EXAMINING THE IMPACT OF FIRM ASYMMETRIES ON FIRM RISK LEVEL IN THE CONSTRUCTION INDUSTRY FROM 1983 TO 2022

by

Duygu Dirice Karadağ

B.S., Civil Engineering, İstanbul Technical University, 2014

Submitted to the Institute for Graduate Studies in
Science and Engineering in partial fulfillment of
the requirements for the degree of
Master of Science

Graduate Program in Civil Engineering

Boğaziçi University

2024

ACKNOWLEDGEMENTS

First and foremost, I would like to extend my deepest gratitude and appreciation to my thesis supervisor, Assoc. Prof. Semra Çomu Yapıcı, for her guidance, sympathy, patience and support. She was omnipresent and always provided me with invaluable advice and assistance throughout her supervisory. Therefore, I owe a great deal of debt for her guidance.

Secondly, I am immensely grateful and thus wish to thank my committee members Prof. Beliz Özorhon and Prof. Esin Ergen Pehlevan for their contributions and valuable time.

Lastly, I would like to thank my mother, Gülzade Dirice, for taking care of my daughter as I was dealing with my thesis; my husband, Yilber Karadag, for his guidance and complete support; and my little daughter, Venus Karadag, for her pure presence. Without my entire family, it would be impossible for me to do this master's at this time of my life.

ABSTRACT

EXAMINING THE IMPACT OF FIRM ASYMMETRIES ON FIRM RISK LEVEL IN THE CONSTRUCTION INDUSTRY FROM 1983 TO 2022

The term uncertainty has received increasing attention in the risk management literature, particularly following the COVID-19 outbreak. K-shaped recovery has become markedly explicit in the wake of the COVID-19 pandemic. Surprisingly, some firms remained considerably robust or even strikingly enhanced their performance following recessions. Fundamentally, there exists a divergent performance of firms akin to the arms of the letter K within same industry. Hence, the overall aim of this study is to investigate the effect of firm asymmetries on firm-level risk during crises/uncertainties. This study was deployed in the construction industry. The results of this study do refute the general consensus of uniform risk impact at the firm level. Along this line, the findings of this study are: (i) larger construction firms are better off coping with uncertainties compared to their smaller peers; (ii) going public diminishes firm-level risk during crises, for publicly traded firms possess the precedence of raising external capital at a lower cost; (iii) Superior financial health cushions the adverse effects of external shocks during uncertainties, particularly lower debt-equity ratio, and higher cash balance; (iv) both geographical and unrelated business diversity appear to undermine firm risk during uncertainties given the greater structural complexity, inefficient resource allocation, and liability of newness and foreignness (v) SOEs are less likely to be vulnerable to external variations through implicit and explicit governmental guarantees. Specifically, Chinese firms are more resilient to crises compared to firms in other countries; (vi) Indulgent organizations imperfectly ward off crises due to overgratification and feeble self-control.

ÖZET

İNŞAAT SEKTÖRÜNDE FİRMA ASİMETRİLERİNİN FİRMA RİSKİNE ETKİSİ: 1983-2022 YILLARI ARASINDA AMPİRİK BİR ÇALIŞMA

Belirsizlik terimi, özellikle COVID-19 salgınının ardından, risk yönetimi literatüründe giderek artan bir ilgi görmektedir. K-şeklinde iyileşme, Covid-19 salgınının ardından belirgin hale geldi. Beklenenin aksine kriz sonrasında, çoğu sektördeki aktif firma sayısı azalırken, bazı firmalar hayatta kalmayı sürdürmekle kalmayıp, performanslarını çarpıcı biçimde artırdılar. Özetle, aynı sektördeki firmaların bazıları performanslarını arttırırken, diğerlerinin performansında ciddi düşüşler meydana gelmiştir. Bu bağlamda çalışmanın genel amacı, krizler/belirsizlikler sırasında firma asimetrilerinin firma düzeyindeki risk etkisini araştırmaktır. Bu çalışma inşaat sektöründe uygulanmıştır ve çalışmanın sonuçları, firmaların eşdeğer bir risk etkisine maruz kaldıklarına dair genel bakış açısını çürütmektedir. Bu doğrultuda, bu çalışmanın bulguları şunlardır: (i) daha büyük inşaat firmaları, daha küçük emsallerine kıyasla belirsizliklerle daha iyi başa çıkmaktadır; (ii) halka açılma, kriz sırasında firma düzeyindeki riski azaltır, çünkü halka açık firmalar daha düşük bir maliyetle dış sermayeyi arttırabilirler; (iii) mali sağlık, özellikle düşük borç-özsermaye oranı ve yüksek nakit dengesi gibi belirsizlikler sırasında dış şokların olumsuz etkilerini hafifletir; (iv) yapısal karmaşıklık, verimsiz kaynak tahsisi ile yenilik ve yabancılık sorumluluğu göz önüne alındığında, hem coğrafi hem de ilgisiz iş çeşitliliği belirsizlikler sırasında firma riskini arttırmaktadır; (v) İktisadi Kamu Kuruluşların örtülü ve açık hükümet müdahaleleri yoluyla dış etkenlere karşı daha dayanıklıdır. Özellikle Çin firmaları diğer ülkelerdeki firmalara göre krizlere karşı daha dirençlidir; (vi) Hoşgörülü örgütler, aşırı memnuniyet ve zayıf öz denetim koşulları nedeniyle krizlerden daha fazla etkilenmektedirler.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS . . . iii
ABSTRACT . . . iv
ÖZET . . . v
LIST OF FIGURES . . . ix
LIST OF TABLES . . . xi
LIST OF ACRONYMS/ABBREVIATIONS . . . xii
1. INTRODUCTION . . . 1
1.1. Background of Research . . . 1
1.2. Problem Definition and Research . . . 3
1.3. Aim and Objectives of the Study . . . 4
1.4. Research Methodology . . . 6
1.5. Scope and Limitations . . . 6
1.6. Outline of the Study . . . 7
2. LITERATURE REVIEW . . . 8
2.1. Definition of Risk, Uncertainty and Crisis . . . 8
2.2. Traditional Risk Assessment Matrix . . . 18
2.2.1. Asymmetric and Long-Lasting Risk Severity but Same Probability . . . 18
2.3. Definition of Vulnerability and Organizational Resilience . . . 22
2.4. Prior Studies on the Impact of Firm-Specific Characteristics and Firm-Level Risk . . . 31
3. FORMULATION OF HYPOTHESES . . . 33
3.1. Definition of Asymmetry . . . 33
3.1.1. Types of Asymmetries . . . 34
3.1.2. Size Asymmetry . . . 35
3.2. Firm Type Asymmetry . . . 41
3.3. Financial Position Asymmetry . . . 43
3.3.1. Past Performance . . . 43

