December 2015

An Examination of U.S. restaurant firms' internationalization in a risk context

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AN EXAMINATION OF U.S. RESTAURANT FIRMS' INTERNATIONALIZATION IN A RISK CONTEXT

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A dissertation submitted in partial fulfillment
of the requirements for the

Doctor of Philosophy - Hospitality Administration

William F. Harrah College of Hotel Administration
The Graduate College

University of Nevada, Las Vegas
December 2015

UNLV | GRADUATE COLLEGE

Dissertation Approval

The Graduate College
The University of Nevada, Las Vegas

June 11, 2015

This dissertation prepared by

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entitled

An Examination of U.S. Restaurant Firms' Internationalization in a Risk Context

is approved in partial fulfillment of the requirements for the degree of

Doctor of Philosophy – Hospitality Administration
William F. Harrah College of Hotel Administration

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ABSTRACT

AN EXAMINATION OF U.S. RESTAURANT FIRMS' INTERNATIONALIZATION IN A RISK CONTEXT

by

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The purpose of this dissertation is to advance the theoretical and practical understanding of the relationship between publicly traded U.S. restaurant firms' internationalization as a corporate strategy and risks using a comprehensive set of risk measures: 1) market-based risk (i.e., systematic and unsystematic risk) and 2) accounting-based risk (i.e., standard deviation of return on assets (ROA), return on equity (ROE), and earnings per share (EPS) during the period of 2000-2013. This dissertation further investigates linear, nonlinear, and lagged effects of internationalization on restaurant firms' risks. In summary, the findings of this dissertation reveal that internationalization tends to mitigate systematic risk, supporting modern portfolio theory in a restaurant context. Furthermore, internationalization tends to have an inverted U-shaped relationship with ROA risk, indicating that the risk-increasing effects of internationalization on a restaurant firm's ROA risk exist at the initial stage of internationalization while risk-reducing

effects of internationalization on the restaurant firm’s ROA risk occur at the later stage of internationalization.

ACKNOWLEDGEMENTS

It has been a long, yet fast journey pursuing my doctoral degree. It has been one of the most challenging periods I have ever experienced, yet one of the best decisions I have ever made and one of the most memorable experiences in my life. It has enabled me to open up my eyes into a new world.

Throughout the program, the first thing that came to my mind is how much I appreciate and how lucky I am to get into this program, learn, study, and achieve my dream to be a researcher and educator. I have been incredibly fortunate to meet great people and would like to express my sincere appreciation to all the faculty, friends, and my students. First, I would like to thank Dr. Michael Dalbor, my chair for both doctoral and master programs, for sharing his experience and guidance, being available and responsive all the time, and understanding how busy and tough a doctoral student's life is. I would also like to thank Dr. Grace Chatfield and Dr. Robert Chatfield for their support, encouragement, and patience. Thank you, Dr. Toni Repetti, for your enormous time and critical guidance since my very first semester and for showing (not telling) me what hard work is. Dr. Seoki Lee, I have been extremely fortunate to have met and worked with you. Researching with you was truly enjoyable. My sincere appreciation further extends to my associate dean, Dr. James Busser, for his great support, guidance, encouragement, and great smile since my first interview for the Ph.D. program at

UNLV. I also thank all my dearest friends: Alice, Andrew, Annette, Darren, James, Kaiyang, Kristin, Lan, Laura, Lenna, Lisa, Maddy, Martin, Nadia, Ore, Ray, Shawn, Stefan, Sungsik, Susan, Wen, Yangsu, and Carol for making my time enjoyable and endurable.

Last, but not least, I thank my family including my aunt, Geeja Kim, and my uncle, Eungdo Lee, for their unconditional love and belief in me and my little brother, Joonkyo, for listening and always being right next to me. I thank my two priceless treasures: my loving daughter, Jeana, and my loving son, Dohee, who have enabled me to discover a new joy in my life, who have motivated me to mentally grow up with perseverance, and who have taught me how to focus and prioritize my life between being a doctoral student and being a mom. I am grateful for my dear husband, Soodong, for his enormous patience, support, and belief in me throughout the process.

DEDICATION

This piece of work is completely dedicated to

my dad, YeonWook Jung,

who inspired, encouraged, and hold me to begin and complete this study.

and my mom, SeungJa Kim,

who sacrificed her life for me and remained a haven of my peace.

I respect, appreciate, and love you with all my heart forever.

Thank you for being MY dad and mom and letting me to be your daughter.

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CHAPTER I

INTRODUCTION

The pursuit of international markets and resources has grown remarkably. According to the World Investment Prospects Survey 2012-2014 (United Nations, 2012), the largest transnational corporations in 2014 were expected to operate with 65% of their sales, 54% of their employees, and 41% of their investment expenditures outside their home countries. Similarly, these trends can be witnessed in the U.S. restaurant industry. Approximately 70% of McDonald's and YUM! Brands' revenues were generated from international markets in 2014 (McDonald's Corporation, 2015; Yum! Brands, Inc., 2015). Consequently, many U.S. restaurant firms have implemented internationalization as a corporate strategy, especially given the sluggish U.S. economy (Tice, 2013).

The motivation for international expansion is primarily to enhance cash flow by increasing revenue, to decrease risk by diversifying, or both. Internationalization is one form of diversification (Fouraker & Stopford, 1968), and may secure a more stable cash flow (Hisey & Caves, 1985; Jang & Tang, 2009; Pantzalis, 2001). Nevertheless, multinational corporations (MNCs) may face daunting challenges to manage the high level of uncertainty in diverse global markets.

The popular phrase "never put all your eggs in one basket," can coincide with the modern portfolio diversification theory pioneered by Harry Markowitz (1952). The core notion of Markowitz's theory is to reduce risk by holding a diversified portfolio. Portfolio theory postulates that investing in two assets with less than perfect correlation reduces the portfolio risk without necessarily lowering the portfolio return. Numerous economists and financiers have utilized portfolio theory for the purpose of reducing risk and increasing efficiency, and this theory can be applied to restaurant companies' international operations. By including diverse

international markets rather than depending solely on the domestic market, U.S. restaurant firms may diversify their idiosyncratic risks, or risk peculiar to an individual firm based on the capital asset pricing model (CAPM) (Brealey, Stewart, & Myers, 2000)

Markowitz's theory focuses on the imperfect correlation between two assets: the less positively correlated the assets, the greater the risk-diversification. However, especially after the global financial crisis of 2008-2009, the world markets have seemingly become more correlated (Hsu, 2011). Thus, if the world economies become more synchronized, these world markets may be greatly correlated and the benefits of risk-reduction may diminish as a result. Furthermore, international diversification may render complex challenges (Hitt, Tihanyi, Miller, & Connelly, 2006; Sanders & Carpenter, 1998) which can increase risk. A high level of diversification can cause firms to be exposed to more complicated factors that may escalate transaction costs, including distinctive natural environments, different regulations in various markets, currency fluctuations, and cultural diversity in the organization and customer segments (Egelhoff, 1982; Hitt, Hoskisson, & Ireland, 1994; Hitt, Hoskisson, & Kim, 1997; Jones & Hill, 1988; Sundaram & Black, 1992). In addition, based on agency theory, complex corporate structures may trigger managers to exploit incentives and to exhibit excessive risk-taking behavior. The higher complexity, coupled with possible excessive risk-taking inclination related to internationalization, may outweigh the benefits of diversifying the idiosyncratic risks.

Problem Statement

In the mainstream financial and strategy literature, numerous researchers have investigated internationalization pertaining to risk; however, a consensus concerning the effects of internationalization on risk has not yet been reached (Agmon & Lessard, 1977; Al-Obaidan & Scully, 1995; Hughes, Logue, & Sweeney, 1975; Kim, Hwang, & Burgers, 1993; Miller & Pras,

1980; Rugman, 1976). That is, some researchers have found that internationalization can decrease risk (e.g., Agmon & Lessard, 1977; Fatemi, 1984, Hughes et al.,1975; Kim et al., 1993; Michel & Shaked, 1986; Rugman, 1976, Shaked, 1986). On the other hand, other researchers have found that internationalization can increase risk (e.g., Krapl, 2015; Kwok & Reeb, 2000; Olibe, Michello, & Thorne, 2008; Reeb, Kwok, & Baek, 1998), thus creating an apparent paradox. Some contradictory results may be attributed to the various risk measures employed by previous studies, thereby capturing different dimensions of risk. Moreover, the relationship between internationalization and risk may vary over time. These contradictory results demonstrate the need for further examination into the relationship between internationalization and risk.

More specifically, in the hospitality context, researchers have placed their focus on firms' general risk features using diverse risk measures such as systematic risk, unsystematic risk, earnings variability, debt ratio, and bankruptcy risk (Borde, 1998; Chathoth & Olsen, 2007; Dalbor & Upneja, 2002, 2004; Gu & Kim, 2003; Kim, Gu, & Mattila, 2002; Kim, Kim, & Gu, 2012; Kwansa & Cho, 1995; Lee, 2008a; Lee & Jang, 2007; Tang & Jang, 2007). Several researchers have specifically examined determinants of total, systematic, or unsystematic risk (Borde, 1998; Gu & Kim, 1998; Gu & Kim, 2003; Kim et al., 2002; Kim et al., 2012; Lee & Jang, 2007; Rowe & Kim, 2010). Examining various financial risk measures, Lee (2008a) focused not only on stock performance risk measured by beta and unsystematic risk, but also accounting risk measured by return on assets (ROA), return on equity (ROE), and earnings per share (EPS). Although the hospitality literature has devoted substantial attention to the strategic implications of risk, few studies have focused on risk associated with internationalization in the restaurant industry specifically.

Investigating this topic in the restaurant context is especially of paramount importance since the industry has expanded remarkably overseas as noted. Among the top 10 global franchises, U.S. restaurant firms account for five positions: Subway, McDonald's, KFC, Burger King, and Pizza Hut (Franchise Direct, 2015). More importantly, the restaurant industry has been known as a high-risk business caused by relatively low entry barriers coupled with low capital requirements (Elmont, 1995; Go & Christensen, 1989), as well as significant sensitivity to consumer discretionary expenditures (Singal, 2011), to volatile economic conditions, and to national business cycles (Lee, Koh, & Heo, 2011; Thompson & Kwortnik, 2008).

Both researchers and practitioners have acknowledged the riskiness of the restaurant industry (Gu & Kim, 2002; Parsa, Self, Njite, & King, 2005; Upneja & Dalbor, 2001). De Noble and Olsen (1986) revealed that foodservice firms had the highest market volatility among the seven industries: electronic computing equipment, electronic components, medical chemicals and botanical products, tires and inner tubes, meatpackers, and confectionary products (Noble & Olsen, 1986) and a volatile environment is likely to engender greater risk to firms. Nevertheless, De Noble and Olsen (1986) found that 40% of the chief financial officers of the largest foodservice and lodging firms do not consider risk in their investment decision processes. Therefore, it is significant for restaurant executives to identify and alleviate the effects of risk on firms.

Delimiting its scope to U.S. restaurant firms can additionally allow this study to control for differences amongst industries, such as capital intensity, economic performance regulation, market structure, cyclicality, concentration, or growth (Bowman, 1980; Tang & Jang, 2007). Various industries may have a different optimum strategic composite due to specific entry barrier conditions, creating the industry effect (Daniels & Bracker, 1989). A suitable strategy for each

industry needs to be developed and pursued (Bettis & Hall, 1982). Given that firms in one industry are likely to be homogenous, focusing on a specific industry enables this study to yield more reliable and valid results, as well as customized insights and implications for practitioners in the restaurant industry.

Purpose of Dissertation

The purpose of this study is to examine the relationship between publicly traded U.S. restaurant firms' internationalization and risks using a comprehensive set of risk measures: 1) market-based risk (i.e., systematic and unsystematic risk) and 2) accounting-based risk (i.e., standard deviation of ROA, ROE, and EPS) during the period of 2000-2013. This study further intends to examine linear, nonlinear, and lagged effects of internationalization on restaurant firms' risks.

This study is believed to be among the first to empirically research restaurant firms' internationalization strategy with a variety of risk measures. Internationalization may modify business strategies, thereby influencing a firm's risk features (Hughes et al. 1975; Liang & Rhoades 1988; Lubatkin & Chatterjee 1994). Consequently, a thorough analysis of the risk features pertaining to internationalization may not only provide a good cornerstone for understanding internationalization mechanisms in the restaurant industry, but also assist in supporting existing studies in other contexts. This study will provide practical recommendations for restaurant executives to make better-informed decisions regarding implementation of internationalization strategies in terms of risk, as well as for investors to estimate better investment opportunities based upon the risk features of internationalization.

This study comes with several limitations since the sample of this study, publicly traded U.S. restaurant firms, might constrain the generalizability of the results. In addition, this study

examines the risk perspective of internationalization solely in the restaurant industry; therefore, it may call for a resurgence of this examination in other hospitality segments such as the hotel and casino industries for possible variations across sectors.

Organization of Dissertation

This dissertation is organized into five chapters. Chapter 1 presents an overview of the dissertation, which includes the purpose and the significance of the study. Chapter 2 reviews extensive literature on internationalization, risk, and the relationship between internationalization and risk. Chapter 3 discusses the data used, methodology employed, and econometrics models to test the hypotheses. Chapter 4 discusses the results. Chapter 5 provides the conclusion of the study and suggestions for future research.

CHAPTER II

LITERATURE REVIEW

Introduction

Chapter 2 provides a literature review of internationalization, risk, and the relationship between internationalization and risk. This chapter comprises three sections: 1) internationalization; 2) types of risk, including market-based risk and accounting-based risk; and 3) the relationship between internationalization and risk, based on previous studies.

Internationalization

Definition

Internationalization generally refers to "the outward movement in an individual firm's or larger grouping's international operations" (Welch & Luostarinen, 1999, p.84). More specifically, Hitt, Ireland, and Hoskisson (2007) define international diversification as "a strategy through which a firm expands the sales of its goods or services across the borders of global regions and countries into different geographic locations or markets" (p.251). International diversification, internationalization, international expansion, geographic diversification, globalization, and multinationality can be labeled interchangeably in academic research (Capar & Kotabe, 2003; Hitt, Tihanyi, Miller, & Connelly, 2006). For consistency, the term "internationalization" will be applied throughout this study and refers to the expansion into international markets.

Benefits

The magnitude of internationalization has prompted scholars in the field of financial economics and strategy to explore the motives for and persistence of the phenomenon. Through international expansion, firms desire to create value by accessing multiple stakeholders,

resources, and markets. Internationalization can be a value-adding strategy by both increasing firms' returns and reducing firms' risk through increased operational flexibility and competitive advantages (Kim, Hwang, & Burgers, 1993; Lu & Beamish, 2004). Flexibility created from exploration of multiple resources enables firms to adjust to market changes (Lu & Beamish, 2004).

According to internalization theory and the resource-based view (Barney, 1991; Buckley & Casson, 1976; Buckley & Strange, 2011; Capar & Kotabe, 2003; Hitt, Hoskisson, & Kim, 1997; Tallman & Li, 1996), expanding into global markets can provide domestic firms with significant benefits (Deng & Elyasiani, 2008; Grant, 1987). The internalization theory proposed by Buckley and Casson (1976) focuses on the firm's bundles of activities and intangible assets. Intangible assets such as patents, managerial skills, production skills, marketing abilities, consumer goodwill, and research and development (R&D) capability make duplication by external parties difficult (Morck & Yeung, 1992; Saudagaran, 2002). Therefore, multinational corporations (MNCs) tend to prefer expanding internally and investing directly in international markets by setting up subsidiaries over expanding externally by issuing licenses to foreign partners. Similarly, according to the resource-based view (Barney, 1991), firms' intangible assets such as knowledge and skills are difficult to sell in the market due to contracting problems (Caves, 1982). Thus, firms are more likely to expand their markets to utilize those resources rather than sell them.

Based on internalization theory and the resource-based view above, firms can enjoy various benefits, such as economies of scale and scope, by utilizing resources among diverse markets (Kogut, 1985; Porter, 1990). Economies of scale and geographic scope can lead firms to not only lower costs through arbitrage potential (Contractor, Kundu, & Hsu, 2003), bargaining

power (Sundaram & Black, 1992), and better cross-subsidization (Contractor & Lorange, 2002), but also to increase their efficiency through learning and innovation (Kochhar & Hitt, 1995). In service markets, MNCs can gain economies of scale throughout the value chain process (Dunning, 1989). Additionally, organizational learning theory supports the positive impact of internationalization by arguing that firms can gain and apply knowledge and experience from foreign markets to improve products, services, and processes (Zahra, Ireland, & Hitt, 2000), although initial costs of such learning may be incurred.

Finally, risk-reduction can be one of the benefits of internationalization (Cochrane, 2001). According to modern portfolio theory (Lintner, 1965; Markowitz, 1952; Sharpe, 1964), diversification enables firms to lessen overall risk by generating a stable return resulting from uncorrelated goods (Kim, Hwang, & Burgers, 1989), economic conditions (Rugman, 1976), and regulations (Caves, 1982). In that regard, MNCs can reduce their risk by diversifying their investments across countries (Agmon & Lessard, 1977; Hisey & Caves, 1985; Rugman, 1976). MNCs with more diversified markets can enjoy greater risk reduction benefits than MNCs with domestic markets.

Stemming from modern portfolio theory, the imperfect capital market theory indicates that the market may not be perfectly efficient, and investors may face challenges such as information asymmetry. MNCs' shareholders can enhance their investment value by diversifying their portfolios (Doukas & Travlos, 1988). Shapiro (1978) suggests that MNCs generate positive cash flows in less than perfectly correlated markets due to the benefits from diversification. Moreover, based on the real options theory, MNCs can shift value chain activities to other markets when conditions in one market become unfavorable (Buckley & Tse, 1996). In

summary, internationalization can enhance firms' value or reduce their risk through a variety of benefits, such as economies of scale and scope, and cost reduction.

Costs

However, despite the potential benefits presented above, internationalization may not necessarily always create value for firms (Zaheer, 1995) since it can be accompanied by a great deal of costs or uncertainty (Hitt et al., 2006). According to organizational evolution theory and the contingency theory of complex organization, environmental changes may raise uncertainties, increase organizational complexity, or enlarge regulatory compliance requirements, as a firm diversifies into various markets (Boyd & Fulk, 1996; Mintzberg & Waters, 1982). Increased complexity may substantially drive up, not only the transaction costs (Buckley & Strange, 2011), but also monitoring costs for shareholders (Eun, Kolodny, & Scheraga, 1996; Saudagaran, 2002).

