8-2016

Demand uncertainty and investment in the restaurant industry

Jayoung Sohn
Purdue University

Graduate School Form
30 Updated 12/26/2015

PURDUE UNIVERSITY
GRADUATE SCHOOL
Thesis/Dissertation Acceptance

This is to certify that the thesis/dissertation prepared

By Jayoung Sohn

Entitled

DEMAND UNCERTAINTY AND INVESTMENT IN THE RESTAURANT INDUSTRY

For the degree of Doctor of Philosophy

Is approved by the final examining committee:

Chun-Hung (Hugo) Tang
Chair

SooCheong (Shawn) Jang
Co-chair

Huseyin Gulen

Carl Behnke

To the best of my knowledge and as understood by the student in the Thesis/Dissertation Agreement, Publication Delay, and Certification Disclaimer (Graduate School Form 32), this thesis/dissertation adheres to the provisions of Purdue University's "Policy of Integrity in Research" and the use of copyright material.

Approved by Major Professor(s): Chun-Hung (Hugo) Tang

Approved by: Barbara Almanza 7/14/2016

Head of the Departmental Graduate Program Date

DEMAND UNCERTAINTY AND INVESTMENT IN THE RESTAURANT INDUSTRY

A Dissertation

Submitted to the Faculty

of

Purdue University

by

Jayoung Sohn

In Partial Fulfillment of the

Requirements for the Degree

of

Doctor of Philosophy

August 2016

Purdue University

West Lafayette, Indiana

To my family for their unfailing love, support, and encouragement

변함없이 나를 사랑해주고 지지해주고 웃게 하는, 언제나 돌아갈 안식처가
되어주는 소중한 가족들에게 저의 졸업 논문을 헌정합니다.

ACKNOWLEDGEMENTS

I would like to express my appreciation and respect for my committee members. Without their help and guidance, the completion of this dissertation would not have been possible. Particularly, I am deeply indebted to my advisors, Professors Chun-Hung (Hugo) Tang and SooCheong (Shawn) Jang, for their guidance, support, patience, and encouragement throughout this journey. They have not only challenged me to dig deeper and think harder but also inspired me to develop my own research path. Their sincere and passionate attitude toward research and students that I learned from our countless meetings and discussions is scored in my mind.

I am also very grateful to the other committee members, Professors Huseyin Gulen and Carl Behnke. Professor Gulen guided me through investment theories and offered pointed advice when it was most needed. Professor Behnke helped me view my research from the practitioner's perspective, which is very important in our field.

My gratitude extends to Professor Richard Ghiselli, the Department Head, and Professor Barbara Almanza, the Director of Graduate Program, and the School of Hospitality and Tourism Management. I feel blessed to meet awesome colleagues, who added delightful flavors to my life at Purdue. Lastly, I thank God for my husband, Jinhak Kim, a wonderful father, my best buddy and lifelong discussion partner.

TABLE OF CONTENTS

Page

LIST OF TABLES vii
LIST OF FIGURES viii
ABSTRACT ix
CHAPTER 1. INTRODUCTION 1
1.1 Introduction 1
CHAPTER 2. INDUSTRY BACKGROUND AND INVESTMENT THEORIES 5
2.1 U.S. Economy and the Restaurant Industry 5
2.1.1 Economic Cycles of the U.S. Over the Last Two Decade 5
2.1.2 Economic Cycles and the Restaurant Industry 8
2.1.2.1 Full-Service and Limited-Service Restaurants 10
2.1.2.2 Franchising and Nonfranchising Restaurants 13
2.2 Theory of Investment 16
2.2.1 The *q* Theory 16
2.2.2 Capital Market Imperfections and Investment 19
CHAPTER 3. DEMAND UNCERTAINTY AND INVESTMENT 23
3.1 Introduction 23
3.2 Theoretical Background and Hypotheses 24
3.2.1 Uncertainty and Risk 24
3.2.2 Demand Uncertainty 24
3.2.3 Uncertainty and Investment 26
3.2.3.1 Theory 26
3.2.3.2 Empirical Evidence 27
3.2.3.3 Demand Uncertainty and Capital Investment in the Restaurant Industry 29
3.2.3.4 Nonlinear Relationship Between Demand Uncertainty and Investment 30
3.2.4 Conditional Effects of Firm Characteristics 33
3.2.4.1 Franchise 34
3.2.4.2 Segment 35
3.3 Methodology 36

Page

3.3.1 Data 36
3.3.2 Models 37
3.3.2.1 Estimating Demand Uncertainty in the Restaurant Industry 37
3.3.2.2 The Effect of Demand Uncertainty on Investment 41
3.3.2.3 The Conditional Effect of Franchising and Segment 43
3.4 Results 44
3.4.1 Descriptive Analysis 44
3.4.2 Main Results 48
3.5 Conclusion 63
CHAPTER 4. PEER EFFECT ON INVESTMENT 67
4.1 Introduction 67
4.2 Theoretical Background and Hypotheses 68
4.2.1 Peer Effect on Investment 68
4.2.2 Identification of Peers 74
4.2.3 Motives for Following Peers 77
4.2.4 Investment Outcomes of Peer-Sensitive Firms 79
4.3 Methodology 81
4.3.1 Estimating Peer Effect on Investment 81
4.3.2 Motives for Following Peers 82
4.3.3 Investment Outcomes of Peer-Sensitive Firms 83
4.4 Results 84
4.4.1 Descriptive Analysis 84
4.4.2 Main Results 85
4.5 Conclusion 91
CHAPTER 5. FINANCIAL IMPLICATIONS OF INVESTMENT UNDER DEMAND UNCERTAINTY 94
5.1 Introduction 94
5.2 Theoretical Background and Hypotheses 95
5.2.1 Financial Implication of Investment Under Uncertainty 95
5.2.2 Moderating Effect of Financial Constraint 98
5.3 Methodology 100
5.3.1 Variables 100
5.3.1.1 Investment Outcomes 100
5.3.1.2 Financial Constraint 101
5.3.2 Models 102
5.4 Results 103
5.4.1 Descriptive Analysis 103

Page

5.4.2 Main Results 106
5.5 Conclusion 109
CHAPTER 6. CONCLUSION 112
6.1 Conclusions 112
REFERENCES 119
APPENDIX 137
VITA 139
PUBLICATIONS 140

LIST OF TABLES

Table Page
Table 3.1 Lag length determination 39
Table 3.2 AR (15) model 40
Table 3.3 GARCH (1, 1) results 40
Table 3.4 Descriptive statistics (Total) 45
Table 3.5 Descriptive statistics by franchising 45
Table 3.6 Descriptive statistics by segment 46
Table 3.7 Correlation matrix 47
Table 3.8 Uncertainty effect on investment 49
Table 3.9 Uncertainty, economy conditions, and investment 52
Table 3.10 Two-way descriptive statistics 55
Table 3.11 Interaction model (Uncertainty and franchising) 57
Table 3.12 Two-way descriptive statistics 60
Table 3.13 Interaction model (Uncertainty and segment) 61
Table 4.1 Summary statistics 85
Table 4.2 Peer effect on investment 86
Table 4.3 Descriptive statistics for leaders and followers 88
Table 4.4 Who follows whom? 89
Table 4.5 Investment effect on market share of peer-sensitive firms 90
Table 5.1 Summary statistics 104
Table 5.2 Correlation matrix 105
Table 5.3 Effects of investment, uncertainty and financial constraint on market share . 107
Table 5.4 Effect of investment, uncertainty and financial constraint on profit margin .. 108

LIST OF FIGURES

Figure Page

Figure 2.1 Historical returns of the market index and restaurant stocks 9

Figure 2.2 Historical demand uncertainty in the restaurant industry 10

Figure 2.3 Sales of meals and snacks away from home by type of outlet 12

Figure 2.4 Percentage of sales of meals and snacks away from home by type of outlet .. 13

Figure 2.5 Yearly average stock returns 15

Figure 2.6 Yearly standard deviation of stock returns 16

Figure 3.1 Historical demand uncertainty and average investment 48

Figure 3.2 Demand uncertainty and investment 50

Figure 3.3 Demand uncertainty and GDP growth 53

Figure 3.4 Demand uncertainty, franchising, and investment 59

Figure 3.5 Demand uncertainty, segment, and investment 63

ABSTRACT

Sohn, Jayoung. Ph.D., Purdue University, August 2016. Demand Uncertainty and Investment in the Restaurant Industry. Major Professors: Chun-Hung (Hugo) Tang and SooCheong (Shawn) Jang.

Since the collapse of the housing market, the prolonged economic uncertainty lingering in the U.S. economy has dampened restaurant performance. Economic uncertainty affects consumer sentiment and spending, turning into demand uncertainty. Nevertheless, the highly competitive nature of the restaurant industry does not allow much room for restaurants to actively control prices, leaving most foodservice firms exposed to demand uncertainty. To investigate the impact of demand uncertainty in the restaurant industry, this study focused on the implications of demand uncertainty for investment.

The first essay in chapter 3 examined the impact of demand uncertainty on investment and how the impact varies with industry-specific features: franchising and segment. The results showed that the investment rate decreases with the level of uncertainty and the association is nonlinear. That is, the investment drops more rapidly as the level of uncertainty increases. This study further revealed that there is no significant moderating effect of franchising on the uncertainty-investment relationship. When it comes to segment, full-service restaurants are more adversely affected by demand uncertainty than limited-service restaurants.

The second essay in chapter 4 explored how managers cope with uncertainty when making investment decisions. In the absence of a clear imperative of what is efficient, managers are likely to scan other peers in the market and mimic their behavior. Focusing on this idea, it tested whether the investment is influenced by peers' investment activities and whether peer-sensitive firms produce better investment outcomes. Consistent with the hypotheses, sample restaurant firms appeared to be affected by their peers in making investments. The results also indicate that uncertainty is a powerful force that leads firms to follow peers. In addition, it was seen that investment of peer-sensitive firms is not as effective as that of less-sensitive firms in growing market share.

Lastly, the final piece of dissertation in chapter 5 analyzed the effectiveness of investment made under uncertainty. The findings indicate that a rise in investment in times of high uncertainty leads to a larger market share, suggesting that well-targeted investment can help firms turn crisis into opportunity to pull ahead of competitors who retreat in the face of uncertainty. However, increased depreciation costs and dwindling sales can hurt the profit margin in uncertain times.

CHAPTER 1. INTRODUCTION

1.1 Introduction

The prolonged economic uncertainty lingering in the U.S. has directly dampened restaurant performance (Gasparro, 2012a). The recent recession, caused by the collapse of the housing market, resulted in a chain-reaction that changed the business landscape. Although the National Bureau of Economic Research reported that the recession ended in 2009, shadows of uncertainty in the housing market and government policy still loom over the economy, dragging down recovery (Izzo, 2010; McNabb, 2013; Morath & Hudson, 2014; Zuckerman, 2014). When consumers feel insecure about their future income, their spending mirrors that attitude, translating economic uncertainty into demand uncertainty. Moreover, the instability and unpredictability inherent in consumer spending and preferences render demand uncertainty as the most obvious and significant source of uncertainty that cannot be eliminated (Arda & Hennet, 2006; March, 1978). Nevertheless, the highly competitive nature of the restaurant industry does not allow much room for restaurants to actively control price, leaving most foodservice firms acutely exposed to demand uncertainty (Gasparro, 2012a). Although the industry groans about demand uncertainty, not much is known about its impact on the restaurant industries unique business structure (Harrington, 2001).

This dissertation focuses on the impact of demand uncertainty on investment as an attempt to address the need. Particularly, the current thesis investigates investment behavior and the effectiveness of investment made under uncertainty in the restaurant industry. As in other industries, investment is indispensable for the existence and growth of foodservice businesses. In 2012, the number of total restaurants increased by more than 4,000 units in the United States (NPD, 2013). It is important to understand investment behavior because investment is directly linked to expansion and contraction not only at the firm level, but also at the industry level.

The first essay investigates how restaurant firms coordinate their capital investment in the face of demand uncertainty. According to the real option theory, uncertainty restrains capital investment. Due to asset specificity, firms incur larger costs when they reverse investments than when they expand. Irreversibility and the resulting asymmetric adjustment costs of fixed assets increase with uncertainty, and accordingly uncertainty leads firms to postpone investment. Though demand uncertainty affects the entire restaurant industry, the degree of impact varies per conditions and resource positions of individual firms. Once the general impact of demand uncertainty is examined, conditional effects of restaurant industry-specific factors are tested. Two characteristics are chosen: franchising and segmentation. The findings will shed some light on how the unique features of the restaurant industry moderates the relationship of demand uncertainty to investment.

The second essay explores the way restaurants cope with demand uncertainty when making investment decisions. More specifically, this study probes the effect that peers have on investment decisions. Traditional investment theories argue that investment decisions

should be based on marginal profitability of individual projects. However, limited human capacity to consider all the complexity and uncertainty in the entire set of alternatives and environmental constraints makes it difficult for managers to make rationally optimal decisions. Accordingly, individuals are naturally led to follow cues from successful competitors and imitate them. This will save time in terms of information search and computational cost and will provide legitimacy to their decisions (Banerjee, 1992; Conlisk, 1980). Furthermore, a manager's inclination to prevent the worst scenario of falling behind the average performance can also drive organizations to behave likewise, creating a competitive bandwagon pressure. Using this line of reasoning, the second essay examines the human-side of corporate management and whether a firm's investment decisions are affected by those of its peers. If so, who imitates whom? What drives them to mimic others? What are the performance implications of investment of peer-sensitive firms? These are additional follow-up question explored in this section.

Lastly, the final topic is geared towards the financial implications of investment made under demand uncertainty. As previously argued, a common approach taken by firms facing demand uncertainty is to delay or reduce investments. Whether this practice is a financially favorable choice is another issue that must be analyzed. Uncertainty can raise strategic value of an investment because the time when most firms retreat can be a chance to move forward. In hopes of drawing practical suggestions for managers agonizing over investment, this study will examine the effectiveness of investment under demand uncertainty. Fresh renovation of restaurants can give an edge over rivals and the effectiveness would be more pronounced when the competition clutter is reduced.

Nonetheless, if the financial status is fragile, taking more risks from converting liquid resources into irreversible assets may not be a desirable choice. It suggests that the effectiveness of investment in times of uncertainty should be carefully examined in consideration of the firm's financial position.

The findings will widen our understanding of how industry-based demand uncertainty shapes investment policies of restaurants and about the resulting performance implications. Investigating the interplay between demand uncertainty and characteristics of the foodservice industry infuses unique conditional effects into the general discussion on uncertainty and investment in corporate finance. In addition, the current thesis is expected to cast some light on the human factor of investment decisions, which has not attracted much attention from traditional investment literature. Investigation of the so-called peer effect would suggest another piece of evidence for managers' bounded rationality and thereby contribute to the literature on managerial decision-making. Lastly, but probably the most meaningful, the purpose of this thesis is to provide an opportunity for managers to ponder the theoretical implications and the performance consequences of investments made in times of uncertainty.

CHAPTER 2. INDUSTRY BACKGROUND AND INVESTMENT THEORIES

2.1 U.S. Economy and the Restaurant Industry

2.1.1 Economic Cycles of the U.S. Over the Last Two Decade

In 1994, the U.S. economy entered the recovery phase of the recession: GDP growth surged, new jobs were created every year, investment and consumption regained lost confidence. The unemployment rate that once was as high as 7.8 percent in 1992 fell to just over 4 percent for the first time since 1973, and 2.5million jobs were added to the economy each year since 1991 (Boehne,2000). Despite such dramatic expansion, inflation was not significant, which was partly due to an interest rate increase (from 3 percent to 6 percent) by the Federal Reserve. It was also due to the production capacity that expanded rapidly commensurate to increasing demand. The financial crises in Asia lowered prices of commodities, including oil (Boehne, 2000).

Another virtue of this prosperity was reduction in the budget deficit. The Omnibus Budget Reconciliation Act of 1990, Omnibus Budget Reconciliation Act of 1993, and Balanced Budget Act of 1997, were deficit reduction packages that included tax increases and spending cuts. This legislature allowed the federal government to turn a $290 billion deficit in 1992 into a $236 billion surplus in 2000 (Konigsberg, 2007; Peach, 2001).

According to the NBER, this is the longest economic expansion in the history of the United States, lasting ten years from 1991 to 2001.

In mid-1990s, the rise of commercial growth of internet bred a number of internet companies ("dot-coms"). Combined with low interest rates in 1998-1999, substantial venture capital flowed into internet start-ups. Market confidence and aggressive investment in internet-based businesses led to the upsurge in equity prices. Between 1990 and mid-2000, stock prices soared nearly fivefold, and the growth rate of equity prices accelerated from 10.4 percent per year between 1990 and 1995 to 21.2 percent per year between 1995 and 2000 (Kraay & Ventura, 2007). Most dot-com companies, however, operated on losses in hopes of recouping their initial investment later. Nevertheless, many investors overlooked traditional evaluation measures, such as P/E ratio, and speculated on stocks starting with "e-" prefix. Promising companies made initial public offerings (IPO) and raised considerable funds even though they had never made any profit. Finally, the "irrational exuberance" burst in March 2000, which was followed by the early 2000's recession.

According to the NBER, the early 2000's recession continued only for 8 months from March to November 2001. During this period, the September 11th attacks where Islamic terrorist attacks against the World Trade Center complexes and Pentagon occurred to bewilderment of the United States. Though the unheard-of attacks stirred global stock markets and consumer confidence, the direct aftermath to economy did not last for long. Timely action by the Federal Reserve, the City and State of New York, and the Federal

Emergency Management Agency kept the shock from turning into a financial crisis (Makinen, 2011).

Low interest rates and an ease in the credit market stimulated investment and growth, which heated up the housing market in 2000's. Nontraditional loans with fewer requirements for application were granted to buyers who would otherwise have not been qualified for traditional loans. Moreover, these loans required little or no down payment (Byun, 2010). Lax management of mortgages and speculative investment in residential structures finally came to an end in 2006 and 2007. Home prices, measured as Case-Shiller 10-City Composite Home Price Index, plummeted from 226.29 in June 2006 to 150.44 in April 2009, a 33.5 percent decrease (http://us.spindices.com). A sharp decline of housing prices drove many homeowners into default on their mortgage payments in 2007. The U.S. mortgage-backed securities (MBS) were marketed in global markets, as they offered higher returns than U.S. government bonds. Accordingly, the subprime mortgage crisis brought about disastrous damage to most financial institutions that invested in MBS, including Lehman Brothers and Bear Sterns, and further threw the global economy into a state of shock.

The Great Recession is generally acknowledged as the most devastating and longest economic downturn since the Great Depression in 1930's (Sum, Khatiwada, McLaughlin, & Palma, 2009). In the U.S., 1.2 million jobs were eliminated from payrolls during the first 10 months (Isidore, 2008), real GDP shrank 4.3 percent between late 2007 and mid-2009 (Fieldhouse, 2014). Although its origins were American, the financial crisis had worldwide effects. A chain-reaction of recession spread throughout the world, in continents like

Europe, South America, and Asia. The financial crisis also inflated fears about public debt levels, leading to the sovereign debt crises in Greece and Ireland in 2010.

The NBER defined the duration as December 2007 through June 2009, but the Wall Street Journal/NBC News poll showed that 57 percent of Americans still believe the economy was in depression (O'connor, 2014). Although the economy gradually recovered from the Great Recession, there are still difficult problems the U.S. economy should tackle. One of them is the unprecedented federal deficit. During 2000's, federal spending sharply increased in areas of medical expenses, income security, and subsidies to individuals and businesses in need whereas tax revenue decreased (Wall Street Journal, 2010).

2.1.2 Economic Cycles and the Restaurant Industry

Figure 2.1 depicts historical returns of a market index (S&P Composite index) and sample restaurant stocks. Monthly stock return data were retrieved from the Center for Research in Security Prices and firms with the Standard Industrial Code of 5812 were used as sample. Observations with monthly return that exceeds 100 percent were excluded from the sample. The graph clearly shows cyclicality and larger volatility of restaurant firm performance in comparison to the market. Average foodservice company stock returns plunged and soared more dramatically than the market index.

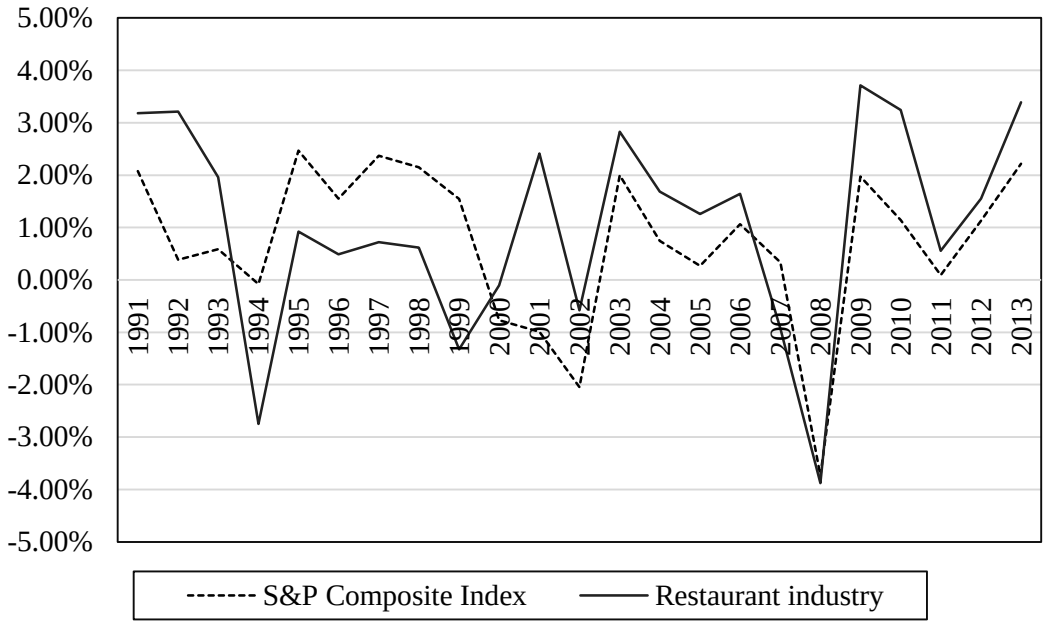
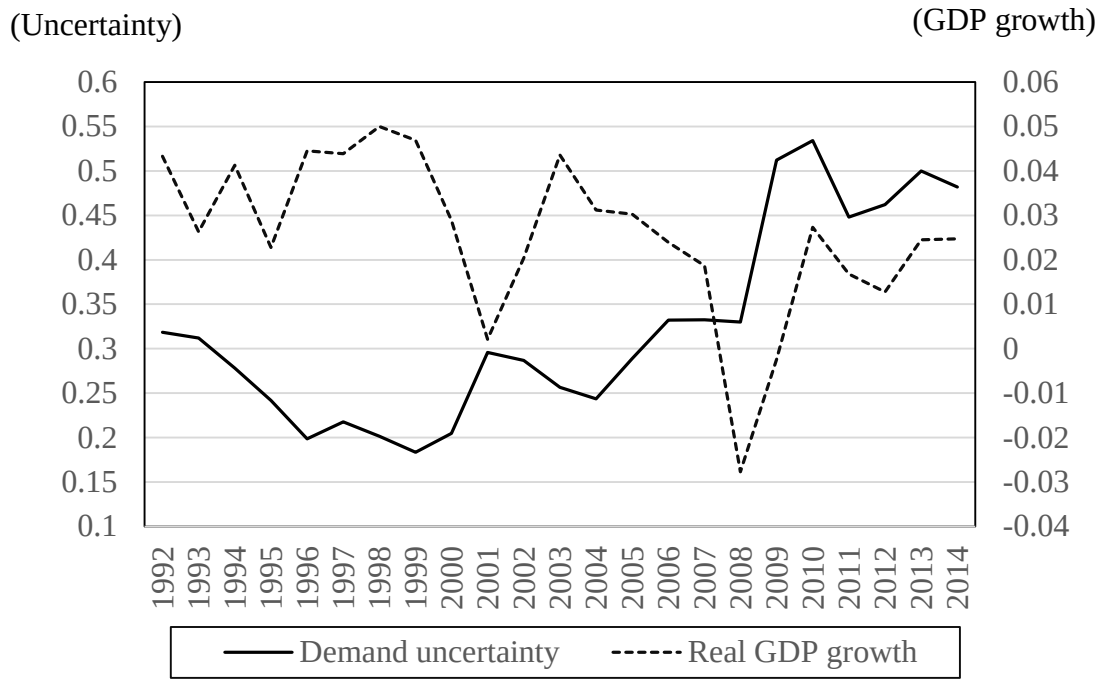


Figure 2.1 Historical returns of the market index and restaurant stocks

Figure 2.2 shows demand uncertainty of the U.S. restaurant industry over the last two decades. The U.S. monthly retail sales of food services and drinking places were retrieved from the U.S. Census Bureau (http://www.census.gov/retail/), and demand uncertainty was calculated using GARCH (1, 1), as specified later in Chapter 3. The graph reveals ups and downs of demand uncertainty in the industry and its negative association with the business cycle. Consistent with Bloom (2014), the uncertainty tends to rise in recessionary periods and subside in booming periods. The following subsections will examine the impact of economic changes upon the

restaurant industry.



Source: the U.S. Census Bureau (http://www.census.gov/retail/)
Monthly uncertainty is estimated using GARCH (1, 1)

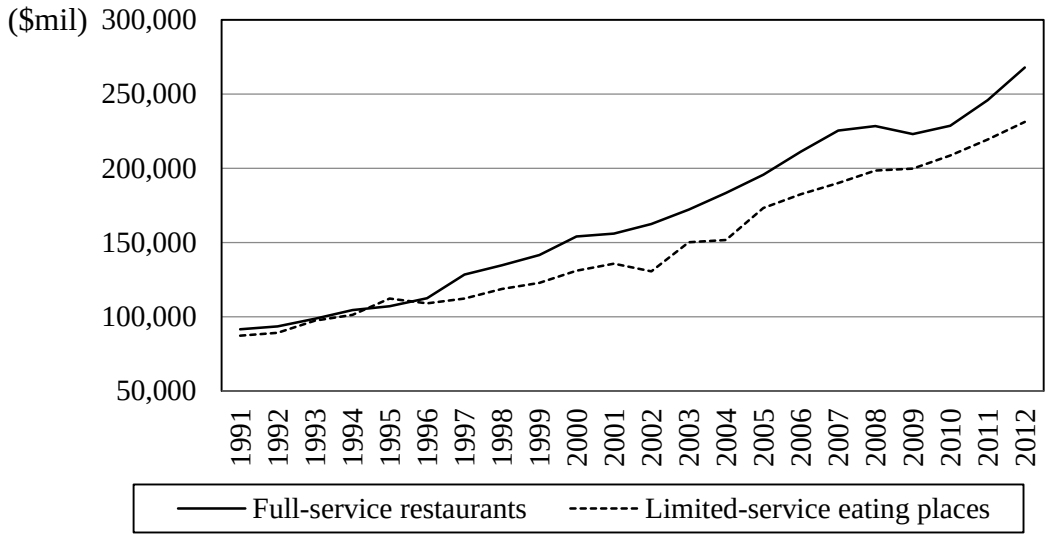
Figure 2.2 Historical demand uncertainty in the restaurant industry

2.1.2.1 Full-Service and Limited-Service Restaurants

The performance of a restaurant business largely depends on the business cycle (Gu, 1993). However, the impacts of economic changes on performance may not be the same between segments due to differing characteristics, in terms of styles of operation, menu items, target customers, and financial characteristics (Gu, 1996; Zheng, Farrish, & Wang, 2013).