3.3.2. Financial Leverage 48
3.3.3. Financial Liquidity 57
3.4. Corporate Diversification Asymmetry 60
3.5. Ownership Structure Asymmetry 68
3.6. Cultural Asymmetry 73
4. METHODOLOGY 81
4.1. Research Setting 81
4.2. Data Collection 81
4.2.1. Variables 83
4.2.1.1. Dependent Variable (DV) 83
4.2.2. Independent Variables (IVs) 87
4.2.2.1. Firm Size 87
4.2.2.2. Firm Type 87
4.2.2.3. Financial Position 87
4.2.2.4. Diversification 89
4.2.2.5. Privatization 92
4.2.2.6. Culture 93
4.2.3. Control Variables (CVs) 94
4.3. Empirical Model Development 96
5. EMPIRICAL RESULTS 98
5.1. Descriptive Statistics 98
5.2. Pearson Correlation Matrix 101
5.3. Empirical Models and Results 103
6. DISCUSSION 106
6.1. Size Asymmetry 107
6.2. Ownership Asymmetry 107
6.3. Financial Position Asymmetry 108
6.4. Corporate Diversification Asymmetry 111
6.5. Culture Asymmetry 114
6.6. Control Variables 115
7. CONCLUSION 117

7.1. Contribution to the Literature 117
7.2. Theoretical and Managerial Implications 120
7.3. Limitations and Future Research 121
REFERENCES 124
APPENDIX A: USED DATABASES REGISTERED BY BOĞAZİÇİ UNIVERSITY 161

LIST OF FIGURES

Figure 2.1. Risk and uncertainty concept (Own elaborate). 9

Figure 2.2. Risk analysis matrix (Own elaborate). 18

Figure 2.3. Loss of GDP per selected continents and countries in 2020. 19

Figure 2.4. Projected coronavirus (COVID-19) impact index by industry and dimension-minor (1) to severe (5) in 2020. 20

Figure 2.5. The historical annual GDP growth rate of the World and past recessions. 21

Figure 2.6. Average time to recover back to the previous level, by type of bear market (Source: Statista). 22

Figure 2.7. Context and responses to different levels of certainty (Own elaborate). 23

Figure 3.1. Types of corporate diversification (Own elaborate). 61

Figure 3.2. Triggers of business diversification (Own elaborate). 68

Figure 4.1. Theoretical framework and hypotheses. 81

Figure 4.2. The distribution of firms in the sample at country level by 2022, (This figure is compiled by the author). 82

Figure 4.3. The distribution of firms in the sample at continent level by 2022, (This figure is compiled by author). 83

Figure 4.4. Conceptualization of firm diversity (Own elaborate). 92

Figure 5.1. Number of firms by year in the sample. 99

Figure 5.2. Pearson correlation matrix. 103

Figure A.1. Both Statista and World Bank databases are officially accessible by Boğaziçi University students and staffs. 161

LIST OF TABLES

Table 2.1. Selected prior studies for the definition of uncertainty. 12

Table 2.2. Literature-based and expert-based sources of organizational resilience during the pandemic. 26