According to transaction cost theory, when entering new markets, a firm is likely to be exposed to more complicated factors, such as different regulations, cultural diversity, and diverse natural environments (Egelhoff, 1982; Hitt, Hoskisson, & Ireland, 1994; Jones & Hill, 1988). Restaurant literature specifically identifies such factors as unfavorable macro-economic conditions, fluctuations in relative values of currencies, political instability, cultural and religious differences, and different tax and accounting structure, among other factors (Hua & Upneja, 2007; Singh, Upneja, & Dalbor, 2004). Managing such factors as firms diversify geographically may substantially increase both internal transaction costs, such as information, coordination, and motivation costs among multiunit restaurant managers and external transaction costs with government officials, suppliers, and customers (Buckley & Strange, 2011; Jang & Tang, 2009).

Moreover, agency theory postulates that managers may seek their own self-interests at the expense of shareholders' interests (Jensen, 1986; Jensen & Meckling, 1976). Jensen and

Meckling (1976) define an agency relationship as “a contract under which one or more persons (the principals) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent” (p.5). However, conflicts between shareholders (the principals) and managers (the agent) can arise due to outside ownership. This separation of ownership and control may result in managers overindulging in perquisites, or failing to maximize firm value. Particularly, the agency cost (i.e., costs due to the size of divergence) is likely to be aggravated in the presence of free cash flow, namely excessive cash flow, in the firm (Jensen, 1986). Managers may pursue unreasonable investments, even though the outcome may not necessarily maximize the wealth of shareholders. For instance, managers may increase firm size that may result in greater compensation, or adopt strategies that may decrease their employment risk. This activity is referred to as an over-investment problem. Therefore, the divergence in interests between shareholders and managers, coupled with information asymmetry, may reduce MNCs’ value relative to domestic companies’ (DCs’) value (Morck & Yeung, 1991). In other words, based on agency theory, a negative effect from internationalization might exist since internationalization typically creates more complex systems, thereby increasing monitoring costs (Eun et al., 1996; Saudagaran, 2002).

Risk

Definition

Risk has been a critical variable in numerous strategy studies (Miller & Reuer, 1996). Porter (1985) states that “'Risk is a function of how poorly a strategy will perform if the "wrong" scenario occurs” (p.476). Miller (1992) specifically refers to risk as “variation in corporate outcomes or performance that cannot be forecast ex ante” (p.311). Risk captures the uncertainty, the probability distribution, or unpredictability related to the corporate outcome variables (Bowman, 1980; Miller, 1992).

The Capital Asset Pricing Model

Financial researchers have, in general, utilized CAPM to measure the risk/returns of investment (Kim, Gu, & Mattila, 2002). CAPM proposes that the expected return has a positive link with market beta which represents systematic or non-diversifiable risk. The expected rate of return on a risky asset can be estimated by the risk-free rate plus the risk premium, where the risk premium is the excess market return beyond the risk-free rate multiplied by the level of systematic risk, as denoted by beta, for the specific investment (Lintner, 1965; Sharpe, 1963, 1964). The expected rate of return can be delineated as below.

$R_i = R_f + (R_m - R_f) \times \beta_i$, (1)

where

R_i is the expected return on the *i*th security;

R_f is the risk-free rate;

R_m is the return on the market portfolio;

β_i is the estimated beta of the *i*th security; and

$(R_m - R_f)$ is the risk premium.

Bowman (1979) stated assumptions underlying CAPM as follows:

1) All investors are single-period, risk-averse maximizers of the expected utility of terminal wealth;

2) Investors find it possible to make their optimal portfolio decisions solely on the basis of the mean and standard deviations of the probability distributions of the terminal wealth associated with the various portfolios;

3) All investors have the same decision horizon, and over this period the mean and standard deviation of the probability distributions exist;

4) Investors have homogeneous expectations regarding the mean and standard deviation of the probability distributions; and

5) Capital markets are perfect (p.618).

CAPM postulates that a firm's total risk, measured by variance or standard deviation of stock return, consists of systematic and unsystematic risk (Lintner, 1965; Sharpe, 1963, 1964). Systematic risk represents the stock return volatility caused by market-specific events (Kim et al., 2002), or the risk of a stock relative to the risk of the market portfolio (Van Horne, 1998). In other words, systematic risk implies how sensitive the firm's returns are to the market (Olibe, Michello, & Thorne, 2008). Market-specific events include recessions, inflation, elections, and wars that affect all stocks (Gu & Kim, 2003; Kim et al., 2002). For instance, the terrorist attacks on the World Trade Center in New York on September 11, 2001, had a significant impact on stock prices across the country (Gu & Kim, 2003). This type of risk is called undiversified or market risk (Sharpe, 1963). More specifically, systematic risk is a measure of the slope of a regression line between the expected return on the ith security (R_i) and the return on the market

portfolio (R_m), including the Standard and Poor 500 (S&P 500) Stock index or the New York Stock Exchange (NYSE) Index.

Conversely, the unsystematic risk represents the stock return volatility caused by firm-specific events, and can be reduced and eliminated by portfolio diversification (Brealey, Stewart, & Myers, 2000). Firm-specific events include lawsuits, strikes, product defects, resignations of company officials, success or failure of marketing programs, gain or loss of contracts, etc., (Haugen, 1997). The passing of McDonald's CEO in 2004, and that of Apple Inc.'s CEO in 2011 (Bhatnagar, 2004; Griggs, 2011) exemplify firm-specific events. This type of risk is also known as diversified, idiosyncratic, unique, and company-specific risk (Sharpe, 1963). Although this type of risk can have a significant impact on a single stock's return, the impact can be reduced due to diversification (Gu & Kim, 2003). That is, a decreased stock price caused by firm specific events in one stock is likely to be compensated for by gain in another stock, and thus, investors need not be compensated for bearing unsystematic risk (Kim et al., 2002). Consequently, the unsystematic term does not exist in Equation (1) of CAPM (Gu & Kim, 2003).

However, CAPM may not be appropriate when measuring a large number of securities, since it requires an estimate of the covariances among all pairs of available securities (Haugen, 1997). Building upon Markowitz's model (1952), Sharpe (1963) developed a single-factor model for portfolio variance which can manage a large population of securities (Kim, Kim, & Gu, 2012). Based on the single-factor model, the sensitivity of a security's return to the market portfolio's return, or beta, can be estimated by the characteristic line with historical stock price data, as expressed on the following page.

$R_i = \alpha_i + \beta_i R_m + e_i$, (2)

where,

R_i is the return on the *i*th security;

α_i is the estimated vertical intercept;

β_i is the estimated beta of the *i*th security; or also βi,= Cov (R_i, R_m)/ Var (R_m)

where

Cov(R_i, R_m) is the covariance between the stock returns and the market returns;

Var (R_m) is the variance of the returns on the market;

R_m is the return on the market portfolio; and

e_i is the error about the regression line that represents the relationship of the two.

Using the characteristic line shown in Equation (2), the variance of a security's return, namely, total risk, can be divided into two parts, systematic and unsystematic risk (Levy & Sarnat, 1984). Taking the variance of both sides of Equation (2), Equation (3), or the single-factor model equation for the security variance (Haugen, 1997), can be derived as below.

$\sigma_i^2 = \beta_i^2\sigma_m^2 + \sigma_e^2$, (3)

where,

σ_i^2 is the variance of the return on the *i*th security;

β_i is the beta of the *i*th stock (or the sensitivity of *i*'s return to the market return);

σ_m^2 is the variance of the market portfolio;

$\beta_i^2\sigma_m^2$ measures the stock's covariance with the market and is thus the volatility due to systematic risk; and

σ_e^2 is the variance due to *i*'s random residual returns, or unsystematic risk.

The first term ($\beta_i^2\sigma_m^2$) on the right-hand side of Equation (3) is the systematic risk of the security. In other words, beta is only related to the variance ($\beta_i^2\sigma_m^2$) with the market. Following the single-factor model, beta accounts for the security's variance which cannot be diversified away. The second term (σ_e^2) on the right-hand side of Equation (3) is the unsystematic risk which can be measured as the standard deviation of the error term, or the residual of CAPM (Fama, 1970).

The Fama-French Three Factor Model

CAPM primarily considers market factors to estimate a firm's stock returns. Yet, researchers have found that additional factors can affect the firm's stock returns (e.g., Banz, 1981; Fama & French, 1992). Stocks that have lower market capitalization (small stocks) are likely to have higher average returns (Banz, 1981). Moreover, value stocks that have high ratios of price to a fundamental such as book value or cash flow, have higher average returns than growth stocks that have low ratios of price to fundamentals (Fama & French, 1992; Jegadeesh & Titman, 1993). Accordingly, the Fama and French three-factor model proposed by Fama and French (1993) considers additional factors including size and value versus growth, to capture the patterns in U.S. average stock returns (Fama & French, 2012). The Fama and French three-factor model is on the following page:

R_i - R_f = a_i + b_i[R_m - R_f] + s_iSMB + h_iHML + e_i (4)

where,

R_i is the return on asset *i*;

R_f is the risk-free rate;

R_m is the market return;

SMB is the difference between the returns on diversified portfolios of small stocks and big stocks; and

HML is the difference between the returns on diversified portfolios of high book-to-market (value) stocks and low book-to-market (growth) stocks (Fama & French, 2012, p.457).

The Carhart Four-Factor Model

The Fama and French three-factor model has been a commonly used measure for portfolio performance (Carhart, 1997; Fama & French, 2010). Fama and French (1993) find that the Fama and French three-factor model captures the size and value in U.S. average returns better than CAPM. However, the model cannot completely explain average returns (Fama & French, 2012). For instance, U.S. stock returns also are found to exhibit momentum, indicating that stocks that have performed well in the past year are likely to continue to do so (Jegadeesh & Titman, 1993). Both momentum and the value premium (i.e., higher average returns of value stocks compared to growth stocks) are found to have an impact on international returns (Chui, Titman, & Wei, 2010; Fama & French, 1998). Consequently, based upon the Fama and French three-factor model, Carhart (1997) proposes a four-factor model that additionally considers momentum for U.S. stock returns (Carhart, 1997; Tuli & Bharadwaj, 2009). The Carhart four-

factor model has been utilized in recent studies (e.g., Kim & Kim, 2014). The model is shown as below.

$R_i - R_f = a_i + b_i[R_m - R_f] + s_i SMB + h_i HML + wi WML + e_i$ (5)

where,

R_i is the return on asset i;

R_f is the risk-free rate;

R_m is the market return;

SMB is the difference between the returns on diversified portfolios of small stocks and big stocks;

HML is the difference between the returns on diversified portfolios of high book-to-market (value) stocks and low book-to-market (growth) stocks; and

WML is the difference between the month t returns on diversified portfolios of the winners and losers of the past year.

Risk Measures

For valid measures of strategic risk, the consideration of various stakeholders' perspectives is critical (Chakravarthy, 1986). Different stakeholders may be interested in different measures of corporate risk (Fiegenbaum & Thomas, 1988; Jemison, 1987; Oxelheim & Wihlborg, 1987). Investors are likely to be more interested in stock market risk, while managers are likely to be more interested in accounting return risk (Fiegenbaum & Thomas, 1988; Libby & Fishburn, 1977).

Miller and Bromiley (1990) evaluated the most common risk measures employed in strategic management research and categorized various firm risk measures into three factors: 1) stock returns risk, 2) income stream uncertainty, and 3) strategic risk. Stock returns risk

measured systematic and unsystematic risk. Income stream uncertainty included both historical returns variability (i.e. the standard deviation of ROA and ROE) and measures derived from analysts' forecasts (i.e. the standard deviation of EPS and coefficient of variation). Strategic risk included debt-to-equity ratio, capital intensity, and R&D intensity. The authors suggested that various risk factors can generate diverse substantive results.

In a hospitality context, Lee (2008a) examined various risk measures for lodging firms in the following four sections: 1) stock performance risk, 2) performance risk, 3) strategic risk, and 4) bankruptcy risk. Stock performance risk measures included beta and unsystematic risk. Performance risk measures included variations of three ratios: ROA, ROE, and EPS. Two measures, debt-to-equity and book-to-market ratios, were examined for strategic risk which coincides with the study by Miller and Bromiley (1990). Additionally, bankruptcy risk was examined based on a bankruptcy score developed by Ohlson (1980). Lee concluded that stock performance and strategic risk factors properly represent the firm's financial risk in the lodging industry.

Market-Based Risk

Based upon previous studies, this study intends to examine both market-based risk measures and accounting-based risk measures. First, market-based risk measures variability in historical stock returns. The two main standard measures for market-based risk are systematic and unsystematic risk (Miller & Bromiley, 1990; Miller & Reuer, 1996). As noted, since it is assumed that unsystematic risk can be diversified away, prior studies have heavily focused on systematic risk. However, measuring risk simply by systematic risk may not be sufficient since systematic risk does not consider bankruptcy costs and corporate taxes (Amit & Livnat, 1988).

As noted, CAPM assumes that investors find it possible to make their optimal portfolio decisions and that capital markets are perfect (Bowman, 1979). In other words, according to CAPM's assumptions, the unsystematic risk is irrelevant in stock pricing only when all of the investors include well-diversified portfolios, and capital markets are perfect. However, these assumptions may be inappropriate (Aaker & Jacobson, 1987) because, contrary to CAPM, not all investors hold diversified stock portfolios, and if investors do not diversify, unsystematic risk may play a role in firm valuation (Van Horne, 1998).

More specifically, Van Horne (1998) contended that, in general, the greater the imperfections of capital markets, the more important the unsystematic risk, and that investors are likely to consider unsystematic risk due to bankruptcy cost or other costs caused by imperfect capital markets. Investors might in turn consider significant bankruptcy costs in imperfect capital markets. Thus, unsystematic risk can impact firm value owing to the possible high costs of bankruptcy. Moreover, other factors such as transaction costs, costly information, and unequal borrowing and lending rates resulting from market imperfections, might, in reality, restrict investors from diversifying unsystematic risk. Similarly, other researchers (e.g., Crain, Cudd, & Brown, 2000) point out the relevance of unsystematic risk in stock valuation due to a lack of well-diversified portfolios and imperfection of capital markets. Non-diversified or less diversified investors may need to cope with both unsystematic and systematic risk (Crain et al., 2000).

Additionally, this study seeks to investigate downside risk and upside risk. Modern portfolio theory measures risk in terms of standard deviation of asset returns, which considers risk both negative and positive deviations from expected returns. The negative deviations can be considered as "downside risk" and the positive deviations can be considered as "upside risk"

(Chong, Jin, & Phillips, 2013). Batur and Choobineh (2010) state that "the downside risk involves the probability of obtaining outcomes smaller than a target value, while the upside risk involves the probability of obtaining outcomes larger than a target value" (p.2). In other words, the downside risk is referred to as a performance that falls below a certain target (Huchzermeier & Cohen, 1996), whereas the upside risk is referred to as a performance that falls above a certain target. Investors are risk-averse, indicating that investors should avoid downside risk, yet they would benefit from upside risk if their investments generate better than expected cash flows, or a stock yields higher than average returns (Chong et al., 2013). Nevertheless, this asymmetric view on downside risk and upside risk is not reflected by standard deviation of asset returns (Chong et al., 2013).

Accordingly, many researchers (e.g., Belderbos, Tong, & Wu, 2014; Miller & Reuer, 1998; Reuer & Leiblein, 2000; Tong & Reuer, 2007) have explored multinationality associated with downside risk in more depth. Recently, Belderbos et al. (2014) argue that multinationality is more likely to decrease downside risk when a firm exploits cross-border opportunities. By contrast, multinationality is less likely to decrease downside risk when the firm operates in countries with less valuable opportunities such as similar labor cost. Thus, for a thorough analysis, the current study expands the examination of downside risk and upside risk.

Accounting-Based Risk

Although most previous empirical studies have focused on the effects of internationalization on market-based risk, examination of earnings volatility is of significant importance to financial managers, investors, and creditors (Krapl, 2015). Unlike market-based risk measures which are based on future values, accounting-based risk measures capture historic values (Krapl, 2015). Subsequently, accounting-related risk measures can represent operations

more directly than market-related risk measures (Bettis & Hall, 1982) and thus are, in general, considered to be more relevant to management (Fiegenbaum & Thomas, 1988; Libby & Fishburn, 1977). Profits allow managers to meet multiple stakeholders' needs by implementing diverse corporate strategies, while reduced profits may cause unfavorable managerial decisions, such as layoffs, reduced investments, or intensified cost controls (Bromiley, 1986). Moreover, a joint analysis of market-based risk and accounting-based risk can be worthwhile because it can differentiate between fundamental changes to corporate risk (i.e., accounting-based risk) and changes that are subject to market reaction (i.e., market-based risk) (Krapl, 2015). Furthermore, earnings volatility may cause unfavorable issue, and thus, higher stock price volatility (Mehdi & Seboui, 2011), indicating that earnings volatility can be a good predictor of the systematic risk of firms' securities (Beaver, Kettler, & Scholes, 1970).

Consequently, in conjunction with market-based risk measures, accounting-based risk measures are among the most common risk measures employed in strategic management research (Miller & Bromiley, 1990). More specifically, the literature on earnings volatility associated with internationalization suggests the following two opposite views (El Mehdi, & Seboui, 2011). On the one hand, according to the agency conflicts, a firm's organization complexity engendered by internationalization may induce managers to manipulate earnings information. On the other hand, according to the earnings volatility hypothesis, internationalization tends to alleviate earnings volatility since earnings generated from the firm's diversified markets are less than perfectly correlated (Amihud & Lev, 1981) and accruals from various units tend to cancel out; thus, the total accruals at a corporate level are less volatile (El Mehdi & Seboui, 2011).

In that regard, Rugman (1976) found that internationalization attenuates earnings volatility primarily due to firms' sales generated from imperfectly correlated economies. By contrast, examining all firms traded on Nasdaq, Amex, and the NYSE between 1980 and 2011 based upon CAPM, Krapl (2015) discovered that internationalization increases earnings volatility as well as systematic risk, idiosyncratic risk, and total risk of equity. However, the effects of internationalization varied depending on the following measures of internationalization: foreign sales ratios, foreign assets ratios, geographical segment data, and foreign exchange exposure. Interestingly, internationalization tends to yield risk-reducing effects for firms that have higher levels of foreign assets, while it tends to yield risk-increasing effects for firms that have higher levels of foreign sales. Therefore, additionally considering accounting-based risk measures could provide a more complete picture of the internationalization process from a risk perspective (Bettis & Hall, 1982; Krapl, 2015).

