications on the geographic diversification-firm performance relationship among three different segments of the US hospitality industry. That is, the results of analyses show a positive effect from geographic diversification in the US lodging (both on Tobin's and ROA) and casino industries (on ROA) and the insignificant effect from geographic diversification on firm performance in the US restaurant industry.

The positive effect of geographic diversification on both Tobin's q and ROA in the US lodging industry context is consistent with findings of previous studies (Deng and Elyasiani, 2008; Grant, 1987; Han et al., 1998), and implies that benefits from geographic diversification outweigh costs with regard to a firm's value and profitability. That is, for US lodging firms, economies of scale, learning effects, risk reduction, and/or market power advantages from business operations across diverse geographic locations are greater than incremental costs from geographic expansion, such as coordination, information, and motivation costs caused by complexities of organization and principal-agent structures (Hengartner, 2006; Hitt et al., 1994; Jensen, 1986).

For the US casino industry, the positive effect of geographic diversification on ROA and the insignificant effect of geographic diversification on Tobin's q imply that while the geographic diversification leads to an increase in the profitability of the sampled casino firms, it does not significantly affect a firm's market value relative to the replacement value of physical assets. That means, although returns from assets enhance from geographic diversification, investors in financial markets do not value significantly this effect yet.

This result is different from the finding of the Kang et al.'s (in press) study that found a negative effect from geographic diversification on Tobin's q of the sampled US casino firms. The inconsistency may be due to the difference in samples of two studies. While the Kang et al.'s (in press) study employs a sample of 14 casino firms during the period 2000-2008, the current study's sample consists of 43 casino firms with a sample period of 1993-2010. It is possible that for this study's analyses, the positive effect of geographic diversification at the initial stage in the US casino industry (i.e., before 2000) may compensate for the negative effect of geographic diversification on Tobin's q for the sample period (i.e., from 2000 to 2010). Or, perhaps, different estimation methods may lead to different results. The Kang et al.'s (in press) study used a pooled OLS estimation due to a limited sample size, which may not appropriately addresses firm and time specific heterogeneities and transitory endogeneity, and thus may not ensure causality between geographic diversification and Tobin's q. On the other hand, the current study addresses the causality issue rigorously by using the FE-IV method that account for both unobserved, invariant firm and time specific factors, and potential transitory endogeneity factors, such as unexpected organizational changes or technological improvements within each firm during the sample period.

More specifically for the positive effect of geographic diversification in the US lodging and casino industries, benefits from geographic diversification based on the internalization theory, resource-based view, market power view, and portfolio theory seem to outweigh costs according to the transaction cost theory, agency theory, and organizational evolution theory. Especially, for the benefit side, arguments from the market power view and portfolio theory are more applicable to the results for the effect of

geographic diversification in the US lodging and casino industries than ones from the internalization theory and resource-based view. While expanding into diverse geographic markets, US casino and lodging firms can achieve conglomerate powers, thereby establishing dominant positions, mitigating competition, and gaining greater bargaining powers across geographic markets (Montgomery, 1994). Frequent closures of small firms and mergers and acquisitions in the US casino and lodging industry support the critical influences of market power advantages in those industries. In addition, considering substantial differences in regulations, customers, and natural environments across states in which US casino and lodging firms operate their businesses (Basham and Kwon, 2009), the portfolio effect that stabilizes a firm's overall return, thereby reducing risk and bankruptcy costs may be a significant benefit to US casino and lodging firms. An empirical evidence of risk reduction from interstate geographic diversification in the US casino industry (Kang et al., in press) supports the benefit based on the portfolio theory.

On the other hand, the benefits according to internalization theory and the resource-based view seem to be less influential for explaining the benefits from geographic diversification of the US casino and lodging industries. The internalization theory and resource-based view commonly emphasize establishment of firm specific knowledge or competitive advantage through learning and interdependencies among diverse business units (Buckley and Casson, 1976; Barney, 1991). However, US casino and lodging firms replicate an entire value chain in each geographic region, which is a characteristic of capital-based service firms (Contractor et al., 2003). Such independent operations in separate geographic locations may hamper, among geographic- level

business units, effective learning and interdependencies which allow establishing firm-specific knowledge, resources, and capabilities.

The insignificant effect of geographic diversification both on Tobin's and ROA may be due to differences in industry or firm characteristics among the restaurant and the other industries in the US hospitality field (i.e., casino and lodging industries). Compared to US casino and lodging industries, the US restaurant industry seems to bear higher costs relative to benefits from geographic diversification. More specifically, the internal transaction costs argument and the organizational evolution theory, rather than the agency theory, may better explain costs of geographic diversification in the US restaurant industry. US restaurants are smaller and less-established than US casino and lodging firms. While the average firm size, measured by total assets of the sampled casino and lodging firms are $500.16 million and $293.53 million, respectively, the average firm size of the sampled restaurant firms is just $7.44 million. Smaller US restaurant firms with less managerial capabilities may have more difficulties coordinating diversified geographic level business units and processing information within complex organizations caused by geographic diversification. In contrast, US casino and lodging firms that have relatively well-established structures and programs have less difficulty dealing with such internal transaction costs from geographic diversification. In addition, the number of geographic markets in which US restaurant firms operate businesses is greater (15 of the average number of states for the sampled restaurant firms vs. 3 and 12 for the sampled casino and lodging firms, respectively) and the size of each highly competitive geographic market is especially small for US restaurant firms (Waldfogel, 2008). Those circumstances imply that restaurant firms may face more severe challenge