Table 3.1. Selected studies regarding the leverage risk nexus. 51

Table 4.1. Different measurements of firm risk. 85

Table 4.2. Variable measures and data sources. 95

Table 5.1. Descriptive statistics. 99

Table 5.2. Composition of selected regression models. 104

Table 5.3. Regression outputs of selected models. 105

Table 6.1. Summary of empirical results. 106

Table 6.2. T-test group statistics for ownership structure 108

Table 6.3. ANOVA test results 112

Table 6.4. Independent t-test for chinasation asymmetry 113

LIST OF ACRONYMS/ABBREVIATIONS

BSD	Broad-Spectrum Diversification
BT	Behavioral Theory
BTOF	Behavioral Theory of Firm
CAPM	Capital Asset Pricing Model
CD	Corporate Diversification
CPI	Consumer Price Index
CRO	Chief Risk Officer
CUD	Construction-Unrelated Diversification
CVs	Control Variables
DD	Distance to Default
DV	Dependent Variable
EPS	Earning per Share
ERM	Enterprise Risk Management
FANG	Facebook, Amazon, Netflix and Google
FX	Foreign Exchange
GD	Geographical Diversification
GFC	Global Financial Crisis
HI	Herfindahl Index
HILP	High-Impact, Low-Probability
ID	International Diversification
IND	Industry Diversification
IPOs	Initial Public Offerings
IR	Intangible Resources
IVR	Indulgent Versus Restraint
IVs	Independent Variables
KPIs	Key Performance Indicators
LTO	Long-Term Orientation
MandAs	Mergers and Acquisitions

MNSD	Mean Narrow Spectrum Diversification
NOPAT	Net Operating Profit After Taxes
OLI	Ownership, Location and Internalization
OLS	Ordinary Least Square
OR	Organizational Resilience
PD	Product Diversification
POT	Pecking Order Theory
PT	Prospect Theory
RandD	Research and Development
RBV	Resource-Based View
RD	Regional Diversification
RDT	Resource Dependency Theory
RM	Risk Management
ROA	Return on Assets
ROE	Return on Equity
ROIC	Return on Invested Capital
ROS	Return on Sales
SandL	Saving and Loan
SIC	Standard Industrial Classification
SMEs	Small-Medium Enterprises
SOEs	State-owned Enterprises
TBTF	Too Big To Fail
TCT	Transaction Cost Theory
TR	Tangible Resources
TT	Trade-off Theory
UAI	Uncertainty Avoidance Index
VRIN	Valuable, Rare, Inimitable, Non-Substitutable
WACC	Working Average Cost of Capital

1. INTRODUCTION

In the wake of increased globalization, interconnected supply chains and rapid technological changes, risk management (RM thereafter) has emerged as a crucial paradigm in the business literature. Given the turbulent business environment, increasing information influx and augmented internationalization, organizations are more likely to incur risks; thereby, exhibiting an increasing proclivity towards enterprise risk management (ERM thereafter) (Startienė and Remeikienė, 2007). Owing to the capricious nature of the business milieu, risk is per se omnipresent; that is, risk is the foregone conclusion in any business activity (Florescu, 2012). In this line, the principal premise of RM is to mitigate or even eliminate the negative aftermaths of uncertain or predictable events. Drawing upon this line of reasoning, RM emerges as an important organizational vehicle for firms to improve their resilience and long-term value, for it enables organizations to identify, analyze and control the causes and effects of uncertainties and risks (Florescu, 2012). In accord with this line of thinking, extant literature posits that RM, typically, consists of three key pillars: risk assessment, risk response and risk monitoring and control (Tucker, 2015). Of these three components, risk assessment is of paramount significance to measure the severity of identified risks in accordance with their respective likelihoods and impacts. Put it another way, risk severity is the product of the occurrence and the impact of a risk event: f(Risk)= Likelihood*Impact. This sacrosanct probability/impact matrix is the sweet spot of the risk analysis process; therefore, it has been at the center of RM academia. Accordingly, almost all organizations utilize this well-respected formula in their internal processes to manage risk and uncertainties throughout their longevity.

1.1. Background of Research

The construction industry quintessentially teems with diverse risks and uncertainties. Unlike the traditional wisdom states that construction firms utterly propagate some risks to their stakeholders through contractual covenants and remaining risks

can be prevented by internal mechanisms, it is self-evident that risks and uncertainties remain ever-lingering within the confines of the construction industry (Farshchian and Heravi, 2018). What is more significant, construction firms concurrently pursue a plethora of projects; thereby, enhancing their risk exposure. Therefore, construction firms are prone to utilize a myriad of risk assessment techniques to enhance their organizational resilience counter to intrinsic and extrinsic anomalies. To do so, construction organizations capitalize upon this traditional impact/probability duality to quantify their risk exposure (Yildiz *et al.*, 2014). In this respect, construction firms can evaluate their risks in terms of cost and time overruns. This conventional risk analysis approach has been primarily adopted at the project level and at the organizational level to a lesser extent.