Full-service restaurants target high-income customers. The average check for fine-dining restaurants was $28.55 in 2013 and $13.75 for casual-dining brands, compared to $5.32 for quick-service eating places (Brandau, 2014b). Thus, along with quality food,

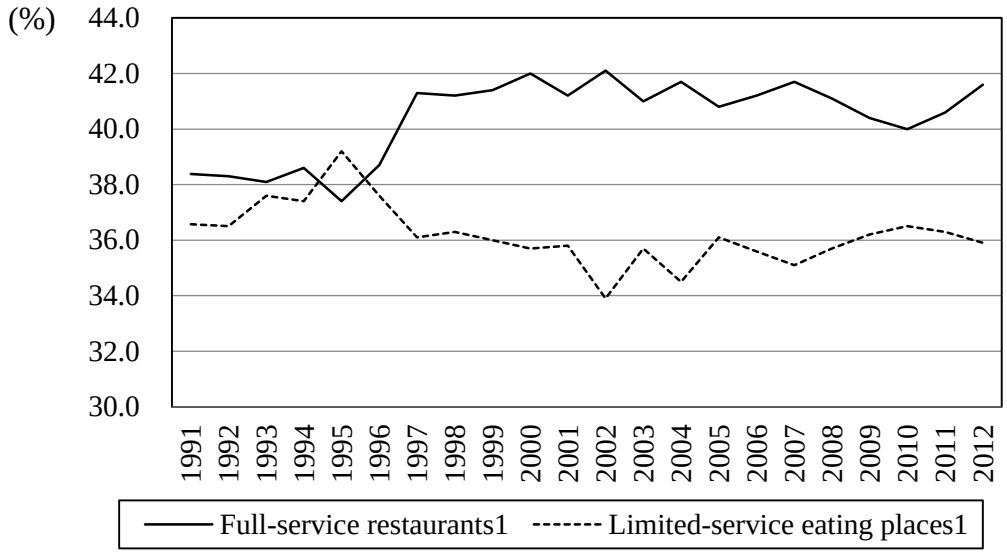
sophisticated atmosphere and experienced and committed employees are key factors driving sales. Due to the high price range, full-service restaurants are the first to feel a upcoming recession (Youn & Gu, 2009). Fine-dining restaurants especially suffered from slowing consumer spending and decreasing corporate travel and entertainment expenses (Liddle, 2009). Morton's Restaurant Group closed three steakhouses and its revenue fell 18.9 percent while in-store sales dropped 24.9 percent in 2008 and 2009 (Liddle, 2009). The good news is, however, that the full-service segment is the first to feel any economic blossoming. Full-service restaurant sales grew faster than limited-service restaurants in 2011 and 2012. During the early years of recovery when the unemployment rate was still high, upper-income classes increased their economic position faster than middle-income and low-income classes. Improved corporate spending also fuels quick recovery of the full-service sector (Thorn, 2014). Patronage to fine-dining restaurants grew 4 percent in both 2012 and 2011, whereas quick-service eateries reported only a 1 percent increase (Brandau, 2014b).



Source: Calculated by the Economic Research Service, USDA, from various data sets from the U.S. Census Bureau and the Bureau of Labor Statistics. (http://www.ers.usda.gov)

Figure 2.3 Sales of meals and snacks away from home by type of outlet

Compared to the full-service segment, the limited-service segment exhibits lower elasticity to economic ups and downs. Limited-service restaurants rely on massive sales volume to make up for low profit margin (Youn & Gu, 2009). The affordable menu prices appeal to price-sensitive consumers during times of recession. Zheng et al. (2013) observed that limited-service restaurant stocks are recession-proof and the segment stock index outperformed that of full-service segment and the S&P 500 index from 2005 to 2010. However, it also takes longer to enjoy growing demand in post-recession period. Quick service restaurants fell behind full service establishments in 2011-2012 but outpaced them in growth of sales and employment in 2013, aided by the declining unemployment rate and an increase in payroll employment (IHS Economics, 2014).



Source: Calculated by the Economic Research Service, USDA, from various data sets from the U.S. Census Bureau and the Bureau of Labor Statistics. (http://www.ers.usda.gov)

Figure 2.4 Percentage of sales of meals and snacks away from home by type of outlet

2.1.2.2 Franchising and Nonfranchising Restaurants

Franchising is a lucrative business model that yields relatively higher return on invested capital at lower risk (Koh, Lee, & Boo, 2009). In return for using the franchisor's brand, operation system, and marketing programs, franchisees pay royalties. Since the marginal cost of sharing a brand with an additional unit is nearly zero, franchise royalty delivers enhanced profitability. Moreover, as it is proportional to unit sales as opposed to profits, franchisors can collect royalties as long as franchisees earn revenue. A franchising fee, which is relatively less volatile than cash flow streams from company-owned units, contributes to risk-reduction as well. While the operating loss of company-owned properties are transferred directly to the nonfranchisors' bottom line, franchisors can still realize profit since the ongoing fee is positive as long as franchised restaurants make

revenue. A lower volatility of earnings leads to lower financial costs, including financial distress (Smith & Stulz, 1985), underinvestment (Bessembinder, 1991), and taxes (Graham & Rogers, 2002).

Low operating leverage also works in favor for franchise firms in downturns. Non-franchise firms that generate revenue from owned/leased properties should invest a substantial portion of their resources in fixed assets, which would increase the portion of fixed costs like depreciation and interest expenses. Since fixed costs do not vary with sales, even a small variation in sales has a snowball effect on the bottom line in firms with high operating leverage. Furthermore, Zhang (2005) argues that asymmetric adjustment costs and irreversibility of investment make assets-in-place riskier than growth options in bad times. During challenging economic times, firms try to dispose of their idle assets, but the high cost of disinvestment deprives them of adjustment flexibility, leaving them stuck with unproductive assets. Accordingly, the firms with larger fixed-asset holdings could be hit harder by economic meltdowns. On the contrary, franchise firms that hold relatively fewer corporate units have more buffer to adverse economic shocks, reducing their market risk exposure (Tuzel, 2010). Moreover, smaller asset size enhances profitability (e.g. ROA and ROI) and efficiency measures (e.g. sales turnover), which generally is a good sign according to analysts and investors.

Figure 2.5 presents the average historical stock returns since 1991. As seen in the graph, the return of non-franchise restaurant equity exhibits greater fluctuation than that of franchise restaurants. Particularly, nonfranchisors are hit harder by downturns, showing a steep plunge at the trough of recessions. On the contrary, franchise stocks show a relatively

stable movement. They generally have a similar track record with the S&P Composite Index but sometimes show a bigger spike than the market index. In the 2000's, franchise stocks outperformed the S&P most of the time, especially during the Great Recession.

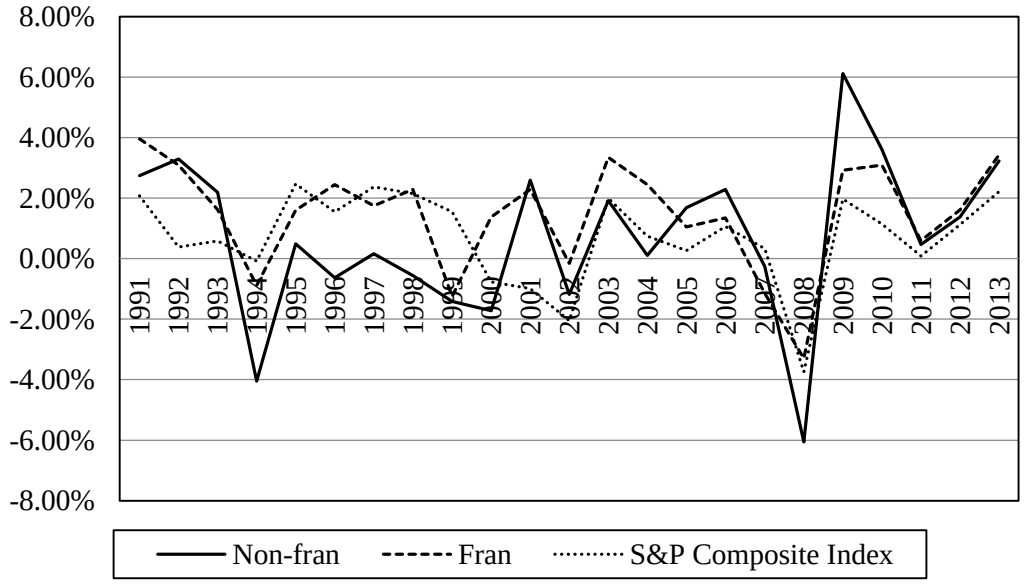


Figure 2.5 Yearly average stock returns

Figure 2.6 presents the annual volatility of stock returns. As suggested by the trajectory of returns in Figure 2.5, nonfranchising firms have more significant fluctuations than franchise stocks and the market index. Whether it is a franchisor or not, restaurant stocks have a higher volatility than the market, and the gap tends to widen during a period of economic depression.

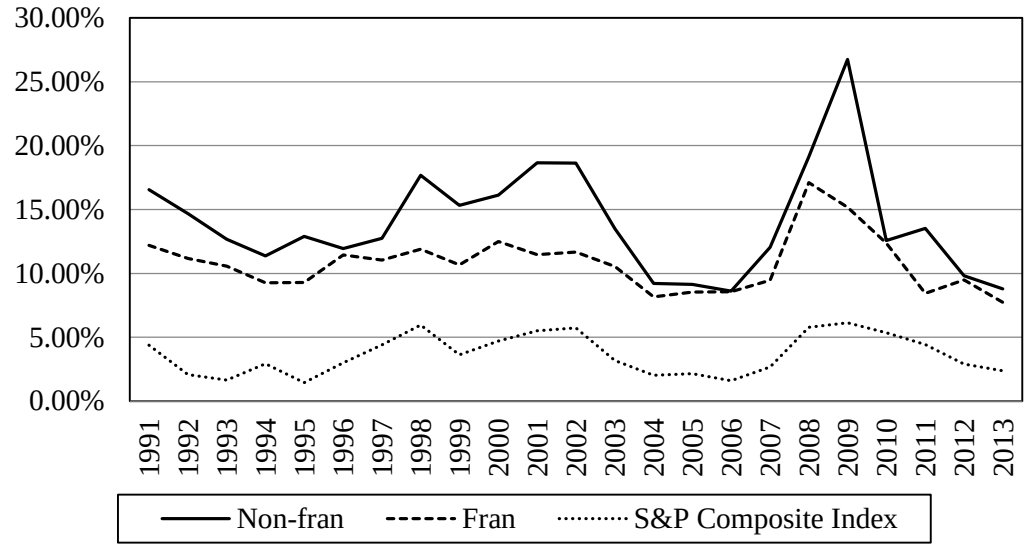


Figure 2.6 Yearly standard deviation of stock returns

Aliouche, Kaen, and Schlentrich (2012) observed that franchise firms across all service industries outperformed the market benchmark on a risk-adjusted basis. Similarly, Hua and Dalbor (2013) revealed that restaurant franchisors yielded higher returns than nonfranchisors over the long term.

2.2 Theory of Investment

2.2.1 The *q* Theory

According to the *q* theory of investment, suggested by Tobin (1969) and Tobin and Brainard (1977), the rate of investment is determined by the marginal *q* ratio, which is the market value of additional unit of capital stock to its replacement cost. The *q* investment function derives the optimal rate of investment from the firm's profit maximization

condition. The derivation comes from (Lewellen & Lewellen, 2013). The value of the firm can be expressed as below.

$$\mathrm{V_t} = \Pi(K_t, s_t) - I_t - C(I_t, K_t, \lambda_t) + E_t[V_{t+1}] \qquad \text{Eq. 2.1}$$

$\Pi(K_t, s_t)$ denotes profit as a function of the capital stock at the beginning of period (K_t) and with a state variable (s_t). I_t is the investment and $C(I_t, K_t, \lambda_t)$ is the adjustment cost of investment, where λ_t is an exogenous stochastic parameter, e.g. technology shock.

It is assumed that β is constant and the exogenous variables s_t and λ_t are Markov processes. Capital depreciates at a rate of δ, such that the capital at time t+1 is $\mathrm{K_{t+1}} = (1-\delta)\mathrm{K_t} + I_t$. The firm value can be rewritten as $\mathrm{V_t} = \mathrm{V}(K_t, s_t, \lambda_t)$. Then the first-order condition for value maximization is

$$1 + C_I(I_t, K_t, \lambda_t) = E_t[\mathrm{V_K}(K_{t+1}, s_{t+1}, \lambda_{t+1}) \qquad \text{Eq. 2.2}$$

C_I and V_K are partial derivatives. The left-hand side is the marginal cost of investment and the right-hand side is the present value of an additional dollar of capital, which is the marginal q. The adjustment cost C is further assumed to be quadratic in I_t/K_t. For instance, $\mathrm{C} = 0.5\alpha(I_t/K_t - \lambda_t)^2 K_t$. The first-order derivative is $\mathrm{C_I} = \alpha(I_t/K_t - \lambda_t)$. Plugging into (2) yields the following equation.

$$I_t/K_t = -1/\alpha + (1/\alpha)q + \lambda_t \qquad \text{Eq. 2.3}$$

Equation 2.3 implies that an individual firm's value is maximized when investment is pushed until the marginal cost of investment is equal to the present value of an additional

dollar of capital. An individual firm's stock price incorporates expectations of future variables that affect investment decisions. Thus, a firm's share price should signal the correct level of investment to managers (Schaan, 2007). Simply put, there should be a direct relationship between the firm's level of investment and the firm's market valuation.

Assuming that firms can freely adjust their capital stock, firms would increase or decrease capital stock until they reach the optimal *q* ratio of unity. A marginal *q* ratio greater than one stimulates investment whereas a ratio less than one deters investment. However, marginal *q* is usually not observable. Thus, average *q*, the ratio of market value of total existing capital stock to its replacement cost, is widely used in empirical studies as a proxy for marginal *q*. Hayashi (1982) derived a relationship between marginal and average *q*. If the firm is a price taker with constant returns to scale in both input and output markets, marginal *q* can be replaced by average *q*. However, if the firm is a price maker, then the average *q* is larger than the marginal *q* by the size of the monopoly rent.

Unfortunately, despite its theoretical appeal, the *q* theory does not successfully explain corporate investment behavior in reality (Chirinko, 1993; Schaan, 2007). For example, investigating the response of investment to two stock market crashes in 1929 and 1987, Blanchard, Rhee, and Summers (1993) argue that given fundamentals, market valuation plays a limited role in the determination of investment decisions. They observed that before and after the crash in 1929, firms adjusted investment to a greater extent than the level implied by market valuation, that is, firms increased investments less but decreased more than what was predicted by the theoretical relation between stock price and investment. With regard to 1987, firms appeared to ignore market valuation. Chirinko

(1993) also notes low statistical significance of *q* and model fit in most recent empirical research. Moreover, the presence of significant serial correlation among residuals suggests a possible misspecification of the *q* model. He suggests two caveats behind the disappointing empirical power of *q* models. First, potential measurement errors surrounding components of average *q*. For instance, investment sentiment, such as fads, speculative bubbles, or excessive volatility, can create problems for *q* models. In addition, imperfect competition in the product market may distort the association between the shadow price of capital and the market value of the firm. In the presence of imperfect competition, the shadow price of capital is not equal to its market valuation anymore, leading to a discrepancy between marginal and average *q*.

2.2.2 Capital Market Imperfections and Investment

The *q* model previously described rests on the assumption of no financial frictions (Hubbard, 1998; Lewellen & Lewellen, 2013). However, if the firm faces financing constraints, cash flow can be important for investment decisions. Firms make investments through three financing sources: internal funds (cash flows), debt, and equity. According to Modigliani and Miller's (1958) irrelevance theory, in a perfect capital market, where firms can freely get access to external capital at no cost, a firm's investment is independent of its capital structure. Alternatively, the pecking order theory argues that internal funds and external funds are not perfect substitutes. Due to transaction costs associated with issuance of stock or bond and information asymmetry between insiders and outside investors, a premium wedge is created between the cost of internal and external capital.

Therefore, firms are likely to use the least expensive fund first, which is the internal fund, then liability and stockholders' equity as a last resort (Myers, 1984). Moreover, shocks to current earnings may influence future net worth of the firm and thereby current credit conditions, which affects investment. Accordingly, if the internal funds run low, more financially constrained firms would find it more difficult to finance investments than less constrained firms, and thus should shrink or even forgo investment projects.

Following such argument, Fazzari, Hubbard, and Petersen (1988) reveal that cash flow and other cash-related measures can explain investment. More specifically, they show that investment is much more sensitive to fluctuations of cash flow in firms with a high earnings retention ratio and low dividend payout ratio, which are considered more financially constrained. The test model of FHP is as follows.

$$(I/K)_{it} = \alpha + \beta Q_{it} + \gamma (CF/K)_{it} + \varepsilon_{it} \qquad \text{Eq. 2.4}$$

CF is cash flow, a proxy for changes in net worth of the firm.

But for capital market frictions, γ would not be significantly different from zero given that investment opportunities are captured by Q. Subsequent studies have confirmed a significant role of cash flow in the q model for firms that are likely to resort on external funds (Bond & Meghir, 1994; Gilchrist & Himmelberg, 1995; Hubbard, Kashyap, & Whited, 1995; Lewellen & Lewellen, 2013)

Kaplan and Zingales (1997) reexamined the low dividend paying group defined by FHP and reclassified the firms based on not only quantitative data but also qualitative facts from 10-K reports. They observe that the sensitivity of investment to cash flow is lowest

in the most financially constrained group, contrary to the finding of FHP, and argue that the investment-cash flow sensitivity is not a valid measure of financing constraints. However, their argument is limited due to several caveats. First, small sample size (49 firms) and the concomitant insufficient heterogeneity among samples deters detection of meaningful differences. In addition, according to their sample-splitting criteria, the most constrained firms were actually financially distressed firms. Since the use of internal funds are usually restricted by creditors, the investment-cash flow sensitivity can be low in the most financially constrained firms (Fazzari, Hubbard, & Petersen, 2000; Hubbard, 1998).

The *q* model, which draws on the assumption of perfect capital market, may not be suitable in the presence of asymmetric information problems. This problem could be more serious in younger and low-dividend payout firms. As an attempt to address the problem, Hubbard et al. (1995) examined manufacturing firms' investment and internal finance employing the Euler equation. As the Euler equation does not require measuring marginal *q*, it is less subjective to troubles stemming from inaccurate measurement of *q*. Their findings show that the standard neoclassical investment model based on the perfect capital market assumption works less satisfactorily for low-dividend payout ("more constrained") firms than for high-dividend payout firms. They further demonstrate that the rejection of the standard investment model does not depend on size or maturity of the firm, implying that the effect of internal funds is not traceable to the free cash flow hypothesis suggested by (Jensen, 1986). Other studies yield similar results using the Euler equation (Bond & Meghir, 1994; Gilchrist, 1990; Whited, 1992).

Another possible explanation for the significant role of cash flow is that cash flow might measure investment opportunities better than q (Hubbard, 1998). Gilchrist and Himmelberg (1995) examine whether cash flow played a fundamental role in investment decision or simply predicted investment opportunities. To bypass the problems pertaining to the measurement of q, they developed an alternative proxy for the expected discounted marginal profit of investment ("Fundamental Q") using the vector auto-regression (VAR) model. By adopting cash flow as one of explanatory variables for the Fundamental Q, they control the effect of cash flow as an indicator of investment opportunities. Consistent with FHP and subsequent empirical research, Gilchrist and Himmelberg (1995) confirm cash flow is an important predictor of investment. They find that investment of firms with bond rating and access to commercial market papers are satisfactorily accounted for by the perfect capital market model of investment. In contrast, firms that have a limited access to external capital markets exhibit excessive sensitivity of investment to the volatility of cash flow.

In summary, empirical studies of firm investments generally lend strong support for the links between changes in net worth and investment arising from information asymmetry in financial markets.

CHAPTER 3. DEMAND UNCERTAINTY AND INVESTMENT

3.1 Introduction

According to the contingency and resource dependency theories, organizations must be designed to cope with, and change to keep up with, the uncertainty of their environments (Burns & Stalker, 1961; Scott, 1981; Thompson, 1967). Therefore, uncertainty has received more attention in the literature than any other dimension of environment (Dess & Beard, 1984; Duncan, 1973; Khandwalla, 1977)

The restaurant industry is highly sensitive to external economic factors (Enz, 2009; Neuman, 2009). As the restaurant business depends on consumer disposable income, the uncertainty over demand directly affects the restaurant performance. Nevertheless, academia has been silent about the impact of demand uncertainty in the restaurant business (Harrington, 2001). A strand of research on revenue management has suggested indirect ways to cope with demand fluctuation by maximizing revenue in a given situation, but other than that, much remains unexplored. Designed to fill the void in understanding how demand uncertainty affects restaurant businesses, this study examines the impact of demand uncertainty on restaurant investment. More specifically, it focuses on how restaurant firms facing uncertain demand adjust their fixed investment activity.

3.2 Theoretical Background and Hypotheses

3.2.1 Uncertainty and Risk

Risk and uncertainty are both related to the randomness of future outcomes. Though many researchers agree that they are not identical concepts, no unanimous definition has been made yet. Instead, the definitions are rather context or discipline dependent (Samson, Reneke, & Wiecek, 2009). According to Samson et al.'s (2009) review of multidisciplinary perspectives on uncertainty and risk, risk and uncertainty are either used interchangeably or distinguished from each other. Researchers who distinguish the two concepts seem to follow Willett's (1901) early definition. He regards risk as the "objectified uncertainty regarding the occurrence of an undesirable event" and thus is quantifiable, whereas subjective uncertainty is "resulting from the imperfection of man's knowledge." As uncertainty arises when imperfect knowledge makes it difficult to predict the future (Beckman, Haunschild, & Phillips, 2004), some scholars regard uncertainty as a state of the mind relying on subjective belief and knowledge (Pfeffer, 1956). Nevertheless, most studies that examine uncertainty and investment do not distinguish the two concepts and attempt to quantify uncertainty using observable data.

3.2.2 Demand Uncertainty

Demand uncertainty is the most obvious and significant source of uncertainty for most systems (Arda & Hennet, 2006). The instability and unpredictability inherent in consumer taste and preferences renders demand uncertainty a consistent source of ambiguity that cannot be eliminated (March, 1978). The restaurant is no exception.

Moreover, economic uncertainty takes a toll on restaurants (Gasparro, 2012a; Jargon, 2013). Economic uncertainty affects consumer sentiment, translated into demand uncertainty. Highly intense competition in the foodservice market, however, does not allow much discretion for restaurants to actively control prices in response to uncertain demand. Nevertheless, it has not attracted much attention from hospitality management researchers (Harrington, 2001). Although a line of revenue management research has prescribed several ways for restaurants to maximize revenue in a given situation (Kimes, 1999; Kimes, Chase, Choi, Lee, & Ngonzi, 1998), their analysis is done at a micro-level for a particular restaurant unit rather than a macroscopic examination of the impact of demand uncertainty in the restaurant industry.

This study investigates how restaurant firms adjust the level of investment in the presence of industry demand uncertainty. In addition, firm characteristics that affect a firm's susceptibility to uncertainty will be explored as well. The findings will reveal what types of firms are more bound to industrial uncertainty when making investments.

The match of industry-level uncertainty and firm-level investment data will better capture the causal relationship between uncertainty and investment because uncertainty in the industry is usually uncontrollable for most firms. A major problem of using firm-level uncertainty and investment data is endogeneity (Fuss & Vermeulen, 2008). When a firm starts an investment project whose profitability is unknown, it can increase the uncertainty of the firm. However, it is not reasonable to assume that a firm's investment project would increase the industry's uncertainty, particularly in a highly fragmented market like the

foodservice industry. The idiosyncratic impact of most restaurant firms' investment policy on industry demand would be diffused at the industry level.

3.2.3 Uncertainty and Investment

3.2.3.1 Theory

The impact of uncertainty on corporate investment has long been researched in finance. According to one line of research, initiated by (Hartman, 1972) and (Abel, 1983), greater uncertainty increases investment. Assuming that the marginal revenue product of capital is convex in the output price, output price uncertainty can raise the marginal profitability of capital and thus increase investment. An increase in the variance of output price without a change in the mean raises the expected profitability of capital, leading to an increase in investment. This applies to firms that operate in competitive markets and have no problem in reversing investment with constant returns to scale.

Caballero (1991) demonstrates how the association between uncertainty and investment changes according to different assumptions about marginal return to capital and adjustment cost. He argues that the positive association, claimed by Hartman (1972) and Abel (1983), is robust even to irreversible investment under the assumptions of perfect competition and nondecreasing returns to scale. He suggests that in a very competitive market, today's investment decision only depends on the marginal profitability of capital. The asymmetry of adjustment cost has nothing to do with the sign of today's investment. Thus, as long as the convexity of marginal return of capital with respect to price uncertainty holds, uncertainty encourages investment. However, when the adjustment cost asymmetry

is combined with decreasing marginal return to capital (because of imperfect competition or decreasing returns to scale), the association can turn negative.

Another view, which emphasizes the role of irreversibility projects a negative relationship between uncertainty and investment. Once put into use, capital (or fixed) assets, such as plant and equipment, are hard to reverse to their former physical state without cost because the asset is likely to be tied to specific configuration requirements or contractual provisions of the firm, diminishing the reusable value of the asset. Accordingly, firms incur larger costs when they disinvest than when they expand. Because of the irreversibility of investment and asymmetric adjustment cost, Pindyck (1991) and Bernanke (1983) argue that firms unsure of future demand can benefit from delaying investment until the uncertainty at least partly dissolves away. Firms can make better-informed investment decisions by waiting for new information and reevaluating investment projects, implying a negative association between uncertainty and investment (Dixit & Pindyck, 1994; Pindyck, 1991). Abel, Dixit, Eberly, and Pindyck (1996) expand Pindyck (1991) and Dixit and Pindyck (1994) and consider a more general case. When investment is not necessarily irreversible, uncertainty increases both the value of waiting and the value of the reversing option, and thus the ultimate effect is not obvious. However, the effect would be negative as investment is more irreversible.

3.2.3.2 Empirical Evidence

As investment decisions are forward-looking (Carruth, Dickerson, & Henley, 2000), uncertainty of any economic factor related with costs or return of the investment can impact

investment. Several sources of uncertainty have been examined, and the general consensus is that uncertainty has a negative effect on investment.

Campa (1993) investigated the impact of exchange rate variability on foreign direct investment (FDI). Because of sunk costs in capacity (i.e., the degree of irreversibility), FDI exhibits hysteresis effects, the phenomenon that the level of exchange rate at which a firm exits a foreign market does not come back to the level at which the firm first entered the market. For the firm to leave the market, the exchange rate should be lower than the level that induced entry. Consequently, firms would have an incentive to defer entry as the exchange rate becomes more volatile (Dixit, 1989). Campa (1993) empirically finds exchange rate volatility to be negatively related with the number of FDI, and the negative effect is more pronounced for industries where the extent of investment irreversibility is relatively high. Cushman (1988) observes that expected appreciation of the dollar is negatively correlated with foreign investment in the United States. However, Goldberg (1993) suggests a weak impact of the currency rate volatility on U.S. aggregate investment. The overall relationship is not significant and weakly positive in the manufacturing durable sectors.

Huizinga (1993) examined inflation uncertainty and investment in the U.S. manufacturing sectors. Inflation uncertainty leads to uncertainty in real cost of production, such as real wages, as well as the uncertainty in relative price of final products and the profit rate, effecting uncertainty about real returns from investment projects. The empirical results show inconsistent associations of different types of uncertainties with aggregate investment. While uncertainty about real wage and output price induce a drop in investment,

uncertainty about the profit rate leads to increased capital expenditure. Byrne and Davis (2004) also found that inflation uncertainty has a depressant impact on investment, either the uncertainty is temporary or permanent.