of adapting themselves to new business environments when implementing geographic diversification, as the organizational evolution theory argues. On the other hand, the agency problem may be less substantial in the US restaurant industry than the US casino and lodging industries. In general, the discrepancy between corporate managers' interests and shareholders' interests may be an increasing function of firm size. That is, managers of smaller US restaurant firms with limited cash flow have relatively less opportunity for over-investments to entrench their positions and diversify their employment risk (Jensen 1986; Amihud and Lev, 1981).

According to this study's samples, several different industry- or firm-specific characteristics exist between the US restaurant industry and the casino or lodging industries. For example, the mean degree of competition (DOC) of the sampled restaurant firms (4.543) is more than 10 times greater than that of the sampled lodging firms (0.418) in this study. Severe competition in the US restaurant industry may deter taking advantage of firm specific competitive advantages (Barney, 1991; Buckley and Casson, 1976) or increased market power (Montgomery, 1994) from geographic diversification, which can limit benefits from geographic expansion not enough to cover increased costs. In addition, the average growth opportunity of the sampled restaurant firms (0.134) is just 1/43 of that of the sampled lodging firms (5.763). Considering that growth opportunity, measured by capital expenditure divided by sales, reflects the potential growth in the industry, less growth opportunity in the US industry may mitigate the positive benefits from expansion across diverse geographic locations, thus leading to an insignificant impact of geographic diversification on performance of the sampled restaurant firms. And, average firm size of the sampled lodging firms measured by total

assets ($293.53 million in total assets) is almost 40 times greater than that of the sampled restaurant firms ($7.44 million in total assets). That implies that US restaurant firms may reap less advantage from geographic diversification due to limited economies of scale or a lack of resource availability required for successful implementation of geographic diversification (Bausch and Krist, 2007).

5.1.2. Effects of Product and Brand Diversification on Firm Performance

This study found an insignificant effect of product diversification on both Tobin's q and ROA in the US casino industry. And, according to the study's analyses, while the effect of brand diversification on firm performance in the US lodging industry appears to be insignificant, in the US restaurant industry the effect of brand diversification on both Tobin's q and ROA is negative and significant.

An insignificant impact of product diversification on firm performance in the US casino industry implies that, on average, the US casino firms do not appropriately exploit economies of scope, learning effect, or benefits from complementarities among products (Siggelkow, 2003), nor bear significant internal transaction costs caused by increased complexities of organization (Hitt et al., 1994; Jones and Hill, 1988). It is possible that benefits and costs from product diversification of US casino firms adequately offset each other, thus leading to an insignificant effect on firm performance.

More specifically, the internalization theory and resource-based view may explain benefits from product diversification of US casino firms more appropriately than the portfolio theory. Since US casino firms operate related and complementary products within each property, common backgrounds and shared understandings among diverse

product-level business units located within a constrained location may lead to greater learning effect and economies of scope thorough more facilitated interdependencies among those units. On the other hand, a higher degree of relatedness and complementarities among products leads to less portfolio effect, which generates insignificant benefits in terms of risk reduction for US casino firms.

For the cost side of product diversification, the agency theory seems to be more influential than the transaction cost theory and organizational evolution theory. Because of separate operation of each property of US casino firms, within which diverse products exist, headquarters of US casino firms may not appropriately control and monitor managers' activities which tend toward pursuing self-interests that may not align with shareholders' interests. However, due to the complementarity and location boundedness nature of product diversification, internal transaction costs, such as coordination and information processing costs from an increased degree of product diversification, may not be significant. And, considering the limited degree of product diversification (maximum 6 products in the sampled casino firms) within the same business environment (i.e., product diversification in the same property), costs of adapting to new business environments may not be substantial for US casino firms.

The finding from this study is not consistent with finding of Kang et al.'s (2011) study, an inverse U shaped relationship between product diversification and Tobin' q in the US casino industry. Firm characteristics (e.g., firm size and leverage) and the degree of product diversifications, measured by the Berry-Herfindahl index, in two studies' samples are not substantially different. And, even from OLS estimation of this study with a curvilinear functional form, which is the same estimation method and model

specification used in the Kang et al.'s (2011) study, the results of the current study's analyses consistently show an insignificant effect from product diversification. The potential source of difference between two studies' results may be the difference in samples employed. That is, while the earlier Kang et al.'s (2011) study used 15 casino firms spanning the period 2001 to 2008, the current study uses 43 casino firms with a sample period of 1993-2010. Speculatively, business operations of US casino firms before 2001, excluded from the Kang et al. (2011) sample, may deter an overall positive relationship (between product diversification and firm performance) up to the optimal level of product diversification and/or mitigate the negative relationship after passing the optimal point of product diversification, shown in the Kang et al.'s (2011) study.