Nevertheless, the practical use of the traditional risk formula above has been limited in the construction industry. In the first place, risk assessment techniques are considerably dependent on individual projects rather than project portfolios. This one-dimensionality elicits ignorance of interdependencies among projects, for projects are interconnected to one another from operational, financial and organizational perspectives. Second, extant literature is shortsighted since risk impact has been analyzed in terms of a handful of parameters (i.e., cost, time and safety). The paucity of impact representation inevitably leads to the misevaluation of risks and uncertainties (Taylan *et al.*, 2014). Third, subjectivity is of utmost significance in RM, for perception looms large in the level of risk threshold and risk appetite of an organization. Along this line, firms are inclined to reap the benefits of diverse multi-criteria decision-making techniques to transform qualitative data into quantitative data. Albeit their benefits, the use of these techniques is limited due to their complexity and applicability on a single project rather than multiple projects (Dey, 2012). Last, prior research has attempted to concentrate on subphases of a project rather than the entire project cycle. However, risks might surface throughout different phases of a project lifecycle and there might be interrelatedness between these risks. Therefore, the risk assessment should be materialized at the project level instead of the subphase level. Despite several drawbacks, this widely-esteemed formula imperfectly suffices to assess all risks and uncertainties

because all available data is scarce and the perception of unknown incidents is markedly individual; thus, cannot be reflected to organization-wide.

1.2. Problem Definition and Research

In the face of its simplicity and widespread usage, the Achilles heel of this formula above is that the likelihood and impact of any risk can be quantified; thus, RM is considered proactive and precautionary. From this line of reasoning, it can be interpreted in such a way that previous external crises should have been anticipated prior to their existence. Nevertheless, none of any global crises, pandemics, or endemics was predicted by any organization or even by leading firms in practice. Another chief backdrop of this formulation is that risk analysis is uniform across industries and even firms. In another saying, the level of risk exposure is symmetric for countries, industries and firms. However, the application of this formulation in a real-world setting is unlikely to materialize given the recent two global incidents (GFC and COVID-19). What is more important, the COVID-19 pandemic recalls the destructive impact of high-impact, low-probability risks (HILP thereafter). Despite substantial endeavors to enhance scientific understanding and restructure RM approaches, both governments and firms imperfectly embrace HILP incidents; in turn, improperly oversee the socioeconomic aftermaths of these HILP risks (Lee *et al.*, 2012). The *low-but-never-zero* trait of these HILP risks results in an impasse for organizations. First, it is an indisputable fact that firms *do* have limited resources. Second, organizations are unable to cover all potential HILP risks given the abundance of these risks. Last but not least, such risks are imperfectly identifiable. With respect to HILP risks, the importance of likelihood is negligible from the ERM point of view, since they are unlikely and positioned on the same point at the horizontal (i.e., level of certainty) axis. However, the impact of these risks might vary across the vertical axis (i.e., level of impact) owing to different levels of vulnerabilities among firms. In another saying, not all risks are on par at the firm level. Whilst some firms experience an existential crisis, others might incur moderate losses or even gains. This disparity primarily stems from firm-specific variables (vulnerabilities). Concisely, it is reasonable to draw a conclusion that each risk

is idiosyncratic rather than ubiquitous. Albeit the widespread standpoint that risk severity is uniform across firms, the extent to which characteristics of a firm moderate the linkage between risk severity and firm asymmetries remains a largely unexplored area of research. Hence, a large and growing body of literature has displayed that there is unequal risk exposure among firms in a real-world setting (Cefis *et al.*, 2020). Extant studies revealed that firm viability is highly dependent on firm-specific attributes (e.g., size, age, nationality, financial leverage, customer base, brand equity, culture and so forth). This creates a risk paradox for organizations. Contrary to expectations, this conundrum stresses that there is no uniform risk exposure among firms in a real-world context. Rather, risk events do impact firms in an asymmetric manner. Along this line, it can be assumed that since firms have different attributes and resource bases, there is an asymmetric risk exposure among firms from the spotlight of risk analysis. Under these circumstances, one intriguing question needs to be asked: What determines how risk exposure varies among firms? Why are some firms able to generate greater risk tolerance?

1.3. Aim and Objectives of the Study

Suffice to say that the risk analysis should be materialized through an inside-out approach rather than an outside-in stance. Along this line, contribution to the existing body of literature on RM, the overall aim of this study is to bridge the gap that very little is known about differences in the drivers of firm-level risk in an asymmetric competitive market. In other words, the central focus of this research is to examine whether any asymmetry in the attributes of firms may result in an unequal level of risk threshold. To examine the significance of vulnerabilities in risk analysis, one question will serve as a guideline throughout this report. This central question will be:

How do firm asymmetries affect firm-level risk during uncertainties/crises?

To respond to this question, a handful of hypotheses are addressed. Each hypothesis covers a disparate firm characteristic (asymmetry) to shed light on the relationship

between the characteristics of a firm and firm-level risk. The objectives of this study are fourfold: Firstly, the main objective of this study is to address the precise nature of asymmetry-risk interaction in the construction industry. Secondly, another purpose of this report is to adopt an integrated approach through the inclusion of a wide range of firm-specific attributes. In this way, this study will elicit a better understanding of how firm asymmetries shape firm risk during uncertainties and ambiguities. Third, another objective of this study is to materialize a worldwide empirical analysis in order to seek the impact of national differences on firm risk. Lastly, another notable purpose of this thesis is to perform a longitudinal analysis rather than an analysis of a particular case.