Internationalization and Risk

Negative Relationship

Researchers have found contradictory results on the effects of internationalization on risk: negative, positive, and no relationship (e.g., Al-Obaidan & Scully, 1995; Brewer, 1981; Fatemi, 1984; Hughes, Logue, & Sweeney, 1975; Kim et al., 1993; Miller & Pras, 1980; Reeb, Kwok, & Baek, 1998; Rugman, 1976; Sledge, 2000). The negative relationship between internationalization and firm risk may be explained by modern portfolio theory, which postulates that investors can reduce exposure to risk from an individual asset by holding a well-diversified portfolio of multiple assets (Lintner 1965; Markowitz, 1952; Sharpe 1964). This theory can be applied to the international diversification strategy in that firms can reduce risk by including foreign markets in their well-diversified portfolios, rather than depending on a single market's

distress or cyclicality (Kang, Lee, Choi, & Lee, 2012). Additionally, the product life cycle theory (Vernon, 1966) suggests that a firm's stable return can be generated from uncorrelated economic conditions (Rugman, 1976), differences in goods (Kim et al., 1989), and political factors across diverse markets (Caves, 1982).

Proponents of internationalization's risk-reduction effects found that a higher degree of internationalization can lower the degree of risk due to the diversification benefits (Agmon & Lessard, 1977; Al-Obaidan & Scully, 1995; Hughes et al., 1975; Kim et al., 1993; Miller & Pras, 1980; Rugman, 1976). More specifically, revenues from international markets can mitigate overall cash flow volatility at the corporate level, reducing default risk (Pantzalis, 2001).

By comparing the returns of 46 MNCs to those of 100 DCs between 1970 and 1973, Hughes et al. (1975) found that MNCs have lower systematic risk, lower unsystematic risk, lower total risk, higher returns, and higher risk-adjusted returns as a result of lower operating risks, higher debt capacity, and operations of economies. The researchers concluded that investors perceive that MNCs create substantial diversification benefits. Applying the portfolio theory in the international context, Rugman (1976) found that internationalization is adversely correlated with variance of profits and that the risk of MNCs is lower than that of DCs. Consistent with Hughes et al.(1975) and Rugman (1976), Agmon and Lessard (1977) indicated that the betas for portfolios with international operations are much lower and concluded that the greater the MNCs' degree of international operations, the lower the systematic risk.

Fatemi (1984) compared 84 MNCs and 52 uninational corporations (UNCs) for the period of 1971-1980 and found that the monthly betas of the MNCs' portfolio are significantly lower and more stable than those of the UNCs' portfolio, suggesting that international involvement decreases the degree of systematic risk. Shaked (1986) contended that the standard

deviation of 125 large manufacturing MNCs' equity had lower systematic risk, total risk, and risk-adjusted performance, but MNCs were significantly more capitalized than DCs. By examining the risk-return of 125 U.S. MNCs, Kim et al. (1993) found that as diversification endows MNCs with several market bases, global market diversification reduces risk for MNCs. Overall, the studies above suggest that a higher degree of international involvement lowers the risk.

Positive Relationship

Other researchers hold the diametrically opposite view of a positive relationship between internationalization and risk. That is, internationalization may escalate risk since firms are exposed to increased uncertainty which includes agency problems, fluctuating exchange rates, institutional risk, etc. (Reeb et al., 1998). Since both the operating and financing risk affect a firm, investing in a diversified firm might not be a suitable option in terms of portfolio diversification (Jacquillat & Solnik, 1978). Although internationalization decreases financial risk, measured by variation in earnings, it increases operational risk due to augmented complexities in operation of dispersed organizations (Liang & Rhoades, 1988).

This argument may be attributed to agency theory which argues that managers may act for their own self-interest rather than for shareholders' interests (Jensen, 1986; Jensen & Meckling, 1976). According to the agency models of Jensen and Meckling (1976) and Jensen (1986), conflicts between managers and stockholders may exist. As corporate structure becomes more complex, it would be more difficult for shareholders to monitor managers' management activities to align with the shareholders' interest. Since MNCs are generally more complex to operate, managers might favor international diversification (Morck & Yeung, 1991). Divergence in interests between these two parties can create more complex issues (Saudagaran, 2002). Thus,

internationalization may drive up agency costs of debt resulting from higher monitoring costs and auditing costs, coupled with different languages, legal systems, and asset structures in imperfect capital markets (Burgman, 1996; Lee & Kwok, 1988).

In a similar vein, the transaction cost theory posits that as a firm enters new markets, it is likely to be exposed to more complicated factors. Transaction cost theory has been considered in evaluating the control of MNCs on their foreign subsidiaries through the use of equity structure (Gatignon & Anderson, 1988) and vertical integration (Dunning, 1988). Thus, these increased transaction costs may impede investors from completely diversifying business risk (Constantinides, 1986).

Providing the evidence of higher discount rates in evaluating international operations, Reeb et al. (1998) demonstrated that MNCs can augment risk due to various risk factors such as agency issues, asymmetric information, exchange rate risk, political risk, etc., thereby offsetting the diversification benefits. A firm may undertake unnecessary risk and overlook problems caused by internationalization (Chong, 1991). Demsetz and Strahan (1997) revealed that a higher degree of internationalization in large bank holding companies did not lower risk since diversification may render firms to pursue riskier activities and raise leverage. Cheng and Roulac (2007) found that as the degree of internationalization increased, marginal risk reduction decreased, and suggested that the effect of internationalization on risk should not be overestimated.

No Relationship

Finally, some researchers have found a non-significant relationship between internationalization and firm risk. For instance, finding limited impact of foreign operations on the systematic risk measures of U.S. MNCs, Jacquillat and Solnik (1978) contended that if a

MNC share is indeed like an international portfolio, the stock price should be affected by factors to the extent of its activity abroad. In a study of monthly returns and the value-weighted NYSE Index of 151 MNCs and 137 DCs during the period of 1963-1975**,** Brewer (1981) also found no significant difference in risk, measured by the intercept and slope of the security market line. Despite an attempt to examine the nonlinear relationship between the degree of internationalization and the betas, Fatemi (1984) found insufficient evidence to conclude that the relationship is nonlinear. Similarly, Sledge (2000) attempted to examine a U-shaped curved line between international diversification and risk; however, the curve was not observed.

Even though substantial studies on the effect of internationalization on a firm's risk have revealed mixed findings, the majority of literature has yielded significant relationships in either a negative or positive manner as noted. In a similar vein, hospitality studies imply that internationalization can be one of the factors that affect the quality of the hotel Real Estate Investment Trusts (REIT) (Simonoff & Baig, 1997) and can increase average costs of REIT (Bers & Springer, 1997).

Hypotheses

Therefore, this dissertation argues for significant effects of internationalization on a restaurant firm's risk measures and proposes the following hypotheses.

H1: The degree of a U.S. restaurant firm's internationalization significantly affects the firm's systematic risk.

H2: The degree of a U.S. restaurant firm's internationalization significantly affects the firm's unsystematic risk.

H3: The degree of a U.S. restaurant firm's internationalization significantly affects the firm's ROA risk.

H4: The degree of a U.S. restaurant firm's internationalization significantly affects the firm's ROE risk.

H5: The degree of a U.S. restaurant firm's internationalization significantly affects the firm's EPS risk.

Conclusion

This chapter reviews related extant literature on 1) costs and benefits of internationalization; 2) various risk measures, including systematic, unsystematic, and accounting risk; and 3) contradictory results on the relationship between internationalization and risk as being negative, positive, or no relationship. This study intends to investigate potential effects of U.S. restaurant firms' internationalization on firm risk. The next chapter will discuss the methodology employed in this study.

CHAPTER III

DATA AND METHODOLOGY

Introduction

The methodology chapter consists of three main sections: 1) data collection; 2) description of dependent, independent, and control variables; and 3) models/method to examine the relationship between internationalization and risk in the restaurant industry.

Data Collection

This study identifies publicly traded U.S. restaurant firms using the standard industrial classification (SIC) code of 5812, and utilizes four resources to collect data: 1) COMPUSTAT, 2) annual financial reports (10-Ks), 3) the Center for Research in Security Prices (CRSP), and 4) the Fama-French Portfolios. This dissertation utilizes COMPUSTAT to retrieve annual financial data including total assets and total revenues, and 10-Ks for the number of domestic/international/total units. For estimation of restaurant firms' systematic, and unsystematic risk, both the CRSP for restaurant firms' daily returns and the Fama-French portfolios for four factor resources (i.e., excess return on the market, small-minus-big return, high-minus-low return, momentum, and risk-free return rate (one month treasury bill rate)) were utilized. The sample period spans 2000 to 2013 due to very limited availability of restaurant firms' internationalization information prior to 2000 and the unavailability of 10-Ks in 2014 when initiating this study. To examine potential variations between the two data sets, the current study divided the data into two categories: 1) the first category spans all the U.S. based restaurant firms included in COMPUSTAT (hereafter referred to as all the U.S. restaurant firms) and 2) the second category only spans U.S. based restaurant firms, taken from the first category, which report their number of international operations to be more than or equal to one unit (hereafter referred to as U.S. restaurant firms with international operations). The number of observations

from 179 firms for all the U.S. restaurant firms varies from 642 to 930 depending on various risk measures, while the number of observations from 120 firms for U.S. restaurant firms with international operations only ranges from 276 to 338 depending on those risk measures.

Dependent Variables

Based upon previous studies on risk measures, this dissertation utilizes two avenues of risk measures: 1) market-based risk (i.e., systematic and unsystematic risk), and 2) accounting-based risk (i.e., the standard deviation of ROA, ROE, and EPS), to examine the effect of internationalization on restaurant firms' risk. Following earlier approaches to risk in finance and strategic management literature (e.g., Lee, 2008a; Miller & Bromiley, 1990; Shaked, 1986), this study uses the standard deviation as a proxy for risk since it is a commonly used measure of dispersion and, therefore, risk (Bettis & Hall, 1982).

The estimation of the systematic and unsystematic risk in this study is based upon the Carhart four-factor model (Carhart, 1997) which stems from the Fama-French three-factor model. Unlike CAPM that considers market factors only to estimate a firm's stock returns, the Carhart four-factor model takes into account size, value, growth, and momentum for U.S. average stock returns (Carhart, 1997). The revised model by Carhart used in this dissertation is as follows:

$$R_{id} - R_{fd} = \sigma_{id} + \beta_{1i}[R_{md} - R_{fd}] + \beta_{2i}SMBd + \beta_{3i}HML_{d} + \beta_{4i}UMD_{d} + e_{id} \quad (6)$$

where,

i is the firm and d is day

R_{id} is the return on asset of firm i at day d,

R_{fd} is the risk-free rate at day d,

R_{md} is the return on a value-weighted market portfolio at day d,

SMB_d is the difference between the stock returns on the value-weighted portfolios of small stocks and big stocks for day *d*,

HML_d is the difference between the stock returns on the value-weighted portfolios of high book-to-market (value) stocks and low book-to-market (growth) stocks for day *d*,

UMD_d is the difference between the average return of two high prior return portfolios and two low prior return portfolios for day *d*, and

e_{id} is the error terms (Fama & French, 2012; Kim & Kim, 2014).

Market-Based Risk: Systematic Risk and Unsystematic Risk

To estimate firm *i*'s systematic and unsystematic risk in year *t*, the daily stock returns of all the restaurants included in the sample were retrieved from the CRSP database. These returns were then regressed against the daily returns for the entire market and the three additional factors included in Equation (6). For each firm in each year between 2000 and 2013, the estimated coefficient for market return (R_{md} - R_{fd}) in Equation (6) was considered as systematic risk (SR) of firm *i* in year *t* (Kim & Kim, 2014; Tuli & Bharadwaj, 2009). Unsystematic risk (UR) was measured by the standard deviation of estimated residuals ($\hat{}e_{id}$) for the error term (e_{id}) in Equation (6) (Kim & Kim, 2014; Tuli & Bharadwaj, 2009).

This dissertation expands the market-based risk analysis (i.e., systematic and unsystematic risk) to downside risk and upside risk more in depth. In other words, systematic risk has been examined in three different ways: 1) systematic risk, 2) downside systematic risk, and 3) upside systematic risk. Likewise, unsystematic risk has been examined in three different ways: 1) unsystematic risk, 2) downside unsystematic risk, and 3) upside unsystematic risk for a thorough analysis. Downside risk was measured by regressing against the daily returns less than the mean value of returns for each year, which served as the target level, whereas upside risk was

measured by regressing against the daily returns greater than the mean value of returns for each year.

Accounting-Based Risk: ROA Risk, ROE Risk, and EPS Risk

Accounting-based risk has been estimated by the variance of returns (e.g., Bettis & Hall, 1982; Bowman, 1980, Fiegenbaum & Thomas, 1986, 1988). Variations of ROA, ROE, and EPS, among other returns, have been applied as risk measures (Bowman, 1980; Fiegenbaum & Thomas, 1986, 1988; Milller & Bromiley, 1990; Lee, 2008a). Following accepted practice, this study includes the standard deviation of ROA, ROE, and EPS for the last five years as proxies for variation of returns (Dichev & Tang, 2009).

ROA has been widely utilized as a proxy for the accounting measures in international business research (Amit & Livnat, 1988; Bettis & Hall, 1982; Bettis & Mahajan, 1985) since it can control for different financial structures across firms and focuses on the relative efficiency with which the resources available have been utilized. Similarly, ROE has been employed for return stability analysis (Milller & Bromiley, 1990; Lee, 2008a). Additionally, EPS can be a proxy for the uncertainty associated with the firm's future income stream (Miller & Bromiley, 1990) and have been examined in previous studies (Bromiley, 1991; Conroy & Harris, 1987; Imhoff & Lobo, 1987; Miller & Bromiley, 1990; Lee, 2008a).

Main Independent Variable of Interest

The degree of internationalization (DOI) is employed as a proxy for internationalization as an independent variable in this study. Measurements of the DOI of a firm, as suggested by previous literature, include three attributes: structural (what resources are overseas) (Stopford & Wells, 1972), performance (what happens overseas) (Vernon, 1971), and attitudinal (what is top management's international orientation) (Perlmutter, 1969). DOI is measured by ratios because it is not an absolute state but a relative proportion to domestic situation (Forsgren, 1989; Welch & Luostarinen, 1988). The structural attribute measures DOI using the number of international subsidiaries (Stopford & Wells, 1972; Vernon, 1971). Variability in the breadth and depth of subsidiaries among MNCs prompted previous studies to standardize overseas operation measure by the number of foreign subsidiaries scaled by the total number of operating subsidiaries (Sullivan, 1994). Since the purpose of this study is to explore a strategic risk perspective of internationalization, this study employs the structural attribute, or the ratio of the number of foreign properties to the number of total properties to measure firms' DOI. Hospitality literature has similarly utilized the ratio of the number of foreign properties to the number of total properties as a measure of restaurant and hotel firms' international involvement (Koh, Lee, & Boo, 2009; Lee, 2008b).

Control Variables

Several financial variables have been found to impact a firm's risk (Breen & Lerner, 1973; Borde, 1998; Gu & Kim, 2002; Kim, Gu, & Mattila, 2002; Lev & Kunitzky, 1974; Logue & Merville, 1972; Lubatkin & Chatterjee, 1994; Lubatkin & O'Neill, 1987; Miller & Bromiley, 1990). This study employs seven variables as control variables: 1) firm size, 2) leverage, 3) liquidity, 4) profitability, 5) operating efficiency, 6) growth, and 7) dividend payout ratio, based

on the previous studies (Gu & Kim, 2002, 2003; Hsu & Jang, 2008; Kim et al., 2002; Kim, Kim, & Gu, 2012; Lee & Jang, 2007; Rugman, 1976).

Firm Size

First, firm size (SIZE) is employed to control for its confounding effect as larger firms are expected to decrease their risk by diversifying their operations, customers, and services (Deng & Elyasiani, 2008; Liang & Rhoades, 1988; Miller & Pras, 1980; Rugman, 1976) or by mitigating the impact of economic, social, and political changes on their firms (Sullivan, 1978). Large firms are likely to lower cost, be more stable, and be profitable from the benefits of economies of scale via diversification, thereby leading to be less chance of default and risky (Harris & Raviv, 1991). In addition, large firms' securities can be quickly converted into cash, thereby indicating that they can be less risky (Fisher, 1959). Several empirical studies have confirmed the negative relationship of firm size to risk (Kim et al., 2002; Lev & Kunitzky, 1974; Logue & Merville, 1972). Consistent with previous studies, this study uses log of total revenues as a proxy for a firm's size (e.g., Gu & Kim, 2002; Lee & Jang, 2007).

Leverage

Second, leverage (LEV) is employed to control for capital structure as diversification can be encouraged by or related to high financial leverage (Lubatkin & O'Neill, 1987). A firm's financial leverage can represent its risk of bankruptcy (Hurdle, 1974; Shapiro & Titman, 1986). Based on the trade-off theory (Kraus & Litzenberger, 1973), a firm's leverage accrues tax benefits to a certain extent, while too high leverage ratio tends to induce higher risk (Kwok & Rebb, 2000; Van Horne, 1998). High leverage generally makes firms more susceptible to financial risk; hence, a firm's financial leverage is known to relate positively to risk (Amit & Livnat, 1988; Borde, 1998; Bowman, 1979; Kim et al., 2002; Logue & Merville 1972;

Modigliani & Miller, 1958; Moyer & Chartfield, 1983). Likewise, hospitality studies have empirically confirmed a positive relationship between leverage and risk (Gu & Kim 2003; Hsu & Jang 2008; Kim, Ryan, & Ceschini, 2007). In this study, LEV is measured by the ratio of total debt to total assets (e.g., Amit & Livnat, 1988; Lee & Jang, 2007).

Liquidity

Third, liquidity (LIQ) is included as it can be associated with the degree of diversification (Chartterjee & Wernerfelt, 1991). Jensen (1986) suggests that liquidity is positively related to risk because high liquidity could increase agency costs of free cash flow due to moral hazard and thus induce unreasonable investments. In contrast, other studies have shown the negative relationship between liquidity and risk since high liquidity fulfills short-term cash needs and alleviates financial risk (Beaver, Kettler, & Scholes, 1970; Logue & Merville, 1972; Moyer & Chatfield, 1983). Hospitality literature also views liquidity as one of the potential critical determinants of risk (Borde 1998; Gu & Kim, 2003; Kim, Ryan, & Ceschini, 2007; Lee & Jang, 2007). In this study, LIQ is measured by current ratio (current assets/current liabilities).