This study's finding of a negative effect of brand diversification on firm performance in the US restaurant industry is consistent with the finding of the Choi et al.'s (in press) study, conducted in the US restaurant industry context. The same results from two studies' analyses, despite differing samples (46 firms during 2003-2007 for Choi et al.'s (in press), and 132 firms during 1993-2010 for the current study) may increase validity of the negative effect of brand diversification on firm performance in the US restaurant industry. By increasing the degree of brand diversification, US restaurant firms seem to bear a performance decline possibly due to aggravated internal transaction costs within a complex organization (Schwandt, 2009) or inefficiency in marketing through dilution of marketing resources (Hill et al., 2005). These circumstances may outweigh potential benefits form brand diversification, such as establishing entry barriers (Bordley, 2003), enhancing marketing economies of scale and scope (Aaker, 2004), and reducing customer satiation (Lancaster, 1990).

The inconsistency between the insignificant effect of brand diversification for US lodging firms and the negative effect of brand diversification for US restaurant firms may be due to differences in the degree of brand diversification, the degree of competition, and firm size among samples of the two industries. The substantially small degree of brand diversification of the sampled restaurant firms (0.192), compared to that of the sampled lodging firms (0.366) implies that brand diversification of US restaurant firms may not be sufficiently developed to transcend the threshold of exploiting benefits from brand diversification, such as economies of scale and scope or building entry barriers to crowd out potential competitors. On the other hand, the larger degree of brand diversification of US lodging firms may be sufficient to access those benefits from brand diversification that, although not outweighing, can cover the costs from brand diversification. And, considering recent proliferation of brands in the US restaurant and lodging industries (Basham, 2008; Kim, 2008), a substantially higher degree of competition in the US restaurant industry (4.543 of DOC) than in the US lodging industry (0.418 of DOC) may amplify the cannibalization problem, price competition, and brand switching of customers (Quelch and Kenny, 1994; Bawa et al., 1989). In addition, significantly smaller firm size of the sampled restaurant firms ($7.44 million in total assets) than that of the sampled lodging firms ($293.53 million in total assets) may deter marketing economies of scale, scope, and effective learning from operating diverse brands (Choi et al., in press).

From a theoretical perspective, similar to the product diversification case, the internalization theory and resource-based view may be more applicable to brand diversification in the US restaurant and lodging industries than the portfolio theory. That

is, considering that brand diversification in the US restaurant and lodging industry occurs within a homogeneous product arena, or sometimes, for the same customer segment, brand-level business units within US restaurant and lodging firms share a greater portion of resources and knowledge, thereby facilitating the learning effect and marketing economies of scope. However, operating multiple brands for a homogeneous product may generate less degree of risk diversification because correlations between brands may be substantially high.

For the explanation of costs of brand diversification, the organizational evolution theory seems to be more applicable than the agency theory and internal transaction cost argument. Different from product diversification, corporate headquarters of US restaurant and lodging firms arrange and operate brand diversification, which enables a firm to more effectively monitor and control managers of brand level divisions. And, considering that brand diversification involves less significant restructuring of an organization than product diversification (Delacroix and Swaminathan, 1991), increased internal transaction costs from brand diversification may be less substantial than for product diversification. However, according to the organizational evolution theory, as a firm diversifies, costs increase to deal with new customers, suppliers, and competitors (Chang and Wang, 2007). Considering that proliferated brands of hedonic products in the US restaurant and lodging industries may induce customers' frequent brand switching behaviors and lead to a high degree of competition, US restaurant and lodging firms may have more difficulties maintaining a loyal customer base, dealing with suppliers, and coping with competitors as the degree of brand diversification increases. Especially, combined with a more severe competition and more brand proliferation within a small

market in the US restaurant industry than the US lodging industry, costs from launching new brands to adapt to new business environments may substantially influence the negative effect of brand diversification on firm performance in the US restaurant industry.

5.1.3. Moderating Effects of Product and Brand Diversification

With regard to geographic diversification-firm performance relationship, this study finds an insignificant moderating effect of product diversification in the US casino industry, a negative moderating effect of brand diversification in the US restaurant industry, and a positive moderating effect of brand diversification in the US lodging industry. These results, based on the estimation methods for coefficients (i.e., FE or IV-FE method if relevant), rigorously address endogeneity to avoid omitted variable bias and enhance causality as much as possible. For standard error estimation, the Newey-West standard errors are used to adjust for possible autocorrelation and heteroscedasticity in the panel data set.

The insignificant moderating effect of product diversification in the US casino industry implies that an increase in product diversification does not affect geographic diversification's influence on firm performance. That is, as a whole the effect from geographic diversification on firm performance is not contingent on the level of product diversification. It may be possible that the positive moderating effect of product diversification (e.g., increased learning and synergy effects from the integration of geographic and product diversification) and the negative moderating effect of product diversification (e.g., increased internal transaction costs from organizational complexity) offset each other, leading to the insignificance, on average.