Given the overall aim along with the main objectives of this study, I seek to fill this gap that has been largely neglected by research on RM. The construction industry encapsulates more risks in comparison with other industries and it is impossible to eliminate all risks. Furthermore, since construction firms largely engage in numerous projects simultaneously, they are vulnerable to more risks. In addition, the studies to date have tended to focus on risk assessment at an individual level from cost and time overrun aspects (i.e., Yildiz *et al.*, 2014 and Farshchian and Heravi, 2018) rather than an organization-wide level. Moreover, prior studies tend to concentrate on the asymmetry-risk linkage at the regional (i.e., Spailara and Tsoukas, 2103; Kausar *et al.*, 2022; and Alcalde-Fradetas and Ramírez-Alesón, 2015) or country level (i.e., Tsiapa, 2017; Cefis *et al.*, 2020; Varum and Rocha, 2012 and Ma and Zhang, 2022). To the best of my knowledge, there exists no such study that investigates this association at the global scale. Also, previous studies fall prey to a myopic behavior (short-termism) and thus they imperfectly address the real effect of crises on firm outcomes, for firms are subject to exogenous shocks at regular intervals. Besides, extant studies have been more likely to concentrate on the post-crisis phase rather than the pre-crisis stage. In a nutshell, this study will improve our comprehension of the asymmetry-risk nexus through the implementation of predefined research objectives.

1.4. Research Methodology

To gain a better understanding of how firm attributes shape firm-level risk, this study will be implemented amidst publicly listed firms in the construction industry under an empirical setting. Since this study is heavily dependent upon financial parameters, the relevant data was obtained through the DataStream database and missing data was complemented through corresponding annual reports. Of diverse statistical methods, linear regression analysis comes to the fore as the most accepted and well-reputed statistical tool in the literature (Koronis and Ponis, 2018). In the same vein, the empirical analysis in this report will be materialized through this preferred approach. To do so, the existence of each predicted relationship will be analyzed in conjunction with its respective magnitude and direction at the firm asymmetry level. In short, this study engenders a linear regression model in which firm-level determinants are a function of firm-level risk along with a sample of 4,275 observations from 192 firms incorporated in 37 countries between 1983 and 2022.

1.5. Scope and Limitations

This study addresses to what extent firm-specific attributes impact firms-level risk throughout crises and uncertainties given the capriciousness of the external environment. In this sense, this report is solely centered upon the construction industry in lieu of multiple industries, lest the empirical and academic quality of this study might be prejudiced and skewed due to the differences in industry features. This condition might undermine the extensibility of empirical findings to other industries. Furthermore, the empirical data were single-handedly retrieved from well-reputed secondary sources and annual reports. Despite the high accuracy and reliability, the extent of empirical data appears to be myopic and scarce for firms incorporated in less developed countries. This situation resulted in a substantial reduction in the sample size; however, empirical analyses satisfied our statistical demands. Moreover, certain explanatory variables (i.e., ownership structure and privatization) are represented through dummy variables due to the simplicity and absence of relevant data, for the empirical setting of this

study is entirely based on quantitative data. Thus, these independent variables should be represented through other quantitative measures to address the precise nature of asymmetry-risk linkage in full measure.

1.6. Outline of the Study

In a nutshell, the primary aim of this study is to tackle the paradigm of asymmetric risk exposure through a nascent and collective approach. Therefore, a cluster of firm traits, instead of one firm feature, will be determined to delve into the linkage between firm risk and predefined firm peculiarities. In this context, the overall structure of this study takes the form of six sections. Following the introduction to the topic, the second part of the study will be organized to provide an overview of past studies regarding the impact of firm asymmetries on firm-level risk. Furthermore, this section will be supplemented with numerous definitions of different terms (e.g., risk, uncertainty, crisis, resilience and vulnerability). The third part will attempt to analyze the prior literature on the asymmetry-risk nexus in detail. Moreover, the concept of asymmetry will be elaborated to form a basis in the pursuit of the formulation of hypotheses. The fourth and fifth parts deal with the methodology and data collection, followed by the analysis and interpretation of the empirical results. The final section of this study draws together the key findings and provides a critique of these findings. In addition, the limitations of this study will be introduced to provide a guideline for future research to finetune this study and the recital of managerial implications will be reported in accordance with meaningful empirical statements to guide decision-makers.

2. LITERATURE REVIEW

Following the introduction of this study, the primary purpose of this section is to summarize prior definitions of different terms in the literature to improve our understanding of the effects of firm asymmetries on firm risk. In the sequel, another aim of this part is to provide a brief review of the literature relating to the impact of firm characteristics on firm risk. To begin with, an overview of past definitions of related terms will be discussed.