Rodrik (1991) demonstrates how perceived uncertainty about policy reforms acts as an implicit tax on investment. Uncertainty regarding the implications of a new policy freezes entrepreneurs' investment sentiment, leading them to withhold projects until the uncertainty partially dissolves. Pástor and Veronesi (2013) argue that political uncertainty diminishes government protection for capital markets, raising the equity risk premium. The phenomenon is more significant in a fragile economy. Gulen and Ion (2016) also reveal a negative association of economic policy uncertainty and investment. They further show that policy uncertainty exerts a stronger impact on firms that operate in competitive industries and that are more financially constrained.

Episcopos (1995) investigated the impact on fixed investment of five major uncertainty variables: the growth rates of real interest rate, consumer spending, composite index of leading indicators, stock price index, and GDP inflator. He also observed that the various proxy measures of economic uncertainty are inversely related to fixed investment.

3.2.3.3 Demand Uncertainty and Capital Investment in the Restaurant Industry

Capital investment generally refers to investment in physical long-term assets (e.g. property, plant and equipment) that are utilized for production. Mergers and acquisitions are also regarded as a part of capital investment. Capital expenditure in restaurant businesses mostly involves development of new restaurants and improvement of existing properties. Other capital expenditures include investments in information technology

systems and production facilities. In terms of amount, the restaurant industry is placed in the middle between manufacturing and pure service-oriented industries. For example, the amount of capital expenditure by an average restaurant firm was $107K as of January 2014, whereas the same figure was $646K in the automotive industry, and $37K in the computer software industry (Damodaran, 2014).

Capital investment in the restaurant industry bears a certain level of industry-specificity and irreversibility. Under the U.S. GAAP, capital expenditure is capitalized and depreciated over the life of the asset, leading to an increase in operating leverage. Moreover, given that restaurant firms tend to finance their fixed assets through long-term debt (Jang & Ryu, 2006), making capital expenditures likely increases financial leverage as well. Thus, if future demand for new restaurants turns out to be insufficient to cover the investment expenditures, the restaurant firms would be burdened with idle capacity and debt. This suggests that restaurant chains would be reluctant to make capital investment as they see industry demand uncertainty increases.

3.2.3.4 Nonlinear Relationship Between Demand Uncertainty and Investment

As previously argued, most empirical studies commonly report a negative relationship between uncertainty and investment, dominated by the concept of irreversibility of investment and real option (Pindyck, 1991). There are two common features in the aforementioned empirical research. One is that most of them focus on manufacturing industries (Koetse, de Groot, & Florax, 2009) and the other is that they implicitly assume a linear association. However, because of unique characteristics of the restaurant industry this study suspects a nonlinear relationship between demand uncertainty

and investment. That is, the negative impact of uncertainty may be insignificant or moderate for low levels of uncertainty but be more severe for high levels of uncertainty.

According to Kahneman and Tversky (1979), individuals maintain an asymmetric attitude toward risks according to the size of loss. They observe a risk-seeking behavior over the domain of small losses when the utility of an agent depends on gains and losses rather than on the state of final outcomes. Thus, in the investment function derived from a nonlinear utility function, a firm may be willing to take risks for a range of small losses arising in the low level of uncertainty (Bo & Lensin, 2005).

On top of that, the unique conditions of the restaurant industry provide additional support for a nonlinear relationship. Kulatilaca and Perotti (1998) argue that the impact of uncertainty on investment depends on the strategic value of investment, such as preemption and dissuasion of entry, and the value of not investing (the value of flexibility). As is well known, the restaurant industry is highly competitive. In the presence of competition, the impact of uncertainty between on investment depends not only on the degree of irreversibility but also on the value of strategic investment (Ghosal & Loungani, 1996). The real option theory claims that companies facing uncertainty are better off waiting before they make investment expenditures. This is because delaying allows the firm opportunities to reevaluate a project based on new information about price, costs, and other market conditions before committing resources (Pindyck, 1991). Such a claim implicitly assumes that the firm has an exclusive property right on the project that other firms cannot take over; however, that is not always guaranteed. When the firm shares growth opportunities with the firm's rivals, the firm may need to invest quickly to preempt

investment by competitors or at least to maintain its competitiveness in the market. A myriad of research shows that the value of real options quickly deteriorates with competition (Baldursson, 1998; Bulan, Mayer, & Somerville, 2009; Grenadier, 1996, 2002; Kulatilaka & Perotti, 1998; Lambrecht & Perraudin, 2003). In line with this reasoning, Akdoğu and MacKay (2008) examine how industry competitiveness affects firms' investment behavior. The results revealed that firms competing in oligopolistic and competitive industries show a larger investment-*q* sensitivity and a faster investment speed than firms in monopolistic industries.

What makes capital investment risky under uncertainty is the irreversibility. Firms usually cannot disinvest or even if they can, the loss of time and value reduces the resale value of used capital far below its replacement cost (Ramey & Shapiro, 2001). The degree of irreversibility is one of the most obvious sources of heterogeneity in the relationship between uncertainty and investment (Koetse et al., 2009); the lower the cost to reverse the investment, the smaller the sensitivity of the investment to uncertainty. In manufacturing industries, capacity expansion is usually lumpy and requires a huge capital commitment and a years-long construction period. Moreover, the layout of a factory and equipment are specifically designed for and customized to what is produced. Thus, in 1981 Ford Motor Company had to close its gigantic Michigan Casting Center in Flat Rock built only 12 years previously at a cost of more than $150 million (New York Times, 1981; Tuzel, 2010). After more than three years of being closed, the plant was torn down so that another car maker Mazda Motor Manufacturing could construct a factory on the same site. However, the level of irreversibility is lower in the restaurant industry. As the investment is generally

undertaken on a unit restaurant basis, the capital investment can be split into a series of multiple projects. Furthermore, compared with building a new factory, opening a new restaurant can be done in a shorter time span with less cash. So does closing unprofitable units.

Intense competition and relatively low disinvestment costs are restaurant industry-specific features that work against the dampening impact of uncertainty. Thus, when uncertainty is low or moderate, those two factors, combined with human nature, which is generous to small losses, may dilute the inhibiting effect of demand uncertainty on investment. However, as uncertainty continues to increase, concerns about being stuck with unwanted equipment and loss-making outlets would discourage restaurant firms from making new investments. In other words, the investment rate falls slowly for low levels of uncertainty but it drops more rapidly as the level of uncertainty continues to go up.

H1: As the level of demand uncertainty increases, the investment rate concavely decreases.

3.2.4 Conditional Effects of Firm Characteristics

Although industry-wide demand uncertainty affects entire firms in the market, not all firms would be affected to the same degree. Some firms may be more sensitive to macro uncertainties than others. The impact of demand uncertainty on investment is tested for, conditional on the following firm characteristics. The results would shed some light on the features of firms more subject to demand uncertainty.

3.2.4.1 Franchise

Next is an examination of the conditional effect of franchise on the relation between demand uncertainty and investment. Franchisors share business risk with franchisees as they rely on franchisees' capital and human resources. By investing their resources, franchisees share the business risk with franchisors (Martin, 1988). The product of investment would be shared with franchisees as well. It is implemented through franchise fees, which are relatively more stable than operating income from company-owned outlets, and low operating leverage, which would dilute the effect of fluctuations in demand on the bottom line.

Uncertainty dampens investment because of irreversibility inherent in investment, suggesting that the impact of uncertainty on investment is proportional to the extent of investment irreversibility. Thus, firms whose investment bears a larger sunk cost would be more sensitive to uncertainty shocks (Gulen & Ion, 2016). One of the proxy measures of irreversibility is a fixed asset ratio because fixed assets, such as property and equipment, are costly to reverse, and incur large sunk costs as a form of depreciation expense (Gulen & Ion, 2016). Franchising restaurants have a lower operating leverage than nonfranchisors (i.e., lower irreversibility of investment) as it is usually franchisees who own and manage units.

Relatively stable cash flow obtained from franchise royalties is an important route that intervenes between uncertainty and investment. Froot, Scharfstein, and Stein (1993) argue that the goal of risk management is to align the inflow of cash with the demand for investment funding. Imperfections of capital markets, such as information asymmetry

between managers and investors and default risk arising from debt, create a cost wedge between external capital (equity and debt) and internal fund (retained earnings). Thus, managers prefer internal funds to relatively expensive external funds in financing investment projects. They even forgo profitable projects when in-house capital is not sufficient. Indeed, it has been shown that investment is highly correlated with cash flow (Fazzari et al., 1988; Hovakimian, 2009; Kaplan & Zingales, 1997). Therefore, it is predicted that if a firm is concerned with its volatile cash flow stream, the firm would be cautious to make capital investments and it would be all the more so as the level of uncertainty rises. However, franchising firms, by securing a more stable cash flow stream, would be able to push forward investment projects as planned. This is the point where franchising can tackle the dampening impact of demand uncertainty on investment.

H2a: Franchising restaurants are less susceptible to demand uncertainty in implementing investment projects than nonfranchising restaurants.

3.2.4.2 Segment

As described in Chapter 2.1, the impacts of economic changes on performance differ between segments. Because of the high price range, full-service restaurants are the first to feel the onset of recession and the first to see the end of recession (Youn & Gu, 2009). During the early years of recovery, when the unemployment rate is still high, the upper-income class increases their economic position faster than the middle-income and low-income classes (Thorn, 2014). In contrast, the limited-service segment exhibits lower cyclicality than the full-service segment. Limited-service restaurant stocks appear to be recession-proof and the segment stock index outperformed that of the full-service segment

and the market during the recent Great Recession. However, it also takes longer to benefit from increasing demand in the post-recession period.

Less cyclical businesses have a greater temporal inertia (Steenkamp & Fang, 2011), which would offer a larger shield against the dampening effect of demand uncertainty. Conversely, highly cyclical businesses have to deal with sharp fluctuations in demand, and thus should be more cautious in making decisions that are fairly irreversible. In this regard, it is predicted that the full-service restaurants would be more susceptible to demand uncertainty than limited-service counterparts.

H2b: Full-service restaurants are more susceptible to demand uncertainty in implementing investment projects than limited-service restaurants.

3.3 Methodology

3.3.1 Data

The U.S. monthly retail sales of food services and drinking places were retrieved from the U.S. Census Bureau (http://www.census.gov/retail/). They provide seasonally adjusted monthly estimates of segmental (full-service, limited-service, and drinking places) as well as total sales since 1992. Firm accounting data were obtained from the Compustat database. Franchising data were manually collected from 10-K reports. Lastly, the annual U.S. Real GDP growth rate data were retrieved from the U.S. Bureau of Economic Analysis for (http://www.bea.gov/national/index.htm#gdp).

3.3.2 Models

3.3.2.1 Estimating Demand Uncertainty in the Restaurant Industry

In this study, a two-faceted measure of demand uncertainty based on historical industrial sales data was develped. First, uncertainty was estimate as the variance forecast of industry sales using a Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model. It states that the best predictor of variance in the current period is the weighted sum of the long-run average variance, the variance predicted for the previous period, and the most recent squared residual, which is to reflect new information that arrived in the previous period so was not available when the previous forecast was made (Engle, 2001).

One feature of GARCH is that recent squared deviations are assigned larger weights than distant squared deviations and the weights gradually decline as observations recede in time (Ederington & Guan, 2006). Huizinga (1993) claims that what matters in investment decisions is not deviations from the average value that can be reliably predicted but rather fluctuations about an expected future trend, and that the use of an ARCH-based model fits the need for extracting unexpected shock from unconditional variance of a series.

In the case of restaurant demand, the factors affecting restaurant sales are likely to be persistent over time. For example, critical to the success of restaurant businesses, economic conditions gradually shift. The U.S. economy has not yet completely overcome the Great Recession of the late 2000s. In addition, consumers' preference shifts also tend to persist over a few years. For example, increasing demand toward healthy diet and sustainable businesses is expected to continue (Zwolak, 2010). What they imply in

common is that the variance of restaurant demand today, this month, or this year would be likely to resemble those of yesterday, last month, or last year. For these reasons, the demand uncertainty was estimated using a GARCH (1, 1) model. The variance forecast of demand would be a proxy measure for demand uncertainty.

$$D_t = \alpha_0 + \sum_{i=1}^{q} \alpha_i D_{t-i} + u_t \qquad \text{Eq. 3.1}$$

$$\sigma_t^2 = \gamma_0 + \gamma_1 u_{t-1}^2 + \delta \sigma_{t-1}^2 \qquad \text{Eq. 3.2}$$

This is the simplest but mostly widely used form of GARCH model, GARCH (1, 1). The weights $\gamma_0, \gamma_1,$ and δ determine the speed at which the forecast variance reflects new information and the speed at which it converts to the long-run average (Engle, 2004). GARCH (1, 1) is easy to estimate, parsimonious (compared with *q*th-order ARCH model) while successful in forecasting conditional variances. The GARCH reaction parameter (γ_1) indicates the degree to which the volatility of the last period feeds through to the current period's volatility, and generally ranges from 0.05 (relatively stable market) to 0.1 (relatively volatile and nervous market). The GARCH persistence parameter (δ) falls between 0.85 and 0.98, with smaller values related to higher γ_1. Thus, the lower δ and the higher γ_1, the more spiky and jumpy is the volatility (Alexander, 2008).

The estimation starts with finding the best-fitting AR model, which turns out to be AR (15) in this study. The lag length of an AR model should be long enough to capture the full cycle of the data. So in the case of monthly data, there should be a minimum of 12 lags. Moreover, to consider some seasonality carried over from year to year and across months,

lag lengths of 13–15 months are commonly used (Brandt & Williams, 2007). The results of information criteria for AR models with different lag lengths are presented in Table 3.1.

Table 3.1 Lag length determination

lag	AIC	HQIC	SBIC
0	21.061	21.066	21.075
1	17.871	17.882	17.898
2	17.604	17.621	17.646
3	17.593	17.615	17.648
4	17.590	17.618	17.659
5	17.551	17.584	17.634
6	17.512	17.551	17.608
7	17.148	17.193	17.259
8	17.114	17.164	17.238
9	16.896	16.952	17.035
10	16.904	16.965	17.056
11	16.773	16.840	16.939
12	16.160	16.232	16.340
13	15.870	15.948	16.064
14	15.772	15.855	15.979
15	**15.627***	**15.716***	**15.848***
16	15.634	15.729	15.869
17	15.640	15.741	15.890
18	15.645	15.750	15.908
19	15.636	15.747	15.913
20	15.638	15.755	15.928

Then, a GARCH (1, 1) model was estimated using the residuals produced by the AR (15) model, and the variance forecast of demand would be a proxy measure for monthly demand uncertainty.

Table 3.2 AR (15) model

	Coefficient	Std. Dev.
L1.	0.231***	0.062
L2.	0.211***	0.061
L3.	0.380***	0.066
L4.	-0.046	0.041
L5.	0.105**	0.041
L6.	-0.108***	0.041
L7.	0.017	0.045
L8.	0.022	0.047
L9.	0.035	0.042
L10.	-0.033	0.046
L11.	0.096**	0.037
L12.	0.866***	0.038
L13.	-0.216***	0.067
L14.	-0.182***	0.060
L15.	-0.370***	0.066
cons	35.205	137.907

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level.

Table 3.3 shows the coefficients of the GARCH (1, 1) model. The GARCH reaction parameter (γ_1) is significant at $\alpha = 0.10$, validating the use of the GARCH model in estimating monthly demand uncertainty. High δ and low γ_1 indicate that the restaurant industry demand is relatively stable (Alexander, 2008). To match the frequency of the

monthly demand uncertainty index to the yearly accounting data, monthly indices are averaged, equally-weighted, into a yearly average.

Table 3.3 GARCH (1, 1) results

	Coeff.	Std. Dev
γ_1	0.044*	0.026
δ	0.947***	0.045
cons	3737.350	5857.664
chi-sq	68123.17	

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level.

3.3.2.2 The Effect of Demand Uncertainty on Investment

Based on the theoretical literature about investment model in Chapter 2, the following baseline investment model is presented:

$$INV_{i,t} = \alpha_i + \alpha_1 UNCER_{i,t-1} + \alpha_2 (UNCER_{i,t-1})^2 + \alpha_3 Q_{i,t-1} + \alpha_4 CF_{i,t-1} + \alpha_5 INDSG_{t-1} + \alpha_6 GDP_{t-1} + \varepsilon_{i,t} \quad \text{Eq. 3.3}$$

INV is the logarithm of capital expenditure net of depreciation expense scaled by previous period's total assets (Lang, Ofek, & Stulz, 1996); *UNCER* is the measure of industry-wide demand uncertainty. Along the uncertainty measure, several control variables were considered. *Q* is the Tobin's *q* to control for firm-specific investment opportunity and variation in business conditions (Stein & Stone, 2012). It is calculated following (Chung & Pruitt, 1994); *CF* is cash flow defined as the ratio of earnings before extraordinary items plus depreciation and minus dividends deflated by previous period's total assets; *INDSG* is industry sales growth, which is a log difference of the U.S annual retail sales of food

services and drinking places; *GDP* is the real GDP growth rate. Firm growth, industry sales growth and real GDP growth are to control for investment opportunities that might not have been captured by *Q* (Gulen & Ion, 2016). The subscript *i* indexes firms, and *t*, time.

To match the time period between the uncertainty and the investment and ensure the uncertainty precedes the investment, this study calculated two uncertainty estimates for every year. One is over the period from January to December (Uncer12), and the other from July to June (Uncer6). Then, we pair accounting data of firms whose fiscal year ending month falls between June and November with the uncertainty index that covers July through June (Uncer6). For example, the accounting data in 1995 of a firm whose fiscal year ending month is August were matched with the uncertainty estimate that covers July 1993 through June 1994, whereas the data of a firm whose fiscal year ends in December 1995 were linked with the uncertainty estimate that covers January to December in 1994. However, this variation is subtle because the majority of sample firms face the same level of industry-wide uncertainty in every fiscal year. Thus, the equation does not include time-fixed effects to prevent time variables from absorbing the effect of uncertainty (Gulen & Ion, 2016).

Lastly, all firm-specific variables were winsorized at the 1st and 99th percentiles to minimize the impact of data errors and outliers. To improve normality, *INV* and *UNCER* were logarithmically transformed.

The Hausman test and Wooldridge test for autocorrelation results indicated the presence of unobserved firm-specific effect and first-order serial correlation among residuals. Serial correlation in the panel-data models causes bias in the standard errors and

consequently makes the results less efficient (Drukker, 2003). Accordingly, the models were estimated using fixed-effect regression with AR (1) disturbances (Baltagi & Wu, 1999).

3.3.2.3 The Conditional Effect of Franchising and Segment

The following model was developed to test the moderating effect of franchising.

$$INV_{i,t} = \gamma_i + \gamma_1 UNCER_{t-1} + \gamma_2 (UNCER_{t-1})^2 + \gamma_3 FRAN_{i,t-1} + \gamma_4 UNCER_{t-1} \times FRAN_{i,t-1} + \gamma_5 (UNCER_{t-1})^2 \times FRAN_{i,t-1} + \gamma_6 Q_{i,t-1} + \gamma_7 CF_{i,t-1} + \gamma_8 INDSG_{i,t-1} + \gamma_9 GDP_{i,t-1} + \varepsilon_{i,t} \quad \text{Eq. 3.4}$$

FRAN indicates the franchise dummy (1 = Franchisors, 0 = Nonfranchisors). Franchisors are defined here as the firms with positive franchising-related revenue: royalty and other franchise fees.

The following equation is to test the moderating role of the segment.

$$INV_{i,t} = \gamma_i + \gamma_1 UNCER_{t-1} + \gamma_2 (UNCER_{t-1})^2 + \gamma_3 SEG_{i,t-1} + \gamma_4 UNCER_{t-1} \times SEG_{i,t-1} + \gamma_5 (UNCER_{t-1})^2 \times SEG_{i,t-1} + \gamma_6 Q_{i,t-1} + \gamma_7 CF_{i,t-1} + \gamma_8 INDSG_{i,t-1} + \gamma_9 GDP_{i,t-1} + \varepsilon_{i,t} \quad \text{Eq. 3.5}$$

SEG is the segment indicator (1 = Full service, 0 = Limited-service).

Since fixed-effect model automatically washes away the effect of time-invariant regressors, the Hausman-Taylor estimator was used, which is a transformed random-effect model (Hausman & Taylor, 1981). A general random effect model assumes that unobserved individual effects are not correlated with predictor variables, while a fixed

effect model allows for endogeneity of regressors and individual effects. Hausman and Taylor propose a random-effect model where some independent variables, either time-variant or invariant, are correlated with the unobserved individual effects. In the presence of endogeneity among regressors, there is substantial bias in the random-effect estimators (Baltagi, Bresson, & Pirotte, 2003). The Hausman-Taylor estimator addresses this problem by allowing the correlation between some predictor variables and the individual effects.

3.4 Results

3.4.1 Descriptive Analysis

Descriptive statistics for the main variables are summarized in Tables 3.4 through 3.6. For descriptive purposes, natural (unlogged) numbers are reported for *INV* and *UNCER*. It is shown that a typical public restaurant chain makes 7.4 percent of investment a year. The average *Q* is 2.926 and there is a large variation in *Q* from 0.02 to 19.45, showing that even within the single industry stock market evaluation can substantially vary across firms. The annual sales of the U.S. foodservice and drinking places have grown at 4.7 percent on average.

Table 3.4 Descriptive statistics (Total)

	Obs	Mean	Std. Dev.	Min	Max
INV	1352	0.074	0.124	-0.101	0.644
UNCER	1424	0.305	0.103	0.182	0.579
Q	1409	2.926	3.789	0.020	19.445
CF	1348	0.106	0.112	-0.432	0.333
INDGR	1303	0.047	0.016	-0.004	0.068
GDP	1424	0.027	0.018	-0.028	0.050

Table 3.5 compares average investment rate, *Q*, and cash flow between nonfranchisors and franchisors. Given that franchisees are responsible for investment, it is not surprising that nonfranchisors invest more than franchisors. Franchisors report higher *Q* than nonfranchisors but no significant difference in cash flow amount.

Table 3.5 Descriptive statistics by franchising

	Nonfranchisors			Franchisors			t-test
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	$(\mu_1 = \mu_2)$
INV	559	0.096	0.144	793	0.059	0.104	5.43^{***}
Q	585	2.717	3.745	824	3.073	3.817	-2.12^{**}
CF	562	0.101	0.107	786	0.110	0.115	-1.62
UNCER	596	0.287	0.093	828	0.318	0.108	-5.64^{***}

Descriptive information by segment is presented in Table 3.6. Limited-service restaurants invest less in fixed assets than their full-service counterparts. This fact can be explained by the gap in the franchise ratio. The franchise ratio of the full-service chains is less than half of the same ratio of the limited-service chains. In terms of *Q*, limited-service

firms surpass full-service firms. This is due to the well-established fast-food chains and outstanding performance of fast-casual eateries. As of May 2016, the market-to-book ratio of Chipotle Mexican Grill is 8.59, Panera Bread 12.06, and McDonald's 28.47, whereas Darden Restaurants is 4.35 and Cracker Barrel Old Country Store 6.30 (Yahoo Finance, 2016). In terms of cash flow, the full-service restaurants have a deeper pocket.

Table 3.6 Descriptive statistics by segment

	Limited-service			Full-service			t-test
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	$(\mu_1 = \mu_2)$
INV	384	0.062	0.123	909	0.090	0.130	-3.58***
Q	408	3.500	4.581	944	2.510	3.238	4.52***
CF	392	0.095	0.125	904	0.113	0.097	-2.77***
FR	355	0.949	0.220	917	0.458	0.499	17.90***
UNCER	414	0.307	0.104	953	0.299	0.099	1.35

Note: FR is the franchise ratio, number of franchising firm-year observations divided by the number of total firm-year observations in that segment.

Table 3.7 displays the pairwise correlation matrix of variables. As expected, investment is negatively related with uncertainty but positively with *Q*, cash flow, GDP growth, and industry growth. Uncertainty has a negative association with real GDP growth, meaning that as the economy declines the uncertainty is on the rise. This is consistent with the finding in Bloom (2014). It is also shown that demand uncertainty suppresses industry sales growth.

Table 3.7 Correlation matrix

	INV	UNCER	Q	CF	INDGR	GDP	FRAN
UNCER	-0.270***						
Q	0.169***	0.234***					
CF	0.217***	-0.007	0.300***				
INDGR	0.105***	-0.355***	-0.011	0.097***			
GDP	0.141***	-0.558***	-0.109***	0.080***	0.411***		
FRAN	-0.124***	0.107***	0.080***	0.042	-0.015	-0.090***	
SEG	0.159***	-0.067**	-0.137***	0.036	0.032	0.040	-0.469***

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level.

Figure 3.1 exhibits the historical demand uncertainty and industry average investment rate in the restaurant industry from 1992 to 2014. There is a negative association between the industry demand uncertainty and the investment rate. After the recent Great Recession, investment has not fully recovered to the previous level.

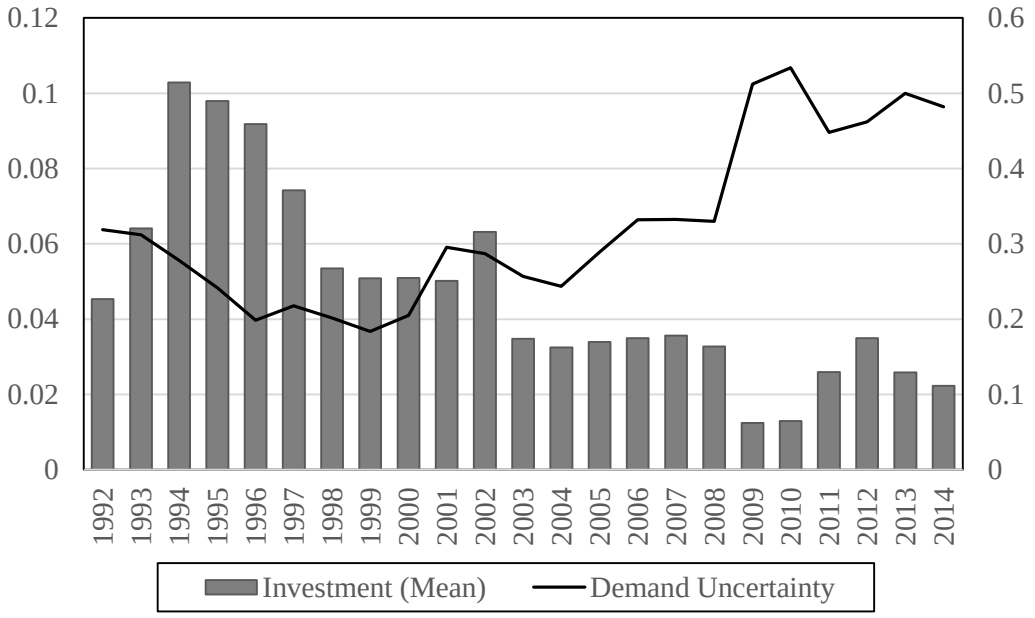


Figure 3.1 Historical demand uncertainty and average investment

3.4.2 Main Results

The regression outcomes of the unconditional baseline model are presented in Table 3.8. Three specifications of Eq.3.3 are estimated: column (1) includes only control variables, column (2) adds a linear uncertainty term, and finally column (3) estimates the full model, augmented by the squared uncertainty term.

In column (1), traditional investment determinants *Q* and *CF* are positively significant. After the inclusion of *UNCER* in column (2), the uncertainty term is significantly negative, confirming the inhibiting impact of demand uncertainty on investment. The full model estimation outcomes are shown in column (3). Although the coefficient decreases, the linear uncertainty term still contains statistical significance. The squared uncertainty term, of primary interest, emerges to be negatively significant after

controlling for the effect of *Q*, *CF*, industry and GDP growth, consistent with the hypothesis.