Profitability

Fourth, profitability (PRO) is included as it can be correlated with diversification and risk concurrently (Barton, 1988). Profitability generally improves firms' financial stability while decreasing risk (Logue & Merville 1972). Hospitality literature has found that profitability reduced systematic risk in restaurant firms (Borde, 1998; Kim et al. 2007) and airlines (Lee & Jang 2007), and reduced unsystematic risk in restaurant and hotel firms (Hsu & Jang 2008). On the other hand, profitable firms can often employ aggressive business strategies and thus exhibit higher risk (Borde, 1998; Borde, Chambliss, & Madura, 1994), as demonstrated in the hotel (e.g., Kim et al., 2002) and insurance firms (e.g., Borde et al., 1994), suggesting that firms can more

profitable when taking more risk. In this study, profitability is measured by the return on assets (ROA: net income to total assets) (e.g., Lee & Jang, 2007).

Operating Efficiency

Fifth, operating efficiency (EF) is included as it can be negatively associated with risk (Borde, 1998; Gu & Kim, 2002; Logue & Merville, 1972). If firms efficiently utilize their assets in generating revenues, they are likely to generate higher profits and to have a negative relationship with risk (Kim et al., 2002; Lee & Jang, 2007). Gu and Kim (1998) examined 35 casino firms and found that higher operating efficiency leads to lower systematic risk. Operating efficiency is measured by the ratio of total revenue to total assets (e.g., Kim et al., 2002).

Growth

Sixth, growth (GW) is included since high growth tends to increase firms' risk. Firms with higher growth may need more resources (Roh, 2002) which, in turn, cause the firms to look for outside financing and to invest time and money in human resource training and education. This internal adjustment costs lead firms to high leverage. In this regard, growth is positively related to risk. Nevertheless, firms with high growth rates in earnings before interest and taxes (EBIT) can usually keep high stock prices due to the anticipated high earnings, whereas the stock prices of companies with low growth rates may be much more volatile (Borde, 1998). This study uses EBIT growth (annual percentage change in EBIT) as a proxy for growth.

Dividend Payout Ratio

Finally, dividend payout ratio (DIV) is included since high dividend payout may reduce risk (Logue & Merville, 1972; Moyer & Chatfield, 1983; Rosenberg & McKibben, 1973). Since high dividend payout ratio can reflect firms' confidence in their current position and in the stability of future earnings, dividends can help settle uncertainty as to firms' future returns

(Moyer & Chatfield, 1983). Investors consider dividend returns to be more secure than stock returns; thus, firms with high dividend payments are expected to mitigate systematic risk (Logue & Merville, 1972). This study uses dividend payout ratio, measured by a ratio of dividends per common share to earnings per share, which indicate the proportion of current earnings, per common share, paid out as dividends (e.g., Kim et al., 2012).

Models

The following models assess market-based risk for linear, nonlinear, lagged, and lagged non-linear effects, respectively. The models are shown below:

1. Market-based risk

1.1. Systematic risk

[1.1.a] $SR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

[1.1.b] $SR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_t$

[1.1.c] $SR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

[1.1.d] $SR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

1.2. Downside systematic risk

[1.2.a] $DSR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

[1.2.b] $DSR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_t$

[1.2.c] $DSR_t = \alpha_0 + \alpha_1 \, LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

[1.2.d] $DSR_t = \alpha_0 + \alpha_1 \, LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

1.3. Upside systematic risk

[1.3.a] $USR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

[1.3.b] $USR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_t$

[1.3.c] $USR_t = \alpha_0 + \alpha_1 \, LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

[1.3.d] $USR_t = \alpha_0 + \alpha_1 \, LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

1.4. Unsystematic risk

[1.4.a] $UR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_t$

[1.4.b] $UR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_t$

[1.4.c] $UR_t = \alpha_0 + \alpha_1 \, LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

[1.4.d] $UR_t = \alpha_0 + \alpha_1 \, LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

1.5. Downside unsystematic risk

[1.5.a] $DUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_t$

[1.5.b] $DUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_t$

[1.5.c] $DUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

[1.5.d] $DUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

1.6. Upside unsystematic risk

[1.6.a] $UUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_t$

[1.6.b] $UUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_t$

[1.6.c] $UUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

[1.6.d] $UUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

The next models assess accounting-based risk for linear, nonlinear, lagged, and lagged non-linear effects, respectively. The models are shown on the following pages:

2. Accounting-based risk

2.1. ROA risk

[2.1.a] $SROA_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

[2.1.b] $SROA_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2{}_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

[2.1.c] $SROA_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

[2.1.d] $SROA_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2{}_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

2.2. ROE risk

[2.2.a] $SROE_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

[2.2.b] $SROE_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2{}_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

[2.2.c] $SROE_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

[2.2.d] $SROE_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2{}_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

2.3. EPS risk

[2.3.a] $SEPS_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

[2.3.b] $SEPS_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2{}_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

[2.3.c] $SEPS_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

[2.3.d] $SEPS_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2{}_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

The dependent variables employed in the models are defined as follows:

- SR = a firm's market-based risk, measured by systematic risk;
  - DSR = a firm's downside systematic risk;
  - USR = a firm's upside systematic risk;
- UR = a firm's market-based risk, measured by unsystematic risk;
  - DUR = a firm's downside unsystematic risk;
  - UUR = a firm's upside unsystematic risk;
- SROA = a firm's accounting-based risk, measured by the standard deviation of return on assets (ROA = net income/total assets) for the last five years;
- SROE = a firm's accounting-based risk, measured by the standard deviation of return on equity (ROE = net income/total equity, where equity is denoted by total book-value of equity) for the last five years; and
- SEPS = a firm's accounting-based risk, measured by the standard deviation of earnings per share (EPS) for the last five years.

The independent variable employed in the models is defined as follows:

- DOI = the degree of internationalization, measured by total number of foreign units/total number of units;
- DOI^2 = the squared form of DOI;
- LagDOI = the degree of internationalization, measured by total number of foreign units/total number of units at t-1; and
- $LagDOI^2$ = the squared form of LagDOI.

The control variables employed in the models are defined as follows:

- SIZE = a firm size, measured by log of total revenues;

- LEV = a firm’s capital structure, measured by total debt/total assets;
- LIQ = a firm’s liquidity, measured by current ratio (current assets/current liabilities);
- PRO = a firm’s profitability, measured by return on assets (net income/total assets);
- EF = a firm’s operating efficiency, measured by the asset turnover ratio (total revenues/total assets);
- GW = a firm’s growth, measured by annual percentage change in earnings before interest and taxes (EBIT);
- DIV = a firm’s dividend payout ratio, measured by dividends per common share/earnings per share; and
- ε_i = the error terms.

Methods

To examine the relationship between internationalization and restaurant firms’ risk, this study performed panel regression analysis of two-way fixed-effects models or two-way random-effects models to account for unobserved effects. Panel data can offer a solution to potential bias problems caused by unobserved heterogeneity, a common issue in model fitting with cross-sectional data sets. Panel data sets may enable researchers to increase the sample size, to conduct more complicated models, and to reveal dynamics that are difficult to detect with cross-sectional data (Gujarati, 2003). The pooled ordinary least squares (OLS) estimation may not control omitted variable bias from unobservable time (firm)-invariant firm (time) specific effects of panel data (Gujarati, 2003; Wooldridge, 2010). This study performs either fixed-effects regressions or random-effects regressions which are known as the two main approaches to model fitting. This study conducts the Hausman test to determine an appropriate model between fixed-effects models and random-effects models (Greene, 2003).

Conclusion

This chapter delineates 1) data collection, 2) the variables employed in this study, and 3) models/method. This study examines publicly traded U.S. restaurant firms during the period of 2000 through 2013 using a panel dataset. This study categorizes the dependent variables into two segments: market-based risk and accounting-based risk. Market-based risk includes systematic risk and unsystematic risk. Accounting-based risk includes standard deviation of ROA, ROE, and EPS. The main independent variable of interest is DOI. The seven control variables are size, leverage, liquidity, profitability, operating efficiency, growth, and dividend payout ratio, based on related literature. The next chapter will discuss the results of the study.

CHAPTER IV

FINDINGS OF THE STUDY

Introduction

This chapter presents the results of the statistical analyses performed. First, the descriptive statistics of the indicators for 17 variables including nine risk measures (i.e., systematic risk, unsystematic risk, downside systematic risk, downside unsystematic risk, upside systematic risk, upside unsystematic risk, standard deviation of ROA, standard deviation of ROE, and standard deviation of EPS), one primary independent variable (i.e. the degree of internationalization), and seven control variables (i.e., firm size, leverage, liquidity, profitability, operating efficiency, growth, and dividend payout ratio) are presented. Second, the Pearson's correlation analyses for the bivariate correlations among all study variables are presented. Finally, the results of the linear effects, non-linear effects, and lagged effects of internationalization on nine risk measures are presented.

Preliminary Analysis and Assumption Check

To examine the effect of internationalization on firms' risk, this study employs panel regression analysis using panel data of the sampled restaurant firms over the period between 2000 and 2013. A panel data set encompasses both cross-sectional and time series dimensions; that is, it can show not only the cross-sectional differences between subjects, but also the time-series changes within subjects over time (Gujarati, 2003). Baltagi (2005) and Hsiao (1986) imply that panel data methodology can control for each firm's heterogeneity, reduce multicollinearity-linked problems as well as estimation bias, and specify the time-varying relationship between dependent and independent variables.

Before completing the main analysis, this study implemented several steps to ensure the validity of the econometric specification and related assumptions underlying the statistical models. This dissertation checked for outliers based on the criteria of an absolute value of studentized residual of 4 (Younger, 1979), identified and removed them for each analysis. The number of outliers removed from the data ranges from one to five for the analyses using all the U.S. restaurant firms (i.e., both cases with domestic operations only, and domestic and international operations). For instance, the number of outliers removed for the unsystematic risk model was one whereas the number of outliers removed for all three accounting-based risk models including ROA risk, ROE risk, and EPS risk were five. On the other hand, the number of outliers removed from the data ranges from zero to four for the U.S. restaurant firms with both domestic and international operations (excluding the restaurant firms with only domestic operations). Specifically, the number of outliers removed for the systematic risk model was zero while the number of outliers removed for the EPS risk model was four. These numbers of outliers seem to be not large enough to cause any significant problems.

To check the normality assumption, this study conducted Shapiro-Wilk W tests, which is considered to be a more accurate test than other normality tests including the Kolmogorov–Smirnov test (Field, 2005). The maximum p-value of the test is less than 0.00170, rejecting the null hypothesis of normality. In other words, residuals of the regression analysis are not normally distributed. Nevertheless, firms' financial variables are seldom distributed normally (Barnes, 1987) and the variables included in this study were no exception. Moreover, when the sample size is large enough, the normality assumption can be relaxed based upon the central limit theorem (Rice, 2007). More specifically, Good (1992) indicates that the sample size of 100 or more is acceptable as the criteria of thumb to relax the normality assumption. Since the sample

size in this study ranges from 276 to 930 depending on risk measures, the normality assumption can be reasonably relaxed.

Furthermore, this study analyzed variance inflation factors (VIF) for each model to identify the presence of multicollinearity. Multicollinearity causes issues such as shared variance between variables, thus decreasing the ability to predict the dependent variable and to identify the relative effects of each independent variable (Hair, Black, Babin, & Anderson, 2010). All VIF values in this study fall within 10: a generally accepted cut-off value of multicollinearity suggested by previous literature (e.g., Hair et al., 2010; Kutner, Nachtsheim, Neter, & Li, 2005; Tabachnick & Fidell, 2001). Thus, the multicollinearity issue may not be a concern.

This study additionally performed Breusch-Pagan/Cook-Weisberg test to examine whether homoscedasticity assumption is violated or not. This dissertation ran the homoscedasticity test on all 72 models of two dataset (i.e., 1) All the U.S. restaurants and 2) U.S. restaurant firms with international operations). Overall, according to test results, the models with only systematic risk and standard deviation of ROA as dependent variable do not violate homoscedasticity assumption while the other three models (with unsystematic risk, standard deviation of ROE, and standard deviation of EPS) violate the assumption. For example, U.S. restaurant firms with international operations present the following detailed results for lagged effects; the model with systematic risk as dependent variable (DV) shows a chi-square value of .01 (p-value = .94); the model with unsystematic risk as DV shows a chi-square value of 122.83 (p-value < .01); the model with standard deviation (SD) of ROA shows a chi-square value of 2.51 (p-value = .1128); the model with SD of ROE shows a chi-square value of 973.55 (p-value < .01); and the model with SD of EPS shows a chi-square value of 431.19 (p-value < .01). Interestingly, all significant findings except one are from the models with systematic risk

and standard deviation of ROA as dependent variables where the homoscedasticity assumption is satisfied.

Descriptive Statistics

Table 1 summarizes descriptive statistics for each variable included in analyses for all the U.S. restaurant firms. Systematic risk (SR) for the sampled restaurant companies shows a mean value of 0.71 with a range of -1.11 to 2.41. A beta of more than 1.0 represents a riskier portfolio than the market portfolio, and vice versa. In other words, the mean of systematic risk of the restaurant firms for all the U.S. restaurant firms is lower than the market portfolio of 1.0, indicating that the stocks of publicly traded U.S. restaurant firms are considered less risky to investors compared to the market. Unsystematic risk (UR) has a mean value of 0.03 with a minimum value of 0.01 and a maximum value of 0.20. The degree of internationalization (DOI) variable has a mean value of 0.07, ranging from 0 to 0.97, indicating that the sample includes both domestic operations (minimum value of 0) and international operations (maximum value of 0.97).

Firm leverage ratio (LEV) shows a mean value of 0.65 with a minimum (maximum) value of 0 (10.20) and the mean of firm liquidity (LIQ) is 1.03 with a minimum (maximum) value of 0.04 (10.90). The mean of operating efficiency (EF) is 1.65 with a minimum (maximum) value of 0.05 (5.28) and the mean of growth (GW) is -0.60 with a minimum (maximum) value of -572 (45.01). The mean of dividend payout ratio (DIV) is 0.14 with a minimum (maximum) value of -39.66 (39.63). Total revenues span $ 0.28 million to $28,105 million with a mean value of $1,233 million. Total assets vary from $0.35 million to $36,626 million with a mean value of $1,091 million.

Table 1

Descriptive statistics for All the U.S. restaurant firms

Variable	Obs	Mean	S.D.	Minimum	Maximum
SR	645	0.71	0.47	-1.11	2.41
UR	647	0.03	0.02	0.01	0.20
DSR	646	0.34	0.34	-1.13	1.44
DUR	642	0.02	0.01	0.00	0.09
USR	643	0.30	0.44	-1.87	2.63
UUR	643	0.02	0.02	0.00	0.13
SROA	918	0.09	0.35	0.00	6.04
SROE	918	0.66	2.51	0.00	40.83
SEPS	930	0.90	2.22	0.00	38.11
DOI	930	0.07	0.18	0.00	0.97
SIZE	930	2.46	0.80	-0.55	4.45
LEV	930	0.65	0.59	0.00	10.20
LIQ	930	1.03	0.95	0.04	10.90
PRO	930	0.01	0.21	-2.17	1.65
EF	930	1.65	0.73	0.05	5.28
GW	930	-0.60	19.06	-572.00	45.01
DIV	647	0.14	2.55	-39.66	39.63
TR	930	1233.39	3121.92	0.28	28105.70
TA	930	1091.50	3712.49	0.35	36626.30

Note. Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; DOI = degree of internationalization, measured by the number of foreign units/total units; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share; TR = total revenues; and TA = total assets.

Table 2 presents the summary of descriptive statistics analysis for each variable for U.S. restaurant firms with international operations for the observations of the same period. Systematic risk (SR) for the sampled restaurant companies shows a mean value of 0.85 with a range of -0.55 to 2.16. The mean of systematic risk of the restaurant companies in U.S. restaurant firms with international operations is still lower than the market portfolio of 1.0, indicating that the stocks of publicly traded U.S. restaurant firms in this sample are considered less risky to investors

compared to the market. Unsystematic risk (UR) has a mean value of 0.02 with a minimum value of 0.01 and a maximum value of 0.13. The degree of internationalization (DOI) variable shows a mean value of 0.20, ranging from 0.00 to 0.97, indicating that the sample includes international operations with value greater than 0. Originally, the minimum value of DOI is 0.001947; however, due to the rounding, it shows the minimum value of 0.00 in Table 2.

The average values of firm leverage ratio (LEV), liquidity (LIQ), profitability (PRO), and growth (GW) are 0.67, 1.12, 0.55, and -0.04, respectively, which are higher than the mean values of these variables for all the U.S. restaurant firms. On the other hand, the average values of operating efficiency (EF) and dividend payout ratio (DIV) are 1.52 and 0.08, respectively, which are slightly lower than those for all the U.S. restaurant firms. Total revenues and total assets show mean values of $2,658 million and $2,518 million, respectively, which are higher than the mean values of those for all the U.S. restaurant firms. Compared to all the U.S. restaurant firms, U.S. restaurant firms with international operations overall show higher mean values for each variable.

Table 2

Descriptive statistics for U.S. restaurant firms with international operations

Variable	Obs	Mean	S.D.	Minimum	Maximum
SR	277	0.85	0.37	-0.55	2.16
UR	276	0.02	0.01	0.01	0.13
DSR	276	0.44	0.27	-0.41	1.23
DUR	276	0.02	0.01	0.00	0.04
USR	276	0.38	0.30	-0.56	1.67
UUR	276	0.02	0.01	0.00	0.12
SROA	331	0.06	0.09	0.00	1.12
SROE	330	0.51	1.14	0.00	8.86
SEPS	338	0.78	0.92	0.02	6.46
DOI	338	0.20	0.25	0.00	0.97
SIZE	338	2.93	0.69	0.74	4.45
LEV	338	0.67	0.56	0.00	4.07
LIQ	338	1.12	0.90	0.10	6.12
PRO	338	0.55	0.11	-0.60	0.41
EF	338	1.52	0.72	0.08	4.62
GW	338	-0.04	2.56	-35.50	14.76
DIV	277	0.08	2.96	-39.66	23.68
TR	338	2657.71	4805.28	5.53	28105.70
TA	338	2517.90	5877.96	13.94	36626.30

Note. Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; DOI = degree of internationalization, measured by the number of foreign units/total units; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share; TR = total revenues; and TA = total assets.