2.1. Definition of Risk, Uncertainty and Crisis

Risk and uncertainty *per se* loom large in the business literature given the capriciousness and hostility embedded in the business milieu. Notwithstanding that the term risk inherently bears a certain degree of uncertainty, there exists a marked divergence between the two paradigms. Nonetheless, these two terms have been used interchangeably, inconsistently and interrelatedly in retrospect (Ostrowska and Mazur, 2015). Therefore, it is necessary to define these two phenomena in order to grasp deeper insights with respect to the bright line between two phenomena. From an etymological lens, the word risk is derived from the Italian word *risicare*, which means *to dare* or to *try something that may be uncertain* (Jensen and Sublett, 2017, p. 19). Hence, a multitude of distinct definitions of the term risk have been proposed in hindsight. To illustrate, risk is defined as *the objectified uncertainty as to the occurrence of an undesired event* (Willet, 1901, p. 37). Furthermore, risk refers to the *potential for the realization of unwanted negative consequences of an event* (Rowe, 1977, p. 24). Another taxonomy of risk *is the possibility of the occurrence of an unfavorable situation during the implementation of plans and the budget of an enterprise* (Ostrowska and Mazur, 2015, p. 2). Seemingly, there is no universally accepted definition of risk. Yet, to summarize, it is pertinent to opine that risk is a different form of uncertainty and an undesired deviation of actual outcomes in comparison with predicted outcomes. Drawing this line of thinking, the definition of risk will be hinged upon the seminal

work of Frank Knight (1921) in this study. Therefore, risk is defined as a situation where it is possible to calculate the likelihoods associated with a range of scenarios, whereas uncertainty corresponds to a situation where neither its probability distribution nor its mode of occurrence is known (Amoroso *et al.*, 2017). In another saying, given that uncertainty is an absolute concept, which encapsulates all unexpected future incidents, risk can be attributed to the subset of uncertainty that can be crowded out as *predictable uncertainty* (Jensen and Sublett, 2017). As depicted in Figure 2.1 below, whilst risk and uncertainty are closely associated, they are utterly disparate concepts. The essential disparity between risk and uncertainty is that whereas the consequences and likelihood of risk incidents are known by means of quantitative or qualitative data, this is not the case for uncertainty. In other saying, whereas risk can be expressed as *known unknowns (or certain uncertainties)*, uncertainty can be defined as *unknown unknowns (or true uncertainties)* (Oehmen *et al.*, 2020). The ratio between risk and true uncertainty (indicative in Figure 2.1) is idiosyncratic and thus heavily dependent on the perception of the bearer.

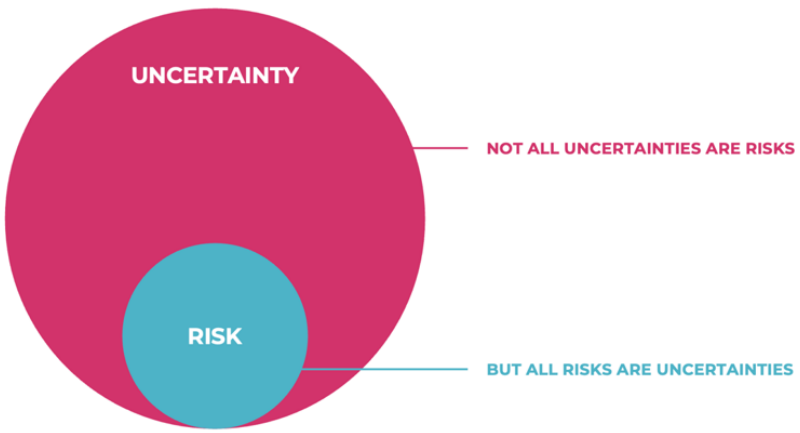

Figure 2.1. Risk and uncertainty concept (Own elaborate).

In a similar fashion, there is no universal agreement on the definition of uncertainty. Therefore, there is a large volume of published studies describing the definition of uncertainty. Table 2.1 below provide leading frameworks of uncertainty in the literature (Bevan, 2022). The first and foremost facet of risk is *quantifiability*; in turn, neither potential outcomes nor their corresponding probabilities are unknown in an uncertain setting. On the other hand, it has been articulated that uncertainty is a

state of mind; thereby; significantly associated with the cognitive ability of the bearer (Morris, 1997). The *subjective utility theory* states that individuals assign not only subjective utility to potential outcomes but also subjective probability to the occurrence of these outcomes (Savage, 1954). Nevertheless, this approach imperfectly addresses the decision-making under uncertainty, for individuals are averse to *ambiguity* and thus do not utterly adopt the utility approach. In the same vein, uncertainty has been frequently associated with *complexity, contingency, indeterminacy* and *ignorance* (Park and Shapira, 2018; Morris, 1997; and Shubik, 1954). All these terms have been utilized to highlight the paucity or dearth of knowledge regarding potential outcomes and their respective likelihood of occurrences. This is because uncertainty is a state of *knowledgelessness* and individuals do not have the required absorptive capacity to interpret the external environment in full measure. Due to this capacity insufficiency, individuals are unable to have a full understanding of future incidents, which ultimately leads to a state of ignorance (Oehmen *et al.*, 2020). Last but not least, extant studies speculate that uncertainty is an archetype exogenous (environmental) parameter, which has a sweeping impact across the entire economy. Inasmuch as none of any single organization *per se* is unable to predict or control uncertain events, it is an indisputable fact that uncertainty is an objective paradigm rather than a subjective notion. Owing to their unpredictability and uncontrollability, uncertain events *do* disruptively impact the entire business ecosystems, for firms possess a minuscule impact on the occurrence of these external shocks (Oehmen *et al.*, 2020). Considering these disparate frameworks, it is reasonable to stipulate that uncertainty is a superset of risk, wherein measurability and quantifiability are the central distinctions between these two paradigms. On the flip side, ignorance (absence of knowledge) lays the foundations of uncertainty; therefore, individuals or firms are oblivious to potential outcomes and their respective likelihood of occurrences.