Table 3.8 Uncertainty effect on investment

	(1)	(2)	(3)
UNCER		-1.204***	-0.821***
		(0.215)	(0.229)
$UNCER^2$			-2.409***
			(0.546)
Q	0.047*	0.073***	0.071***
	(0.024)	(0.024)	(0.024)
CF	1.514**	1.499**	1.610***
	(0.595)	(0.585)	(0.578)
INDGR	-4.661*	-5.724**	-12.096***
	(2.585)	(2.543)	(2.885)
GDP	4.158	-0.369	6.775**
	(2.547)	(2.644)	(3.076)
cons	-3.439***	-3.330***	-2.932***
	(0.086)	(0.089)	(0.100)
F-value	3.82	9.69	11.91
Prob>F	<.001	<.001	<.001
obs	743	743	743

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level. Numbers in parentheses are the standard error of the coefficients.

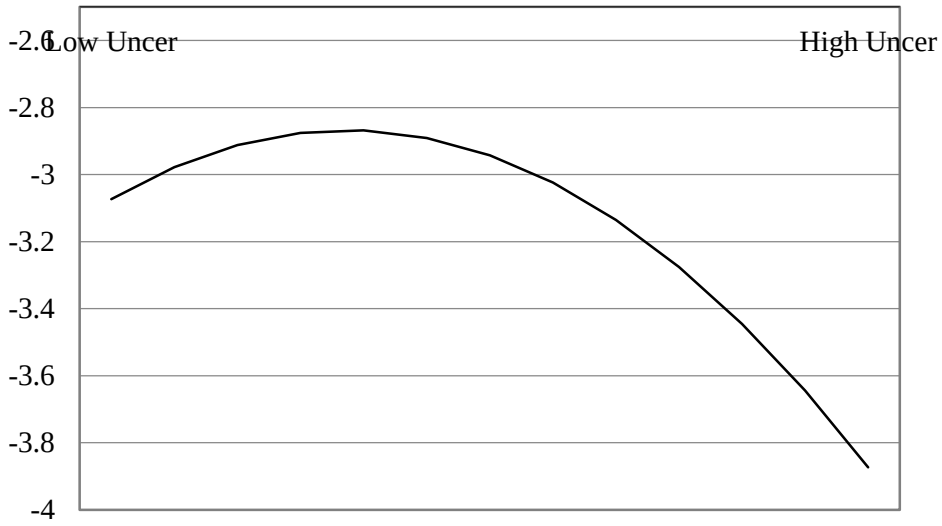


Figure 3.2 Demand uncertainty and investment

Based on the coefficients in column (3), the quadratic uncertainty–investment model is graphed in Figure 3.2 across one and a half standard deviations above and below the mean uncertainty. Combined with the results in Table 3.8, This suggests that the association of demand uncertainty and investment is not linear. Rather, under low levels of uncertainty, investment even slightly increases and then turns to a decrease with increasing uncertainty.

Though not reported here, the model was run for low and high levels of uncertainty respectively, and there was a significantly positive relationship of uncertainty to investment over the range of uncertainty from the lower bound to the inflection point. According to Sarkar (2000), uncertainty influences investment in two ways. On one hand, uncertainty decreases investment as the real option theory predicts. On the other hand, uncertainty can increase the probability that the investment threshold will be reached, and thereby have a positive impact on investment. He further analytically demonstrates that for low-growth

and low-risk projects, the probability of investing actually increases for low levels of volatility but after a certain point it decreases with the level of volatility. Abel and Eberly (1999) argue that when the user cost effect and the hangover effect are considered, there is an inverted U curve relation between the level of uncertainty and expected capital stock. Bo and Lensin (2005) also found an inverted U-shaped relationship between uncertainty and investment.

Table 3.9 shows the effect of the interplay between the economic condition and demand uncertainty on investment. Before making the multiplicative interaction term, two variables of interest, *INV* and *GDP*, were centered on each mean. In column (2), the interaction model coefficients are reported. Both uncertainty variables are significant. When it comes to the interaction terms, the linear interaction coefficient is positively significant but not the quadratic coefficient.

Table 3.9 Uncertainty, economy conditions, and investment

	(1)	(2)
UNCER	-0.821***	-0.811***
	(0.229)	(0.264)
$UNCER^2$	-2.409***	-2.068***
	(0.546)	(0.570)
GDP	6.775**	9.391***
	(3.076)	(3.133)
UNCER×GDP		32.295***
		(12.255)
$UNCER^2$×GDP		1.509
		(21.447)
Q	0.071***	0.069***
	(0.024)	(0.023)
CF	1.610***	1.641***
	(0.578)	(0.570)
INDGR	-12.096***	-14.784***
	(2.885)	(2.879)
cons	-2.932***	-2.516***
	(0.100)	(0.109)
F-value	11.91	11.53
Prob>F	<.001	<.001
obs	743	743

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level. Numbers in parentheses are the standard error of the coefficients.

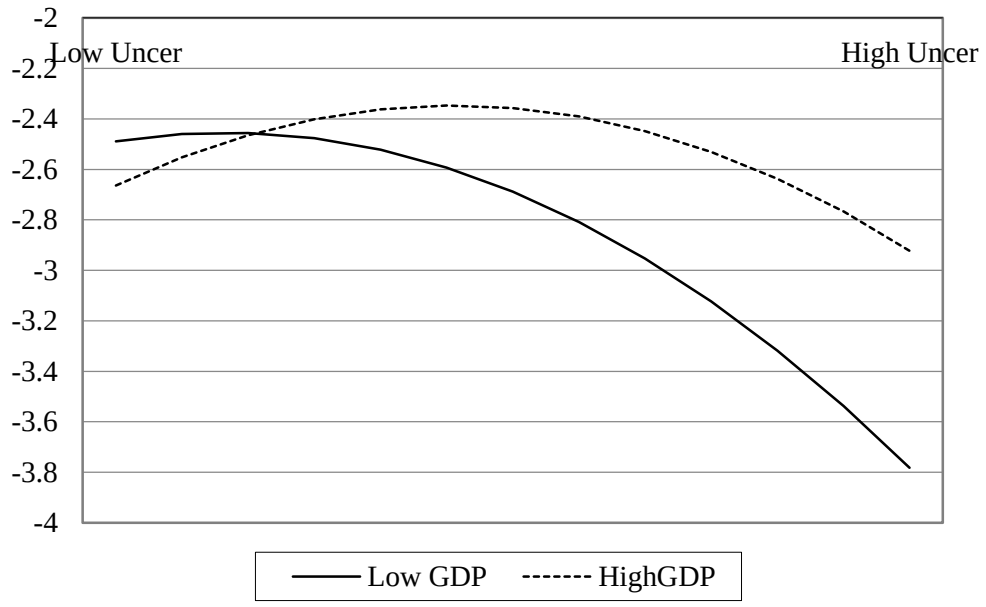


Figure 3.3 Demand uncertainty and GDP growth

To facilitate interpretation of the quadratic interaction term, Figure 3.3 was created the curvilinear relationship of uncertainty to investment between the two economic conditions, following the procedures suggested by Aiken, West, and Reno (1991). Investment rates in cases of low and high GDP growth, predicted by the interaction model, are depicted across one and a half standard deviations above and below the mean uncertainty. Though the quadratic interaction term is not statistically significant, in Figure 3.3 there is a moderating effect of economic condition on the association between uncertainty and investment within the sample data range. At the same level of increase in uncertainty, investment rate falls more steeply in the relatively soft economy marked with low GDP growth than in the strong economy. That is, restaurant firms' investment responds to demand uncertainty more sensitively in recession periods.

Next, the conditional effects of franchising were examined. To estimate a pristine effect of franchising, local master franchisees, who operate franchising restaurants in a region under a contract with franchisors, were excluded from the analysis. They are engaged in the franchising business but do not earn franchising-related revenue. Because of the mixed nature of the business, they were removed from the sample. However, inclusion of those firms hardly alters the results. First, this study divided the estimated demand uncertainty into quintiles and compared the average investment between franchisors and nonfranchisors across the quintiles. Although both groups reduce investment in the face of increasing uncertainty, there is a notable gap in the degree of responsiveness. When uncertainty is low, there is no significant difference between the two. However, as the uncertainty rises, franchising restaurant firms cut investment to a greater extent than nonfranchising firms. In addition, franchising firms show a more dramatic adjustment of investment across different levels of uncertainty than nonfranchising counterparts.

Table 3.10 Two-way descriptive statistics

		Uncertainty level[1]						ANCOVA (F-value)
		1	2	3	4	5	Total	
Non-franchise	Mean	-2.497	-2.355	-2.305	-2.380	-3.245	-2.495	9.67***
	Med	-2.329	-2.138	-2.243	-2.355	-3.070	-2.393	
	obs	99	96	79	92	52	418	
Franchise	Mean	-2.524	-2.550	-2.620	-2.706	-3.753	-2.818	80.87***
	Med	-2.379	-2.525	-2.420	-2.665	-3.542	-2.672	
	obs	103	108	127	109	103	550	
Total	Mean	-2.511	-2.458	-2.499	-2.557	-3.583	-2.678	84.03***
	Med	-2.343	-2.298	-2.401	-2.495	-3.352	-2.543	
	obs	202	204	206	201	155	968	
Difference (NF-F)		0.027	0.195	0.315	0.326	0.508	0.322	
t-test		0.169	1.294*	2.022**	2.138***	2.567***	4.415***	

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level.

Table 3.11 reports the results of the interaction model. To test for moderating effects of franchising on the nonlinear effect of uncertainty on investment, two interaction variables were included: a linear-by-linear interaction term (*UNCER*×*FRAN*) and a quadratic-by-linear interaction term ($UNCER^2$×*FRAN*). Evidence of a moderation effect is found when the quadratic interaction term is significant and the model fit improves (Golden & Veiga, 2005).

[1] Quintiles of demand uncertainty estimate

Panel A presents coefficients of the baseline and the interaction model estimated by the Hausman–Taylor regression and Panel B the main model outcomes estimated by fixed effect with AR (1) disturbance for nonfranchisors and franchisors respectively. In the baseline model, two uncertainty terms are both significantly negative but franchise dummy is not. However, once the interaction terms are included, the first-order uncertainty term becomes insignificant. As to the interaction terms, only the linear interaction coefficient still maintains statistical significance. Two separate regression analyses were additionally performed for nonfranchisors and franchisors. As hinted by the interaction model results, for nonfranchisors only the quadratic term is statistically significant whereas both uncertainty variables are significant for franchisors. The findings indicate that the investment functions of the two groups are not different in terms of the degree of curvature but in terms of location. Because the quadratic interaction term is insignificant, it fails to reject the null hypothesis that there is no moderating effect of franchising.

Table 3.11 Interaction model (Uncertainty and franchising)

	Panel A		Panel B	
	Base	Interaction	Non-franchisor	Franchisor
UNCER	-0.654***	-0.240	-0.335	-1.145***
	(0.171)	(0.232)	(0.366)	(0.309)
$UNCER^2$	-2.146***	-2.539***	-2.747***	-2.386***
	(0.411)	(0.597)	(0.883)	(0.724)
FRAN	-0.188	-0.286		
	(0.169)	(0.178)		
UNCER×FRAN		-0.693***		
		(0.261)		
$UNCER^2$×FRAN		0.759		
		(0.684)		
Q	.095***	0.095***	.065*	.085***
	(0.015)	(0.016)	(0.037)	(0.030)
CF	2.759***	2.886***	1.724	0.956
	(0.469)	(0.491)	(1.080)	(0.803)
INDGR	-5.113*	-5.158*	-11.898***	-14.694***
	(2.820)	(2.850)	(4.583)	(4.052)
GDP	11.126***	10.821***	9.150*	7.243*
	(2.895)	(2.910)	(4.739)	(4.334)
cons	-3.255***	-3.196***	-2.881***	-2.801***
	(0.200)	(0.204)	(0.143)	(0.162)
	chi^2 (Prob.>chi^2)		F (Prob.>F)	
	205.57	210.25	3.49	9.42
	<.0001	<.0001	<.0001	<.0001
obs	801	790	269	426

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level.
Numbers in parentheses are the standard error of the coefficients.

The results are not consistent with the hypothesis that predicts that the restraining impact of demand uncertainty would be mitigated in franchising firms. This phenomenon can be explained as an agency problem. Though the guideline of investment is specified in a franchise agreement, certain investments like remodeling "depend(s) on the ability, and willingness, of franchisees to accelerate the remodeling of their existing restaurants" (Burger King Worldwide Inc., 2013), implying that franchisees have discretion, to some degree, over capital investment decisions. When a franchisee upgrades its restaurant, the benefits, for which the franchisee pays the full cost, would be shared with other franchisees through shared brand.Thus, each franchisee would be inclined to refrain from making an investment and free-ride on other franchisees' investments (Brickley & Dark, 1987; Williamson, 1989). This free ride problem applies to all investments that strengthen the brand and that cannot be specified by the franchisor (Mathewson & Winter, 1985). A similar argument applies between the franchisor and franchisees. Certain investments the franchisor makes will have some spillover benefits to franchisees. Thus, suspecting franchisees' free-riding behavior, the franchisor may avoid making investments, and it can be expected that this tendency would be reinforced when the profitability of investment cannot be guaranteed due to high uncertainty. However, for nonfranchisors spillovers are maintained within the firm. As they do not share the gains with franchisees, they are likely to invest more, and it seems to allow more room for nonfranchisors to take risks and increase investments in a low to moderate uncertainty environment, as shown in Figure 3.4. In a similar vein, Michael (2000) shows that advertising falls with the degree of franchising in both hotel and restaurant industries.

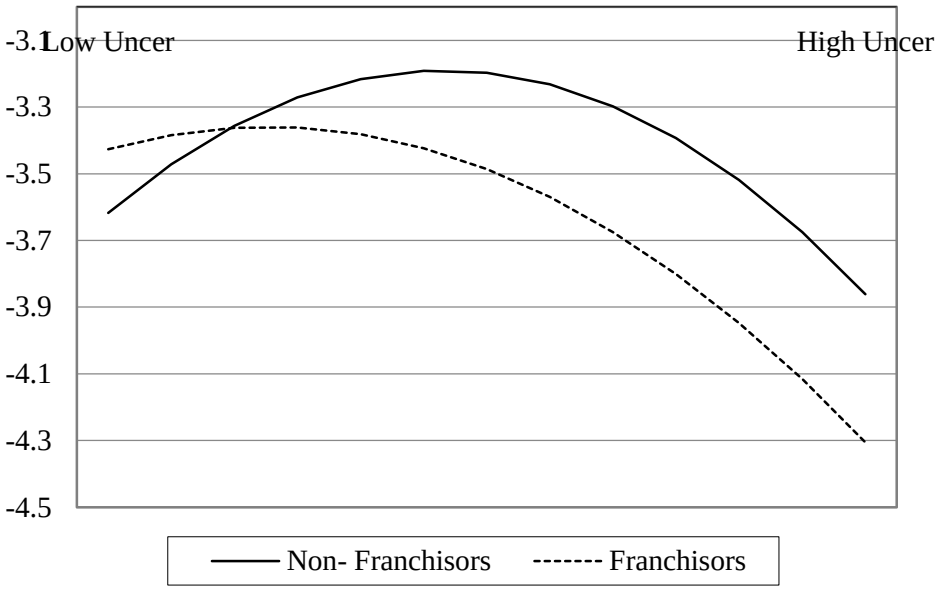


Figure 3.4 Demand uncertainty, franchising, and investment

Next, it was examined whether the effect of demand uncertainty on investment varies between limited- and full-service restaurants. To improve homogeneity of the sample, data of nonalcoholic beverage bars (NAICS 722515) and buffet chains were excluded from the sample. Table 3.12 displays two-way descriptive statistics of two segments across different levels of uncertainty. As hinted in the previous results, no significant change in investment is detected between the low- and medium-level uncertainties. Both segments considerably decrease investment in times of high uncertainty. When compared by the uncertainty level, however, the difference in investment between the two segments is not crystal clear. When uncertainty is low full-service restaurants significantly invest more, but the gap becomes less apparent with increasing uncertainty.

Table 3.12 Two-way descriptive statistics

		Uncertainty level						ANCOVA
		1	2	3	4	5	Total	(F-value)
Limited	Mean	-2.812	-2.844	-2.597	-2.551	-3.618	-2.885	15.46
	Med	-2.585	-2.740	-2.422	-2.717	-3.352	-2.762	***
	obs	52	50	57	54	55	268	
Full	Mean	-2.390	-2.323	-2.421	-2.410	-3.519	-2.525	47.11
	Med	-2.280	-2.238	-2.309	-2.316	-3.359	-2.379	***
	obs	151	152	146	148	84	680	
Total	Mean	-2.498	-2.452	-2.470	-2.448	-3.558	-2.627	66.86
	Med	-2.344	-2.298	-2.393	-2.363	-3.352	-2.492	***
	obs	203	202	203	202	139	949	
Difference (L-F)		-0.423	-0.521	-0.176	-0.141	-0.099	-0.360	
t-test		-2.356 ***	-3.049 ***	-1.018	-0.803	-0.471	-4.264	

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level.

In Table 3.13, this study run four specifications to test the conditional effect of the segment. As in the test of the moderating effect of franchising, Panel A is the Hausman–Taylor estimators and Panel B is the fixed-effect estimators with AR (1) disturbances. Panel A presents the regression coefficients of the baseline model and the interaction model extended by the interaction term.

Table 3.13 Interaction model (Uncertainty and segment)

	Panel A		Panel B	
	Base	Interaction	Limited	Full
UNCER	-0.628***	-0.828***	-1.310**	-0.689***
	(0.179)	(0.284)	(0.510)	(0.271)
$UNCER^2$	-2.021***	-0.858	0.168	-3.038***
	(0.430)	(0.702)	(1.304)	(0.628)
SEG	0.377*	0.506**		
	(0.198)	(0.210)		
UNCER×SEG		0.220		
		(0.295)		
$UNCER^2$×SEG		-1.574**		
		(0.760)		
Q	.088***	0.089***	.095**	.049
	(0.016)	(0.017)	(0.040)	(0.031)
CF	3.298***	3.200***	1.289	2.204***
	(0.505)	(0.503)	(1.159)	(0. 148)
INDGR	-5.532*	-5.188*	-4.500	-15.628***
	(3.008)	(2.924)	(7.230)	(3.398)
GDP	11.462***	11.220***	3.963	9.266**
	(3.008)	(3.002)	(7.344)	(3.620)
cons	-3.653***	-3.748***	-3.827***	-2.625***
	(0.235)	(0.240)	(0.322)	(0.111)
	chi^2 (Prob.>chi^2)		F (Prob.>F)	
	186.53	191.01	2.97	9.59
	<.0001	<.0001	0.009	<.0001
obs	747	747	177	469

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level.
Numbers in parentheses are the standard error of the coefficients.

In comparison with the base model, in the interaction model, the linear uncertainty term (*UNCER*) is negatively significant but the quadratic term ($UNCER^2$) lost its significance.

When it comes to interaction terms, only the quadratic-by-linear interaction coefficient ($UNCER^2 \times SEG$) is statistically significant. The negative coefficient indicates that compared with limited-service restaurants the average investment of full-service restaurants falls more rapidly as the uncertainty increases, implying that full-service restaurants' investments are more adversely affected by demand uncertainty than limited-service restaurants and the gap widens along with the growing uncertainty.

Figure 3.5 visualizes the moderating effect of segment. As suggested by the negative coefficient of the quadratic-by-linear interaction term ($UNCER^2 \times SEG$) in Table 3.13, the investment rate of full-service restaurants drops more steeply than that of limited-service restaurants for moderate to high levels of uncertainty.

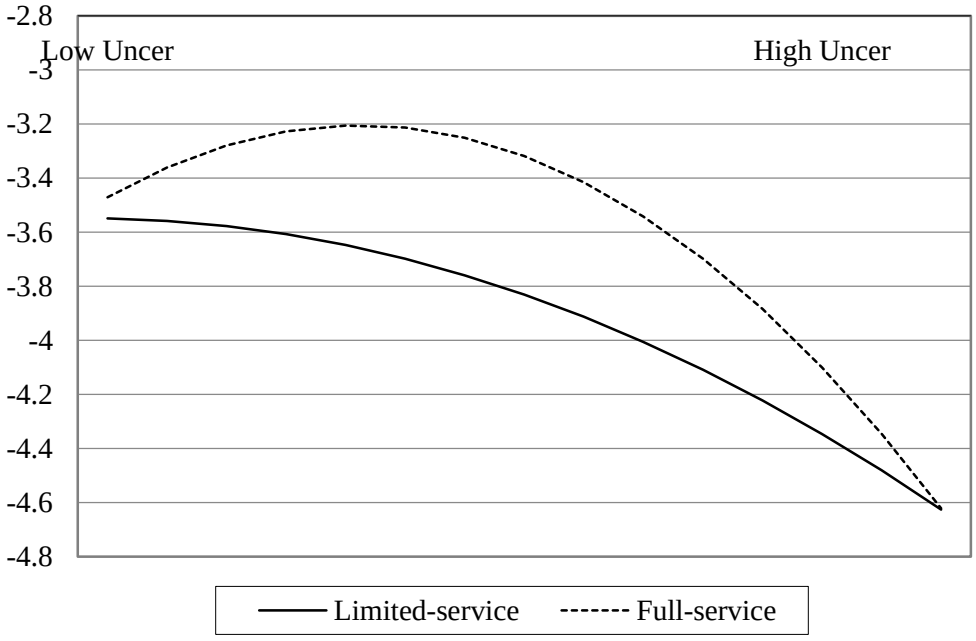


Figure 3.5 Demand uncertainty, segment, and investment

3.5 Conclusion

This study investigated how restaurant firms coordinate their fixed investment in the face of demand uncertainty. Four principal findings emerged: The sign of the demand uncertainty–investment relationship is negative. Consistent with prior studies, restaurant firms postpone fixed investment when it is hard to predict the industry demand. The association, however, is not linear. More specifically, the restricting effect of uncertainty is trivial or moderate for low levels of uncertainty but becomes stronger for high levels of uncertainty. Put differently, investment outlay drops more quickly in periods of high uncertainty. Follow-up tests checked whether the uncertainty–investment relationship is conditional on industry-specific nature: franchising and segment. According to the results,

franchising chains consistently make smaller investments than nonfranchisors but there is no significant difference between the two groups in terms of the degree of the responsiveness of investment to uncertainty. When it comes to segment, full-service restaurants are more adversely affected by demand uncertainty than limited-service restaurants, a finding that is in line with previous literature which argues that limited-service restaurant chains have a lower income elasticity of demand and thus outperform full-service counterparts in recessions (Youn & Gu, 2009).

The current study offers evidence that the impact of uncertainty on investment is not simply linear as implicitly assumed by most prior empirical research. However, because of the fact that the data are from a single industry, the generalizability of the conclusion is limited. Hence, future research that applies the nonlinear relationship to other industries and with other kinds of uncertainty is warranted to verify whether it is a general phenomenon or a unique situation of the restaurant industry. Furthermore, although this paper provides theoretical support for the nonlinear association of demand uncertainty and investment, the dynamics between competition, irreversibility, and uncertainty has yet to be verified.

It has been argued that franchise contracts allow franchisors to reduce their business risk with franchisees through a sharing agreement. Franchisors share in the success of franchisees through royalty fees, which are tied to sales revenue of a franchised outlet and thus are more predictable and free from any cost inefficiency on the franchisee's side (Caves & Murphy, 1976). Similarly, Koh, Rhou, Lee, and Singal (2015) argue that franchising restaurant chains have a lower earnings volatility, and are less vulnerable to

economic conditions. Moreover, franchisors can spread their business risk by opportunistically owning profitable stores while franchising unwanted units (Martin, 1988). In this aspect of the risk-sharing element of franchising, it was initially assumed that franchisors would be less affected by the adversity of demand uncertainty. However, the results do not confirm such a shield effect of franchising. Franchising companies exhibit the same responsiveness to uncertainty as nonfranchising firms. A potential reason lies in the free-riding problem. Because the fruits of investment spill over to other franchisees through a shared brand, a franchisee has an incentive to free ride on other franchisees and franchisor's investment. This phenomenon would be strengthened when uncertainty is high and thus it becomes more difficult to anticipate other franchisees' actions. Concerned about such an opportunistic behavior of franchisees, a franchisor may refrain from investment. Under the franchising agreement, a franchisor shares both risks and benefits with franchisees. The findings here suggest that the advantages of franchising may be swamped by the perceived cost associated with free-riding behavior of franchisees.

Some additional results warrant discussion. According to the analysis of the conditional effect of segment, the quadratic term of uncertainty is insignificant for limited-service chains. This indicates that the nonlinear relationship is caused by full-service restaurants. As mentioned before, the value of real option erodes in a competitive market characterized by low seller concentration (Grenadier, 2002). While the limited-service segment is dominated by a small number of gigantic chains, such as McDonald's and Yum Brand, the full-service segment is a comparatively more atomistic market. In 2013, 13 limited-service chains in the sample account for 10.3 percent of the market, whereas 23

full-service chains account for 4.7 percent, suggesting fiercer competition among the full-service firms. Hence, when uncertainty is low, the fear of preemption may offset the value of waiting, loosening the uncertainty–investment relationship in full-service restaurants.

Another explanation can be found the degree of heterogeneity of products. If two firms sell similar products, they attract the same groups of customers. Hence, shocks on demand would affect the firms' demand functions in mostly the same manner. Conversely, if the goods are differentiated, the firms deal with different types of customers. This suggests that the heterogeneity of the products decreases the correlation between demand functions of different firms, and thus the firms' demand functions would respond differently to shocks on the demand side (Raith, 1996). Compared to the full-service restaurants, the limited-service restaurants are more standardized in terms of menu offerings, service quality, and atmosphere. Aware that other firms in the same segment face similar demand curves, limited-service restaurants may find it risky to be aggressive in making fixed investments because if the market gets worse it will be difficult to dispose of idle equipment as everybody else would struggle too. However, the more variation exists in demand curves among firms in the segment, the greater possibility would be there that unwanted used equipment can be sold to other companies, reducing the risk associated with investment made when the environment is uncertain.

CHAPTER 4. PEER EFFECT ON INVESTMENT

4.1 Introduction

When making a decision on investment projects, most corporate finance textbooks suggest calculating the net present value (NPV). If the NPV of the project is greater than zero, that is, the sum of discounted future cash flows to be generated by the project is larger than the initial cost, the standard rule-of-thumb is to make that investment. Otherwise, disregard the plan. The *q* theory of investment is logically similar to the NPV rule. An investment project should be undertaken if and only if the market value of the project exceeds the cost. So for values of *q*, which is the market value of the capital relative to its replacement cost, greater than 1 promote investment, but values less than 1 deter investments (Tobin & Brainard, 1977). What is common between the two theories is that an investment plan should be appraised based on its expected value and cost. However, as described further on, there are theories that indicate a firm's investment behavior cannot be understood in isolation.

In the presence of a clear imperative about what is efficient, managers would be able to see the imperative and respond accordingly (Roberts & Greenwood, 1997). However, combined with managers' bounded rationality, increases in ambiguity about the economic efficacy of a decision make it nearly impossible for decision makers to

assess the full-range of possible situations and predict the consequences of their decisions (Lieberman & Asaba, 2006). Accordingly, managers are led to search for cues from successful competitors or past actions and depend on social norms for guidance (Nickerson & Silverman, 2003; Oliver, 1997).

No firm exists in a vacuum. As long as it participates in a market with others, they inevitably influence and are influenced by each other. Thus, without taking the peer effect into account, our understanding of corporate behavior must be limited. Based on this line of reasoning, this study purports to examine the peer effect on corporate investment in the restaurant industry- whether a firm's investment is affected by its peers' investment activities; if so, what motivates them to do so?; and are the investment outcomes different between peer-sensitive and less-sensitive firms? These are the main questions to be explored.