Pearson's Correlation Analysis

Table 3 presents the Pearson's correlation analysis for the bivariate correlations among all variables in this study for all the U.S. restaurant firms. SR positively and significantly correlates with SIZE (r = 0.44) and PRO (r = 0.11) while negatively correlating with EF (r = -0.14). UR negatively correlates with DOI (r = -0.11), SIZE (r = -0.18), and PRO (r = - 0.26) at the significance level of 0.01. SROA negatively correlates with SIZE (r = -0.28) and PRO (r = -

0.58), but positively correlates with LEV (r = 0.11) and EF (r = 0.28). DOI positively and significantly correlates with SIZE (r = 0.47), LEV (r = 0.23), LIQ (r = 0.12), and PRO (r = 0.25).

Table 3

Pearson's correlation for All the U.S. restaurant firms

V	DOI	DOI^2	LagDOI	$LagDOI^2$	SIZE	LEV	LIQ	PRO	EF	GW	DIV
SR	0.05	0.00	0.04	0.00	0.44	0.83	-0.06	0.11	-0.14	0.03	-0.00
	0.23	0.92	0.29	0.97	0.00***	0.25	0.11	0.01***	0.00***	0.52	0.99
UR	-0.11	-0.09	-0.12	-0.09	-0.18	0.26	-0.10	-0.26	0.10	-0.03	-0.00
	0.01**	0.03**	0.01**	0.02**	0.00***	0.31	0.01**	0.00***	0.02**	0.49	0.98
DSR	0.07	0.03	0.07	0.03	0.33	0.03	0.02	0.16	-0.16	0.05	0.00
	0.10	0.47	0.11	0.49	0.00***	0.44	0.71	0.00***	0.00***	0.20	0.93
DUR	-0.23	-0.18	-0.23	-0.18	-0.45	0.08	-0.16	-0.51	0.20	-0.05	0.02
	0.00***	0.00***	0.00***	0.00***	0.00***	0.05*	0.00***	0.00***	0.00***	0.22	0.59
USR	0.02	0.00	0.02	0.00	0.22	0.03	-0.07	-0.09	-0.04	-0.09	-0.03
	0.55	0.93	0.58	0.91	0.00***	0.49	0.11	0.04**	0.40	0.04**	0.50
UUR	-0.19	-0.15	-0.19	-0.15	-0.42	0.06	-0.14	-0.48	0.18	-0.04	-0.02
	0.00***	0.00***	0.00***	0.00***	0.00***	0.13	0.00***	0.00***	0.00***	0.29	0.70
SROA	-0.05	-0.07	-0.06	-0.07	-0.28	0.11	0.03	-0.58	0.28	-0.08	
	0.19	0.09*	0.13	0.07*	0.00***	0.01**	0.53	0.00***	0.00***	0.05*	
SROE	-0.02	-0.02	-0.02	-0.01	-0.05	0.03	-0.05	-0.18	-0.05	-0.01	
	0.58	0.72	0.59	0.73	0.22	0.44	0.28	0.00***	0.22	0.89	
SEPS	-0.02	-0.01	-0.02	-0.01	-0.06	0.10	-0.03	-0.47	0.14	0.00	
	0.58	0.72	0.59	0.74	0.14	0.02**	0.52	0.00***	0.00***	0.97	
DOI		0.94	0.99	0.92	0.47	0.23	0.12	0.25	-0.04	0.02	0.07
		0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.40	0.62	0.10
DOI^2			0.94	0.99	0.36	0.16	0.09	0.21	-0.05	0.01	0.05
			0.00***	0.00***	0.00***	0.00***	0.04**	0.00***	0.19	0.73	0.22
LagDOI				0.94	0.46	0.23	0.13	0.25	-0.05	0.02	0.07
				0.00***	0.00***	0.00***	0.00***	0.00***	0.27	0.62	0.08*
$LagDOI^2$					0.34	0.14	0.09	0.20	-0.07	0.01	0.05
					0.00***	0.00***	0.03**	0.00***	0.11	0.73	0.23
SIZE						0.15	-0.12	0.39	-0.17	0.05	0.05
						0.00***	0.00***	0.00***	0.00***	0.24	0.24
LEV							-0.17	0.02	0.38	-0.03	0.13
							0.00***	0.71	0.00***	0.41	0.00***
LIQ								0.19	-0.19	0.02	0.01
								0.00***	0.00***	0.70	0.77
PRO									-0.14	0.12	0.04
									0.00***	0.01**	0.34
EF										-0.20	0.13
										0.00***	0.00***
GW											0.00
											0.98

Note. Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; DOI = degree of internationalization, measured by the number of foreign units/total units; DOI^2 = the squared form of DOI; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; $LagDOI^2$ = the squared form of LagDOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 4 presents the Pearson's correlation analysis for the bivariate correlations among all variables in this study for U.S. restaurant firms with international operations. SR negatively correlates with DOI (r = -0.20) and LIQ (r = - 0.36) while positively correlating with SIZE (r = 0.27) and GW (r = 0.27). UR correlates with none of the variables. SROA does not significantly correlate with the variables. DOI indicates a positive and significant correlation with SIZE (r = 0.40), LEV (r = 0.19), and PRO (r = 0.30).

Table 4

Pearson's correlation for U.S. restaurant firms with international operations

V	DOI	DOI^2	LagDOI	LagDOI^2	SIZE	LEV	LIQ	PRO	EF	GW	DIV
SR	-0.20	-0.19	-0.20	-0.19	0.27	0.09	-0.36	0.04	0.01	0.27	-0.01
	0.00***	0.00***	0.00***	0.00***	0.00***	0.15	0.00***	0.58	0.86	0.00***	0.90
UR	-0.09	-0.07	-0.09	-0.07	0.00	0.01	-0.07	-0.10	0.00	-0.01	0.01
	0.16	0.26	0.17	0.26	0.99	0.84	0.30	0.11	1.00	0.82	0.90
DSR	-0.12	-0.11	-0.12	-0.11	0.17	0.15	-0.14	0.08	0.01	0.25	0.00
	0.06*	0.08*	0.06*	0.08*	0.01**	0.02**	0.03**	0.19	0.92	0.00***	1.00
DUR	-0.25	-0.22	-0.27	-0.23	-0.32	0.13	-0.12	-0.49	0.07	-0.13	0.08
	0.00***	0.00***	0.00***	0.00***	0.00***	0.04**	0.05*	0.00***	0.30	0.04**	0.21
USR	-0.15	-0.14	-0.15	-0.13	0.21	0.01	-0.29	-0.03	-0.04	0.22	-0.08
	0.02**	0.03**	0.02**	0.04**	0.00***	0.93	0.00***	0.60	0.54	0.00***	0.23
UUR	-0.22	-0.19	-0.23	-0.20	-0.30	0.07	-0.10	-0.44	0.02	0.04	0.00
	0.00***	0.00***	0.00***	0.00***	0.00***	0.30	0.13	0.00***	0.77	0.57	0.96
SROA	-0.07	-0.05	-0.07	-0.05	-0.12	-0.02	-0.02	-0.01	0.07	-0.01	
	0.26	0.46	0.26	0.47	0.06*	0.79	0.74	0.88	0.30	0.84	
SROE	0.06	0.06	0.06	0.06	0.01	0.05	-0.15	-0.02	0.02	0.01	
	0.32	0.36	0.33	0.35	0.88	0.41	0.02**	0.75	0.81	0.90	
SEPS	-0.08	-0.04	-0.08	-0.04	0.00	-0.02	0.05	0.02	-0.12	-0.01	
	0.20	0.49	0.21	0.52	0.95	0.81	0.42	0.75	0.06*	0.91	
DOI		0.95	0.98	0.93	0.40	0.19	0.08	0.30	0.06	0.02	0.08
		0.00***	0.00***	0.00***	0.00***	0.00***	0.20	0.00***	0.33	0.73	0.19
DOI^2			0.94	0.99	0.33	0.12	0.05	0.26	0.00	0.03	0.06
			0.00***	0.00***	0.00***	0.07*	0.39	0.00***	0.94	0.65	0.37
LagDOI				0.95	0.40	0.18	0.10	0.30	0.01	0.05	0.09
				0.00***	0.00***	0.00***	0.12	0.00***	0.52	0.45	0.16
LagDOI^2					0.32	0.10	0.06	0.25	-0.02	0.04	0.06
					0.00***	0.12	0.35	0.00***	0.71	0.48	0.39
SIZE						0.10	-0.30	0.36	-0.04	0.22	0.06
						0.14	0.00***	0.00***	0.57	0.00***	0.35
LEV							-0.13	0.18	0.49	0.01	0.15
							0.04**	0.01**	0.00***	0.88	0.02
LIQ								0.20	-0.16	0.01	0.01
								0.00***	0.01**	0.93	0.83
PRO									0.18	0.18	0.05
									0.01**	0.00***	0.43
EF										0.02	0.18
										0.77	0.01**
GW											-0.02
											0.77

Note. Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; DOI = degree of internationalization, measured by the number of foreign units/total units; DOI^2 = the squared form of DOI; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; LagDOI^2 = the squared form of LagDOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Linear Effects

Based on the literature review, this study examined three different effects of internationalization: linear-effects, non-linear effects, and lagged effects on nine various risk measures under two categories: (1) Market-based risk measures (i.e., systematic risk, unsystematic risk, downside systematic risk, downside unsystematic risk, upside systematic risk, and upside unsystematic risk), and (2) accounting-based risk measures (i.e.., standard deviation of ROA, ROE, and EPS). For data analysis, the study performed panel regression analyses, either two-way fixed-effects model or two-way random-effects model based upon the results of the Hausman test.

As noted, this study suggests five hypotheses pertaining to the effects of internationalization on U.S. restaurant firms’ risk. H1 hypothesizes that the degree of a U.S. restaurant firm’s internationalization significantly affects the firm’s systematic risk. H2 hypothesizes that the degree of a U.S. restaurant firm’s internationalization significantly affects the firm’s unsystematic risk. H3 hypothesizes that the degree of a U.S. restaurant firm’s internationalization significantly affects the firm’s ROA risk. H4 hypothesizes that the degree of a U.S. restaurant firm’s internationalization significantly affects the firm’s ROE risk. Finally, H5 hypothesizes that the degree of a U.S. restaurant firm’s internationalization significantly affects the firm’s EPS risk.

Table 5 (see Appendix A) presents the results of the linear effects between DOI and six market-based risk measures for all the U.S. restaurant firms. According to the random-effects model estimation based by the Hausman test, the effect of internationalization appears to have a modestly significant and negative linear effect on systematic risk (z-value = -1.71; p-value = 0.09), supporting H1 that the degree of a U.S. restaurant firm’s internationalization significantly

affects the firm's systematic risk.. Among other risk measures, only upside systematic risk (z-value = -2.49; p-value = 0.01) are found to be negatively related to internationalization at the significance level of 0.05.

Table 6 presents the results of the linear effects between DOI and three accounting-based risk measures in the first category (i.e., all the U.S. restaurant firms). None of these risk measures have relationships with DOI, rejecting the hypotheses that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's accounting-based risk.

Table 6

Linear effects of internationalization on accounting-based risk for All the U.S. restaurant firms

Variable	Coefficients	z-value	p-value
Standard deviation of ROA			
DOI	0.08	1.31	0.19
SIZE	-0.08	-6.85***	0.00
LEV	-0.02	-1.34	0.18
LIQ	0.00	0.91	0.36
PRO	0.04	2.34**	0.02
EF	0.04	5.27***	0.00
GW	0.00	-1.86*	0.06
Standard deviation of ROE			
DOI	0.33	0.17	0.87
SIZE	-0.37	-0.80	0.42
LEV	0.27	1.22	0.22
LIQ	0.07	0.59	0.56
PRO	1.17	4.86***	0.00
EF	0.35	1.70*	0.09
GW	-0.01	-1.38	0.17
Standard deviation of EPS			
DOI	-1.02	-1.03	0.30
SIZE	0.51	2.41**	0.02
LEV	0.52	2.78**	0.01
LIQ	0.18	1.94*	0.05
PRO	0.17	0.44	0.66
EF	0.00	0.02	0.98
GW	0.00	0.07	0.94

Note. The table reports the results of the following regressions:

$SROA_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

$SROE_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

$SEPS_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

Where, SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; DOI = degree of internationalization, measured by the number of foreign units/total units; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); and GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

U.S. restaurant firms with international operations presents similar results. Table 7 (see Appendix B) presents the results of the linear effects of DOI on market-based risk measures for U.S. restaurant firms with international operations. Among those risk measures, internationalization has a highly significant and negative relationship with systematic risk (z-value = -2.91; p-value = 0.00) at the significance level of 0.01, supporting H1 that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's systematic risk. . Among other risk measures, only upside systematic risk (z-value = -2.93; p-value = 0.00) are found to be negatively related to internationalization. Table 8 presents the results of the linear effects between DOI and accounting-based risk measures for U.S. restaurant firms with international operations. None of these risk measures have relationships with DOI, indicating that the degree of a U.S. restaurant firm's internationalization does not affect the firm's accounting-based risk.

Table 8

Linear effects of internationalization on accounting-based risk for U.S. restaurant firms with international operations

Variable	Coefficients	z-value	p-value
Standard deviation of ROA			
DOI	0.00	-0.02	0.98
SIZE	-0.07	-5.61***	0.00
LEV	0.02	1.33	0.18
LIQ	-0.01	-2.05**	0.04
PRO	0.25	9.55***	0.00
EF	0.02	1.92*	0.06
GW	0.00	0.72	0.47
Standard deviation of ROE			
DOI	0.44	1.00	0.32
SIZE	-0.44	-2.57**	0.01
LEV	-0.02	-0.12	0.91
LIQ	-0.09	-0.97	0.33
PRO	1.13	1.83*	0.07
EF	0.01	0.07	0.95
GW	0.02	1.01	0.31
Standard deviation of EPS			
DOI	0.57	0.69	0.49
SIZE	0.93	2.89***	0.00
LEV	-0.06	-0.24	0.81
LIQ	-0.07	-0.87	0.39
PRO	-0.84	-1.51	0.13
EF	-0.09	-0.59	0.56
GW	0.01	0.33	0.74

Note. The table reports the results of the following regressions:

$SROA_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

$SROE_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

$SEPS_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

Where, SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; DOI = degree of internationalization, measured by the number of foreign units/total units; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); and GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Non-Linear Effects

Table 9 (see Appendix C) presents the results of the non-linear effects of DOI on market-based risk measures for all the U.S. restaurant firms, indicating that non-linear relationships between DOI and market-based risk measures are not significant. Table 10 presents the results of the non-linear effects of DOI on accounting-based risk measures for all the U.S. restaurant firms, indicating that non-linear relationships between DOI and accounting-based risk measures are not significant, rejecting the hypotheses that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's accounting-based risk measures.

Table 10

Non-linear effects of internationalization on accounting-based risk for All the U.S. restaurant firms

Variable	Coefficients	z-value	p-value
Standard deviation of ROA			
DOI	0.24	1.86*	0.06
DOI^2	-0.20	-1.40	0.16
SIZE	-0.08	-6.95***	0.00
LEV	-0.02	-1.36	0.17
LIQ	0.00	0.90	0.37
PRO	0.04	2.38**	0.02
EF	0.04	5.26***	0.00
GW	0.00	-1.85*	0.06
Standard deviation of ROE			
DOI	-1.00	-0.32	0.75
DOI^2	1.20	0.32	0.75
SIZE	-0.40	-1.65	0.10
LEV	0.39	1.81*	0.07
LIQ	-0.02	-0.20	0.84
PRO	0.93	3.99***	0.00
EF	0.22	1.17	0.24
GW	0.00	-1.22	0.22
Standard deviation of EPS			
DOI	-2.02	-0.76	0.45
DOI^2	1.32	0.41	0.68
SIZE	0.52	2.44**	0.02
LEV	0.52	2.79**	0.01
LIQ	0.18	1.95*	0.05
PRO	0.16	0.43	0.67
EF	0.01	0.03	0.97
GW	0.00	0.07	0.94

Note. The table reports the results of the following regressions:

$SROA_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

$SROE_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

$SEPS_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

Where, SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; DOI = degree of internationalization, measured by the number of foreign units/total units; DOI^2 = the squared form of DOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); and GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Similarly, U.S. restaurant firms with international operations generally shows that relationships between DOI and risk measures are not significant. Table 11 (see Appendix D) presents that non-linear effects between DOI and market-based risk measures for U.S. restaurant firms with international operations are not significant, rejecting the hypotheses that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's marketing-based risk measures.

Table 12 presents the results of the non-linear effects of DOI on accounting-based risk measures for U.S. restaurant firms with international operations. Interestingly, standard deviation of ROA only has an inverted U-shaped relationship with DOI (z-value = -2.14; p-value = 0.04) at the significance level of 0.05, supporting H3 that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's ROA risk.

Table 12

Non-linear effects of internationalization on accounting-based risk for U.S. restaurant firms with international operations

Variable	Coefficients	z-value	p-value
Standard deviation of ROA			
DOI	0.20	2.02**	0.04
DOI^2	-0.24	-2.14**	0.03
SIZE	-0.08	-5.92***	0.00
LEV	0.01	1.07	0.29
LIQ	-0.01	-2.16**	0.03
PRO	0.26	9.73***	0.00
EF	0.02	1.61	0.11
GW	0.00	0.72	0.47
Standard deviation of ROE			
DOI	1.28	0.92	0.36
DOI^2	-1.02	-0.63	0.53
SIZE	-0.47	-2.65**	0.01
LEV	-0.04	-0.20	0.84
LIQ	-0.09	-1.00	0.32
PRO	1.15	1.87*	0.06
EF	0.00	-0.02	0.98
GW	0.02	1.01	0.31
Standard deviation of EPS			
DOI	0.75	0.46	0.64
DOI^2	-0.24	-0.13	0.90
SIZE	0.93	2.89***	0.00
LEV	-0.06	-0.23	0.81
LIQ	-0.07	-0.87	0.39
PRO	-0.83	-1.50	0.14
EF	-0.10	-0.60	0.55
GW	0.01	0.33	0.74

Note. The table reports the results of the following regressions:

$SROA_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

$SROE_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

$SEPS_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

Where, SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; DOI = degree of internationalization, measured by the number of foreign units/total units; DOI^2 = the squared form of DOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); and GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Lagged Effects

Table 13 (see Appendix E) presents the results of the lagged-linear effects between DOI and nine market-based risk measures for all the U.S. restaurant firms. Among risk measures, systematic risk (z-value = -2.10; p-value = 0.04) is found to be negatively related to internationalization at the significance level of 0.05, supporting H1 that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's systematic risk. Specifically, internationalization appears to decrease restaurant firms' systematic risk in a lagged-linear manner.