In the sequel, the definition of crisis will be provided. In hindsight, disruptive global events are not scarce in contrast to common intuition. Rather, the world has experienced such exogenous shocks at regular intervals (Park and Shapira, 2018 and Oehmen *et al.*, 2020). Nevertheless, despite the regularity of HILP incidents, organi-

zations are prone to underweight the likelihood of such events due to cognitive biases (i.e., myopia, optimism bias and the Daniel-Kruger effect). In particular, the GFC and Covid-19 pandemic brought the terms risk and uncertainty into question. As it stands, the vast majority of organizations, albeit well-reputed firms, fell prey to these two crises. It is evident that overwhelmed organizations imperfectly assessed their riskiness and were impervious to the symptoms of these crises. Therefore, prior studies have commenced to demonstrate increasing attention toward the crisis paradigm so as to improve our understanding. In parallel with the definitions of risk and uncertainty, it is plausible to contend that risk is tantamount to effective certainty, for the likelihood of risk is measurable. Therefore, risk is applicable to a controlled environment. However, uncertainty is oblivious to any measurement; hence, applicable to everything else in that foresight of future events in line with past data might not represent the current situation. Given the hostility and volatility of the business milieu, a crisis can be attributed to an important strand of uncertainty. A crisis can be defined as a moment, a period of breakdown, a turning point, or a time of economic crisis (Ostrowska and Mazur, 2015). Besides, a crisis might engender a prolonged disruption of regular and goal-oriented activities, endangering the status quo or even eliciting to organizational demise. The key pillars of a crisis are heightened uncertainty, surprise factor, time pressure, late response, a loss of control, a danger to important functions, an increase in tension and information deficit (Ostrowska and Mazur, 2015).

Notwithstanding that the likelihood of uncertainty and crisis is unmeasurable; organizations have been in an enormous endeavor to manage uncertainties and crisis. To do so, firms ceaselessly engage in not only risk management strategies to reduce uncertainties but also strategic management activities to cope with uncertainties and crises. While uncertainty mitigation is an inherent stimulation, the handling of uncertainties can be interpreted as an adaptation to external variations. The former can be materialized through information gathering, proactive collaboration or cooperation and networking. On the other hand, the latter can be transpired through flexibility (diversification and operational adaptation), imitation (mimic rivals and first-movers), reactive collaboration and cooperation, control and avoidance. In short, the manage-

ment of uncertainty and crisis can be realized through mitigation of the likelihood of unfortunate consequences of HILP incidents and their influence on businesses at various stages of the value chain.

Table 2.1. Selected prior studies for the definition of uncertainty.

Author	**Year**	**Source**	**Type of framework**	**Context**	**Brief description of notable features**
Knight	1921	Book	Definition	Economics	A definition of risk (probabilities can be known) and uncertainty (unknown probabilities).
Keynes	1921	Book	Definition	Economics	A fundamental distinction between uncertainty and probability. Probability is disaggregated into i) numerical ii) non-numerical yet comparable and iii) non-comparable
Savage	1954	Journal Article	Distinction	Decision theory	The utility that people assign to certain outcomes are subjective and context dependent.
Shubik	1954	Journal Article	Distinction	Decision theory	The informational aspects of any economic situation give rise to three types of uncertainty. They are ignorance owing to lack of information; risk owing to the spread of possible values for a random variable; and economic

Table 2.1. Selected prior studies for the definition of uncertainty. (cont.)

Author	**Year**	**Source**	**Type of framework**	**Context**	**Brief description of notable features**
					indeterminacy owing to the nature of most game solutions
Ellsberg	1961	Journal Article	Definition	Decision theory	A classic article on decision theory that displays an inconsistency (paradox) between people's choices and evaluations **subjective expected** utility. An ambiguity aversion is identified where subjects prefer gambles where odds can be known, rather than gambles where odds are ambiguous (even if they may be larger).
Thompson	1967	Book	Distinction	Organizational theory	Uncertainties are presented to complex organizations from three sources, two external to the organization and the third internal. External uncertainties stem from (1) generalized uncertainty, or lack of cause/effect understanding in the culture at large and (2) contingency, in which the outcomes of

Table 2.1. Selected prior studies for the definition of uncertainty. (cont.)

Author	**Year**	**Source**	**Type of framework**	**Context**	**Brief description of notable features**
					organizational action are in part determined by actions of elements of the environment. The internal source of uncertainty is (3) interdependence of components.
Kahneman and Tversky	1982	Article	Typology	Decision -making and Psychology	A framework that builds on Howell and Burnett (1978). They recognize that uncertainty may be attributed to either the external world (dispositions) or the internal world (ignorance). External judgement of uncertainty may be distributional (relative frequencies may be estimated) or singular (probabilities assessed from propensities of case at hand). Internal uncertainty may be reasoned (deducing answer from other knowledge) or introspective (confidence in answers that seem familiar).
Milliken	1987	Article	Typology	Management studies	Identification of three types of environmental uncertainty relevant to management (uncertainty

Table 2.1. Selected prior studies for the definition of uncertainty. (cont.)