This study finds a negative moderating effect of brand diversification on the relationship between geographic diversification and firm value (Tobin's q) for the sampled restaurant firms. That is, the effect of geographic diversification on firm value is conditional upon US restaurant firms' degree of brand diversification. More specifically, as the level of brand diversification increases, the effect of geographic diversification on firm value decreases. Arguably, an integration of geographic and brand diversification leads to greater task interdependencies within an organization and increased internal transaction costs (i.e., coordination, information, and motivation costs) beyond managerial capability (Franko, 2004; Tallman and Li, 1996; Williamson, 1985). At the same time, benefits from operating geographic and brand diversification in combination (e.g., increased learning, synergy effect, or marketing options) may exist. However, benefits may be insufficient to outweigh costs from US restaurant firms' operating both geographic and brand diversifications, which lead to the negative moderating effect of brand diversification. Notably, although the effect of geographic diversification, individually, has an insignificant impact on firm performance in the US restaurant industry, that impact is contingent on how much an operations of brands are diversified. More specifically, for a restaurant firm with a higher degree of brand diversification, the effect of geographic diversification on firm value is more negative.

In contrast to the case of the US restaurant industry, the moderating effect of brand diversification on the relationship between geographic diversification and firm performance is positive in the US lodging industry. That is, as the degree of brand diversification increases, the effect of geographic diversification on performance of US lodging firms increases. US lodging firms that conduct geographic and brand

diversifications in combination may achieve benefits by applying what they learn from operating a diversified brand portfolio (e.g., how to deal with cooperation and competition among divisions) to the effective management of geographic diversification (Chang and Wang, 2007; Hitt et al., 1997). Or, US lodging firms may obtain increased economies of scale, scope, and market power through interdependencies and shared resources among brand- and geographic-levels of business divisions (Chang and Wang, 2007; Kim et al., 1989; Tallman and Li, 1996). In addition, US lodging firms with a higher degree of brand diversification can take greater advantages when expanding into geographic markets by effectively satisfying diverse customer needs with more options for targeting (Kekre and Srinivasan, 1990; Varadarajan et al., 2006). For example, when a lodging firm implements business in a tourism destination, advantages arise from having a large brand portfolio from which the firm can choose the most appropriate brand for the particular destination (e.g., luxury brand).

The contrasting result with respect to the moderating effect of brand diversification between the US restaurant industry and the US lodging industry may be due to the different degree of brand diversification, business environment, and firm characteristics. The mean degrees of geographic diversification between the two industries are significantly similar (0.683 for the restaurant industry and 0.690 for the lodging industry) but the mean degrees of brand diversification are substantially different (0.192 for the restaurant industry and 0.366 for the lodging industry). Thus, when implementing geographic diversification, restaurant firms may gain less benefit in learning from operation of brand diversification, exploiting interdependencies between brand and geographic divisions, and enhancing marketing advantages due to a smaller

degree of brand diversification than lodging firms. Further, considering a more saturated US restaurant market (4.543 of the mean degree of competition) with less opportunity (0.134 of the mean growth opportunity) than the US lodging market (0.418 of the mean degree of competition and 5.763 of the mean growth opportunity), restaurant firms' positive effect from increased brand diversification when expanding into new geographic markets may be more limited than lodging firms. And, while increasing brand diversification when implementing geographic diversification, US restaurant firms that have smaller firm sizes than US lodging firms may be less effective in learning, exploiting economies of scale and scope, and dealing with complicated organizations from increased brand diversity due to less established managerial capability and experience.

5.1.4. Source of the Diversification's Effect

The results of analyses for the source of diversification's effects are different among the three industries. For the source of geographic diversification's effect, this study finds a weak negative effect of the dispersion component on Tobin's q in the US casino industry, insignificant effects from both of the number and dispersion components on firm performance in the US restaurant industry, and the positive effect from both the number and dispersion components on Tobin's q in the US lodging industry.

Regarding the US casino industry, although the negative effect of geographic diversification's dispersion component on Tobin's is inconsistent among different measures of geographic diversification, some possibility exists that the degree of dispersion is a more significant source of geographic diversification than the number of

locations. Insignificant separate effects from the number and dispersion components of geographic diversification in the US restaurant industry corresponds to the insignificant effect of geographic diversification measured in combination of the number and dispersion components on firm performance. The positive effects from both components in geographic diversification on Tobin's q in the US lodging industry mean that the source of the overall positive effect of geographic diversification on Tobin's q is both the number of geographic locations and the level of equal distribution across geographic locations.

For product and brand diversification, this study finds a positive effect of the number component in product diversification on Tobin's q and a negative effect of the number component on ROA in the US casino industry. And, in the US restaurant industry, the negative effects are from both the number and dispersion components in brand diversification on Tobin's q and only from the number component on ROA. On the other hand, in the US lodging industry, only the dispersion component in brand diversification contributes to enhancing Tobin's q and ROA.

In the US casino industry, although the overall impact of product diversification on firm performance is insignificant, the number component itself is a significant source of the effect from product diversification on firm performance. That is, an increase in product line, if the share of each product line remains constant, may positively affect Tobin's q, a firm's value, but negatively affect ROA, a firm's profitability. This result is consistent with the finding of the Jose et al.'s (1986) study that suggests the number in product diversification is a more important source than share distribution in manufacturing firms' product diversification contexts.