4.2 Theoretical Background and Hypotheses

4.2.1 Peer Effect on Investment

Tarnishing the economists' long-standing belief in the rational agent, behavioral economists offer abundant evidence about bounded rationality (Conlisk, 1996). Simon (1955, 1972) point out the limits of rationality and proposes bounded rationality as the replacement. Rationality can be bounded for several reasons. Uncertainty and risk associated with demand or input factors and incomplete information about alternatives make it difficult to calculate the optimum. Moreover, human capacity for computation for

finding the optimum has its limit in considering all the complexity inherent in the cost function and other environmental constraints. Thus, individuals are naturally led to settle for approximate optimal solutions given the tradeoff between judgmental accuracy and information search and computational cost (Pitz & Sachs, 1984; Smith & Walker, 1993).

It is not difficult to find empirical evidence that shows corporate investment decisions are subject to managers' bounded rationality. According to the survey from (Graham & Harvey, 2001), CFOs indicate that they shy away from the NPV method, probably the most well-known investment criterion. Despite the theoretical superiority of NPV, CFOs actually prefer internal rate of return and payback period methods, which are much less sophisticated than NPV and do not require calculation of cost of capital and future cash flows. The authors additionally find that among managers who use discount methods, an overall firm-level discount rate is more widely adopted than a project-specific discount rate. Krüger, Landier, and Thesmar (2011) argue that such practice can lead to investment distortions. They provide evidence that firms using a single discount rate within the firm tend to overinvest in risky departments and underinvest in safe ones. The investment rate is positively associated with the spread between department beta and firm beta.

Another theoretical background of the peer effect can be found in institutional theories. Institutional theorists view organizations as "living" forms that are adaptively changing in response to influences and constraints imposed by external environment and to the characteristics and behavior of other participants functioning in the environment (Selznick, 1957). A common feature observed in multiple perspectives on

institutionalization is that institutionalization is regarded as a social process by which participants come to accept shared norms, irrespective of the actor's own beliefs or actions. The norms are taken for granted as the "way things are" or the "way things are to be" (Scott, 1987). As Zucker (1983) puts it, institutionalization is rooted in conformity in search of legitimacy. The mere fact that many peer organizations adopt a certain innovation can grant legitimacy to the adoption of the innovation even without information about the economic gain to be earned from it. When this happens, non-adopters under the institutional pressure come to follow the similar path not because of economic interest but because of fear of being regarded as illegitimate or abnormal and thereby losing access to external resources (Meyer & Rowan, 1977).

Institutional isomorphism explains an organization's isomorphic changes triggered by its need for conformity. Isomorphism refers to "a constraining process that forces one organization in a population to resemble other organizations that face the same set of environmental conditions" (Hawley, 1968; Siegel, Agrawal, & Rigsby, 1997). The process of isomorphism implies that organizations operating in the same field become increasingly homogeneous over time. Institutional isomorphism accounts for a considerable portion of corporate decisions that cannot be explained solely by rationality-based economic theory, such as transaction cost economics (TCE), as organizational endeavors towards conformity does not necessarily result in enhanced efficiency (Jones, Kosnik, & George, 1993; Moran & Ghoshal, 1996). Martinez and Dacin (1999) argue that the efficiency maximization of TCE is more suited for managerial decision-making that involves more certain and identifiable transaction costs but not for decisions featured with uncertainty surrounding

the costs or outcomes, such as innovation (Moran & Ghosal, 1996). Investment involves uncertainty in that the expected payoff may or may not materialize. As previously mentioned, high irreversibility of capital investment can aggravate the influence of uncertainty associated with investment.

Not only institutional forces but also managers' personal concerns about their reputation can lead them to behave similarly to other peers. Hirshleifer (1993) argues that managers may exploit investment projects as a way of establishing their reputation. Since managers care about their reputation as a decision maker, they are reluctant to deviate from other managers even if the decision is against substantive private information about the investment project. They choose to "follow the herd" and share loss with many others rather than to be an eccentric who unconventionally succeeds (Scharfstein & Stein, 1990).

Lastly, competition can also stimulate mimetic behavior among firms. According to the prospect theory, for most individuals, a bad outcome outweighs a good outcome of same utility (Kahneman & Tversky, 1979). Borrowing this schema, Abrahamson and Rosenkopf (1993) argue that organizations would choose to avoid being at a competitive disadvantage rather than to achieve a competitive advantage with equal returns. Such inclination to prevent the worst scenario of falling behind the average performance may drive organizations to behave likewise, creating a competitive bandwagon pressure. Similarly, Gilbert and Lieberman (1987) show that firms make investments to protect their share in the industry. This implies that capital investment of some firms would provoke their competitors to increase capacity so that there is no significant variation in market shares. If competitors provide more value to customers through investment, the firm would

feel urged to do the same thing in order to be on a par with its competitors. Behind the rush of burger giants' costly cosmetic remodeling, lies a fear of being left behind (Nichols, 2013). Such a desperate situation facing the restaurant industry is well summarized in the following comment.

> "In the ailing restaurant industry, it's a game of market share in the U.S. With little room to open new restaurants in a country…, growth comes from stealing customers from one another" (Jargon, 2012 as cited by Gara, 2012).

Akdoğu and MacKay (2012) demonstrate that competitive market forces lead firms to coordinate investment. In their setting, firms tend to make similar investments when the risk of falling behind outweighs the cost of duplication. The restaurant industry is characterized with intense competition, low entry barrier (Zwolak, 2010), and short life cycle of product (Tse & Olsen, 1988). Switching cost of customers is also relatively low compared to other consumer service industries, such as banking and telephone communications. Thus, restaurant firms constantly invest and transform themselves in order to not be left behind in the saturated market (Nichols, 2013). By contrast, the cost of duplication is relatively low. Compared to manufacturing or high-technology industries of which capacity expansion is usually lumpy requiring huge capital commitment and a years-long construction period, opening a new restaurant can be done in a shorter time span with less cash.

> **H1**: A restaurant firm's investment is positively affected by the investment of its peers.

Individuals are more likely to imitate others when optimization is costly or time-consuming and their own information is noisy (Banerjee, 1992; Conlisk, 1980). Uncertainty makes it difficult for managers to assess the full range of possible situations and to predict the consequences of their decisions (Lieberman & Asaba, 2006). DiMaggio and Powell (1983) argue that uncertainty is a powerful force that encourages imitation. When an organization struggles with a problem with ambiguous causes or unclear solutions, problemistic search may yield a viable solution with little expense (Cyert & March, 1963). A line of research in asset pricing literature lends empirical support to the idea. Avery and Zemsky (1998) specify the dimensions of uncertainty and show that the herding behavior increases as each uncertainty dimension is added. Chan, Hwang, and Mian (2005) observe that mutual fund managers tend to show herding behavior when they lack reliable information about the stocks.

Chief executive officers interviewed by Daft, Sormunen, and Parks (1988) indicate customers, competitors, and economic sector impose the most considerable strategic uncertainty, which is measured in terms of importance, complexity and rate of change. The same paper also reports that the greater strategic uncertainty in environmental sectors, the more frequently managers scan them (Daft et al., 1988). High-performing firms show consistently high correlation between strategic uncertainty and scanning frequency. Daft et al. (1998) reveal that companies view competitors as a source of significant strategic uncertainty and routinely scan their behavior.

As managers perceive higher uncertainty in the competitor sector, they perform scanning more frequently. For these reasons, the second hypothesis is formulated as follows.

H2: The peer effect is more pronounced when uncertainty is high.

4.2.2 Identification of Peers

The Merriam-Webster defines a peer as "a person who belongs to the same age group or social group as someone else". Translated to a business nomenclature, peers broadly refer to organizations that operate in the same industry or market. In a narrower sense, peers would probably be regarded as a group of firms doing business in similar circumstances, such as serving similar groups of customers and deploying similar resources. Since firms situated in a similar environment are likely to evolve into competitors, this study relies on the literature for competitor identification and the situation of the restaurant industry in defining peers.

Chen (2006) defines competitors as "firms operating in the same industry, offering similar products, and targeting similar customers." Competitor identification involves classifying firms on the basis of relevant similarities. A variety of perspectives have been suggested to conceptualize the "similarities." For example, resource similarity or market commonality (Chen, 1996), the supply-based attributes (characteristics of firms) versus the demand-based attributes (characteristics of consumers) (Clark & Montgomery, 1999), and market-based and resource-based comparisons (Peteraf & Bergen, 2003).

This study defined quick-service restaurants (QSR), fast casual brands, and casual dining chains as the sample for testing peer effect. First of all, they compete against each

other for similar target customers. According to the industry report by Technomic, a Chicago-based market research firm, 85 percent of survey respondents reported that they visit fast-casual brands at least once a month, and 82 percent said they eat at casual-dining restaurants once a month (Technomic 2013 as cited by Brandau, 2013). That is, fast-casual brands and casual-dining chains are both available options for many customers. Particularly, when the economy collapses, many diners trade down for more affordable dining options; competition among the three segments is more intensified. Indeed, as casual-dining traffic counts declined considerably during and after the recent recession, QSRs and fast-casual brands were targeting the customers in limbo and trying to gain market shares. To attract the customers who are price-minded but concerned about the quality of food and environment at the same time, limited-service restaurants infused casual-dining traditions into their menu, dining-experience, and environment while maintaining key appealing features including convenience, efficiency, and affordability (Brandau, 2014c).

Strategic similarity increasingly observed in those three segments is another reason for the peer identification in this essay. Gimeno and Woo (1996) argue that inter-firm rivalry increases with the degree of strategic similarity and multimarket contact. Given the even level of multimarket contact, strategic similarity intensifies rivalry because strategic similarity is often associated with greater product substitutability (d'Aspremont, Gabszewicz, & Thisse, 1979) and the lack of unique resources. Explosive growth of the fast-casual segment has outshined the overall restaurant industry over the past few years. Total U.S. sales revenue of fast casual restaurants has consistently grown from to $30

billion in 2013, and is still pictured with rosy forecasts of a 26.7 percent of growth, reaching $38 billion in 2018 (Mintel, 2013). Inspired and partly threatened by the success of fast-casual restaurants, QSRs have been scrambling to adopt fast-casual concepts, such as healthful menus featuring low-calorie and high-protein items, customization options, and sophisticated décor (Mintel, 2013; Ries, 2013; Walkup, 2007). Casual dining restaurants have also aggressively penetrated this segment via diverse limited time offers and low-priced and small-portion menus (Mintel, 2013). A comment of a restaurant analyst manifests the tension in this segment, "Fast casual concepts have been stealing share from fast food and they have raised the bar for fast-food restaurants, which are trying to step up and compete," said Bonnie Riggs, restaurant analyst for NPD Group Inc. (Jargon, 2012). All the evidence implies that QSRs, fast casuals, and casual dining restaurants experience the isomorphic pressure.

Lastly, strategic movement is easily noticed and imitable in most cases. This means that innovative strategies can spread quickly and thus are likely to be institutionalized in a relatively short period. For instance, McDonald’s inventive introduction of breakfast items and coffee beverages was quickly copied by Burger King, Wendy’s, Jack in the Box and Taco Bell (Jennings, 2014). Renovation is no exception. Not only QSRs but also many casual dining brands have joined the rally of renovation to rejuvenate the brand and boost sales (Ruggless, 2012, 2013). New restaurant interior concepts and the news of remodeling projects and outcomes are quickly distributed through trade magazines and industry news media.

Lastly, size is considered as one more criterion of peer identification. Firm size has been regarded as an important characteristic in organizational research (Chen & Hambrick, 1995) and has been referred to as one of classification variables in strategic groups research (Lewis & Thomas, 1990). Clark and Montgomery (1999) reported that size was one of top ten attributes managers used in identifying competitors. To improve the similarity in size, the firms in the top and bottom deciles of the distribution of net sales revenue were excluded from the sample. This step decreased the variance of size from $2,860 to $469 million.

4.2.3 Motives for Following Peers

Mimetic isomorphism emphasizes the role of uncertainty as a strong facilitator of imitation (DiMaggio & Powell, 1983). Ambiguity and uncertainty surrounding goals or environments can lead organizations to model themselves on other organizations that they perceive to be successful. When uncertainty hinders a search for optimal solutions, imitating well-established institutions would fetch them legitimacy, which comes to be critical for organizational survival. Thus, the greater the need for legitimacy, the more prone is the organization to mimetic isomorphism.

It is likely that organizations with concerns for survival imitate successful competitors to achieve legitimacy and thereby get access to necessary resources. Firms that face immediate concerns for survival would put higher priority on legitimacy considerations than on efficiency considerations (Meyer & Rowan, 1977). When survival is less assured, the need to acquire critical resources can lead the firm to weigh and act on

certain imperatives, such as legitimacy, at the sacrifice of long-run efficiency (Martinez & Dacin, 1999). Similarly, Leary and Roberts (2014) argue that firms that have greater learning motives and perhaps greater need to earn reputation tend to follow successful leaders in setting capital structure. They found that less successful firms are sensitive to changes in capital structure of leaders but not vice versa.

In a similar vein, making decisions to expand or stay still is not always clear. Despite their logical appeal, it is a general notion that NPV and *q* theory do not come in handy for managers. For example, in case of NPV, it is not a simple task to estimate the future cash flow stream and relevant cost of capital of a particular project. Moreover, NPV does not take into consideration the value of real option attached to the project. When it comes to *q* theory, calculating the marginal market value to be created by a focal project is usually not feasible. Furthermore, stock prices can be contaminated by fads and bubbles. Such difficulty would be more prevalent amongst young, small, and less successful firms that probably do not have well-established process for investment decision making. Consequently, it is predicted that less successful firms would follow their successful peers in making investment decisions but not vice versa. Stated formally,

> **H3**: Less successful firms are responsive to the investment activity of successful peers but not vice versa.

The hypothesis testing results for **H1** and **H3** would cast light on the underlying reasons for peer effect. If the null hypothesis of only **H1** and not of **H3**, is rejected, competition-based view or managers' reputation concerns can explain the imitation

behavior. On the other hand, if both null hypotheses are rejected, learning or legitimacy-seeking motives would provide additional account for the mimicry.

4.2.4 Investment Outcomes of Peer-Sensitive Firms

So far it has been argued that restaurant firms' investments are influenced by those of peers. Managers would be left with a final question whether I should follow my peers or invest against the tide. Answering the question requires assessing the investment outcomes of peer-influenced group and of the counterpart. However, it is not a simple task to single out firms that *actually* follow other peer firms through an indirect approach using secondary data. This study gets around this problem by evaluating the investment outcomes of peer-sensitive and less sensitive firms, where the sensitivity is measured as correlation. Firms whose investment spending is influenced by their peers are likely to have a high correlation with that of peers, but the opposite does not necessarily hold. Therefore, by investigating the performance implications of investment of peer-sensitive and less-sensitive firms, the current study can indirectly examine the consequences of following peers.

Banerjee (1992) argues that herding behavior suppresses the use of personally-collected information and thus causes a reduction of informativeness, harming social welfare and impairing decision making. In this setting, society may benefit from businesses making individual decisions based on their own information gathering. Consequently, imitating behavior leads to inferior information aggregation and overall impaired decisions (Banerjee, 1992; Bikhchandani, Hirshleifer, & Welch, 1992; Welch, 1992). Lieberman and

Asaba (2006) argue that by reducing the variation in firms' strategies mimetic behavior inflates the collective risk of the industry when the environment is uncertain. Firms that pursue a differentiation strategy and market position can be insulated from the actions of rivals. This can lower the likelihood of mimicry and improve profitability.

Renovating or opening restaurants around the same time with competitors will increase competitive interference, diminishing the returns on investment. As previously mentioned, a significant number of QSRs and casual dining restaurants have carried out large renewal projects. The renovation concept is quite similar between brands: updated exteriors and modernized dining areas decorated with features such as wall-mounted TVs, Wifi and lounge seating (Nichols, 2013). The similarity of renovation designs across different chains may take away the limelight of each brand's fresh reimaged units, causing a detrimental effect on the effectiveness of investment (Burke & Srull, 1988). In addition, rivalry-based imitation raises the intensity of competition and reduces profitability (Barreto & Baden-Fuller, 2006; Deephouse, 1999). In a study that examines the branching behavior of the Portuguese banking industry, Barreto and Baden-Fuller (2006) found that mimetic branching imposes a negative effect on the profit margin.

H4: Investment of peer-sensitive firms is not as effective as that of less peer-sensitive firms.

4.3 Methodology

4.3.1 Estimating Peer Effect on Investment

The specification can be represented by the following investment model extended by the variables of demand uncertainty and peers' average investment:

$$INV_{i,t} = \alpha_i + \beta_1 \overline{INV}_{-i,t-1} + \beta_2 UNCER_{t-1} + \beta_3 Q_{i,t-1} + \beta_4 CF_{i,t-1} + \beta_5 INDGR_{t-1} + \beta_6 GDP_{t-1} + \varepsilon_{i,t} \quad \text{Eq. 4.1}$$

INV is the capital expenditure net of depreciation expense, scaled by total assets in the previous period; $\overline{INV}_{-i}$ is the average of the investment ratio of peers excluding that of the own firm; *Q* is the Tobin's *Q*, which is the market value of assets to the replacement cost. It was calculated following Chung and Pruitt (1994); *CF* is cash flow defined as the ratio of earnings before extraordinary items plus depreciation and minus dividends to the total assets in the previous period; *INDSG* is industry sales growth, which is the log difference of the U.S annual retail sales of limited-service eating places; *GDP* is the annual real GDP growth rate.

A major issue in assessing peer effect is to control for the possibility that the peer effect falsely picks up the impact of other investment determinants. Differently put, firms can make similar investments not because they imitate competitors but because they see similar opportunities. To prevent such "spurious" peer effect, this study included average *Q*, industry sales growth, and real GDP growth, all of which were to control the firm's investment opportunities. Theoretically, *Q* should capture all investment opportunities and challenges a firm is faced because the value of all information relevant to the firm, either

it is public or private, should be appropriately reflected in the firm's stock price (Fama, 1970; Tobin & Brainard, 1977). Nevertheless, two more filters were added, industry and GDP growth. They help to capture the investment opportunity that all firms face, and *Q* is to reflect residual firm-specific investment opportunities. Lastly, the model was augmented by *CF*, which was to control for the resource for investment.

Furthermore, additional moderating models were tested in order to check that demand uncertainty plays a role on peer-driven investment.

$$INV_{i,t} = \gamma_i + \beta_1 \overline{INV}_{-i,t-1} + \beta_2 UNCER_{t-1} + \beta_3 \overline{INV}_{-i,t-1} \times UNCER_{t-1} + \beta_4 Q_{i,t-1} + \beta_5 CF_{i,t-1} + \beta_6 INDGR_{t-1} + \beta_7 GDP_{t-1} + \varepsilon_{i,t} \quad \text{Eq. 4.2}$$

4.3.2 Motives for Following Peers

In reference to Leary and Roberts (2014), sample firms were classified into two groups, leaders and followers, according to three criteria: size, profitability, and *q*. More specifically, sample firms were divided into quintiles each year based on their ranking in the three performance measures: the top two quintiles were regarded as "leaders" and the bottom two deciles as "followers". Then, the investment rates of followers were regressed on those of leaders and vice versa.

$$FINV_{i,t} = \alpha_i + \beta_1 \overline{LINV}_{-i,t-1} + \beta_2 UNCER_{t-1} + \beta_3 Q_{i,t-1} + \beta_4 CF_{i,t-1} + \beta_5 INDGR_{t-1} + \beta_6 GDP_{t-1} + \varepsilon_{i,t} \quad \text{Eq. 4.3}$$

$$LINV_{i,t} = \alpha_i + \beta_1 \overline{FINV}_{-i,t-1} + \beta_2 UNCER_{t-1} + \beta_3 Q_{i,t-1} + \beta_4 CF_{i,t-1} + \beta_5 INDGR_{t-1} + \beta_6 GDP_{t-1} + \varepsilon_{i,t} \quad \text{Eq. 4.4}$$

FINV (*LINV*) is the investment rate of a firm in the follower (leader) group; $\overline{LINV}$ ($\overline{FINV}$) is the leader (follower) firm average investment rate.

4.3.3 Investment Outcomes of Peer-Sensitive Firms

The sensitivity of investment of the focal firm to its peers was captured by the correlation between the firm's investments at time *t* and its peers average investment rates at time *t-1*. Firms whose data points are less than five were excluded from the correlation calculation. Once the correlation coefficients were obtained for each firm, the sample firms were divided into three groups, and the firms on top (bottom) third are denoted as peer-sensitive (less peer-sensitive) firms. Based on the classification, a binary indicator is created.

$$PS\ (Peer\text{-}Sensitive)_{i,t} = \begin{cases} 1 & for\ peer\text{-}sensitive\ firms \\ 0 & for\ less\ peer\text{-}sensitive\ firms \end{cases}$$

To test whether there is a significant difference in the investment outcome, here it is market share, the following multiplicative interaction model is developed.

$$MS_{i,t} = \alpha + \beta_1 MS_{\mathrm{i},t-1} + \beta_2 INV_{i,t-1} + \beta_3 PS_{i,t-1} + \beta_4 PS_{i,t-1} \times INV_{i,t} + \beta_5 PROF + \beta_6 GDP + \varepsilon_{i,t} \quad \text{Eq. 4.5}$$

MS is expressed as a fraction and is calculated as the firm's sales revenue divided by the U.S. retail sales of food services and drinking places; and *PROF* is the operating profit margin, which is operating income after depreciation over sales revenue; *GDP* is the annual

real GDP growth. The subscript *i* indexes firms, and *t*, time. To mitigate skewness, the natural log-transformation was taken for the variables *MS* and *INV*.

To prevent the fixed-effect model automatically removing the effect of time-invariant regressors, the Hausman-Taylor estimator was used as in the first study (Hausman & Taylor, 1981).

4.4 Results

4.4.1 Descriptive Analysis

Table 4.1 presents summary statistics for the main variables. For descriptive purposes, natural (unlogged) numbers are reported for *INV* and *PEER*. The variable *PEER* has a smaller variance than *INV* because *PEER* is an aggregated investment rate of entire firms but the focal firm in the group. *PS* is the correlation between the investment rate of focal firm and its peers over the sample period. Firms whose data points are less than five were excluded from the correlation calculation. There is a large variation in *PS* from the lowest -0.959 to the highest 0.906.

Table 4.1 Summary statistics

	Obs	Mean	Std. Dev.	Min	Max
INV	999	0.089	0.132	-0.101	0.645
Q	994	2.687	3.636	0.020	19.445
CF	988	0.114	0.098	-0.431	0.333
PEER	999	0.053	0.025	0.013	0.107
MS	999	0.001	0.001	0.00009	0.008
PROF	999	0.066	0.064	-0.261	0.264
PS	84	0.186	0.496	-0.959	0.906

4.4.2 Main Results

The fixed effect regression results are summarized in Table 4.2. Coefficients and corresponding standard errors are reported. Column (1) and (2) show the baseline results. As expected, a focal firm's investment is negatively associated with demand uncertainty but positively with peer's investment. Even after controlling for industry expansion, economic growth and the firm's unique investment opportunities and financial resources, peer effect is significant, suggesting that sample firms adjust investment following their peers in the market.

Next the conditional effect of uncertainty was examined. Consistent with the hypothesis, a positive moderating effect of uncertainty is observed in column (3). The investment model results were also compared between the cases of high and low uncertainty in column (4) and (5). Observations in the top (bottom) third of uncertainty estimate distribution were assigned to the high (low) uncertainty group.

Table 4.2 Peer effect on investment

	(1)	(2)	(3)	(4) Low uncertainty	(5) High uncertainty
PEER		0.888***	0.764***	0.254	1.902***
		(0.178)	(0.186)	(0.498)	(0.575)
UNCER	-1.329***	-0.668**	-0.345	2.114	-0.698*
	(0.286)	(0.308)	(0.338)	(1.562)	(1.021)
PEER×UNCER			1.091**		
			(0.486)		
Q	.084***	0.098***	0.096***	0.303***	-0.006
	(0.030)	(0.029)	(0.029)	(0.079)	(0.090)
CF	0.613	0.805	0.872	0.590	-1.852
	(0.779)	(0.765)	(0.762)	(0.866)	(2.498)
INDGR	-6.537**	-6.333**	-11.649***	-23.596**	-21.685**
	(3.255)	(3.191)	(3.961)	(10.690)	(8.752)
GDP	0.452	4.509	7.988**	-21.312	33.349***
	(3.464)	(3.494)	(3.807)	(21.293)	(9.054)
cons	-3.110***	-3.231***	-2.941***	0.015**	-1.443***
	(0. 118)	(0.124)	(0.142)	(1.003)	(0.472)
F-value	6.61***	10.78***	10.05***	3.30***	4.86***
obs	519	518	518	139	127

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level. Numbers in parentheses are the standard error of the coefficients.

In column (4), the *PEER* coefficient is insignificant, meaning that sample restaurant firms do not pay much attention to peers' movement if the market demand is moderately uncertain. The significant coefficient of *Q* indicates that investments are made based upon the firm's investment opportunities. Conversely, when uncertainty is considerably high,

sample firms become highly responsive to peer investment behavior. The fact that *Q* loses its statistical significance implies that traditional determinants of investment may be of little use in explaining investment behavior when managerial decisions are tainted by substantial uncertainty. All in all, the results support that uncertainty prevalent in the industry works as a strong motive to imitate peers.

To examine the motive behind the peer effect, the analysis was rerun using the sample of leaders and followers. Identification of leaders and followers is based on three criteria: market share, profitability and *Q*. For each year, this study ranked sample firms based on their market share and assigned those firms in the top two quintiles as leaders and those in the bottom two as followers. The same procedure was repeated in terms of profitability and *Q*. Table 4.3 presents descriptive summary for leaders and followers. Leaders are commonly marked with larger market share, higher profitability, *Q* and cash flow. The only factor the three criteria do not agree is investment. While leaders based on profitability and *Q* make more investments than followers, market share leaders appear to make less investment. It is probably because several rising stars with small market share but armed with superior margins and growth prospect are aggressive in investment activities.

Table 4.3 Descriptive statistics for leaders and followers

		M/S		Profitability		Q	
		Leader	Follower	Leader	Follower	Leader	Follower
INV	Mean	-2.885	-2.476	-2.468	-2.745	-2.419	-2.836
	Med	-2.705	-2.320	-2.344	-2.648	-2.272	-2.706
	obs	391	340	455	302	432	324
M/S	Mean	0.0065	0.0002	0.0052	0.0009	0.0047	0.0007
	Med	0.0030	0.0002	0.0018	0.0003	0.0019	0.0003
	obs	531	532	532	528	528	523
PROF	Mean	0.094	0.028	0.125	0.003	0.094	0.034
	Med	0.084	0.036	0.107	0.020	0.091	0.037
	obs	531	532	553	554	546	547
Q	Mean	4.137	1.643	4.589	1.347	5.787	0.567
	Med	2.876	0.728	3.112	0.757	4.159	0.567
	obs	527	521	548	543	546	547
CF	Mean	0.130	0.086	0.161	0.047	0.148	0.081
	Med	0.133	0.109	0.167	0.071	0.166	0.096
	obs	509	495	513	527	506	528

Once leaders and followers were defined, the investment rates of followers were regressed on the average investment rate of leaders and vice versa in order to see whether each group is sensitive to the counterpart's investment activity. The results are reported in Table 4.4.

Table 4.4 Who follows whom?