Table 14 presents the results of the lagged-linear effects between DOI and three accounting-based risk measures for all the U.S. restaurant firms. None of these risk measures have relationships with the degree of a U.S. restaurant firm's internationalization, rejecting the hypotheses that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's accounting-based risk measures.

Table 14

Lagged-linear effects of internationalization on accounting-based risk for All the U.S. restaurant firms

Variable	Coefficients	z-value	p-value
Standard deviation of ROA			
LagDOI	0.10	1.40	0.16
SIZE	-0.06	-4.50***	0.00
LEV	-0.01	-1.03	0.30
LIQ	0.01	1.31	0.19
PRO	0.11	11.79***	0.00
EF	0.03	3.97***	0.00
GW	0.00	-1.92*	0.06
Standard deviation of ROE			
LagDOI	-1.22	-0.76	0.45
SIZE	-0.47	-1.14	0.26
LEV	0.57	3.44***	0.00
LIQ	0.08	0.77	0.44
PRO	0.83	4.67***	0.00
EF	0.09	0.54	0.59
GW	-0.01	-1.64	0.10
Standard deviation of EPS			
LagDOI	-1.83	-1.05	0.29
SIZE	0.87	2.02**	0.04
LEV	0.42	2.35**	0.02
LIQ	0.32	2.95***	0.00
PRO	0.40	2.13**	0.03
EF	-0.01	-0.03	0.98
GW	0.00	-0.43	0.67

Note. The table reports the results of the following regressions:

$SROA_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

$SROE_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

$SEPS_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

Where, SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); and GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

U.S. restaurant firms with international operations present somewhat different results. Table 15 (see Appendix F) presents the results of the lagged-linear effects between DOI and risk measures for U.S. restaurant firms with international operations. Internationalization has highly significant and negative relationships with downside systematic risk (z-value = -3.62; p-value = 0.00) and upside systematic risk (z-value = -2.70; p-value = 0.01), supporting that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's systematic risk in a lagged-linear manner.

Table 16 presents the results of the lagged-linear effects between DOI and three accounting-based risk measures for U.S. restaurant firms with international operations. ROA risk appears to be positively related to DOI (z-value = 2.06; p-value = 0.04) at the significance level of 0.05, supporting H3 that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's ROA risk in a lagged-linear manner.

Table 16

Lagged-linear effects of internationalization on accounting-based risk for U.S. restaurant firms with international operations

Variable	Coefficients	z-value	p-value
Standard deviation of ROA			
LagDOI	0.13	2.06**	0.04
SIZE	-0.12	-4.82***	0.00
LEV	0.02	1.01	0.31
LIQ	-0.02	-3.49***	0.00
PRO	0.25	9.42***	0.00
EF	0.02	1.53	0.13
GW	0.00	0.53	0.59
Standard deviation of ROE			
LagDOI	1.56	1.57	0.12
SIZE	-1.73	-4.43***	0.00
LEV	-0.43	-1.67*	0.09
LIQ	-0.18	-1.83*	0.07
PRO	0.27	0.39	0.70
EF	-0.15	-0.78	0.43
GW	-0.02	-1.10	0.27
Standard deviation of EPS			
LagDOI	0.89	1.06	0.29
SIZE	1.17	3.72***	0.00
LEV	-0.27	-1.23	0.22
LIQ	-0.07	-0.93	0.35
PRO	-1.27	-2.28**	0.02
EF	-0.08	-0.49	0.62
GW	0.01	0.85	0.39

Note. The table reports the results of the following regressions:

$SROA_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

$SROE_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

$SEPS_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \varepsilon_i$

Where, SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); and GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

With respect to lagged non-linear effects for all the U.S. restaurant firms, Table 17 (see Appendix G) presents the results of the lagged non-linear effects of DOI on market-based risk measures, indicating lagged non-linear relationships between DOI and market-based risk measures are not significant. Thus, the results reject the hypotheses that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's market-based risk measures in a lagged non-linear manner.

Table 18 presents the results of the non-linear effects of DOI on accounting-based risk measures for all the U.S. restaurant firms, indicating lagged non-linear relationships between DOI and accounting-based risk measures. Hence, the results reject the hypotheses that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's accounting-based risk measures in a lagged non-linear manner.

Table 18

Lagged non-linear effects of internationalization on accounting-based risk for All the U.S. restaurant firms

Variable	Coefficients	z-value	p-value
Standard deviation of ROA			
LagDOI	0.26	1.86*	0.06
$LagDOI^2$	-0.20	-1.33	0.18
SIZE	-0.06	-4.61***	0.00
LEV	-0.01	-1.08	0.28
LIQ	0.01	1.17	0.24
PRO	0.11	11.77***	0.00
EF	0.03	3.93***	0.00
GW	0.00	-1.94*	0.05
Standard deviation of ROE			
LagDOI	-4.13	-1.33	0.18
$LagDOI^2$	3.80	1.10	0.27
SIZE	-0.44	-1.08	0.28
LEV	0.61	3.59***	0.00
LIQ	0.09	1.87	0.39
PRO	0.86	4.79***	0.00
EF	0.10	0.63	0.53
GW	-0.01	-1.62	0.11
Standard deviation of EPS			
LagDOI	-1.77	-0.54	0.59
$LagDOI^2$	-0.08	-0.02	0.98
SIZE	0.87	2.01**	0.04
LEV	0.42	2.32**	0.02
LIQ	0.32	2.93***	0.00
PRO	0.40	2.11**	0.04
EF	-0.01	-0.03	0.97
GW	0.00	-0.43	0.67

Note. The table reports the results of the following regressions:

$SROA_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

$SROE_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

$SEPS_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

Where, SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; $LagDOI^2$ = the squared form of LagDOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); and GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

In respects to U.S. restaurant firms with international operations, Table 19 (see Appendix H) presents that lagged non-linear effects of DOI on market-based risk measures are not significant except for downside unsystematic risk. Downside unsystematic risk appears to have a significantly inverted U-shaped relationship with DOI (z-value = -2.13; p-value = 0.03) at the significance level of 0.05.

Table 20 presents the results of the lagged non-linear effects of DOI on accounting-based risk measures for U.S. restaurant firms with international operations, indicating that non-linear relationships between DOI and accounting-based risk measures are not significant. However, like as a non-linear relationship, standard deviation of ROA only has a significantly inverted U-shaped relationship with DOI (z-value = -2.42; p-value = 0.02) at the significance level of 0.05, supporting H3 that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's ROA risk in a lagged non-linear manner.

Table 20

Lagged non-linear effects of internationalization on accounting-based risk for U.S. restaurant firms with international operations

Variable	Coefficients	z-value	p-value
Standard deviation of ROA			
LagDOI	0.37	3.14***	0.00
$LagDOI^2$	-0.30	-2.42**	0.02
SIZE	-0.12	-5.09***	0.00
LEV	0.01	0.91	0.37
LIQ	-0.02	-3.86***	0.00
PRO	0.26	9.61***	0.00
EF	0.02	1.37	0.17
GW	0.00	0.41	0.68
Standard deviation of ROE			
LagDOI	2.15	1.11	0.27
$LagDOI^2$	-0.70	-0.35	0.73
SIZE	-1.75	-4.45***	0.00
LEV	-0.43	-1.69*	0.09
LIQ	-0.18	-1.86*	0.06
PRO	0.28	0.40	0.69
EF	-0.16	-0.80	0.42
GW	-0.02	-1.12	0.26
Standard deviation of EPS			
LagDOI	2.25	1.45	0.15
$LagDOI^2$	-1.76	-1.04	0.30
SIZE	1.15	3.64***	0.00
LEV	-0.27	-1.24	0.22
LIQ	-0.09	-1.07	0.28
PRO	-1.23	-2.22**	0.03
EF	-0.10	-0.62	0.54
GW	0.01	0.82	0.41

Note. The table reports the results of the following regressions:

$SROA_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

$SROE_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

$SEPS_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \varepsilon_i$

Where, SROA = standard deviation of return on assets (net income/total assets); SROE = standard deviation of return on equity (net income/total equity); SEPS = standard deviation of earnings per share; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; $LagDOI^2$ = the squared form of LagDOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); and GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT).

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 21 summarizes the comprehensive analyses of a relationship between one primary independent variable (i.e. the degree of internationalization) and nine risk measures (i.e., systematic risk, unsystematic risk, downside systematic risk, downside unsystematic risk, upside systematic risk, upside unsystematic risk, standard deviation of ROA, standard deviation of ROE, and standard deviation of EPS) in linear, non-linear, lagged manners, respectively. In summary, the findings of this study revealed that internationalization tend to mitigate systematic risk. Furthermore, internationalization tend to have an inverted U-shaped relationship with ROA risk, indicating that risk-increasing effects of internationalization on a restaurant firm's ROA risk exist at the initial stage of internationalization and risk-reducing effects of internationalization on the restaurant firm's ROA risk occur at the later stage of internationalization.

Table 21

Summary of the results on the relationship between internationalization and risk

Dependent Variables	Linear	Nonlinear	Lag-linear	Lag-nonlinear
All the U.S. restaurant firms				
Systematic Risk	Ne (0.09*)	-	Ne (0.04**)	-
Unsystematic Risk	-	-	-	-
Downside Systematic Risk	-	-	-	-
Downside Unsystematic Risk	-	-	-	-
Upside Systematic Risk	Ne (0.01**)	-	-	-
Upside Unsystematic Risk	-	-	-	-
Standard deviation of ROA	-	-	-	-
Standard deviation of ROE	-	-	-	-
Standard deviation of EPS	-	-	-	-
U.S. restaurant firms with international operations				
Systematic Risk	Ne(0.00***)	-	-	-
Unsystematic Risk	-	-	-	-
Downside Systematic Risk	-	-	Ne(0.00***)	-
Downside Unsystematic Risk	-	-	-	InU(0.03**)
Upside Systematic Risk	Ne(0.00***)	-	Ne(0.01***)	-
Upside Unsystematic Risk	-	-	-	-
Standard deviation of ROA	-	InU(0.03**)	Po(0.04**)	InU(0.02**)
Standard deviation of ROE	-	-	-	-
Standard deviation of EPS	-	-	-	-

Note. ROA = return on assets (net income/total assets); ROE = return on equity (net income/total equity); EPS = earnings per share; Ne = Negative relationship; Po = Positive relationship; InU = Inverted U-shaped relationship; and - = no significant relationship.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Conclusion

The models discussed in the previous chapter are analyzed using either two-way fixed-effects models or two-way random-effects models based upon the results of the Hausman test in STATA. In summary, the findings of this study present mixed results depending on various risk measures and the characteristics of the data (either all the U.S. restaurant firms or U.S. restaurant firms with international operations). Specifically, with respect to linear effects, systematic risk tends to have a significant and negative relationship, supporting H1 which argues that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's systematic risk.

Furthermore, ROA risk appears to have a significant and inverted U-shaped relationship with restaurant firms, supporting H3 that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's ROA risk. The findings of this study appear to reject H2, H4, and H5. That is, the degree of a U.S. restaurant firm's internationalization does not significantly affect the firm's unsystematic risk, ROE risk, and EPS risk. The next chapter will discuss the findings of this study in depth, present theoretical and practical implications, and suggest recommendations for future research, as well as limitations of this current study.

CHAPTER V

SUMMARY, CONCLUSIONS, AND

RECOMMENDATIONS FOR FUTURE RESEARCH

Introduction

This chapter presents the findings of this dissertation and discusses implications drawn from the results. Overall, the dissertation finds significant relationships between the degree of a U.S. restaurant firm's internationalization and the firm's systematic risk and ROA risk; yet it finds that relationships between the degree of internationalization and the firm's unsystematic risk, ROE risk, and EPS risk are not significant.

Findings

First, the findings of this study reveal a significant and negative relationship between the degree of a U.S. restaurant firm's internationalization and the firm's systematic risk, thereby supporting prior studies that argue for negative relationships (e.g., Agmon & Lessard, 1977; Hughes, Logue, & Sweeney, 1975; Michel & Shaked, 1986; Shapiro, 1978). The same results are found with upside systematic risk. In other words, the empirical results in this study support risk-reduction effects that, for publicly traded U.S. restaurant firms, benefits such as economies of scale and synergy gains from diversifying into international markets may outweigh the disadvantages engendered by the agency problem from internationalization. Therefore, the findings seem to support modern portfolio theory. In particular, given the fact that the restaurant business is highly competitive and saturated, the advantage of diversifying its business into international markets may be even greater for the restaurant industry than for other business sectors, supporting prior literature (Dunning, 1989; Kirca, Hult, Deligonul, Perryy, & Cavusgil, 2012). Additionally considering lagged effects, the findings of this study show significant and negative lagged-linear effects of internationalization on restaurant firms' systematic risk. A lag

effect presents the effect of a previous value of the lagged variable (i.e., internationalization) when there is some inherent ordering of the observations of this variable. In other words, internationalization in the previous period (i.e., last year) significantly decreases restaurant firms' systematic risk in the current period (i.e., this year).

Second, the findings of this study show a significant and inverted U-shaped relationship between internationalization and ROA risk. In other words, the risk-increasing effects of internationalization on a restaurant firm's ROA risk exist at the initial stage of internationalization, whereas the risk-reducing effects of internationalization on the restaurant firm's ROA risk occur at the later stage of internationalization. This phenomenon may be explained by initial costs and the benefits realized in the long term. It is suggested that initial internationalization requires firms to invest in learning about foreign markets. Owing to the barriers, the operations costs, and complications of managing widely scattered properties, internationalization initially tends to aggravate restaurant firms' ROA risk. However, in the long run, internationalization tends to alleviate firms' ROA risk resulting from the benefits of sharing the company's core competencies in diversified markets. Consistent with non-linear effects, internationalization appears to have significant and inverted U-shaped lagged effects on firms' ROA risk at the significance level of 0.05.

Third, the results of this study generally present that effects of internationalization on restaurant firms' unsystematic risk, ROE risk, and EPS risk are not significant, confirming previous literature that argues for not-significant relationships (e.g., Brewer, 1981; Fatemi, 1984; Jacquillat & Solnik, 1978; Sledge, 2000). It can be presumed that the benefits accrued from diversification and the costs caused by increasing complexity of international operations can be offset, which may lead to non-significant effects on unsystematic risk, ROE risk, and EPS risk.

Moreover, numerous confounding factors might exist when implementing and investigating restaurant firms' internationalization strategies pertaining to firms' unsystematic risk, ROE risk, and EPS risk. Therefore, discovering a conclusive relationship might be elusive.

Implications of Findings

Restaurant firms' strategic decisions regarding operating, investing, and financing can influence the characteristics of risk (Breen & Lerner, 1973; Gu & Kim, 2002). Internationalization is one of the most momentous strategic decisions that restaurant executives need to make and can affect certain aspects of firms' risk (Hughes et al., 1975; Liang & Rhoades, 1988; Lubatkin & Chatterjee, 1994).

Numerous restaurant firms have implemented internationalization as a corporate strategy and risk management is one of the crucial concerns of firms operating in international markets (Ghoshal, 1987). Nevertheless, the holistic mechanism of internationalization associated with risk has not often been examined explicitly. Furthermore, due to its ambivalence, the relationship between internationalization and risk has been an empirical question. Additionally, the degree of risk can vary among industries due to levels of risk peculiar to differing contexts (Borde, 1998). Specifically, the inherently high risk of the restaurant industry, caused by high sensitivity to economic conditions, may render restaurants more vulnerable to risk. Consequently, an examination of internationalization in a risk context seems noteworthy for the industry, both theoretically and practically.

Theoretical Implications

Based upon the Carhart four-factor model (Carhart, 1997), which goes beyond the framework of CAPM, this dissertation investigates restaurant firms' internationalization associated with various risk. While most previous research focuses on the effects of

internationalization on market-based risk including systematic and unsystematic risk, this dissertation expands the analysis to accounting-based risk including ROA risk, ROE risk, and EPS risk. Therefore, this dissertation better provides a full spectrum of risk variables that reflect the realities of internationalization strategies in the contemporary business environment. The empirical results suggest that internationalization partially mitigates a restaurant firm's systematic risk, supporting modern portfolio theory that argues that multinational restaurant firms may alleviate their risk by taking advantage of diversifying their operations in foreign countries and supporting previous literature that argues for negative relationships (e.g., Agmon & Lessard, 1977; Hughes, Logue, & Sweeney, 1975; Michel & Shaked, 1986; Shapiro, 1978). Furthermore, the findings of this study present a significant and inverted U-shaped relationship between internationalization and ROA risk, indicating that internationalization initially tends to generate risk-increasing effects on a restaurant firm's ROA risk caused by the initial costs, yet it also generates risk-reducing effects on a restaurant firm's ROA risk due to the benefits at the later stage of internationalization. The findings of non-significant effects of internationalization on unsystematic risk, ROE risk, and EPS risk support previous literature that argues for no relationships (e.g., Brewer, 1981; Sledge, 2000) between internationalization and risk. The results of this study not only enrich the internationalization and risk management literature, but also the hospitality literature by primarily focusing on U.S. restaurant firms.

Practical Implications

Primarily focusing on the restaurant industry, this dissertation provides more detailed and customized information to restaurant executives and investors, as well as to restaurant literature. Different industries may exhibit specific optimum combination levels of domestic and foreign business because of several factors, such as idiosyncratic entry barrier conditions (Daniels &

Bracket, 1989). Determining the optimum level is critical due to firms' limited resources; however, restaurant executives have limited theoretical and empirical information. In this respect, this industry-specific examination can guide them when narrowing the estimation range of the optimum ratio and deciding the extent to which international operations are appropriate. In addition, the findings of this study can be applicable to other industries that are sensitive to discretionary consumption expenditures, such as the hotel and tourism industries.