In the US restaurant industry, the source of the overall negative effect of brand diversification on Tobin's q is both an increase in the number of brands and the level of share distribution. For ROA, an increase in the number of brands is a more significant source of the negative effect of brand diversification than the degree of share distribution. On the other hand, in the US lodging industry, only the level of share distribution seems to contribute significantly to increasing both Tobin's q and ROA. Comparing the US restaurant industry with the US lodging industry, a reasonable speculation is that, especially for ROA, while an increase in number has a more significant impact if brand diversification is not sufficient as in the restaurant industry (0.192 of the degree of brand diversification), a equal distribution of brands is more important after brands are substantially diversified as in the lodging industry (0.366 of the degree of brand diversification). Or, for the negative effect of brand diversification, an increase in number may tend to have a more significant and negative impact on profitability regardless of share distribution, while for the positive effect of brand diversification, how much the weights are equally distributed across brands is more important for enhancing profitability than an increase in the number of brands.

5.2. Contributions to the Literature and Practical Implications

This study attempts to address rarely examined subjects in the hospitality field, the effects of individual diversification strategies and the moderating effect of product and brand diversification on the geographic diversification-firm performance relationship. To current knowledge, only a few studies investigated the effect of geographic diversification on firm performance in the US casino and lodging industries, the effect of

product diversification on firm performance in the US casino industry, and the effect of brand diversification on firm performance in the US restaurant industry. This study fills a research gap in the hospitality literature by examining the effect of geographic diversification on firm performance in the US restaurant industry and the effect of brand diversification in the US lodging industry. More importantly, this study contributes to the hospitality literature by providing evidence for a moderating effect of product and brand diversification on the geographic diversification-firm performance relationship, a more comprehensive examination of interactions between major diversification strategies of each industry in the hospitality field.

Further, this study contributes to the whole body of diversification theory and literature by providing empirical evidence of the effects of diversification strategies implemented in a unique context. Most diversification studies incorporate a sample composed of diverse manufacturing or service firms, leading to generalized findings, which do not reflect specific industry characteristics for the effect of diversification. However, as this study's findings show, even in the same hospitality field in which each industry (i.e., casino, restaurant, and lodging industry) has relatively homogenous characteristics, the effects of diversification on firm performance are different from one industry to another. For example, this study found a positive moderating effect of brand diversification on the geographic diversification-firm performance relationship in the US lodging industry but a negative moderating effect of brand diversification in the US restaurant industry. These context-specific empirical findings enrich diversification theory and literature as a whole and supports a perspective that the effect of diversification in contingent on the industry structure and the type of diversification

(Hoskisson and Hitt, 1990; Tallman and Li, 1996). In addition, this study's investigation on the moderating role of brand diversification regarding the relationship between geographic diversification and firm performance is valuable, because such examination does not seem to appear, not only in the hospitality literature, but also in the diversification literature in other research fields. This study contributes to the diversification literature as a whole by filling a void with empirical findings regarding the moderating effect of brand diversification on the geographic diversification-firm performance relationship.

The analyses of this study show inconsistent results among diverse estimation methods (i.e., OLS, FE, IV, and FE-IV). For example, while from OLS and FE estimations, the moderating effect of brand diversification on the relationship between geographic diversification and Tobin's q of the sampled restaurant firms appears to be insignificant, the effect is negative and significant from FE-IV estimation. When using the panel dataset in diversification study, accounting for firm and time specific heterogeneities and other transitory endogeneity problems such as simultaneity between diversification and firm performance (Miller, 2006) is critical to avoid omitted variable bias and to enhance causality (Wooldridge, 2002). To address those issues, the FE-IV method with relevant instrumental variable, with confirmed validity through under-identification (e.g., the Anderson test) and over-identification tests (e.g., the Hansen test), may be preferable as applied in this study's analyses. Otherwise, the results, not robust to endogeneity (e.g., OLS or sometimes FE estimation), may lead to inconsistent and biased coefficient estimation. This study provides empirical examples of the importance of methodological rigor in the context of diversification studies by showing varying results

contingent on various coefficient estimation methods.

In addition, this study finds several different results contingent on different measures of firm performance. For example, in the US lodging industry, this study found an insignificant effect from geographic diversification on Tobin's q but a significant and positive effect on ROA. And, for the moderating effect of brand diversification in the US restaurant industry, this study identifies a significant and negative moderating effect on Tobin's q but an insignificant moderating effect on ROA. These results imply that, for example, while the effect of geographic diversification on profitability of US casino firms is positive, it does not significantly influence a firm's market value relative to asset value. In other words, although an increase in geographic expansion in the US casino industry may lead to successful past managerial performance (i.e., efficiency of utilizing assets), investors in financial market do not regard geographic diversification as a significant source of a firm's long-term value improvement. This study's finding of varying results contingent on firm performance measure in the hospitality diversification context is dissimilar to the findings from pervious diversification studies which use samples of firms in various industries (e.g., Pandya and Rao, 1998) and which showed consistent results among different firm performance measures.