	Market share		Profitability		Q	
	Leader	Follower	Leader	Follower	Leader	Follower
Leader		0.758***		0.637**		0.290**
		(0.243)		(0.276)		(0.131)
Follower	0.349***		0.110***		0.112**	
	(0.090)		(0.033)		(0.047)	
UNCER	-0.333	0.032	-1.182***	-0.993	-0.680*	-1.038*
	(0.411)	(0.551)	(0.393)	(0.711)	(0.401)	(0.548)
Q	.051	0.151*	-0.018	0.204**	0.038	-0.714
	(0.042)	(0.088)	(0.032)	(0.087)	(0.030)	(0.558)
CF	4.559***	2.950***	-0.127	3.093***	2.523	3.054*
	(1.565)	(1.078)	(1.641)	(1.065)	(1.575)	(1.715)
INDGR	-7.042*	-9.300	-5.860	-3.313	-7.069	-22.817***
	(4.119)	(6.879)	(4.119)	(8.485)	(5.174)	(6.466)
GDP	1.798	6.987	3.370	-7.829	6.870*	0.415
	(3.842)	(7.256)	(4.003)	(8.719)	(3.883)	(7.303)
cons	-2.868***	-0.734	-2.427***	-1.238***	-3.184***	-1.139***
	(0. 159)	(0.477)	(0.129)	(0.384)	(0.130)	(0.345)
F-value	7.07***	4.00***	7.72***	3.75***	3.89***	4.65***
obs	249	192	189	117	203	158

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level. Numbers in parentheses are the standard error of the coefficients.

According to the results, both groups are sensitive to each other's investment activity. Regardless of performance level, restaurant firms appear to affect and be affected by one another's behavior, and this means that the null **H3** is rejected. The fact that the leader group's investment is still influenced by the follower group suggests that even

superior performers are concerned with maintaining the quality and size of their facilities at par with others and protecting their market share.

Table 4.5 Investment effect on market share of peer-sensitive firms

	(1)	(2)	(3)
MS_{t-1}	0.719***	0.820***	0.808***
	(0.027)	(0.015)	(0.015)
INV		0.041***	0.063***
		(0.006)	(0.010)
PS		0.138**	0.158**
		(0.060)	(0.063)
INV×PS			-0.036***
			(0.012)
PROF	0.502*	0.214	0.215
	(0.293)	(0.195)	(0.193)
GDP	-0.528	-0.167	-0.054
	(0.486)	(0.398)	(0.395)
cons	-1.957***	-1.289***	-1.385***
	(0. 112)	(0.122)	(0.125)
	F (Prob.>F)	chi^2 (Prob.>chi^2)	
	241.00***[a]	3525.68***	3573.43***
obs	558	419	419

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level. Numbers in parentheses are the standard error of the coefficients.

[a] Because the Hausman-Taylor requires at least one time-invariant variable in the model, it cannot be used for the base model with only control variables. Here the fixed-effect model with AR (1) is employed.

Table 4.5 shows the estimated coefficients of Eq. 4.5. In column (2), the main effects are reported. Investment and peer-sensitive indicator are both positively associated

with market share. That means firms whose investment is relatively more sensitive to competitors tend to be larger firms. The moderating effect of peer-sensitivity of investment is presented in column (3). The interaction coefficient of *INV*PS* is negatively significant, suggesting that the positive effect of investment on market share is smaller for peer-sensitive firms. That is, firms whose investment spending moves together with that of rivals yield a smaller investment return than firms whose investments are less sensitive to peers.

4.5 Conclusion

This study purports to examine the peer effect on corporate investment in the restaurant industry. Consistent with the hypotheses, restaurant firms appeare to be influenced by their peers in making investments. After controlling for the effect of *Q*, cash flow and industry and economy growth and, the so-called peer-effect emerges as significant. That is, firms make investment decisions based not only on investment opportunities and resources they have but also on peers' investments. The results further reveal that uncertainty is a powerful force that leads firms to follow peers in making investments.

Additional tests were performed to identify the underlying motives for mimicking investment behavior. The results reveal that mimetic behavior does not work in one direction but rather in bilateral direction. This implies that the mimicry is not driven by learning motives or legitimacy-seeking of less successful players but rather by competitive motives of firms.

Lastly, this study tested the performance implications of investments by peer-sensitive firms; whether they make better investment decisions. The results suggest that investment of peer-sensitive firms is not as effective as that of less-sensitive firms in growing market share. Opening or renovating restaurants simultaneously with rivals can increase the competitive interference among the brands, and thus may erode the profitability of investment. This finding, combined with the results associated with **H3**, suggests that investment driven by a competitive motive can produce poor returns. This is in line with extant research that argues the risk of "hop on an investment bandwagon" (Barreto & Baden-Fuller, 2006; Grundvåg Ottesen & Grønhaug, 2006). There is a caveat related to the methodology, however. Here the peer sensitivity was captured by correlation in a sense that firms following peers are likely to have a high correlation with them. However, the opposite is not necessarily true. Therefore, the current analysis can offer a glimpse of the consequences of following peers but does not allows us to reach a definitive statement.

With regards to this finding, it is worth noting a pitfall of following peers. In 2000's most well-known QSR brands competitively carry out large-scale renovation projects, a convincing example of peer effect. In 2015, Wendy's sued DavCo, the fourth largest franchisee, over its refusal to renovate restaurants. DavCo files counterclaim arguing that the franchisor's "Image Activation" program is economically infeasible. DavCo claims that remodeling may create a jump in sales right after re-opening but has failed to yield sustained return on investment. Moreover, the fact that there have been eight different remodel designs only in four years since the onset of the renovation project implies that

the reimaging initiative had been made in a hasty manner rather than being a well-thought-out plan (Maze, 2015). This case raises another research topic of worth exploring; examine how the return on investment has evolved with time and whether it is a sustainable strategy in the long run.

The findings deepen our understanding about the investment behavior of restaurant firms under uncertainty. This study casts some light on the human factor of corporate investment decisions, which has not attracted much attention from hospitality finance literature. In addition, it contributes to the line of research on managerial decision making. For example, Tversky and Kahneman (1974) discussed heuristics and biases that are used by individuals to make decisions under uncertainty, challenging the economists' long-standing belief in the rational agent. The peer effect observed in the current study provides another piece of evidence for managers' bounded rationality.

In testing the peer effect, the current study took an indirect approach using the secondary data rather than conduct a direct observation of imitating behavior. Although well-known investment determinants were controlled, the possibility cannot be completely ruled out that the peer variable might spuriously capture other residual investment opportunities. Thus, researchers interested in imitating behavior among businesses may find real settings in which they can directly monitor a mimicking behavior.

CHAPTER 5. FINANCIAL IMPLICATIONS OF INVESTMENT UNDER DEMAND UNCERTAINTY

5.1 Introduction

As previously argued, delay or retreat of investment is a common approach taken by firms facing demand uncertainty. In fact, in the face of the recent economic turmoil, capital expenditure in the restaurant industry plummeted to a record-low level (Lockyer, 2009). However, is this truly the best policy to be pursued?

Uncertainty poses a dilemma for businesses: whether to cut costs and investment to protect survival in the short-term at the sacrifice of future returns or to maintain (or increase) investment at the risk of liquidity deficit, hoping to occupy an advantageous position once the demand bounces back (Silberston, 1983). One line of research that deals with retrenchment points out the aftermath of retrenchment strategy. By reducing or forgoing investment projects, firms run the risk not only of losing market share to competitors but also of threatening foundations for future growth. In a similar vein, another line of research argues about the strategic value of proactive investment. Firms that regard crises as opportunities and undertake proactive investment can expand their businesses and strengthen their competitive advantages over weaker rivals, who are waiting for the recession to pass.

In the line of this reasoning, this final essay examines the effectiveness of investment made under uncertainty. More specifically, it aims at providing theoretical and empirical implications and the long-term performance consequences of investment made under demand uncertainty in terms of growth in sales, market share, and profit margin.

5.2 Theoretical Background and Hypotheses

5.2.1 Financial Implication of Investment Under Uncertainty

Although there are no direct empirical findings about demand uncertainty and the effectiveness of investment, given that economic uncertainty rises in recessions and falls in expansions (Bloom, 2014), the literature on countercyclical effectiveness of investment indirectly offers a theoretical background.

Retrenchment strategies involve cutting costs or trimming noncore assets (Kitching, Blackburn, Smallbone, & Dixon, 2009). Studies indicate that retrenchment is a typical response to performance declines (Denis & Kruse, 2000; Geroski & Gregg, 1997; Robbins & Pearce, 1992). Declining firms initially need to retrench to stabilize declining performance with the objective of sustaining the firm's survival and attaining positive cash flows (Robbins & Pearce, 1992). Shrinking investment might enhance liquidity over the short run, but is not a panacea. Scholars have noted the long-term hazard of cutback initiatives. By disposing of assets or forgoing investment plans, firms risk losing the foundations for growth for post-recession expansion.

Geroski and Gregg (1997) found that firms that implemented cutting back practices or abandoned their investment plans were hit harder and experienced greater difficulties during recovery. In contrast, firms that engaged in new product development, process innovation and training to solidify their competitive strengths outperformed rivals. Similarly, Accenture, a market research firm, reported that the top performers in the period following the early-1990s recession were those who made strategic investments, developed new market or customer niches, and experimented with new business models (Accenture, 2003).

Srinivasan, Rangaswamy, and Lilien (2005) proposed a concept of proactive investment, which is the development and execution of investment initiatives in downturns as the reflection of the firm's interpretation of recession as an opportunity to strengthen and establish their advantages over weaker competitors. They examined the antecedents and consequences of proactive investment in terms of marketing, and found that firms that have a proactive marketing response in a downturn achieve superior performance even before the downturn ends. Similarly, other scholars observe firms that have a strategic emphasis on proactive marketing and R&D achieve superior business performance after, even during, the recession (Andras & Srinivasan, 2003; Deleersnyder, Dekimpe, Steenkamp, & Leeflang, 2009; Steenkamp & Fang, 2011).

In addition, the production cost falls along with decreases in demand for investment activities. For example, during the recent economic turmoil, rents dropped nearly 66 percent in prime locations (Schrambling, 2009). Moreover, as the average chef salary decreased 4–16 percent in 2007–2009 (Bell & Martinelli, 2010), restaurant owners could

tap a huge pool of talented chefs who were willing to work at a lower wage and gain the upper hand in negotiations with service vendors (Schrambling, 2009).

Capital investment in the restaurant industry mostly involves construction, acquisition, maintenance, and refurbishing of restaurants. Other capital expenditures include investments in information technology systems and production facilities. It has been argued that the physical environment plays a pivotal role in restaurant patrons' emotions (Jang & Namkung, 2009; Liu & Jang, 2009), perceived value (Jang & Namkung, 2009; Liu & Jang, 2009), brand image (Ryu, Lee, & Kim, 2012), and behavioral intention (Auty, 1992). Don Thompson, the Chief Executive Officer of McDonald's Corp succinctly puts the importance of physical atmosphere "The look and feel of the restaurants has a more significant impact on the brand in the near-term … People eat with their eyes first" (Gasparro, 2012b). Alex Macedo, the president of Burger King's North American system, said "We recognize that when our guests drive down the street today, they have many dining options … In a competitive market, having a fresh new image is one of the main ways we can differentiate ourselves" (Brandau, 2014a). Taken together, these findings suggest that remodeling can be an effective tool for differentiating brands and increasing the value of the dining experience. Such reimaging efforts would be more easily noted in times of high uncertainty when competition interference is reduced as most companies shrink capital expenditure (Danaher, Bonfrer, & Dhar, 2008).

H1: As the level of uncertainty increases, firms that increase the level of investment would experience better operating performance compared with when they do in times of low uncertainty.

5.2.2 Moderating Effect of Financial Constraint

We have reviewed academic findings of countercyclical effectiveness of investment. However, is this argument applicable for firms with different conditions? Probably not. For financially constrained firms such claim may sound like a luxury. It may be a better choice for them to delay investment projects and reserve funds to get ready for worse scenarios that might happen.

In the face of demand shocks, financially constrained firms would be more passive and defensive due to the risk of bankruptcy. Chevalier and Scharfstein (1996) indicate that firms with high financial leverage tend to shrink investment for building long-term market share in response to negative shocks to demand because of greater probability of default while less constrained firms become aggressive in investment to take advantage of the situation. Investigating the causal relationship between capital structure and pricing behavior in the supermarket industry during the recession in early 1990's, Chevalier and Scharfstein (1996) found that national chains (less financially constrained) dropped product prices to a greater extent than local or regional chains (relatively more constrained). Rather, highly leveraged chains increased prices to boost short term profits, resulting in countercyclical markups. The fact that financially constrained firms become passive in investment implies that the attractiveness of investment may dissipate in financially fragile firms.

From the liquidity management perspective, making investments is associated with increased default risk. Acquisition or construction of new restaurants and remodeling of existing outlets usually require long-term planning, and execution and commitment of

sizable financial resources. Under the U.S. GAAP, capital expenditure is capitalized and depreciated over the life of the asset, leading to an increase in operating leverage *ceteris paribus*. Moreover, given that restaurant firms tend to finance their capital requirements largely via cash from operations (Basham, 2009) or long-term debt (Jang & Ryu, 2006), capital expenditures are likely to increase financial burden. When the future prospect of the market is foggy, maintaining operational and financial flexibility are considered key objectives (Denis, 2011; Grewal & Tansuhaj, 2001). Thus, extending rigidity of operating leverage and capital structure in the presence of uncertainty may result in greater default risk.

Arguably, the less confident (more uncertain) about the future, the greater the need for flexibility (Jones & Ostroy, 1984). Jones and Ostroy (1984) demonstrate that in the presence of uncertainty the preference for cash surpasses that for any other type of assets even when money is dominated by all other assets in terms of return and the reversing cost of illiquid assets is modest. Particularly, a thirst for liquidity is strong in the foodservice industry. Parsa, Self, Njite, and King (2005) argue that early failure of restaurants is partly attributed to the lack of resources that allow them to be flexible and adapt to changing environments. Moreover, most restaurant businesses operate with a thin level of working capital and large amount of short-term debt (Mun & Jang, 2015). Given the evidence, it is predicted that the value of investment would depend on the financial status of the company. Formally put, the effectiveness of investment will not be as high for financially constrained firms as for non-financially constrained firms due to the increased default risk involved with investment spending.

H2: For financially constrained restaurant chains, it is lower the positive interaction effect of demand uncertainty and investment on the firm's operating performance.

5.3 Methodology

5.3.1 Variables

5.3.1.1 Investment Outcomes

This study has argued that firms making investments when others retreat can pull ahead competitors, suggesting that uncertainty increases the strategic value of investments. The strategic value can be measured in the context of relative performance. Under imperfect competition, the commitment of an irreversible investment creates a preemptive effect, which is discouraging entrants and new investments of competitors, leading to a gain in market share (Gilbert, 1989). Market share reflects relative performance among firms and the competitive position of the focal firm within the particular industry. In an extreme case it is possible to record an increase in market share even when sales growth is negative if the entire industry suffers from decreasing demand. Market share is expressed as a fraction and is calculated as the firm's sales revenue divided by the U.S. retail sales of food services and drinking places.

$$MS_{i,t} = \frac{Sales\ revenue_{i,t}}{Industry\ sales\ revenue_t} \qquad \text{Eq. 5.1}$$

Another measure of investment effect is operating profit margin. Companies can take advantage of low investment costs in times of increasing uncertainty as the demand for investment dwindles. This cost-saving effect would manifest as a form of reduced depreciation expense, leading to an improved bottom line. However, because most firms adopt the accelerated-depreciation method (Jagels & Ralston, 2007), it would probably take time for the cost-saving effect to materialize.

$$PROF_{i,t} = \frac{Operating\ income\ after\ depreciation_{i,t}}{Net\ Sales\ Revenue_{i,t}} \qquad \text{Eq. 5.2}$$

5.3.1.2 Financial Constraint

Extant literature has relied on individual firm's susceptibility to capital market imperfections as a classification scheme for financially constrained firms (Cleary, 2006). Whited-Wu (WW) index, proposed by Whited and Wu (2006), is a weighted sum of ratios to estimate the degree of external financing constraint. The higher the index, the more difficult the firms to obtain external financing.

$$\begin{aligned} WW\ index_{i,t} = {} & -0.091 \times \frac{Cash\ flow_{i,t}}{Total\ assets_{i,t}} - 0.062 \times DIV_{i,t} + 0.021 \\ & \times \frac{Long\ term\ debt_{i,t}}{Total\ assets_{i,t}} - 0.044 \times Ln\left(Total\ assets(\$mil)_{i,t}\right) + 0.102 \\ & \times \left(Industy\ sales\ growth_{t}\right) - 0.035 \times \left(Sales\ growth_{i,t}\right) \end{aligned} \qquad \text{Eq. 5.3}$$

5.3.2 Models

To test **H1**, the following models were created.

$$MS_{i,t} = \alpha + \beta_1 INV_{i,t-1} + \beta_2 UNCER_{i,t-1} + \beta_3 INV_{i,t-1} \times UNCER_{i,t-1} + \beta_4 PROF_{i,t-1} + \beta_5 LEV_{i,t-1} + \beta_6 INDGR_{t-1} + \epsilon_{i,t} \quad \text{Eq. 5.4}$$

$$PROF_{i,t} = \alpha + \beta_1 INV_{i,t-1} + \beta_2 UNCER_{i,t-1} + \beta_3 INV_{i,t-1} \times UNCER_{i,t-1} + \beta_4 SIZE_{i,t-1} + \beta_5 INDGR_{t-1} + \epsilon_{i,t} \quad \text{Eq. 5.5}$$

Then, the models were expanded to further consider the role of financial constraint.

$$MS_{i,t} = \alpha + \beta_1 INV_{i,t-1} + \beta_2 UNCER_{i,t-1} + \beta_3 WW_{i,t-1} + \beta_4 (INV_{i,t-1} \times UNCER_{i,t-1}) + \beta_5 (UNCER_{i,t-1} \times WW_{i,t-1}) + \beta_6 (WW_{i,t-1} \times INV_{i,t-1}) + \beta_7 (INV_{i,t-1} \times UNCER_{i,t-1} \times WW_{i,t-1}) + \beta_8 PROF_{i,t-1} + \beta_9 LEV_{i,t-1} + \beta_{10} INDGR_{t-1} + \epsilon_{i,t} \quad \text{Eq. 5.6}$$

$$PROF_{i,t} = \alpha + \beta_1 INV_{i,t-1} + \beta_2 UNCER_{i,t-1} + \beta_3 WW_{i,t-1} + \beta_4 INV_{i,t-1} \times UNCER_{i,t-1} + \beta_5 UNCER_{i,t-1} \times WW_{i,t-1} + \beta_6 WW_{i,t-1} \times INV_{i,t-1} + \beta_7 INV_{i,t-1} \times UNCER_{i,t-1} \times WW_{i,t-1} + \beta_8 SIZE_{i,t-1} + \beta_9 INDGR_{t-1} + \epsilon_{i,t} \quad \text{Eq. 5.7}$$

MS is the market share; *INV* is the capital expenditure net of depreciation expenses divided by total assets in the previous period; *UNCER* is the industry-wide demand uncertainty; *WW* is the Whited-Wu index; *PROF* is the operating margin, which is operating income after depreciation over sales revenue; *LEV* is the long-term debt leverage over the total

assets; *SIZE* is the net sales revenue on a log scale; *INDGR* is the annual industry sales growth. The subscript *i* indexes firms, and *t*, time. To improve the normality of the series, the natural log-transformation was taken for the variables *MS, INV,* and *UNCER.* Along with the interaction models above, baseline and two-way interaction models were tested as well.

Wooldridge test for autocorrelation in panel data indicated that the disturbance term is first-order autoregressive. Therefore, to address the unobserved firm-specific effects and the autocorrelation in error terms, the equations were estimated using fixed-effect regression with AR (1) disturbances (Baltagi & Wu, 1999).

5.4 Results

5.4.1 Descriptive Analysis

Table 5.1 presents summary statistics for the main variables. For descriptive purposes, natural (unlogged) numbers are reported for *INV* and *UNCER*. The average market share of restaurant chains is 0.3 percent. Even the largest is 5.5 percent, implying that the U.S. restaurant industry is highly fragmented among public chains and a number of local restaurants. On average, U.S. restaurant firms spend 7.7% of the amount of total assets as capital expenditure.

Table 5.1 Summary statistics

	Obs	Mean	Std. Dev.	Min	Max
MS	1562	0.003	0.007	0.00002	0.055
PROF	1628	0.061	0.073	-0.261	0.264
INV	1533	0.077	0.129	-0.101	0.645
UNCER	1562	0.301	0.100	0.182	0.579
WW	1537	0.396	0.092	0.145	0.597
SIZE	1628	5.508	1.644	-.708	10.244
LEV	1622	0.247	0.314	0	1.308
INDGR	906	0.038	0.327	-2.103	1.181

Table 5.2 summarizes the pairwise correlation coefficients between variables. First of all, *UNCER* is negatively correlated with *INV*, as expected. The intriguing point is that *UNCER* has a positive association with market share (*MS*). Given that the sample firms are public restaurant chains, it can be interpreted as small, nonpublic restaurants are hit relatively harder by demand uncertainty than their large, public counterparts. The dampening effect of uncertainty on growth can be found in the negative correlation between *UNCER* and market share growth (Δ*MS*). *UNCER* has a positive association with *PROF*. Though the results are not reported here, to identify the reason for this seemingly puzzling outcome, it was calculated the correlation between *UNCER* and gross margin, operating expense ratio, and depreciation expense ratio. The results showed that there is a negative correlation between *UNCER* and sales, general, and administrative expense ratio. What this indicates is that in the face of demand uncertainty restaurant firms cut their

marketing and administrative expenses first to protect the bottom line, consistent with previous research (Deleersnyder et al., 2009; Steenkamp & Fang, 2011).

Table 5.2 Correlation matrix

	UNCER	INV	MS	ΔMS	PROF	WW	LEV	SIZE
INV	-0.260***							
MS	0.169***	-0.141***						
ΔMS	-0.138***	0.415***	-0.074**					
PROF	0.061**	0.053*	0.495***	0.096***				
WW	-0.238***	0.128***	-0.903***	-0.037	-0.589***			
LEV	0.026	-0.185***	0.212***	-0.148***	0.122***	-0.066***		
SIZE	0.282***	-0.205***	0.984***	-0.102***	0.482***	-0.911***	0.211***	
INDGR	-0.347***	0.099***	-0.056**	0.018	0.023	0.044*	-0.034	-0.080***

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level.

The negative correlation between *MS* and *INV* suggests that large firms tend to spend a smaller fraction of their resources in investment. This can be explained by the fact that large and well-known restaurant chains are heavily engaged in franchising. Because it is franchisees who are mainly responsible for capital investment, franchisors exhibit a lower investment rate than nonfranchisors. Investment is positively correlated with the Whited-Wu index. The WW index has three components associated with leverage, liquidity, and dividend payment. Given that making investment inevitably entails cash outlay or issuance of new debt, it is not surprising to observe a positive

association between them. *WW* is negatively related to *UNCER*, indicating that it is more difficult to get access to external capital when the environment is uncertain.

5.4.2 Main Results

Table 5.3 reports the effects of uncertainty, investment, and financial constraint on market share. Panel A presents the test results of the two-way interaction between uncertainty and investment. As expected, *INV* has a positive but *UNCER* has a negative impact on market share. Consistent with **H1**, the interaction term is significantly positive, indicating that firms making investments in times of high uncertainty reach a larger market share than when they do in times of low uncertainty.

In Panel B, the role of financial constraints is factored in. In column (3), the main effect of *UNCER*, *INV*, and financial constraint (*WW*) are examined. As expected, *INV* has a positive but *UNCER* and *WW* have a negative impact on market share. The negative coefficient of WW is in line with Chevalier and Scharfstein's (1996) finding that during a recession financially constrained firms get cold feet for fear of default and lose market share to less-constrained firms.

Two-way interaction model results are shown in column (4). Only the *INV*×*UNCER* has a positively significant coefficient. The three-way interaction term in the full model, shown in column (5), is negatively significant. Given that the *WW* measures the extent to which a firm is financially constrained, the negative coefficient means that the positive interaction effect of *UNCER* and *INV* is reduced for financially constrained firms.

Table 5.3 Effects of investment, uncertainty and financial constraint on market share

DV: Market Share	Panel A		Panel B		
	(1)	(2)	(3)	(4)	(5)
INV	0.133***	0.137***	0.142***	0.143***	0.129***
	(0.020)	(0.021)	(0.023)	(0.023)	(0.024)
UNCER	-0.418***	-0.358***	-0.560***	-0.525***	-0.547***
	(0.111)	(0.113)	(0.114)	(0.124)	(0.124)
WW			-7.653***	-7.890***	-8.112***
			(0.897)	(0.900)	(0.908)
INV×UNCER		0.164***		0.194***	0.174***
		(0.057)		(0.065)	(0.065)
UNCER×WW				-1.140	-2.059*
				(1.096)	(1.186)
WW×INV				0.014	0.041
				(0.268)	(0.267)
INV×UNCER×WW					-1.596**
					(0.788)
PROF	-3.819***	-3.545***	-6.486***	-5.922***	-5.919***
	(0.739)	(0.759)	(0.855)	(0.865)	(0.863)
LEV	-0.521**	-0.508**	-0.576**	-0.539**	-0.575**
	(0.221)	(0.223)	(0.230)	(0.230)	(0.230)
INDGR	-9.123***	-9.772***	-11.607***	-12.091***	-12.133***
	(1.169)	(1.193)	(1.316)	(1.328)	(1.324)
cons	-6.200***	-6.171***	-6.071***	-6.083***	-6.080***
	(0.034)	(0.036)	(0.052)	(0.054)	(0.054)
F-value	33.99***	30.44***	44.98***	31.79***	29.12***
obs	790	790	788	788	788

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level. Numbers in parentheses are the standard error of the coefficients.

Table 5.4 Effect of investment, uncertainty and financial constraint on profit margin

DV: PROF	Panel A		Panel B		
	(1)	(2)	(3)	(4)	(5)
INV	0.002*	0.002	0.002**	0.002*	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
UNCER	0.006	0.003	0.005	0.001	0.002
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
WW			0.051	0.032	0.041
			(0.044)	(0.044)	(0.045)
INV×UNCER		-0.007**		-0.008***	-0.008**
		(0.003)		(0.003)	(0.003)
UNCER×WW				-0.032	0.002
				(0.052)	(0.056)
WW×INV				-0.028**	-0.029**
				(0.013)	(0.013)
INV×UNCER×WW					0.058
					(0.039)
SIZE	0.004*	0.003	0.006**	0.006**	0.006**
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
INDGR	0.076	0.097	0.072	0.097	0.100
	(0.073)	(0.073)	(0.070)	(0.071)	(0.071)
cons	0.047***	0.049***	0.034***	0.034***	0.034***
	(0.009)	(0.009)	(0.008)	(0.009)	(0.008)
F-value	2.42**	3.06***	2.89**	2.83***	2.76***
obs	793	793	788	788	788

Note: ***: significant at 0.01 level; **: significant at 0.05 level; *: significant at 0.1 level. Numbers in parentheses are the standard error of the coefficients.

In Table 5.4, the estimation results of Eq. 5.5 and 5.7 are reported. What attracts our attention is the negative coefficient of *INV×UNCER* in column (2). Fixed investment incurs depreciation expense, which is usually large at first and decreases over time according to the accelerated-depreciation method. When consumers refrain from dining out, a substantially increased depreciation expense from a new investment, combined with falling revenue, can hammer the bottom line.

Panel B presents the three-way interaction model results. In column (4), in addition to *INV×UNCER, WW×INV* is also negatively related to *PROF*. This indicates that for financially constrained firms the positive impact of investment on profit margin is less than for less-constrained firms. When it comes to the three-way interaction effect, the negative moderating effect of uncertainty on the effectiveness of investment does not depend on the firm's financial constraint status.