This dissertation highlights the importance of risk management for restaurant firms. Restaurant executives who are in charge of their international operations could consider these findings when developing strategic plans for international operations. Certainly, risks accompany expansion into international markets; however, restaurant executives can be more informed on risk management and gain more confidence in pursuing internationalization strategies, acknowledging that more international operations can somewhat mitigate restaurant firms' systematic and ROA risk in the long run. Lower beta implies lower cost of equity, which directly influences a firm's ability to manage capital investment. Additionally, within accounting-based risk measures, only ROA risk appears to be impacted by internationalization, supporting the argument that MNCs can have earnings that are less correlated with those of the domestic market. Consequently, regarding the implications of internationalization, it could be more critical and valuable for restaurant executives to focus on and scrutinize restaurant firms' variations of ROA rather than other accounting-based risk measures, including ROE and EPS.

Furthermore, investors and financial analysts could utilize the findings of this study to estimate their investment options based upon the aspects of risk applicable to different risk measures and restaurant firms' internationalization strategies. Investors' ability to diversify their portfolios internationally is limited (Krapl, 2015). The results of this study propose that risk-

averse investors could specifically consider purchasing shares of multinational restaurant firms with internationally diversified portfolios to realize the risk-reduction benefits from internationalization in an indirect manner. Moreover, if investors acknowledge the benefits of a corporation's internationalization, they are likely to require lower returns from restaurant firms or lower measures of risk to the firm's equity. Therefore, internationalization can moderate the riskiness of the firm by increasing its debt capacity (e.g., Hughes et al., 1975; Logue & Merville, 1972). Accordingly, the stock price would increase and the wealth of the restaurant firms' shareholders would be maximized.

Limitations and Recommendations for Future Research

This study is not without limitations, and the results contained herein raise questions about several perspectives for future research. First, that the study is limited to publicly traded U.S. restaurant firms may affect the generalizability of the results. Future studies could extend to restaurant firms in foreign countries for market-based risk and accounting-based risk or to U.S. private restaurants for accounting-based risk only, based upon the data availability, to provide more convincing information and to enhance the external validity of the findings of this dissertation.

Second, the restaurant industry faces a changing business environment which may alter the risk features. Despite wide popularity in the past due to its convenience, the fast food segment, the largest segment in the industry, has begun to encounter market challenges caused by consumers' increasing demand for quality because of health concerns, fierce competition with other restaurant segments, and high employee turnover (Little, 2014; Schoen, 2013). The rapid growth of the casual-dining restaurant segment has added to the recent struggles of the fast-food segment (Tice, 2013). Thus, subsequent research extending the study to investigate specific types

of restaurant firms can thoroughly reveal a detailed view of internationalization from the perspective of risk and assist restaurant executives in improving risk management as linked to internationalization strategies.

Third, the risk level for the restaurant industry can vary over time. Future studies may extend the time horizon to examine whether risk level varies over time. For instance, the relationship between internationalization and risk can vary depending on the stage of internationalization. In other words, firms in the advanced stages of internationalization may experience different levels of risk compared to the firms in the initial stages of internationalization. Fourth, this study examines the risk perspective of internationalization strategies solely in the restaurant industry; therefore, a resurgence of this research may be necessary in other hospitality segments, including the hotel and casino industries, which have also experienced significant international growth. This would facilitate cross-category comparisons of different hospitality sectors. Fifth, future studies could not only consider the effect of the recession on this topic, but also divide the samples by firm size to examine possible differences.

Finally, as shown in Table 22 and Table 23, a majority of the models violates the homoscedasticity assumption (only 14 out of 72 models satisfied the assumption). The violation of the assumption about independent errors basically occurs due to two main reasons: heteroscedasticity and autocorrelation. Such violation results in biased standard errors even though panel data specific estimation methods (e.g., fixed effects model or random effects model) are employed (Baker, Stein, & Wurgluer, 2003; Wooldridge, 2003) as done in this dissertation.

Specifically, the standard errors produced by the panel estimation are unbiased only when the firm effects (serial correlation) is constant across time. However, the non-constant correlation yields biased standard errors which are usually smaller than true standard errors (Peterson, 2009). Correcting these underestimated standard errors is therefore needed in order to conduct an accurate statistical inference, mainly dealing with problems caused by heteroscedasticity and autocorrelation. To achieve such corrections, several methods have been suggested and evaluated in the econometrics literature. White (1984) introduced cluster-robust standard errors, which is a modified version of the White (1980) standard errors designed to deal with heteroscedasticity in a cross-sectional data. Newey-West (1987) standard errors generalized White (1984) standard errors in order to get robust standard errors to both heteroscedasticity and autocorrelation. In the finance literature, Fama-MacBeth standard errors have been widely used to consider correlations across firms within a year, but this method is not applicable when autocorrelation exists (Peterson, 2009). In the panel data set, generally two types of correlation among errors need to be considered (1) correlation within a firm across time and (2) correlation within time across individuals. Considering the inherent problems, two-way clustering (clustering on both firm and time dimensions) has been suggested as a better method than many other estimation methods mentioned above to produce unbiased estimates for both cross-sectional (i.e., heteroscedasticity) and time-series correlations (autocorrelation) (Gow, Romazabal, & Taylor, 2010).

Therefore, this dissertation re-ran the analyses using the two-way clustering and present results in Table 24. The two-way clustering analysis confirms that nine significant results are consistent with the findings in this dissertation (out of eleven statistically significant findings). Out of these two inconsistent findings, for the case that examined a nonlinear relationship between internationalization and standard deviation of ROA, the direction is still consistent, but

the p-value increases from 3.2% to 15.9% while for the case that examined a lag-nonlinear relationship between internationalization and Downside Unsystematic Risk, the sign of the coefficient changed from negative (i.e., inverted U-shape) to positive (i.e., U-shape). The both cases fail to show statistically significant results. However, again, the two-way clustering analysis confirmed on other nine cases with same signs and similar statistical significance levels.

Nevertheless, the two-way clustering method is not a perfect solution for all issues involved in a panel data. The two-way clustering method cannot, for example, effectively deal with unobserved effects which typically happen in a panel data. As a result, this dissertation conducted the panel analysis (that is, either two-way fixed- or random-effects model) along with two-way clustering by firm and year to deal with this issue. In fact, the contemporary econometrics literature is still debating these panel analysis issues which clearly suggests that there is no perfect solution to deal with all the issues in the panel data setting. It is believed that the two-way fixed- or random-effects models provide relatively robust and reliable estimations, thus this dissertation maintains the results based on such models. By demonstrating that the original results that used either two-way fixed- or random-effects model (which, in fact, also takes care of biased standard errors issue at a certain degree caused by heteroscedasticity and autocorrelation (Wooldridge, 2003) are mostly consistent with the results from the two-way clustering method, this dissertation can reasonably argue that the original results are reliable even when homoscedasticity assumption is not satisfied. However, as mentioned, there are many unresolved issues in the panel analysis in the econometrics perspective even though there have been much development for the panel analysis in recent years (Hsiao, 2014). Future studies can investigate this topic based upon more thorough and proven analysis.

Table 22

The homoscedasticity test for All the U.S. restaurant firms

Relationships	DVs	P-value	Chi-square
Linear	SR	0.01	7.85
	DSR	0.00	20.10
	USR	0.00	25.78
	UR	0.00	902.20
	DUR	0.00	286.38
	UUR	0.00	428.32
	ROA risk	0.00	531.08
	ROE risk	0.00	19269.21
	EPS risk	0.00	4598.83
Non-linear	SR	0.01	7.76
	DSR	0.00	20.04
	USR	0.00	25.70
	UR	0.00	900.52
	DUR	0.00	285.56
	UUR	0.00	426.80
	ROA risk	0.00	535.50
	ROE risk	0.00	19251.14
	EPS risk	0.00	4598.83
Lagged-linear	SR	0.00	13.79
	DSR	0.00	8.77
	USR	0.00	39.08
	UR	0.00	1062.36
	DUR	0.00	251.05
	UUR	0.00	446.99
	ROA risk	0.00	299.48
	ROE risk	0.00	16196.30
	EPS risk	0.00	3489.46
Lagged non-linear	SR	0.00	13.42
	DSR	0.00	8.76
	USR	0.00	39.23
	UR	0.00	1064.42
	DUR	0.00	254.48
	UUR	0.00	447.38
	ROA risk	0.00	303.38
	ROE risk	0.00	16072.17
	EPS risk	0.00	3489.61

Note. Where, SR = systematic risk; DSR = downside systematic risk; USR = upside systematic risk; UR = unsystematic risk; DUR = downside unsystematic risk; UUR = upside unsystematic risk; ROA risk = return on assets (net income/total assets) risk; ROE risk = return on equity (net income/total equity) risk; and EPS risk = earnings per share risk.

Table 23

The homoscedasticity test for U.S. restaurant firms with international operations

Relationship	DVs	P-value	Chi-square
Linear	SR	0.76	0.09
	DSR	0.63	0.23
	USR	0.72	0.13
	UR	0.00	78.31
	DUR	0.00	51.18
	UUR	0.00	61.83
	ROA risk	0.00	488.49
	ROE risk	0.00	1019.78
	EPS risk	0.00	506.14
Non-linear	SR	0.77	0.09
	DSR	0.63	0.23
	USR	0.72	0.13
	UR	0.00	79.32
	DUR	0.00	51.84
	UUR	0.00	62.42
	ROA risk	0.00	474.51
	ROE risk	0.00	1020.16
	EPS risk	0.00	505.05
Lagged-linear	SR	0.94	0.01
	DSR	0.68	0.17
	USR	0.37	0.80
	UR	0.00	122.83
	DUR	0.00	56.58
	UUR	0.00	120.47
	ROA risk	0.11	2.51
	ROE risk	0.00	973.55
	EPS risk	0.00	431.19
Lagged non-linear	SR	0.77	0.08
	DSR	0.68	0.17
	USR	0.51	0.43
	UR	0.00	118.69
	DUR	0.00	60.98
	UUR	0.00	122.39
	ROA risk	0.11	2.57
	ROE risk	0.00	972.46
	EPS risk	0.00	422.22

Note. Where, SR = systematic risk; DSR = downside systematic risk; USR = upside systematic risk; UR = unsystematic risk; DUR = downside unsystematic risk; UUR = upside unsystematic risk; ROA risk = return on assets (net income/total assets) risk; ROE risk = return on equity (net income/total equity) risk; and EPS risk = earnings per share risk.

Table 24

Summary of the results on the relationship between internationalization and risk using two-way clustering approach

Dependent Variables	Linear	Nonlinear	Lag-linear	Lag-nonlinear
All the U.S. restaurant firms				
Systematic Risk	Ne (0.08*)	-	Ne (0.07*)	-
Unsystematic Risk	-	-	-	-
Downside Systematic Risk	-	-	-	-
Downside Unsystematic Risk	-	-	-	-
Upside Systematic Risk	Ne (0.04**)	-	-	-
Upside Unsystematic Risk	-	-	-	-
Standard deviation of ROA	-	-	-	-
Standard deviation of ROE	-	-	-	-
Standard deviation of EPS	-	-	-	-
U.S. restaurant firms with international operations				
Systematic Risk	Ne(0.00***)	-	-	-
Unsystematic Risk	-	-	-	-
Downside Systematic Risk	-	-	Ne(0.00***)	-
Downside Unsystematic Risk	-	-	-	U(0.10)
Upside Systematic Risk	Ne(0.00***)	-	Ne(0.00***)	-
Upside Unsystematic Risk	-	-	-	-
Standard deviation of ROA	-	InU(0.16)	Po(0.11)	InU(0.02**)
Standard deviation of ROE	-	-	-	-
Standard deviation of EPS	-	-	-	-

Note. Where, ROA = return on assets (net income/total assets); ROE = return on equity (net income/total equity); EPS = earnings per share; Ne = Negative relationship; Po = Positive relationship; InU = Inverted U-shaped relationship; and - = no significant relationship.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Summary

The purpose of this dissertation is to advance the theoretical and practical understanding of the relationship between publicly traded U.S. restaurant firm's internationalization as a corporate strategy and risk using a comprehensive set of risk measures: 1) market-based risk (i.e., systematic and unsystematic risk) and 2) accounting-based risk (i.e., standard deviation of return on assets (ROA), return on equity (ROE), and earnings per share (EPS)) during the period of 2000-2013.

In conclusion, overall, the results of this dissertation reveal significant relationships between internationalization and restaurant firms' systematic risk as well as ROA risk, supporting H1 and H3 that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's systematic risk and ROA risk. More specifically, the degree of internationalization, in general, tends to have a significant and negative relationship with restaurant firms' systematic risk as well as a significant and inverted U-shaped relationship with firms' ROA risk. On the other hand, overall, the findings of this study present that relationships between the degree of internationalization and unsystematic risk, ROE risk, and EPS risk are not significant, rejecting H2, H4, and H5 that the degree of a U.S. restaurant firm's internationalization significantly affects the firm's unsystematic risk, ROE risk, and EPS risk.

This dissertation better provides a full spectrum of risk variables that reflect the realities of internationalization strategies in the contemporary business environment by investigating internationalization associated with market-based risk as well as accounting-based risk based upon the Carhart four-factor model. Furthermore, by highlighting the importance of risk management in the restaurant industry, the results provide more detailed information to restaurant executives and investors. Consequently, restaurant executives and investors can utilize the findings of this study when developing, implementing, and investigating restaurant firms' internationalization strategies in a risk context.

APPENDIX A

Table 5

Linear effects of internationalization on market-based risk for All the U.S. restaurant firms

Variable	Coefficients	z-value	p-value
Systematic Risk			
DOI	-0.32	-1.71*	0.09
SIZE	0.26	5.25***	0.00
LEV	-0.10	-1.48	0.14
LIQ	0.02	0.74	0.46
PRO	0.67	4.44***	0.00
EF	-0.08	-1.73*	0.08
GW	0.00	-0.60	0.55
DIV	0.01	0.98	0.33
Unsystematic Risk			
DOI	0.00	0.21	0.84
SIZE	-0.01	-3.44***	0.00
LEV	0.01	2.21**	0.03
LIQ	0.00	-3.48***	0.00
PRO	-0.03	-5.16***	0.00
EF	0.00	1.83*	0.07
GW	0.00	0.35	0.73
DIV	0.00	0.64	0.52
Downside Systematic Risk			
DOI	-0.32	-1.00	0.32
SIZE	0.07	0.79	0.43
LEV	0.10	1.29	0.20
LIQ	0.05	2.28**	0.02
PRO	0.37	2.76**	0.01
EF	-0.06	-1.27	0.20
GW	0.00	0.13	0.90
DIV	0.00	-0.00	1.00
Downside Unsystematic Risk			
DOI	0.00	-0.30	0.76
SIZE	-0.01	-2.96***	0.00
LEV	0.01	3.08***	0.00
LIQ	0.00	-1.98*	0.05
PRO	-0.01	-4.87***	0.00
EF	0.00	-1.24	0.22
GW	0.00	-0.07	0.95
DIV	0.00	1.93*	0.05
Upside Systematic Risk			
DOI	-0.31	-2.49**	0.01

Variable	Coefficients	z-value	p-value
SIZE	0.19	5.64***	0.00
LEV	-0.02	-0.43	0.67
LIQ	-0.04	-1.56	0.12
PRO	0.40	2.63**	0.01
EF	-0.10	-2.89***	0.00
GW	0.00	-4.07***	0.00
DIV	0.00	-0.47	0.64
Upside Unsystematic Risk			
DOI	0.00	0.30	0.77
SIZE	-0.02	-4.65***	0.00
LEV	0.01	2.57**	0.01
LIQ	0.00	-3.62***	0.00
PRO	-0.02	-5.45***	0.00
EF	0.00	0.91	0.36
GW	0.00	0.55	0.59
DIV	0.00	0.00	1.00

Note. The table reports the results of the following regressions:

$SR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$UR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$DSR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$DUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$USR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$UUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; DOI = degree of internationalization, measured by the number of foreign units/total units; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

APPENDIX B

Table 7

Linear effects of internationalization on market-based risk for U.S. restaurant firms with international operations

Variable	Coefficients	z-value	p-value
Systematic Risk			
DOI	-0.38	-2.91***	0.00
SIZE	0.16	3.05***	0.00
LEV	0.08	1.45	0.15
LIQ	-0.08	-2.48**	0.01
PRO	0.10	0.47	0.64
EF	-0.01	-0.21	0.83
GW	0.12	6.62***	0.00
DIV	0.00	0.54	0.59
Unsystematic Risk			
DOI	0.00	0.04	0.97
SIZE	0.01	3.66***	0.00
LEV	0.00	2.10**	0.04
LIQ	0.00	-1.35	0.18
PRO	-0.02	-3.55***	0.00
EF	0.00	-1.77*	0.08
GW	0.00	1.86*	0.06
DIV	0.00	0.79	0.43
Downside Systematic Risk			
DOI	-0.30	-1.01	0.31
SIZE	0.30	1.88*	0.06
LEV	0.20	2.23**	0.03
LIQ	0.00	0.05	0.96
PRO	0.38	1.69*	0.09
EF	-0.09	-1.14	0.25
GW	0.04	2.06**	0.04
DIV	0.00	0.26	0.80
Downside Unsystematic Risk			
DOI	0.00	-0.65	0.52
SIZE	0.01	2.19**	0.03
LEV	0.01	3.35***	0.00
LIQ	0.00	-0.17	0.86
PRO	-0.01	-3.49***	0.00
EF	-0.01	-3.91***	0.00
GW	0.00	-1.12	0.26
DIV	0.00	1.86*	0.06

Variable	Coefficients	z-value	p-value
Upside Systematic Risk			
DOI	-0.27	-2.93***	0.00
SIZE	0.12	3.20***	0.00
LEV	0.02	0.57	0.57
LIQ	-0.06	-2.29**	0.02
PRO	-0.13	-0.60	0.55
EF	-0.02	-0.69	0.49
GW	0.06	2.91***	0.00
DIV	-0.01	-0.90	0.37
Upside Unsystematic Risk			
DOI	0.00	0.27	0.79
SIZE	0.01	1.46	0.15
LEV	0.00	1.98**	0.05
LIQ	0.00	-2.13**	0.03
PRO	-0.02	-3.40***	0.00
EF	0.00	-0.64	0.52
GW	0.00	3.35***	0.00
DIV	0.00	0.05	0.96

Note. The table reports the results of the following regressions:

$SR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$UR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$DSR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$DUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$USR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$UUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; DOI = degree of internationalization, measured by the number of foreign units/total units; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