For practitioners in the US casino industry, more elaborate decision-making is necessary for appropriate diversification strategies. Although the effect of geographic diversification on ROA is positive and significant for the sampled casino firms, the effect on Tobin's q appears to be insignificant. Considering that the ultimate goal of business operations is increasing firm value, not merely the ratio of profitability, US casino firms should be prudent in expanding the degree of geographic diversification. And, from this

study's finding, benefits of increasing the level of product diversification is not convincing. However, based on the examination of the source of the product diversification's effect (i.e., the positive effect of the number of products on Tobin's q), one advisable action regarding US casino firms' product diversification is increasing the number of product lines rather than considering even distribution of products' shares. Especially for casino firms offering small numbers of products (e.g., gaming and hotel room), expanding into other product areas (e.g., F&B, entertainment, or retail) may be considered preferable to distributing the proportion of operations across existing businesses. The insignificant moderating effect of product diversification on the relationship between geographic diversification and performance in the US casino industry may imply that other programs or practices that assist the interrelationship between geographic and product diversification strategies are needed. For example, HR practices that encourage interaction and communication between geographic level and product level divisions within an organization may generate an improved learning effect, which leads to a positive moderating effect of product diversification. Or, implementing a marketing program that facilitates sharing customer information between geographic and product level divisions may enhance the positive moderating effect by increasing economies of scope.

For US restaurant firms, although the effect of increasing the degree of geographic diversification itself is vague, when combined with brand diversification, geographic diversification may not be a beneficial strategy. That is, considering the negative moderating effect of brand diversification on the relationship between geographic diversification and Tobin's q in the US restaurant industry, raising the level of

brand diversification may aggravate the effect of geographic diversification on a firm's market value relative to the replacement costs of assets. It is recommended that US restaurant firms concentrate on limited brands rather than diversify them, not only because brand diversification itself for US restaurant firms negatively affects firm performance, but also because brand diversification may negatively moderate the effect of geographic diversification. If US restaurant firms implement brand diversification, advisably, they should attempt to reduce coordination, information processing, and motivation costs within a complex organization by introducing a relevant infrastructure, such as an appropriate training programs, information technologies, and reward systems, which can mitigate internal transaction costs.

On the other hand, from this study's findings, implementing geographic diversification seems to be a competitive strategy for US lodging firms. And, although the individual effect of brand diversification is not significant, encouraging an increase in the degree of brand diversification is appropriate for US lodging firms because brand diversification may positively moderate the effect of geographic diversification on firm performance. More specifically, this study's finding of a positive effect of the dispersion component and an insignificant effect of the number component of brand diversification recommends that when increasing brand diversification, US lodging firms should consider instituting even distribution among brands rather than launching new brands.

In summary, with regard to implementation of integrative diversification strategies, US casino, restaurant, and lodging firms have three options: 1) increasing the level of geographic diversification while maintaining product or brand diversification at the same level; 2) increasing the level of product or brand diversification while

maintaining geographic diversification at the same level, and 3) simultaneously increasing the level of both dimensions of diversifications. For example, hospitality firms may expand their operations into new geographic markets with existing products or brands (Option 1), add new products or brands in geographic markets in which they already operate businesses (Option 2), or enter new geographic markets with new products or brands (Option 3).

According to the findings of this study, for the sampled casino firms (i.e., the positive effect of geographic diversification on ROA, the insignificant effect of product diversification, and the insignificant of moderating effect of product diversification), Option 1 may be an appropriate diversification strategy. That is, for example, while expanding into new geographic markets with even dispersion of shares for each market may enhance profitability, an increase in the number of products may not work positively. Even when considering the negative effect of the number component of product diversification on ROA from the finding of additional analyses, some possibility exists to suggest that an increase in the number of products may hamper the beneficial effect from geographic diversification for a casino firm's profitability. On the other hand, based on the study's findings (the insignificant effect of geographic diversification, the negative effect of brand diversification on firm performance and the negative moderating effect of brand diversification on the relationship between geographic diversification and Tobin's q) , US restaurant firms should consider a brand concentration strategy rather than choosing among three options of diversification. The effect of geographic diversification itself is uncertain; rather, an increase in the level of brand diversification itself may harm firm performance, and further, it may negatively affect the geographic diversification's

effect on firm value. In contrast, according to the study's findings for US lodging firms (i.e., the positive effect of geographic diversification, the insignificant of brand diversification, and the positive moderating effect of brand diversification), this study proposes Option 3. That is, an increase in the degree of brand diversification itself positively affects firm performance, and moreover, it may accelerate the positive effect of geographic diversification on firm performance. For example, a better strategy for US lodging firms may be to expand into new geographic markets with new brands rather than with existing brands.

5.3. Limitations and Future Studies

This study is not free from generalizability issues. Samples of this study consist of publicly traded US casino, restaurant, and lodging firms. Caution is necessary when applying this study's findings to hospitality firms in other countries or privately owned firms. For example, the effect of diversification in limited markets may be different from the relatively broad US market. Or, the agency problem, a source of internal transaction costs, may be smaller in privately held firms than those publicly traded. To ensure external validity, conducting more diversification studies with samples from different geographic locations, times, and representing different firms are encouraged.