5.5 Conclusion

The final essay analyzes the financial implications of investment made under uncertainty. The results partially confirmed the hypotheses. There is a positive moderating effect of demand uncertainty on the investment's impact on market share. That is, the firms undertaking investment under increasing uncertainty gain a larger market share than when the uncertainty level is relatively low. This shows that well-targeted investments can help firms turn crisis into opportunity to pull ahead of competitors who retreat in the face of uncertainty. However, as far as profit margin is concerned, making fixed investment in

times of high uncertainty appears to be detrimental to the bottom line. Regardless of sales volume, fixed assets incur depreciation expenses, which are usually high at the early stage of the useful life of the asset. Combined with dwindling sales, capital investment decreases the operating profit margin in the following year.

Next, this study further considers the impact of financial constraint. Here, financial constraint indicates how difficult it is to obtain external financing. Construction and remodeling of restaurants usually require the commitment of sizable financial resources, and thus likely increase financial burden. Because of the increased financial risk involved with investment spending, it was hypothesized that the effectiveness of investment would be lower for financially constrained firms than for non-financially constrained firms. The findings reveal that for financially constrained firms, increasing investment when demand is uncertain results in a lower market share than for relatively less constrained firms.

The findings provide several implications for practitioners. Considering the chances hidden in uncertain times as hinted by this study, they should develop strategies to find the opportunities and take advantage of tough times. Nevertheless, given that investment can hurt profit margins in uncertain times, managers should design investment plans in a way that can minimize the adverse impact of depreciation expenses on the profit rate. For example, to protect the profit margin from adverse shocks to sales, it is important to have a high proportion of variable costs relative to fixed costs. Because variable costs are linked to sales volume, the profit margin of companies with a high level of variable costs compared to fixed costs is generally less volatile (Jagels & Ralston, 2007). In this regard, designing a restaurant concept that has a relatively higher portion of variable costs

relative to fixed costs cannot only instill flexibility in the investment project but also preserve the profit margin. It is also recommended to find high-impact elements that can deliver a larger payoff. In addition, the management of financially vulnerable firms should carefully calculate direct and indirect costs of investment beforehand. Indirect costs include potential increased default risk and return of other options, such as reserving cash internally or investing in financial assets.

Given that the data are from the U.S. restaurant industry, the results and discussions cannot be generalized without caution to other countries in different economic situations from the United States. For example, Japan had experienced an unprecedented long economic slump over two decades after the collapse of asset price bubbles within the Japanese economy. In such a prolonged depression being proactive may entail more risk and uncertainty, which might put the firms on the verge of default. Therefore, more studies performed in different countries are warranted to further investigate complex implications of the interplay between uncertainty, economy, and investment.

For future studies, it is worthwhile to examine what causes a difference in a company's stance on uncertainty. While some firms take aggressive actions for the future, other firms exhibit a passive and cautious movement in the face of the same degree of uncertainty. What drives them to behave differently? What are the long-term consequences? Answers to these questions would enhance our understanding of the restaurant firms' growth strategy and uncertainty management.

CHAPTER 6. CONCLUSION

6.1 Conclusions

Uncertainty arises when imperfect knowledge makes it difficult to predict the future (Beckman et al., 2004). The instability and unpredictability inherent in consumer taste and preferences renders "demand uncertainty" as a consistent "source of uncertainty" (March, 1978). The competitive market nature, however, does not allow much room to control price in response to fluctuating demand, implying that the restaurant business is exposed to demand uncertainty. Indeed, the hospitality industry is known to have a high demand uncertainty (Dyer, Furr, & Lefrandt, 2014). Nevertheless, this issue has not received due attention from the hospitality field. As an attempt to investigate the impact of demand uncertainty in the restaurant industry, this study examines the implications of demand uncertainty for capital investment.

The first essay investigated the effect of demand uncertainty on capital investment in the restaurant industry. Consistent with extant literature rooted in the concept of investment irreversibility and real option, the results confirmed a dampening impact of demand uncertainty on investment. Restaurant firms postpone fixed investments when it is hard to predict industry demand.

In addition, this study found that the relationship between uncertainty and investment is not a linear one as assumed by most previous empirical research. The significantly negative quadratic uncertainty term suggests that the influence of uncertainty is not constant but becomes more severe as the uncertainty rises. Both uncertainty terms, linear and quadratic, are significant even after controlling conventional determinants of investment, including Q, cash flows and industry and economy growth. Within the range of estimated uncertainty, it was further revealed that investment freezes more rapidly in periods of comparatively low GDP growth than in periods of high growth. In other words, uncertainties about demand is more detrimental to investment activities in recessionary periods when the margin for error is thin.

After analyzing the general effect of uncertainty, it was examined how the effect interacts with industry-specific nature: franchising and segmentation. According to the results, franchising chains consistently invest less than nonfranchisors but there is no significant difference between the two groups in terms of the degree of the responsiveness of investment to uncertainty. When it comes to segment, full-service restaurants are more adversely affected by demand uncertainty than limited-service restaurants. This finding is in line with previous literature which argues that limited-service restaurant chains have a lower income elasticity of demand and thus outperform full-service counterparts in a lean economy.

This study expands the realm of uncertainty-investment research, which has exclusively focused on manufacturing industries, into a service industry. Investment in the restaurant industry is unlike investment in the manufacturing industries. It is less lumpy

and split into multiple small projects as investment is implemented on a unit restaurant basis. The risk of irreversibility is lower as well. Such differences are presumed to cause a nonlinear association between uncertainty and investment. Except for a few studies (Bo & Lensin, 2005), most empirical research implicitly assumes a linear relationship even though several theoretical studies suggest the impact of uncertainty on investment is not monotonic (Abel & Eberly, 1999; French & Sichel, 1993; Kulatilaka & Perotti, 1998; Sarkar, 2000). Our findings provide empirical evidence for the theoretical argument of the previous studies and imply that the uncertainty-investment relationship should be understood in light of other factors, such as competition, strategic value of growth options, and the degree of irreversibility.

The second study examined how restaurant firms behave under uncertainty. How do the managers make investment decisions in times of high uncertainty?

It explored how restaurant firms cope with demand uncertainty when making investments. Although conventional investment rules argue that each investment project be evaluated based on its own profits and costs, this activity is usually not probable due to the bounded rationality of managers. In the absence of a clear imperative of what is efficient, managers are likely to scan other peers in the market and mimic their behavior. Moreover, when the market is fiercely competitive, managers would be more sensitive to peer competitors' movement, not only to defend their customer base but also to achieve conformity.

To test this idea, this study formed a peer sample comprised of quick service, fast casual, and casual dining chains. Consumers' increasing needs for healthful quality foods at affordable prices have weakened the boundaries between the segments and made them

pursue similar strategies. Consistent with the hypotheses, sample restaurant firms appeared to be affected by peers in making investments. After controlling for traditional investment determinants, Q, cash flow, industry and economy growth, peer effect was still significant. The results further showed that as the demand uncertainty increases, that is, as it becomes more difficult to guarantee the profitability of an investment project, the more sample restaurant firms are inclined to follow peer investment behaviors. This indicates that uncertainty is a driving force that leads firms to follow peers.

To verify what drives the mimicking investment behavior, additional tests were conducted. The findings show that either leaders or followers take into account the other's investment activity when making investment decisions, indicating that the mimetic behavior does not work in one direction but rather in the bilateral direction between leaders and followers. This implies that the peer effect does not arise from learning or legitimacy-seeking motives (of less successful firms), but rather from competitive motives.

This essay reveals a human side of corporate investment decision. It shows that investment outlays are not simply determined by economic reasons, but are influenced by competitors' actions. Under atomistic competition like the restaurant industry, each firm is expected neither to influence nor to be influenced by another firm (Hart, 1985; Wolinsky, 1986). Campbell (2011) argues against this notion and demonstrates that strategic interactions lie at the heart of restaurant pricing and turnover. This study extends Campbell's (2011) argument by showing that restaurant firms consider other peer firms in making investment decisions as well. Moreover, the fact that the peer effect is more

pronounced in periods of high uncertainty supplies evidence for the managers' bounded rationality.

Lastly, this study compared the investment outcomes between peer-sensitive and less-sensitive firms. According to the findings, capital expenditures of firms whose investment outlay is highly correlated with their peers are less effective in expanding market share than that of firms with a low correlation. Investments undertaken simultaneously would increase competition clutter, which can decrease the profitability of investment.

In relation to this point, a word of caution is warranted for managers who consider basing their investment decisions on other firms. Every firm is situated differently in terms of products, resources, competitive advantages etcetera. Thus, before referring to other peers' behavior, the firm must evaluate whether the investment plan is economically feasible and sustainable. As hinted by the aforementioned case of DavCo and Wendy's, a roughly designed investment plan that does not go through a thorough test to ensure the long-term economic feasibility may cause negative outcomes.

In the final piece of the dissertation, the effectiveness of investment made under uncertainty was analyzed. Extant research delving into the countercyclical effectiveness of investment, commonly warns against the backlash of cutback practices and predicts greater investment returns in the post-recession periods. Firms that actively search for opportunities in difficult times and make an aggressive investment can achieve superior performance afterwards. Inspired by this line of research, this study examined the financial implications of investment made under uncertainty. The results showed that a rise in

investment in times of high uncertainty leads to a larger market share. It shows that well-targeted investments can help firms turn crisis into opportunity to get the jump on competitors. However, it also has to be noted that increased depreciation costs and dwindling sales can hurt the profit margin in uncertain times.

Most research that deals with countercyclical value of investment focus on intangible investment, such as marketing and R&D. Now it has been shown that not only soft but also fixed investments have a similar effect. Moreover, this study discovered that investment effectiveness is moderated not only by the economic conditions but also by the degree of demand uncertainty. In addition, this study added one more layer of complexity, financial constraint. The findings suggest that although capital investments made under uncertainty generate greater returns, its association with the firm's financial condition should also be considered.

Taken together, the first and last essays suggest that uncertainty is not always a "bad" thing to be afraid of. As Sarkar (2000) points out, uncertainty depresses investment but it can also increase the probability that the investment threshold will be hit (Sarkar, 2000). Indeed, the nonlinear relationship surfaced in this thesis implies that many restaurant firms increase investment for low levels of uncertainty. Hence, if demand uncertainty is low to moderate, managers should aggressively search for investment opportunities and carefully weigh the strategic value of investment against the hidden cost of investment (a form of flexibility) rather than merely waiting until the uncertainty subsides.

The current thesis is an early attempt to deal with demand uncertainty in the restaurant industry. This means that research on uncertainty in the foodservice industry is at the very beginning stage and there is much more to explore. A few research directions worthy of investigation include 1) estimating the exposure of firm value to industry uncertainty; 2) identifying the operational and financial characteristics of firms with greater vulnerabilities to uncertainty in order to suggest some practical hedging tactics for hospitality businesses; 3) verifying the determinants of industry and firm-level uncertainty, which would involve various factors, such as the economy, intra-industry competition, input price volatility, to name a few; and 4) developing different kinds of uncertainty measures to attain a more comprehensive understanding of the uncertainty inherent in the hospitality industry.

REFERENCES

REFERENCES

Abel, A. B. (1983). Optimal investment under uncertainty. *The American Economic Review*, 73(1), 228-233.

Abel, A. B., Dixit, A. K., Eberly, J. C., & Pindyck, R. S. (1996). Options, the value of capital, and investment. *The Quarterly Journal of Economics, 111*(3), 753-777.

Abel, A. B., & Eberly, J. C. (1999). The effects of irreversibility and uncertainty on capital accumulation. *Journal of Monetary Economics, 44*(3), 339-377.

Abrahamson, E., & Rosenkopf, L. (1993). Institutional and competitive bandwagons: using mathematical modeling as a tool to explore innovation diffusion. *Academy of Management, 18*(3), 487-517.

Accenture (2003) *Innovating for the Upturn*, Retrieved from http://www.accenture.com/NR/rdonlyres/4C61218F-476A-488A-88C6-3B9C12D18BBA/0/upturn.pdf

Aiken, L. S., West, S. G., & Reno, R. R. (1991). *Multiple regression: Testing and interpreting interactions*: Sage.

Akdoğu, E., & MacKay, P. (2012). Product markets and corporate investment: Theory and evidence. *Journal of Banking & Finance, 36*(2), 439-453.

Alexander, C. (2008). *Market Risk Analysis: Pricing, Hedging and Trading Financial Instruments, vol III*: Wiley: New York.

Aliouche, E. H., Kaen, F., & Schlentrich, U. (2012). The market performance of franchise stock portfolios. *International Journal of Contemporary Hospitality Management, 24*(5), 791-809.

Andras, T. L., & Srinivasan, S. S. (2003). Advertising intensity and R&D intensity: Differences across industries and their impact on firm's performance. *International Journal of Business and Economics, 2*(2), 81-90.

Arda, Y., & Hennet, J.-C. (2006). Inventory control in a multi-supplier system. *International Journal of Production Economics, 104*(2), 249-259.

Auty, S. (1992). Consumer choice and segmentation in the restaurant industry. *Service Industries Journal, 12*(3), 324-339.

Avery, C., & Zemsky, P. (1998). Multidimensional Uncertainty and Herd Behavior in Financial Markets. *The American Economic Review, 88*(4), 724-748.

Baldursson, F. M. (1998). Irreversible investment under uncertainty in oligopoly. *Journal of Economic Dynamics and Control, 22*(4), 627-644.

Baltagi, B. H., Bresson, G., & Pirotte, A. (2003). Fixed effects, random effects or Hausman–Taylor?: A pretest estimator. *Economics Letters, 79*(3), 361-369.

Baltagi, B. H., & Wu, P. X. (1999). Unequally spaced panel data regressions with AR(1) disturbances. *Econometric Theory, 15*(6), 814-823.

Baldursson, F. (1998). Irreversible investment under uncertainty in oligopoly. *Journal of Economic Dynamics & Control 22*, 627-644.

Banerjee, A. V. (1992). A simple model of herd behavior. *The Quarterly Journal of Economics, 107*(3), 797-817.

Barreto, I., & Baden-Fuller, C. (2006). To conform or to perform? Mimetic behaviour, legitimacy-based groups and performance consequences. *Journal of Management Studies, 43*(7), 1559-1581.

Beckman, C. M., Haunschild, P. R., & Phillips, D. J. (2004). Friends or Strangers? Firm-Specific Uncertainty, Market Uncertainty, and Network Partner Selection. *Organization Science, 15*(3), 259-275.

Bell, E., & Martinelli, K. (2010). 2009 StarChefs.com salary survey. Retrieved from http://www.starchefs.com/features/editors_dish/salary_survey/2009/

Bernanke, B. S. (1983). Irreversibility, Uncertainty, and Cyclical Investment. *The Quarterly Journal of Economics, 98*(1), 85-106.

Bessembinder, H. (1991). Forward contracts and firm value: Investment incentive and contracting effects. *Journal of Financial and Quantitative Analysis, 26*(4), 519-532.

Bewley, R. A. (1979). The direct estimation of the equilibrium response in a linear dynamic model. *Economics Letters, 3*(4), 357-361.

Bikhchandani, S., Hirshleifer, D., & Welch, I. (1992). A theory of fads, fashion, custom, and cultural change as informational cascades. *Journal of Political Economy, 100*(5), 992-1026.

Blanchard, O., Rhee, C., & Summers, L. (1993). The Stock Market, Profit, and Investment. *The Quarterly Journal of Economics, 108*(1), 115-136.

Bloom, N. (2014). Fluctuations in Uncertainty. *The Journal of Economic Perspectives, 28*(2), 153-175.

Bo, H., & Lensin, R. (2005). Is the Investment-Uncertainty Relationship Nonlinear? An Empirical Analysis for the Netherlands. *Economica, 72*(286), 307-331.

Boehne, E. (January 19, 2000). The US economy in 2000. A speech presented at 2000 Economic Forecast Breakfast. Federal Reserve Bank of Philadelphia. Main Line Chamber of Commerce, Berwyn, PA. Retrieved from https://www.philadelphiafed.org/publications/speeches/boehne/2000/01-19-00_main-line-chamber

Bond, S., & Meghir, C. (1994). Dynamic investment models and the firm's financial policy. *The Review of Economic Studies, 61*(2), 197-222.

Bonoma, T. V. (1986). Marketing subversives. *Harvard Business Review, 64*(6), 113-118.

Brandau, M. (February 11, 2013). Casual-dining, fast-casual concepts stealing market share. Retrieved from http://nrn.com/latest-headlines/casual-dining-fast-casual-concepts-stealing-market-share

Brandau, M. (February 13, 2014a). Burger King reaps benefits of refranchising. Retrieved from http://nrn.com/franchising/burger-king-reaps-benefits-refranchising

Brandau, M. (April 11, 2014b). Fine dining traffic growth outpaces other segments. Retrieved from http://nrn.com/consumer-trends/fine-dining-traffic-growth-outpaces-other-segments

Brandau, M. (May 19, 2014c). The journey from fine dining to fast casual. Retrieved from http://nrn.com/fast-casual/journey-fine-dining-fast-casual

Brandt, P. T., & Williams, J. T. (2007). *Multiple time series models*: Sage.

Brickley, J. A., & Dark, F. H. (1987). The choice of organizational form the case of franchising. *Journal of Financial Economics, 18*(2), 401-420.

Bulan, L., Mayer, C., & Somerville, C. T. (2009). Irreversible investment, real options, and competition: Evidence from real estate development. *Journal of Urban Economics, 65*(3), 237-251.

Burger King Worldwide Inc. (2013). *10-K Report.* Retrieved from http://www.sec.gov/Archives/edgar/data/1547282/000119312514061827/d648966d10k.htm

Burke, R. R., & Srull, T. K. (1988). Competitive interference and consumer memory for advertising. *Journal of Consumer Research, 15*(1), 55-68.

Burns, T. E., & Stalker, G. M. (1961). The management of innovation. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.

Byrne, J. P., & Davis, E. P. (2004). Permanent and temporary inflation uncertainty and investment in the United States. *Economics Letters, 85*(2), 271-277. doi:http://dx.doi.org/10.1016/j.econlet.2004.04.015

Byun, C. (December, 2010). The U.S. housing bubble and bust: Impacts on employment. *Monthly Labor Review*, 3-17.

Caballero, R. J. (1991). On the sign of the investment-uncertainty relationship. *The American Economic Review, 81*(1), 279-288.

Campa, J. M. (1993). Entry by foreign firms in the United States under exchange rate uncertainty. *The Review of Economics and Statistics, 75*(4), 614-622.

Campbell, J. R. (2011). Competition in large markets. *Journal of Applied Econometrics, 26*(7), 1113-1136.

Carruth, A., Dickerson, A., & Henley, A. (2000). What do We Know About Investment Under Uncertainty? *Journal of Economic Surveys, 14*(2), 119-154. doi:10.1111/1467-6419.00107

Caves, R. E., & Murphy, W. F. (1976). Franchising: Firms, markets, and intangible assets. *Southern Economic Journal, 42*(4), 572-586.

CBRL: Key statistics for Cracker Barrel Old Country Store, Inc. (n.d.) Retrieved May 25, 2016 from http://finance.yahoo.com/q/ks?s=CBRL+Key+Statistics

Chan, K., Hwang, C.-Y., & Mian, G. M. (2005). Mutual fund herding and dispersion of analysts' earnings forecasts. *Available at SSRN 675562*.

Chen, M.-J. (1996). Competitor Analysis and Interfirm Rivalry: Toward a Theoretical Integration. *The Academy of Management Review, 21*(1), 100-134.

Chen, M.-J., & Hambrick, D. C. (1995). Speed, stealth, and selective attack: How small firms differ from large firms in competitive behavior. *Academy of Management Journal, 38*(2), 453-482.

Chevalier, J. A., & Scharfstein, D. S. (1996). Capital-market imperfections and countercyclical markups: Theory and evidence. *The American Economic Review, 86*(4), 703-725.

Chirinko, R. S. (1993). Business fixed investment spending: Modeling strategies, empirical results, and policy implications. *Journal of Economic Literature, 31*(4), 1875-1911.

Chung, K. H., & Pruitt, S. W. (1994). A simple approximation of Tobin's q. *Financial Management, 23*(3), 70-74.

Clark, B. H., & Montgomery, D. B. (1999). Managerial identification of competitors. *The Journal of Marketing*, *63*(3), 67-83.

Cleary, S. (2006). International corporate investment and the relationships between financial constraint measures. *Journal of Banking & Finance, 30*(5), 1559-1580. doi:http://dx.doi.org/10.1016/j.jbankfin.2005.03.023

CMG: Key statistics for Chipotle Mexican Grill, Inc. (n.d.) Retrieved May 25, 2016 from http://finance.yahoo.com/q/ks?s=CMG+Key+Statistics

Conlisk, J. (1980). Costly optimizers versus cheap imitators. *Journal of Economic Behavior & Organization, 1*(3), 275-293. doi:http://dx.doi.org/10.1016/0167-2681(80)90004-9

Conlisk, J. (1996). Why Bounded Rationality? *Journal of Economic Literature, 34*(2), 669-700.

Cushman, D. O. (1988). Exchange-rate uncertainty and foreign direct investment in the United States. *Weltwirtschaftliches Archiv, 124*(2), 322-336.

Cyert, R. M., & March, J. G. (1963). A behavioral theory of the firm. *Englewood Cliffs, NJ, 2*.

d'Aspremont, C., Gabszewicz, J. J., & Thisse, J. F. (1979). On Hotelling's" stability in competition". *Econometrica: Journal of the Econometric Society*, *47*(5), 1145-1150.

Daft, R. L., Sormunen, J., & Parks, D. (1988). Chief executive scanning, environmental characteristics, and company performance: An empirical study. *Strategic Management Journal, 9*(2), 123-139.

Damodaran, A. (2014). *Capital Expenditures, Depreciation, Reinvestment Rate and Sales to Capital Ratios by Industry* [Data file]. Retrieved from http://pages.stern.nyu.edu/~adamodar/New_Home_Page/dataarchived.html

Danaher, P. J., Bonfrer, A., & Dhar, S. (2008). The effect of competitive advertising interference on sales for packaged goods. *Journal of Marketing Research, 45*(2), 211-225.

Deephouse, D. L. (1999). To be different, or to be the same? It's a question(and theory) of strategic balance. *Strategic Management Journal*, *20*(2), 147-166.

Deleersnyder, B., Dekimpe, M. G., Steenkamp, J.-B. E. M., & Leeflang, P. S. H. (2009). The role of national culture in advertising's sensitivity to business cycles: An investigation across continents. *Journal of Marketing Research, 46*(5), 623-636.

Denis, D. J. (2011). Financial flexibility and corporate liquidity. *Journal of Corporate Finance, 17*(3), 667-674.

Denis, D. J., & Kruse, T. A. (2000). Managerial discipline and corporate restructuring following performance declines. *Journal of Financial Economics, 55*(3), 391-424. doi:http://dx.doi.org/10.1016/S0304-405X(99)00055-0

Dess, G. G., & Beard, D. W. (1984). Dimensions of organizational task environments. *Administrative Science Quarterly, 29*(1), 52-73.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*(2), 147-160.

Dixit, A. (1989). Entry and exit decisions under uncertainty. *Journal of Political Economy, 97*(3), 620-638.

Dixit, A. K., & Pindyck, R. S. (1994). Investment under uncertainty, 1994. *Princeton UP, Princeton*.

DRI: Key statistics for Darden Restaurants, Inc. (n.d.) Retrieved May 25, 2016 from http://finance.yahoo.com/q/ks?s=DRI+Key+Statistics

Drukker, D. M. (2003). Testing for serial correlation in linear panel-data models. *Stata Journal, 3*(2), 168-177.

Duncan, R. B. (1973). Multiple decision-making structures in adapting to environmental uncertainty: The impact on organizational effectiveness. *Human Relations*.

Dyer, J., Furr, N., & Lefrandt, C. (2014). The industries plagued by the most uncertainty. *Harvard Business Review, digital article, 11*.

Ederington, L. H., & Guan, W. (2006). Measuring historical volatility. *Journal of Applied Finance, 16*(1), 5-14.

Engle, R. (2001). GARCH 101: The use of ARCH/GARCH models in applied econometrics. *Journal of Economic Perspectives, 15*(4), 157-168.

Engle, R. (2004). Risk and volatility: Econometric models and financial practice. *American Economic Review, 94*(3), 405-420.

Episcopos, A. (1995). Evidence on the relationship between uncertainty and irreversible investment. *The Quarterly Review of Economics and Finance, 35*(1), 41-52.

Enz, C. A. (2009). *Hospitality strategic management: Concepts and cases* (2nd ed.). New York, NY: John Wiley & Sons.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work*. *The journal of Finance, 25*(2), 383-417.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics, 33*(1), 3-56.

Fazzari, S., Hubbard, R. G., & Petersen, B. C. (1988). *Financing constraints and corporate investment*. National Bureau of Economic Research Cambridge, Mass., USA.

Fazzari, S. M., Hubbard, R. G., & Petersen, B. C. (2000). Investment-cash flow sensitivities are useful: A comment on Kaplan and Zingales. *The Quarterly Journal of Economics, 115*(2), 695-705.

Fieldhouse, A. (2014, June 26). 5 years after the great recession, our economy still far from recovered. Retrieved from http://www.huffingtonpost.com/andrew-fieldhouse/five-years-after-the-grea_b_5530597.html

French, M. W., & Sichel, D. E. (1993). Cyclical patterns in the variance of economic activity. *Journal of Business & Economic Statistics, 11*(1), 113-119.

Froot, K. A., Scharfstein, D. S., & Stein, J. C. (1993). Risk managements coordinating corporate investment and financing policies. *the Journal of Finance, 48*(5), 1629-1658.

Fuss, C., & Vermeulen, P. (2008). Firms' investment decisions in response to demand and price uncertainty. *Applied Economics, 40*(18), 2337-2351.

Gara, T. (November 8, 2012). Competition is behind Mcdonalds' falling sales, but McRib may redeem. Retrieved from http://blogs.wsj.com/corporate-intelligence/2012/11/08/competition-is-behind-mcdonalds-falling-sales-but-mcrib-may-redeem/

Gasparro, A. (July 27, 2012a). Slower GDP growth weighs on restaurants. Retrieved from http://www.wsj.com/articles/SB10000872396390443931404577553361814477368

Gasparro, A. (November 13, 2012b). McDonald's says tough economy is 'new normal'. Retrieved from http://online.wsj.com/news/articles/SB10001424127887324735104578117103850395288

Geroski, P. A., & Gregg, P. (1997). *Coping with Recession: UK company performance in adversity* (Vol. 38): Cambridge University Press.

Ghosal, V., & Loungani, P. (1996). Product Market Competition and the Impact of Price Uncertainty on Investment: Some Evidence from US Manufacturing Industries. *Journal of Industrial Economics, 44*(2), 217-228.

Gilbert, R. J. (1989). Mobility Barriers and the Value of Incumbency, *Handbook of Industrial Organization*, Vol. 1, capo 8, ed. R. Schmalensee e R. Willig. Arnsterdarn: North-Holland.

Gilbert, R. J., & Lieberman, M. (1987). Investment and coordination in oligopolistic industries. *The RAND Journal of Economics*, *18*(1), 17-33.

Gilchrist, S. (1990). An empirical analysis of corporate investment and financing hierarchies using firm level panel data. *unpublished, Board of Governors*.

Gilchrist, S., & Himmelberg, C. P. (1995). Evidence on the role of cash flow for investment. *Journal of monetary Economics, 36*(3), 541-572.

Gimeno, J., & Woo, C. Y. (1996). Hypercompetition in a multimarket environment: The role of strategic similarity and multimarket contact in competitive de-escalation. *Organization Science, 7*(3), 322-341.

Goldberg, L. S. (1993). Exchange rates and investment in United States industry. *The Review of Economics and Statistics*, *75*(4), 575-588.