APPENDIX C

Table 9

Non-linear effects of internationalization on market-based risk for All the U.S. restaurant firms

Variable	Coefficients	z-value	p-value
Systematic Risk			
DOI	0.10	0.19	0.85
DOI^2	-0.63	-0.84	0.40
SIZE	0.25	4.99***	0.00
LEV	-0.11	-1.59	0.11
LIQ	0.02	0.68	0.50
PRO	0.67	4.43***	0.00
EF	-0.08	-1.74*	0.08
GW	0.00	-0.61	0.54
DIV	0.01	0.99	0.32
Unsystematic Risk			
DOI	-0.02	-0.56	0.58
DOI^2	0.03	0.73	0.47
SIZE	-0.01	-3.47***	0.00
LEV	0.01	2.20**	0.03
LIQ	0.00	-3.52***	0.00
PRO	-0.03	-5.16***	0.00
EF	0.00	1.90*	0.06
GW	0.00	0.36	0.72
DIV	0.00	0.66	0.51
Downside Systematic Risk			
DOI	-0.36	-0.51	0.61
DOI^2	0.07	0.07	0.95
SIZE	0.07	0.78	0.44
LEV	0.10	1.28	0.20
LIQ	0.05	2.27**	0.02
PRO	0.37	2.76*	0.06
EF	-0.06	-1.26	0.21
GW	0.00	0.13	0.90
DIV	0.00	-0.00	1.00
Downside Unsystematic Risk			
DOI	-0.01	-0.78	0.43
DOI^2	0.02	0.72	0.47
SIZE	-0.01	-3.00***	0.00
LEV	0.01	3.07***	0.00
LIQ	0.00	-2.02**	0.04
PRO	-0.01	-4.86***	0.00
EF	0.00	-1.15	0.25
GW	0.00	-0.05	0.96

Variable	Coefficients	z-value	p-value
DIV	0.00	1.95*	0.05
Upside Systematic Risk			
DOI	-0.17	-0.47	0.64
DOI^2	-0.20	-0.39	0.70
SIZE	0.19	5.31***	0.00
LEV	-0.02	-0.50	0.62
LIQ	-0.04	-1.60	0.11
PRO	0.40	2.63**	0.01
EF	-0.10	-2.90***	0.00
GW	0.00	-4.07***	0.00
DIV	0.00	-0.46	0.64
Upside Unsystematic Risk			
DOI	-0.01	-0.41	0.68
DOI^2	0.02	0.62	0.54
SIZE	-0.02	-4.68***	0.00
LEV	0.01	2.56**	0.01
LIQ	0.00	-3.65***	0.00
PRO	-0.02	-5.44***	0.00
EF	0.00	0.97	0.33
GW	0.00	0.56	0.58
DIV	0.00	0.02	0.99

Note. The table reports the results of the following regressions:

$SR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$UR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$DSR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$DUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$USR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$UUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; DOI = degree of internationalization, measured by the number of foreign units/total units; DOI^2 = the squared form of DOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

APPENDIX D

Table 11

Non-linear effects of internationalization on market-based risk for U.S. restaurant firms with international operations

Variable	Coefficients	z-value	p-value
Systematic Risk			
DOI	-0.25	-0.61	0.54
DOI^2	-0.18	-0.33	0.74
SIZE	0.15	2.92^{***}	0.00
LEV	0.07	1.36	0.17
LIQ	-0.08	-2.50^{**}	0.01
PRO	0.11	0.50	0.62
EF	-0.01	-0.23	0.82
GW	0.12	6.62^{***}	0.00
DIV	0.00	0.54	0.59
Unsystematic Risk			
DOI	0.00	-0.42	0.67
DOI^2	0.01	0.47	0.64
SIZE	-0.01	-4.15^{***}	0.00
LEV	0.00	2.07^{**}	0.04
LIQ	0.00	-1.12	0.26
PRO	-0.06	-9.60^{***}	0.00
EF	0.00	1.43	0.15
GW	0.00	4.72^{***}	0.00
DIV	0.00	0.60	0.55
Downside Systematic Risk			
DOI	-0.49	-2.00^{*}	0.05
DOI^2	0.30	0.94	0.35
SIZE	0.09	2.79^{**}	0.01
LEV	0.10	3.41^{***}	0.00
LIQ	-0.01	-0.47	0.64
PRO	0.15	0.82	0.41
EF	-0.04	-1.46	0.14
GW	0.06	3.70^{***}	0.00
DIV	0.00	-0.08	0.94
Downside Unsystematic Risk			
DOI	0.00	0.26	0.79
DOI^2	-0.01	-0.61	0.54
SIZE	0.01	2.24^{**}	0.03
LEV	0.01	3.38^{***}	0.00
LIQ	0.00	-0.10	0.92

Variable	Coefficients	z-value	p-value
PRO	-0.01	-3.50***	0.00
EF	-0.01	-3.96***	0.00
GW	0.00	-1.07	0.28
DIV	0.00	1.84*	0.07
Upside Systematic Risk			
DOI	-0.40	-1.35	0.18
DOI^2	0.18	0.46	0.65
SIZE	0.12	3.20***	0.00
LEV	0.02	0.65	0.52
LIQ	-0.05	-2.17**	0.03
PRO	-0.14	-0.64	0.52
EF	-0.02	-0.64	0.52
GW	0.06	2.86***	0.00
DIV	-0.01	-0.90	0.37
Upside Unsystematic Risk			
DOI	0.02	1.06	0.29
DOI^2	-0.03	-1.04	0.30
SIZE	0.01	1.57	0.12
LEV	0.00	2.03**	0.04
LIQ	0.00	-1.98*	0.05
PRO	-0.02	-3.42***	0.00
EF	0.00	-0.85	0.39
GW	0.00	3.43***	0.00
DIV	0.00	0.02	0.98

Note. The table reports the results of the following regressions:

$SR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$UR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$DSR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$DUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$USR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$UUR_t = \alpha_0 + \alpha_1 DOI_t + \alpha_2 DOI^2_t + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; DOI = degree of internationalization, measured by the number of foreign units/total units; DOI^2 = the squared form of DOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

APPENDIX E

Table 13

Lagged-linear effects of internationalization on market-based risk for All the U.S. restaurant firms

Variable	Coefficients	z-value	p-value
Systematic Risk			
LagDOI	-0.39	-2.10**	0.04
SIZE	0.27	5.61***	0.00
LEV	-0.08	-1.20	0.23
LIQ	0.02	0.65	0.52
PRO	0.64	4.34***	0.00
EF	-0.07	-1.58	0.12
GW	0.00	-0.33	0.74
DIV	0.00	0.55	0.58
Unsystematic Risk			
LagDOI	0.01	0.33	0.74
SIZE	-0.01	-3.49***	0.00
LEV	0.01	1.99*	0.05
LIQ	0.00	-3.27***	0.00
PRO	-0.03	-4.63***	0.00
EF	0.00	2.39**	0.02
GW	0.00	0.94	0.35
DIV	0.00	0.33	0.74
Downside Systematic Risk			
LagDOI	-0.19	-0.51	0.61
SIZE	0.15	1.53	0.13
LEV	0.09	1.18	0.24
LIQ	0.08	3.16***	0.00
PRO	0.31	2.47**	0.01
EF	-0.06	-1.19	0.23
GW	0.00	0.28	0.78
DIV	0.00	-0.13	0.89
Downside Unsystematic Risk			
LagDOI	0.00	-0.24	0.81
SIZE	-0.01	-3.2***	0.00
LEV	0.00	2.88***	0.00
LIQ	0.00	-1.84*	0.07
PRO	-0.01	-4.57***	0.00
EF	0.00	-0.27	0.79
GW	0.00	0.39	0.69
DIV	0.00	0.91	0.37

Variable	Coefficients	z-value	p-value
Upside Systematic risk			
LagDOI	0.58	1.15	0.25
SIZE	-0.21	-1.66	0.10
LEV	-0.12	-1.25	0.21
LIQ	-0.09	-2.80**	0.01
PRO	0.15	0.87	0.38
EF	-0.03	-0.52	0.60
GW	0.00	-4.16***	0.00
DIV	0.00	-0.16	0.87
Upside Unsystematic Risk			
LagDOI	0.00	0.32	0.75
SIZE	-0.02	-5.38***	0.00
LEV	0.01	2.54**	0.01
LIQ	0.00	-3.06***	0.00
PRO	-0.02	-5.13***	0.00
EF	0.00	1.80*	0.07
GW	0.00	1.00	0.32
DIV	0.00	0.01	0.99

Note. The table reports the results of the following regressions:

$SR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$UR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$DSR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$DUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$USR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$UUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

APPENDIX F

Table 15

Lagged-linear effects of internationalization on market-based risk for U.S. restaurant firms with international operations

Variable	Coefficients	z-value	p-value
Systematic Risk			
LagDOI	-0.25	-0.63	0.53
SIZE	0.39	2.23**	0.03
LEV	0.19	2.02**	0.04
LIQ	-0.01	-0.33	0.74
PRO	0.43	1.83*	0.07
EF	0.19	2.23**	0.03
GW	0.06	2.84**	0.01
DIV	0.00	0.27	0.79
Unsystematic Risk			
LagDOI	0.00	-0.72	0.47
SIZE	-0.01	-4.37***	0.00
LEV	0.00	2.43**	0.02
LIQ	0.00	-1.40	0.16
PRO	-0.05	-6.98***	0.00
EF	0.00	0.62	0.54
GW	0.00	1.00	0.32
DIV	0.00	-0.52	0.60
Downside Systematic Risk			
LagDOI	-0.29	-3.62***	0.00
SIZE	0.08	2.58**	0.01
LEV	0.09	2.95***	0.00
LIQ	-0.01	-0.65	0.52
PRO	0.16	0.89	0.38
EF	-0.04	-1.39	0.17
GW	0.06	3.00***	0.00
DIV	0.00	0.02	0.98
Downside Unsystematic Risk			
LagDOI	0.00	-0.44	0.66
SIZE	0.01	2.32**	0.02
LEV	0.01	3.38***	0.00
LIQ	0.00	0.04	0.97
PRO	-0.01	-2.83**	0.01
EF	0.00	-2.23**	0.03
GW	0.00	-2.03**	0.04
DIV	0.00	-0.06	0.95

Variable	Coefficients	z-value	p-value
Upside Systematic Risk			
LagDOI	-0.24	-2.70**	0.01
SIZE	0.09	2.50**	0.01
LEV	0.00	0.10	0.92
LIQ	-0.07	-2.87***	0.00
PRO	0.06	0.28	0.78
EF	-0.02	-0.68	0.50
GW	0.06	3.20***	0.00
DIV	0.00	-0.08	0.94
Upside Unsystematic Risk			
LagDOI	0.00	-0.12	0.90
SIZE	0.01	1.97*	0.05
LEV	0.00	1.94*	0.05
LIQ	0.00	-1.44	0.15
PRO	-0.02	-3.22***	0.00
EF	0.00	-0.24	0.81
GW	0.00	3.04***	0.00
DIV	0.00	-0.88	0.38

Note. The table reports the results of the following regressions:

$SR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$UR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$DSR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$DUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$USR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

$UUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 SIZE_t + \alpha_3 LEV_t + \alpha_4 LIQ_t + \alpha_5 PRO_t + \alpha_6 EF_t + \alpha_7 GW_t + \alpha_8 DIV_t + \varepsilon_i$

Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

APPENDIX G

Table 17

Lagged non-linear effects of internationalization on market-based risk for All the U.S. restaurant firms

Variable	Coefficients	z-value	p-value
Systematic Risk			
LagDOI	-0.29	-0.56	0.57
$LagDOI^2$	-0.14	-0.19	0.85
SIZE	0.27	5.43***	0.00
LEV	-0.08	-1.21	0.23
LIQ	0.02	0.60	0.55
PRO	0.64	4.34***	0.00
EF	-0.07	-1.58	0.11
GW	0.00	-0.34	0.73
DIV	0.00	0.56	0.57
Unsystematic Risk			
LagDOI	0.01	0.46	0.64
$LagDOI^2$	-0.02	-0.33	0.74
SIZE	-0.01	-3.48***	0.00
LEV	0.01	2.00*	0.05
LIQ	0.00	-3.29***	0.00
PRO	-0.03	-4.63***	0.00
EF	0.00	2.33**	0.02
GW	0.00	0.93	0.35
DIV	0.00	0.43	0.67
Downside Systematic Risk			
LagDOI	-0.40	-0.60	0.55
$LagDOI^2$	0.41	0.38	0.71
SIZE	0.15	1.51	0.13
LEV	0.08	1.17	0.24
LIQ	0.08	3.18***	0.00
PRO	0.31	2.47**	0.01
EF	-0.05	-1.13	0.26
GW	0.00	0.28	0.78
DIV	0.00	-0.26	0.79
Downside Unsystematic Risk			
LagDOI	0.01	0.69	0.49
$LagDOI^2$	-0.02	-1.00	0.32
SIZE	-0.01	-3.19***	0.00
LEV	0.00	2.91***	0.00
LIQ	0.00	-1.90*	0.06
PRO	-0.01	-4.57***	0.00

Variable	Coefficients	z-value	p-value
EF	0.00	-0.40	0.69
GW	0.00	0.37	0.71
DIV	0.00	1.20	0.23
Upside Systematic Risk			
LagDOI	-0.31	-0.34	0.73
$LagDOI^2$	1.73	1.20	0.23
SIZE	-0.22	-1.70^{*}	0.09
LEV	-0.13	-1.27	0.20
LIQ	-0.09	-2.72^{**}	0.01
PRO	0.15	0.86	0.39
EF	-0.02	-0.36	0.72
GW	0.00	-4.14^{***}	0.00
DIV	0.00	-0.58	0.56
Upside Unsystematic Risk			
LagDOI	0.01	0.29	0.77
$LagDOI^2$	-0.01	-0.14	0.89
SIZE	-0.02	-5.38^{***}	0.00
LEV	0.01	2.54^{**}	0.01
LIQ	0.00	-3.06^{***}	0.00
PRO	-0.02	-5.13^{***}	0.00
EF	0.00	1.77^{*}	0.08
GW	0.00	0.84	0.32
DIV	0.00	0.13	0.95

Note. The table reports the results of the following regressions:

$SR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$UR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$DSR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$DUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$USR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$UUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; $LagDOI^2$ = the squared form of LagDOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

APPENDIX H

Table 19

Lagged non-linear effects of internationalization on market-based risk for U.S. restaurant firms with international operations

Variable	Coefficients	z-value	p-value
Systematic Risk			
LagDOI	-1.13	-1.60	0.11
$LagDOI^2$	1.67	1.51	0.13
SIZE	0.37	2.13**	0.03
LEV	0.18	2.00*	0.05
LIQ	-0.01	-0.14	0.89
PRO	0.41	1.76*	0.08
EF	0.22	2.49**	0.01
GW	0.05	2.75**	0.01
DIV	0.00	-0.27	0.79
Unsystematic Risk			
LagDOI	-0.01	-1.03	0.31
$LagDOI^2$	0.01	0.84	0.40
SIZE	0.00	-3.89***	0.00
LEV	0.00	2.55**	0.01
LIQ	0.00	-1.12	0.26
PRO	-0.05	-7.03***	0.00
EF	0.00	0.73	0.47
GW	0.00	0.93	0.35
DIV	0.00	-0.52	0.60
Downside Systematic Risk			
LagDOI	-0.58	-2.32**	0.02
$LagDOI^2$	0.39	1.22	0.22
SIZE	0.09	2.84**	0.01
LEV	0.10	3.17***	0.00
LIQ	-0.01	-0.34	0.73
PRO	0.15	0.81	0.42
EF	-0.03	-1.25	0.21
GW	0.06	2.93***	0.00
DIV	0.00	0.04	0.97
Downside Unsystematic Risk			
LagDOI	0.02	1.50	0.13
$LagDOI^2$	-0.04	-2.13**	0.03
SIZE	0.01	2.47**	0.01
LEV	0.01	3.45***	0.00
LIQ	0.00	-0.22	0.82
PRO	-0.01	-2.74**	0.01

Variable	Coefficients	z-value	p-value
EF	0.00	-2.62**	0.01
GW	0.00	-1.91*	0.06
DIV	0.00	0.67	0.50
Upside Systematic Risk			
LagDOI	-0.43	-1.50	0.13
$LagDOI^2$	0.25	0.68	0.50
SIZE	0.09	2.59**	0.01
LEV	0.01	0.24	0.81
LIQ	-0.06	-2.61**	0.01
PRO	0.05	0.24	0.81
EF	-0.02	-0.60	0.55
GW	0.06	3.16***	0.00
DIV	0.00	-0.09	0.93
Upside Unsystematic Risk			
LagDOI	0.01	0.91	0.36
$LagDOI^2$	-0.03	-1.19	0.24
SIZE	0.01	2.06**	0.04
LEV	0.00	1.97*	0.05
LIQ	0.00	-1.59	0.11
PRO	-0.02	-3.17***	0.00
EF	0.00	-0.47	0.64
GW	0.00	3.12***	0.00
DIV	0.00	-0.42	0.67

Note. The table reports the results of the following regressions:

$SR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$UR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$DSR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$DUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$USR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

$UUR_t = \alpha_0 + \alpha_1 LagDOI_{t-1} + \alpha_2 LagDOI^2_{t-1} + \alpha_3 SIZE_t + \alpha_4 LEV_t + \alpha_5 LIQ_t + \alpha_6 PRO_t + \alpha_7 EF_t + \alpha_8 GW_t + \alpha_9 DIV_t + \varepsilon_i$

Where, SR = systematic risk; UR = unsystematic risk; DSR = downside systematic risk; DUR = downside unsystematic risk; USR = upside systematic risk; UUR = upside unsystematic risk; LagDOI = degree of internationalization, measured by the number of foreign units/total units at t-1; $LagDOI^2$ = the squared form of LagDOI; SIZE = a firm size, measured by log of total revenues; LEV = a firm's capital structure, measured by total debt/total assets; LIQ = a firm's liquidity, measured by current ratio (current assets/current liabilities); PRO = a firm's profitability, measured by return on assets (net income/total assets); EF= a firm's operating efficiency, measured by asset turnover ratio (total revenues/total assets); GW = a firm's growth, measured by annual percentage change in before interest and taxes (EBIT); and DIV = a firm's dividend payout ratio, measured by dividends per common share/earnings per share.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

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Dissertation Title

An examination of U.S. restaurant firms' internationalization in a risk context

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