In addition, this study examines the average effect of diversification strategies in the US hospitality field. Prudent application of this study's findings to individual firms is necessary because the customized effect of diversification for each firm may be conditional upon a firm's specific attributes, such as managerial capability, market power, and organizational characteristics. In this regard, case studies within the context of more

specific firm characteristics would be valuable for future studies.

For the measures of diversifications, the Berry-Herfindahl index, used in this study, does not contain the element of customers' perceptions of diversification. Considering the degree of diversification may vary depending on how customers perceive the distance between entities of diversification, developing a diversification measure that incorporates the perceived degree of diversification is encouraged.

Studies that incorporate cultural variables in the examination of the effect of diversification may produce interesting insight. For example, the effect of brand diversification in a dynamic culture with a high degree of uncertainty would be different from a stable culture with greater uncertainty avoidance. Perhaps customers' brand switching frequency in the context of a dynamic culture context moderates the effect of brand diversification.

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APPENDIX A

SUMMARY OF HAUSMAN TEST

Table 35. Summary of Hausman Test[†]

Industry	Main Variable	Firm Performance	F-value
Casino	DOGDS	Tobin's q	0.2
		ROA	4.68**
	DOGDZ	Tobin's q	0.28
		ROA	4.82**
	DOGDSZ	Tobin's q	0.15
		ROA	5.64**
	DOPD	Tobin's q	2.19
		ROA	4.38**
	DOGDS × DOBD	Tobin's q	0.44
		ROA	0.39
	DOGDZ × DOBD	Tobin's q	0.07
		ROA	0.84
	DOGDSZ × DOBD	Tobin's q	0.01
		ROA	1.01
Restaurant	DOGD	Tobin's q	20.59***
		ROA	0.08
	DOBD	Tobin's q	19.55***
		ROA	0.71
	DOGD × DOBD	Tobin's q	29.11***
		ROA	0.99
Lodging	DOGD	Tobin's q	12.57***
		ROA	9.49***
	DOBD	Tobin's q	0.49
		ROA	3.89
	DOGD × DOBD	Tobin's q	2.39
		ROA	0.01

[†]** and *** denote the 5% and 1% significance level, respectively. A rejection of the null hypothesis of the Hausman test implies severe endogeneity.

APPENDIX B

SUMMARY OF IDENTIFICATION TESTS

Table 36. Summary of Underidentification Overidentification Tests[†]

Industry	Main Variable	Firm Performance	Anderson Statistic	Hansen Statistic
Casino	DOGDS	ROA	59.78***	2.51
	DOGDZ	ROA	80.15***	1.85
	DOGDSZ	ROA	74.28***	2.03
	DOPD	ROA	40.57***	3.97
Restaurant	DOGD	Tobin's q	51.33***	11.57
	DOBD	Tobin's q	21.56***	9.81
	DOGD × DOBD	Tobin's q	15.23***	5.12
Lodging	DOGD	Tobin's q	58.45***	5.88
		ROA	13.65***	4.19

[†]** and *** denote the 5% and 1% significance level, respectively. A rejection of the null hypothesis of the Anderson test and a failure of rejection of the null hypothesis of the Hansen test ensure validity of instrumental variables.

APPENDIX C

SENSITIVITY ANALYSIS: GEOGRAPHIC DIVERSIFICATION

Table 37. Effect of Geographic Diversification for Casino Firms without Harrah's[†]

ESTIMATION VARIABLES	FE Tobin's q	FE Tobin's q	FE Tobin's q	FE-IV ROA	FE-IV ROA	FE-IV ROA
DOGDS	0.0302			0.557***		
	(0.255)			(0.202)		
DOGDZ		0.152			0.527**	
		(0.220)			(0.221)	
DOGDSZ			0.183			0.558**
			(0.173)			(0.280)
SIZE	-0.464***	-0.481***	-0.492***	-0.00651	-0.0528	-0.0797
	(0.0932)	(0.101)	(0.101)	(0.0200)	(0.0387)	(0.0584)
LEV	0.449**	0.426	0.414	-0.138***	-0.135***	-0.150***
	(0.219)	(0.224)	(0.225)	(0.0346)	(0.0333)	(0.0435)
DIV	0.000457	0.000486	0.000502	6.61e-05	0.000119	0.000165
	(0.000588)	(0.000582)	(0.000581)	(6.96e-05)	(0.000140)	(0.000192)
DOI	0.715***	0.720***	0.720***	0.00615	0.170	0.257
	(0.247)	(0.249)	(0.251)	(0.0597)	(0.111)	(0.168)
DOC	-9.20e-05	-8.40e-05	-8.93e-05	7.50e-05***	4.08e-05**	2.04e-05
	(7.81e-05)	(6.93e-05)	(6.81e-05)	(2.15e-05)	(1.67e-05)	(2.17e-05)
GO	0.213	0.226	0.233**	-0.0436*	-0.00648	0.0195
	(0.117)	(0.119)	(0.118)	(0.0251)	(0.0454)	(0.0664)
Constant	3.016***	4.693***	3.060***	-0.00832	0.262	0.440
	(0.514)	(0.844)	(0.527)	(0.114)	(0.229)	(0.357)
Observations	321	321	321	321	321	321
F-value	8.86***	8.88***	8.91***	n/a	n/a	n/a
Adj. R-square	0.6111	0.6118	0.6127	n/a	n/a	n/a