Golden, T. D., & Veiga, J. F. (2005). The impact of extent of telecommuting on job satisfaction: Resolving inconsistent findings. *Journal of Management, 31*(2), 301-318.

Graham, J. R., & Harvey, C. R. (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics, 60*(2), 187-243.

Graham, J. R., & Rogers, D. A. (2002). Do firms hedge in response to tax incentives? *The Journal of finance, 57*(2), 815-839.

Grenadier, S. R. (1996). The strategic exercise of options: Development cascades and overbuilding in real estate markets. *The Journal of Finance, 51*(5), 1653-1679.

Grenadier, S. R. (2002). Option exercise games: An application to the equilibrium investment strategies of firms. *Review of Financial Studies, 15*(3), 691-721.

Grewal, R., & Tansuhaj, P. (2001). Building organizational capabilities for managing economic crisis: The role of market orientation and strategic flexibility. *Journal of Marketing, 65*(2), 67-80.

Grundvåg Ottesen, G., & Grønhaug, K. (2006). Pursuing opportunities: Why so many fail and so few succeed. *European Journal of Marketing*, 40(1/2), 100-112.

Gu, Z. (1993). Debt use and profitability: A reality check for the restaurant industry. *Foodservice Research International, 7*(3), 135-147.

Gu, Z. (1996). Financial ratios of the restaurant industry by types of operations: before and after the recent recession. *Bottomline, 11*(3), 20-22.

Gulen, H., & Ion, M. (2016). Policy uncertainty and corporate investment. *Review of Financial Studies, 29*(3), 523-564.

Harrington, R. (2001). Environmental uncertainty within the hospitality industry: Exploring the measure of dynamism and complexity between restaurant segments. *Journal of Hospitality & Tourism Research, 25*(4), 386-398.

Hart, O. D. (1985). Monopolistic competition in the spirit of Chamberlin: A general model. *The Review of Economic Studies, 52*(4), 529-546.

Hartman, R. (1972). The effects of price and cost uncertainty on investment. *Journal of economic theory, 5*(2), 258-266.

Hausman, J. A., & Taylor, W. E. (1981). Panel data and unobservable individual effects. *Econometrica: Journal of the Econometric Society*, *49*(6), 1377-1398.

Hawley, A. H. (1968). *Human Ecology//International Encyclopedia of Social Sciences*. L. NY: Mancmillan, 328-337.

Hayashi, F. (1982). Tobin's marginal q and average q: A neoclassical interpretation. *Econometrica: Journal of the Econometric Society*, *50*(1), 213-224.

Hirshleifer, D. (1993). Managerial reputation and corporate investment decisions. *Financial Management, 22*, 145-145.

Horovitz, B. (March 5, 2014). Consumers plan to spend less eating out. *USA Today*. Retrieved from http://www.usatoday.com/story/money/business/2014/03/05/restaurant-traffic-eating-out-less/6027247/

Hovakimian, G. (2009). Determinants of Investment Cash Flow Sensitivity. *Financial Management, 38*(1), 161-183. doi:10.1111/j.1755-053X.2009.01032.x

Hua, N., & Dalbor, M. C. (2013). Evidence of franchising on outperformance in the restaurant industry: A long term analysis and perspective. *International Journal of Contemporary Hospitality Management, 25*(5), 723-739.

Hubbard, R. G. (1998). Capital-market imperfections and investment. *Journal of Economic Literature, 36*(1), 193-225.

Hubbard, R. G., Kashyap, A. K., & Whited, T. M. (1995). Internal Finance and Firm Investment. *Journal of Money, Credit and Banking, 27*(3), 683-701.

Huizinga, J. (1993). Inflation uncertainty, relative price uncertainty, and investment in US manufacturing. *Journal of Money, Credit and Banking*, *25*(3), 521-549.

Isidore, C. (2008, December 1). It's official: Recession since Dec. '07. Retrieved from http://money.cnn.com/2008/12/01/news/economy/recession/index.htm?postversion=2008120112

Izzo, P. (September 20, 2010). Recession over in June 2009. *The Wall Street Journal.* Retrieved from http://blogs.wsj.com/economics/2010/09/20/nber-recession-ended-in-june-2009/

Jagels, M. G., & Ralston, C. E. (2007). *Hospitality management accounting* (Vol. 831154902): John Wiley & Sons New York, NY.

Jang, S. S., & Namkung, Y. (2009). Perceived quality, emotions, and behavioral intentions: Application of an extended Mehrabian–Russell model to restaurants. *Journal of Business Research, 62*(4), 451-460.

Jang, S. S., & Ryu, K. (2006). Cross-balance sheet interdependencies of restaurant firms: a canonical correlation analysis. *International Journal of Hospitality Management, 25*(1), 159-166.

Jargon, J. (October 10, 2012). Fast food aspires to 'fast casual'. Retrieved from http://online.wsj.com/news/articles/SB10000872396390444657804578048651773669168

Jargon, J. (January 23, 2013). McDonald's says economic uncertainty weighs on sales. *The Wall Street Journal.* Retrieved from http://www.wsj.com/articles/SB10001424127887323539804578259511755704142

Jennings, L. (March 17, 2014). QSR breakfast battle escalates. Retrieved from http://nrn.com/quick-service/qsr-breakfast-battle-escalates

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review, 76*(2), 323-329.

Jones, G. R., Kosnik, R. D., & George, J. M. (1993). Internalization and the firm's growth path: On the psychology of organizational contracting. *Research in Organizational Change and Development*, 105-136.

Jones, R. A., & Ostroy, J. M. (1984). Flexibility and Uncertainty. *The Review of Economic Studies, 51*(1), 13-32.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the Econometric Society*, *47*(2), 263-291.

Kaplan, S. N., & Zingales, L. (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints? *Quarterly Journal of Economics, 112*(1), pp. 169-215.

Khandwalla, P. N. (1977). *The design of organizations* (Vol. 260): Harcourt Brace Jovanovich New York.

Kim, H., & Gu, Z. (2003). Risk-adjusted performance: a sector analysis of restaurant firms. *Journal of Hospitality & Tourism Research, 27*(2), 200-216.

Kimes, S. E. (1999). Implementing restaurant revenue management: a five-step approach. *The Cornell Hotel and Restaurant Administration Quarterly, 40*(3), 16-11.

Kimes, S. E., Chase, R. B., Choi, S., Lee, P. Y., & Ngonzi, E. N. (1998). Restaurant revenue management applying yield management to the restaurant industry. *Cornell Hotel and Restaurant Administration Quarterly, 39*(3), 32-39.

Kitching, J., Blackburn, R., Smallbone, D., & Dixon, S. (2009). Business strategies and performance during difficult economic conditions. Retrieved from http://eprints.kingston.ac.uk/5852/1/Kitching-J-5852.pdf

Kline, D. (February 4, 2014). McDonald's coffee vs. Starbucks -- can McCafe make a dent?. Retrieved from http://www.fool.com/investing/general/2014/02/04/mcdonalds-coffee-vs-starbucks-can-mccafe-make-a-de.aspx?source=isesitlnk0000001&mrr=0.17

Koetse, M. J., de Groot, H. L. F., & Florax, R. J. G. M. (2009). A Meta-Analysis of the Investment-Uncertainty Relationship. *Southern Economic Journal, 76*(1), 283-306.

Koh, Y., Lee, S., & Boo, S. (2009). Does franchising help restaurant firm value? *International Journal of Hospitality Management, 28*(2), 289-296.

Koh, Y., Rhou, Y., Lee, S., & Singal, M. (2015). Does Franchising Alleviate Restaurants' Vulnerability to Economic Conditions? *Journal of Hospitality & Tourism Research*.

Konigsberg, C. (2007). *America's Priorities: How the US Government Raises and Spends $3,000,000,000,000 (trillion) Per Year*: AuthorHouse.

Kraay, A., & Ventura, J. (2007). The Dot-Com Bubble, the Bush Deficits, and the US Current Account. *NBER Chapters*, 457-496.

Krüger, P., Landier, A., & Thesmar, D. (2011). The WACC fallacy: The real effects of using a unique discount rate. *Journal of Finance, 70*(3), 1253-1285.

Kulatilaka, N., & Perotti, E. C. (1998). Strategic growth options. *Management Science, 44*(8), 1021-1031.

Lambrecht, B., & Perraudin, W. (2003). Real options and preemption under incomplete information. *Journal of Economic dynamics and Control, 27*(4), 619-643.

Lang, L., Ofek, E., & Stulz, R. (1996). Leverage, investment, and firm growth. *Journal of financial Economics, 40*(1), 3-29.

Leary, M. T., & Roberts, M. R. (2014). Do peer firms affect corporate financial policy? *The Journal of Finance, 69*(1), 139-178.

Leung, S. (October 1, 2003). A glutted market is leaving food chains hungry for sites. Retrieved from http://online.wsj.com/news/articles/SB10649642768823100

Lewellen, J., & Lewellen, K. (2013). Investment and cashflow: New evidence. *Forthcoming in Journal of Financial and Quantitative Analysis*.

Lewis, P., & Thomas, H. (1990). The linkage between strategy, strategic groups, and performance in the UK retail grocery industry. *Strategic Management Journal, 11*(5), 385-397.

Liddle, A.J. (2009, August 17). Recession batters upscale chains as sales, traffic dips sap profits. Retrieved from http://nrn.com/corporate/recession-batters-upscale-chains-sales-traffic-dips-sap-profits

Lieberman, M. B., & Asaba, S. (2006). Why do firms imitate each other? *Academy of Management Review, 31*(2), 366-385.

Liu, Y., & Jang, S. S. (2009). The effects of dining atmospherics: an extended Mehrabian–Russell model. *International Journal of Hospitality Management, 28*(4), 494-503.

Lockyer, S. E. (January 12, 2009). NRA survey reveals record-low capital spending in Nov. *Nation's Restaurant News 43*(2), 12-12 1/5

Makinen, G. (2011). *Economic effects of 9/11: A retrospective assessment*: DIANE Publishing.

March, J. G. (1978). Bounded rationality, ambiguity, and the engineering of choice. *The Bell Journal of Economics, 9*(2), 587-608.

Martin, R. E. (1988). Franchising and Risk Management. *The American Economic Review, 78*(5), 954-968.

Martinez, R. J., & Dacin, M. T. (1999). Efficiency motives and normative forces: Combining transactions costs and institutional logic. *Journal of Management, 25*(1), 75-96.

Mathewson, G., & Winter, R. (1985). The Economics of Franchise Contracts. *Journal of Law & Economics, 28*(3), 503-526.

Maze, J. (February 20, 2015). Wendy's franchisee files counterclaim over remodels. Retrieved from http://nrn.com/corporate-news/wendy-s-franchisee-files-counterclaim-over-remodels

MCD: Key statistics for McDonald's Crop. (n.d.) Retrieved May 25, 2016 from http://finance.yahoo.com/q/ks?s=MCD+Key+Statistics

McNabb, B. (April 28, 2013). Uncertainty is the enemy of recovery. *The Wall Street Journal.* Retrieved from http://www.wsj.com/articles/SB10001424127887323789704578443431277889520

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, *83*(2), 340-363.

Michael, S. C. (2000). Do franchised chains advertise enough? *Journal of Retailing, 75*(4), 461-478.

Mintel (2013, October). *Fast Casual Restaurants*. Retrieved from Mintel Market Research Reports database.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review, 48*(3), 261-297.

Moran, P., & Ghoshal, S. (1996). Theories of economic organization: The case for realism and balance. *Academy of Management Review, 21*(1), 58-72.

Morath, W., & Hudson, K. (July 24, 2014). New-home slowdown pressures economy. *The Wall Street Journal.* Retrieved from http://www.wsj.com/articles/new-home-sales-fall-in-june-1406210849

Mun, S. G., & Jang, S. (2015). Working capital, cash holding, and profitability of restaurant firms. *International Journal of Hospitality Management, 48*(0), 1-11.

Myers, S. C. (1984). The capital structure puzzle. *Journal of Finance*, *39*(3), 574-592.

Neuman, W. (June 24, 2009). Discounts have restaurants eating own lunch. Retrieved from http://www.nytimes.com/2009/06/24/business/24casual.html

New York Times. (September 15, 1981). Ford will close unit in Flat Rock. *New York Times*. Retrieved from http://www.nytimes.com/1981/09/15/business/ford-will-close-unit-in-flat-rock.html

Nichols, C. (2013). Burger giants roll out remodels, but are you noticing?. Retrieved from http://finance.yahoo.com/blogs/the-exchange/burger-giants-roll-remodels-noticing-150243628.html

Nickerson, J. A., & Silverman, B. S. (2003). Why firms want to organize efficiently and what keeps them from doing so: Inappropriate governance, performance, and adaptation in a deregulated industry. *Administrative science quarterly, 48*(3), 433-465.

NPD Group. (January 23, 2013). U.S. total restaurant count increases by 4,442 units over last year, reports NPD. Retrieved from https://www.npd.com/wps/portal/npd/us/news/press-releases/us-total-restaurant-count-increases-by-4442-units-over-last-year-reports-npd/

O'connor, P. (2014, March 12). WSJ/NBC news poll: Obama's approval rating hits new low. *The Wall Street Journal.* Retrieved from http://online.wsj.com/news/articles/SB10001424052702304250204579433533118580224

Oliver, C. (1997). Sustainable competitive advantage: Combining institutional and resource-based views. *Strategic management journal, 18*(9), 697-713.

Parekh, R. (2009). When will this end? *Advertising Age* (February 16). Retrieved from http://adage.com/article/news/p-g-unilever-colgate-coke-a-b-cutting-budgets/134634/

Parsa, H. G., Self, J. T., Njite, D., & King, T. (2005). Why restaurants fail. *Cornell Hotel and Restaurant Administration Quarterly, 46*(3), 304-322.

Peach, R. W. (2001). The Evolution of the Federal Budget and Fiscal Rules. *Available at SSRN 2094470*.

Peteraf, M. A., & Bergen, M. E. (2003). Scanning dynamic competitive landscapes: a market-based and resource-based framework. *Strategic Management Journal, 24*(10), 1027-1041.

Pfeffer, I. (1956). *Insurance and economic theory*: Pub. for SS Huebner Foundation for Insurance Education, Univ. of Pennsylvania, by RD Irwin.

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75*(2), 335-346.

Pindyck, R. S. (1991). IRREVERSIBILITY, UNCERTAINTY, AND INVESTMENT. *Journal of Economic Literature, 29*, 1110-1148.

Pitz, G. F., & Sachs, N. J. (1984). Judgment and decision: Theory and application. *Annual Review of Psychology, 35*(1), 139-164.

PNRA: Key statistics for Panera Bread Company. (n.d.) Retrieved May 25, 2016 from http://finance.yahoo.com/q/ks?s=PNRA+Key+Statistics

Pástor, Ľ., & Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics, 110*(3), 520-545.

Raith, M. (1996). Product differentiation, uncertainty and the stability of collusion. *LSE STICERD Research Paper No. EI16*.

Ramey, V. A., & Shapiro, M. D. (2001). Displaced capital: A study of aerospace plant closings. *Journal of Political Economy, 109*(5), 958-992.

Ries, L. (July 8, 2013). Menu proliferation can lead to identity crisis. Retrieved from http://nrn.com/advertising/menu-proliferation-can-lead-identity-crisis

Robbins, D. K., & Pearce, J. A. (1992). Turnaround: Retrenchment and recovery. *Strategic Management Journal, 13*(4), 287-309. doi:10.1002/smj.4250130404

Roberts, P. W., & Greenwood, R. (1997). Integrating transaction cost and institutional theories: Toward a constrained-efficiency framework for understanding organizational design adoption. *Academy of Management Review, 22*(2), 346-373.

Rodrik, D. (1991). Policy uncertainty and private investment in developing countries. *Journal of Development Economics, 36*(2), 229-242.

Ruggless, R. (August 9, 2012). Brinker: 4Q earnings rise on reimaging. Retrieved from http://nrn.com/latest-headlines/brinker-4q-earnings-rise-reimaging

Ruggless, R. (January 15, 2013). Schlotzsky's sees growth with reimaged units. Retrieved from http://nrn.com/latest-headlines/schlotzsky-s-sees-grows-reimaged-units?page=1

Ryu, K., Lee, H.-R., & Kim, W. G. (2012). The influence of the quality of the physical environment, food, and service on restaurant image, customer perceived value, customer satisfaction, and behavioral intentions. *International Journal of Contemporary Hospitality Management, 24*(2), 200-223.

Samson, S., Reneke, J. A., & Wiecek, M. M. (2009). A review of different perspectives on uncertainty and risk and an alternative modeling paradigm. *Reliability Engineering & System Safety, 94*(2), 558-567.

Sarkar, S. (2000). On the investment–uncertainty relationship in a real options model. *Journal of Economic Dynamics and Control, 24*(2), 219-225.

Schaan, D. N. (2007). *An Empirical Investigation of Corporate Investment Decisions*: ProQuest.

Scharfstein, D. S., & Stein, J. C. (1990). Herd Behavior and Investment. *The American Economic Review, 80*(3), 465-479.

Scherer, F. (1980). *Industrial market structure and economic performance*. Chicago, IL: Rand McNally.

Schrambling, R. (November 2, 2009). Why now is the time to open a restaurant. Retrieved from https://www.entrepreneur.com/article/203700

Scott, W. R. (1981). Developments in organization theory, 1960-1980. *The American Behavioral Scientist*, *24*(3), 407-422.

Scott, W. R. (1987). The adolescence of institutional theory. *Administrative science quarterly*, *32*(4), 493-511.

Selznick, P. (1957). *Leadership in administration: A sociological interpretation.* Evanston, IL: Pew, Peterson, and Co

Siegel, P. H., Agrawal, S., & Rigsby, J. T. (1997). Organizational and professional socialization: Institutional isomorphism in an accounting context. *The Mid-Atlantic Journal of Business*, *33*(1), 49-68.

Silberston, A. (1983). Efficiency and the Individual Firm'. *Microeconomic Efficiency and Macroeconomic Performance, Philip Allen, London*.

Simon, H. A. (1955). A behavioral model of rational choice. *The Quarterly Journal of Economics*, *69*(1), 99-118.

Simon, H. A. (1972). Theories of bounded rationality. *Decision and organization*, *1*(1), 161-176.

Smith, C. W., & Stulz, R. M. (1985). The determinants of firms' hedging policies. *Journal of financial and quantitative analysis*, *20*(4), 391-405.

Smith, V. L., & Walker, J. M. (1993). Monetary rewards and decision cost in experimental economics. *Economic Inquiry*, *31*(2), 245-261.

Snel, A. (August 6, 2011). Quick-service restaurants hit customers' sweet tooth. Retrieved from http://nrn.com/archive/quick-service-restaurants-hit-customers-sweet-tooth

Srinivasan, R., Rangaswamy, A., & Lilien, G. L. (2005). Turning adversity into advantage: Does proactive marketing during a recession pay off? *International Journal of Research in Marketing*, *22*(2), 109-125.

Steenkamp, J.-B. E. M., & Fang, E. (2011). The impact of economic contractions on the effectiveness of R&D and advertising: Evidence from US companies spanning three decades. *Marketing Science*, *30*(4), 628-645.

Stein, L. C. D., & Stone, E. C. (2012). The effect of uncertainty on investment, hiring, and R&D: Causal evidence from equity options. *Arizona State University*.

Stynes, T. (September 29, 2010). DineEquity Nears Deal to Refranchise 86 Applebee's. Retrieved from http://online.wsj.com/news/articles/SB10001424052748704116004575522273054978664

Sum, A., Khatiwada, I., McLaughlin, J., & Palma, S. (2009). The economic recession of 2007-2009: A comparative perspective on its duration and the severity of its labor market impacts. *Documento de trabajo del Center for Labor Market Studies, Northeastern University.[Links]*.

Thompson, J. D. (1967). *Organizations in action: Social science bases of administrative theory*: Transaction publishers.

Thorn, B. (2014, January 9). Fine-dining restaurants poised for growth in 2014. Retrieved from http://nrn.com/fine-dining/fine-dining-restaurants-poised-growth-2014

Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of money, credit and banking, 1*(1), 15-29.

Tobin, J., & Brainard, W. C. (1977). Asset markets and the cost of capital. *Economic Progress, Private Values, and Public Economic Journal, 96*, 120-138.

Tse, E. C.-Y., & Olsen, M. D. (1988). The impact of strategy and structure on the organizational performance of restaurant firms. *Journal of Hospitality & Tourism Research, 12*(2), 265-276.

Tuzel, S. (2010). Corporate real estate holdings and the cross-section of stock returns. *Review of Financial Studies, 23*(6), 2268-2302.

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science, 185*(4157), 1124-1131.

Walkup, C. (March 29, 2007). Fast feeders work to revitalize brands through unit remodelings. Retrieved from http://nrn.com/archive/fast-feeders-work-revitalize-brands-through-unit-remodelings-0

Wall Street Journal. (2010, January 27). The Obama fisc. *The Wall Street Journal.* Retrieved from http://online.wsj.com/articles/SB10001424052748703906204575027181656362948

Welch, I. (1992). Sequential sales, learning, and cascades. *The Journal of finance, 47*(2), 695-732.

Whited, T. M. (1992). Debt, liquidity constraints, and corporate investment: Evidence from panel data. *The Journal of Finance, 47*(4), 1425-1460.

Whited, T. M., & Wu, G. (2006). Financial Constraints Risk. *Review of Financial Studies, 19*(2), 531-559.

Willett, A. H. (1901). *The economic theory of risk and insurance*: The Columbia university press.

Williamson, O. E. (1989). Transaction cost economics. *Handbook of industrial organization, 1*, 135-182.

Williamson, S. (1981), *The moral hazard theory of corporate financial structure: An empirical test*, Unpublished Ph.D. Dissertation, MIT.

Wolinsky, A. (1986). True monopolistic competition as a result of imperfect information. *The Quarterly Journal of Economics*, *101*(3), 493-511.

Youn, H., & Gu, Z. (2009). US restaurant firm performance check: An examination of the impact of the recent recession. *The Journal of Hospitality Financial Management, 17*(2), 35-53.

Zhang, L. (2005). The value premium. *The Journal of Finance, 60*(1), 67-103.

Zheng, T., Farrish, J., & Wang, X. (2013). How did different restaurant segments perform differently through the recession?: An ARIMA with intervention analysis on US restaurant stock indices. *Journal of Hospitality Financial Management, 20*(2), 1.

Zillman, C. (2014, April 23). Will the real McDonald's please stand up?. Retrieved from http://fortune.com/2014/04/23/will-the-real-mcdonalds-please-stand-up/

Zucker, L. G. (1983). Organizations as institutions. *Research in the Sociology of Organizations, 2*(1), 1-47. Zuckerman, G. (August 2, 2014). Real estate's epic rebound starts to cool. *The Wall Street Journal.* Retrieved from http://www.wsj.com/articles/real-estates-epic-rebound-starts-to-cool-1407034789

Zwolak, R., (2010). *IBISWorld Industry Report 72211. Full-service restaurants in the US.* Retrieved from IBISWorld database.

APPENDIX

APPENDIX

The list of restaurant chains used in Study 1 and 2 is presented below. Firm-year observations less than five are excluded from the sample.

Quick service	
Back Yard Burgers Inc	Morgans Foods Inc
Burger King Worldwide Inc	Nathan's Famous Inc
Carrols Restaurant Group Inc	Papa Johns International Inc
Checkers Drive-In Restaurant	Pj America Inc
Cke Restaurants Inc	Rallys Hamburgers Inc
Davco Restaurants Inc	Santa Barbara Restaurant Grp
Domino's Pizza Inc	Sonic Corp
Good Times Restaurants Inc	Wendy's Co
Jack In The Box Inc	Wendy's International Inc
Krystal Co	Yum Brands Inc
Mcdonald's Corp	
Meritage Hospitality Group	
Fast casual	
Boston Chicken Inc	Pollo Tropical Inc
Chipotle Mexican Grill Inc	Rubio's Restaurants Inc
Cosi Inc	Schlotzsky's Inc
Miami Subs Corp	Taco Cabana
Panera Bread Co	Wall Street Deli Inc
Fine dining	
Mccormick & Schmicks Seafood	Ruths Hospitality Group Inc
Mortons Restaurant Group Inc	Smith & Wollensky Rstrnt Grp

Casual dining	
Applebees Intl Inc	J. Alexander's Corp
Ark Restaurants Corp	Jerrys Famous Deli Inc
Avado Brands Inc	Kona Grill Inc
Back Bay Restaurant Grp Inc	Koo Koo Roo Inc
Bayport Restaurant Gp	Landrys Restaurants Inc
Benihana Inc	Lone Star Steakhouse Saloon
Bertuccis Inc	Lubys Inc
Biglari Holdings Inc	Main Street Restaurant Group
Bj's Restaurants Inc	Max & Ermas Restaurants
Bob Evans Farms	Mexican Restaurants Inc
Boston Restaurant Assoc Inc	O'charley's Inc
Bravo Brio Restaurant Gp Inc	Osi Restaurant Partners Inc
Brinker Intl Inc	P F Changs China Bistro Inc
Buca Inc	Perkins Family Rests
Buffalo Wild Wings Inc	Phoenix Restaurant Group Inc
California Pizza Kitchen Inc	Piccadilly Cafeterias Inc
Cec Entertainment Inc	Rainforest Cafe Inc
Champps Entmt Inc	Rare Hospitality Intl Inc
Cheesecake Factory Inc	Red Robin Gourmet Burgers
Chefs International Inc	Roadhouse Grill Inc
Cooker Restaurant/Oh	Rock Bottom Restaurants Inc
Cracker Barrel Old Ctry Stor	Ruby Tuesday Inc
Cucos Inc	Rudys Restaurant Group Inc
Darden Restaurants Inc	Sbarro Inc
Dennys Corp	Shoney's Inc
Dineequity Inc	Silver Diner Inc
Eateries Inc	Skyline Chili Inc
El Chico Restaurants Inc	Spaghetti Warehouse Inc
Elephant & Castle Group Inc	Summit Family Restaurnts Inc
Elmer's Restaurants Inc	Texas Roadhouse Inc
Famous Daves Of America Inc	Timber Lodge Steakhouse Inc
Flanigans Enterprises Inc	Uno Restaurant Corp
Fox & Hound Restaurant Group	Vicorp Restaurants Inc
Friendly Ice Cream Corp	Worldwide Restaurant Concept
Frisch's Restaurants Inc	Granite City Food & Brewery

VITA

VITA

EDUCATION

Ph.D.	Hospitality and Tourism Management Purdue University	August, 2016 West Lafayette, IN
M.S.	Hospitality Business Management Michigan State University	May, 2010 East Lansing, MI
B.A.	Public Administration and Business Administration Sungkyunkwan University	Aug, 2004 Seoul, South Korea

PROFESSIONAL EXPERIENCE

Assistant Consultant Franwise Consulting	May, 2007-June, 2008 Seoul, South Korea
Associate Financial Management Department Digital Printing Division Samsung Electronics Co., Ltd.,	January, 2005-April, 2007 Suwon, South Korea

RESEARCH INTEREST

Uncertainty and Risk Management, Investment, Franchising

TEACHING INTEREST

Managerial/Financial Accounting, Strategic Management, Revenue Management, Research Methods, Data Analysis

PUBLICATIONS

PUBLICATIONS

Sohn, J., Tang, C.H., & Jang, S.C. (2014) The asymmetric effect of the asset-light & fee-oriented strategy: The business cycle matters! *International Journal of Hospitality Management, 40*, 100-108. doi:http://dx.doi.org/10.1016/j.ijhm.2014.03.007

Sohn, J., Tang, C.H., & Jang, S.C. (2013). Does the asset-light & fee-oriented strategy create value? *International Journal of Hospitality Management, 32*, 270-277. doi:http://dx.doi.org/10.1016/j.ijhm.2012.07.004