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. FE represents fixed effects estimation; FE-IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOGDZ represents 3-digit zip code level degree of geographic diversification; DOGDSZ represents state-zip level degree of geographic diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

APPENDIX D

SENSITIVITY ANALYSIS: PRODUCT DIVERSIFICATION

Table 38. Effect of Product Diversification for Casino Firms without Harrah's[†]

ESTIMATION VARIABLES	FE Tobin's q	FE Tobin's q	FE-IV ROA
DOPD	0.353	1.811	0.0227
	(0.313)	(1.072)	(0.395)
DOPD2		-1.940	
		(1.388)	
SIZE	-0.465***	-0.461***	0.0167
	(0.0885)	(0.0881)	(0.0149)
LEV	0.472**	0.426	-0.0911**
	(0.213)	(0.224)	(0.0371)
DIV	0.000467	0.000488	2.57e-05
	(0.000592)	(0.000591)	(4.98e-05)
DOI	0.673**	0.492	-0.0261
	(0.266)	(0.328)	(0.0487)
DOC	-0.000101	-9.25e-05	1.46e-05
	(6.74e-05)	(6.67e-05)	(1.52e-05)
GO	0.201	0.217	-0.0658***
	(0.115)	(0.120)	(0.0163)
Constant	4.137***	3.896***	-0.0893
	(0.677)	(0.666)	(0.134)
Observations	321	321	321
F-Value	8.92***	8.86***	n/a
Adj. R-squared	0.6130	0.6150	n/a

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. Firm dummies and time dummies are excluded. FE represents fixed effects estimation; FE-IV represents fixed effects instrumental variable estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOPD represents the degree of product diversification; DOPD2 represents the squared term of the degree of product diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.

APPENDIX E

SENSITIVITY ANALYSIS: MODERATING EFFECT

Table 39. Moderating Effect for Casino Firms without Harrah's[†]

ESTIMATION VARIABLES	FE Tobin's q	FE Tobin's q	FE Tobin's q	FE ROA	FE ROA	FE ROA
DOGDS	0.0357			-0.0730		
	(0.667)			(0.0699)		
DOGDZ		0.112			-0.0726	
		(0.476)			(0.0577)	
DOGDSZ			0.107			-0.0602
			(0.375)			(0.0489)
DOPD	0.356	0.371	0.365	-0.130	-0.138**	-0.137**
	(0.363)	(0.360)	(0.351)	(0.0668)	(0.0654)	(0.0640)
DOGDS × DOPD	0.0960			0.0912		
	(1.295)			(0.118)		
DOGDZ × DOPD		0.189			0.133	
		(0.873)			(0.0933)	
DOGDSZ × DOPD			0.234			0.128
			(0.676)			(0.0796)
SIZE	-0.469***	-0.489***	-0.500***	0.00120	0.000693	-0.000878
	(0.0959)	(0.103)	(0.103)	(0.0207)	(0.0230)	(0.0237)
LEV	0.462**	0.436	0.423	-0.0729**	-0.0763**	-0.0780***
	(0.228)	(0.233)	(0.232)	(0.0299)	(0.0296)	(0.0294)
DIV	0.000474	0.000507	0.000518	-3.20e-05	-3.38e-05	-3.24e-05
	(0.000587)	(0.000583)	(0.000584)	(4.42e-05)	(4.53e-05)	(4.55e-05)
DOI	0.677**	0.684**	0.689**	-0.0435	-0.0375	-0.0355
	(0.267)	(0.276)	(0.279)	(0.0495)	(0.0512)	(0.0516)
DOC	-9.01e-05	-8.48e-05	-9.23e-05	-7.91e-06	-4.33e-06	-3.55e-06
	(8.03e-05)	(7.16e-05)	(7.01e-05)	(1.16e-05)	(1.09e-05)	(1.11e-05)
GO	0.206	0.221	0.230	-0.0737***	-0.0717***	-0.0705***
	(0.118)	(0.120)	(0.120)	(0.0214)	(0.0226)	(0.0230)
Constant	2.903***	4.569***	2.993***	0.153	0.197	0.153
	(0.505)	(0.822)	(0.520)	(0.131)	(0.175)	(0.137)
Observations	321	321	321	321	321	321
F-value	8.59***	8.63***	8.66***	5.86***	5.88***	5.89***
Adj. R-square	0.6101	0.6114	0.6125	0.5006	0.5016	0.5022

[†]** and *** denote the 5% and 1% significance level, respectively. Standard errors are provided in parentheses. FE represents fixed effects estimation; Tobin's q represents financial market-based measure of firm performance; ROA represents return on assets; DOGDS represents the state level degree of geographic diversification; DOGDZ represents 3-digit zip code level degree of geographic diversification; DOGDSZ represents state-zip level degree of geographic diversification; DOPD represents the degree of product diversification; SIZE represents firm size; LEV represents a firm's leverage; DIV represents dividend payments; DOI represents the degree of internationalization; DOC represents the degree of competition; GO represents growth opportunity.