Author	**Year**	**Source**	**Type of framework**	**Context**	**Brief description of notable features**
					about environment exterior to an organization). Argues that previous authors had considered sources, but it will consider types. The types are: 1) State uncertainty- the inability to predict how components of environment are changing (authors stress not same as not defining pdf) 2) Effect uncertainty - inability to predict how environmental changes affect ones organisation) Response uncertainty- uncertainty about what response options one has and effects of response choice (close to decision theorists).
Dosi and Egidi	1991	Article	Distinction/ Matrix	Economics	The principle distinction made is between procedural (lack of capacity to solve problems) and substantive (lack of information

Table 2.1. Selected prior studies for the definition of uncertainty. (cont.)

Author	**Year**	**Source**	**Type of framework**	**Context**	**Brief description of notable features**
					about the environment one is in) uncertainty. Substantive uncertainty is subdivided into weak substantive uncertainty (probabilities known and analogous to risk and strong substantive (analogous to Knightian uncertainty).
Helton	1994	Journal Article	Distinction	Risk assessment	A distinction between stochastic and subjective uncertainty. Also, adaptation of a risk framework to use for probabilistic risk assessment uncertainties.
Rowe	1994	Journal Article	Dimensions	Risk assessment	Distinguishes four classes or dimensions of uncertainty: temporality (uncertainty in past, present or future states), structural (uncertainty due to the complexity of the system), metrical (uncertainty in measurement)

Table 2.1. Selected prior studies for the definition of uncertainty. (cont.)

Author	**Year**	**Source**	**Type of framework**	**Context**	**Brief description of notable features**
					and translational (uncertainty in explaining uncertain results). Variability is described as contributing to all four classes. Various factors contributing to all of these classes are given.
Dequech	2011	Journal Article	Dimensions	Economics	Builds on Dosi and Egidi and Knightian uncertainty. Adds own distinction between ambiguity and fundamental uncertainty. The three distinctions are: Strong vs weak uncertainty (can pdf be defined); substantive (due to lack of information) vs procedural (lack of capacity to gain information); ambiguity (state space known) vs fundamental (state space unknown)
Kay and King	2020	Book	Various distinctions and dimensions	Economics	Make the Knightian distinction between resolvable and radical uncertainty.

2.2. Traditional Risk Assessment Matrix

As depicted in Figure 2.2, risks can be interpreted in terms of likelihood and impact. From a theoretical standpoint, the product of the values from these columns defines the loss exposed by the respective risk. The principal premise of this probability/impact matrix is that risk severity is uniform per a certain event, which affects all firms on equal footing. In another saying, the risk exposure created through a risk event is distributed uniformly amongst firms. Nonetheless, the same risk exposure is unlikely to emanate in that asymmetries remain perpetual among firm-specific attributes. Given these eternal disparities among organizations, it is an indisputable fact that asymmetric risk exposure persists in an intra-industry context.

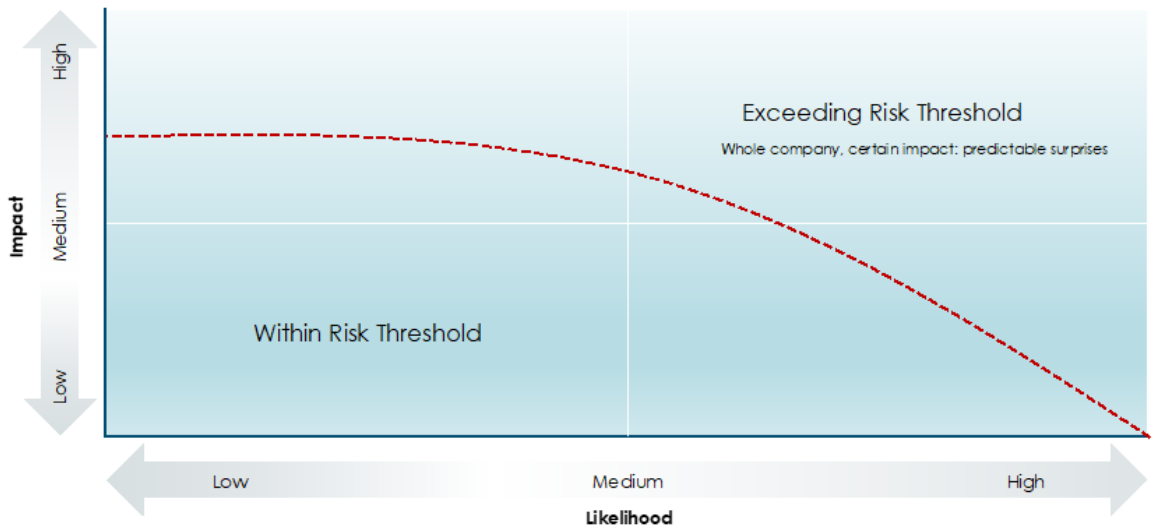

Figure 2.2. Risk analysis matrix (Own elaborate).

2.2.1. Asymmetric and Long-Lasting Risk Severity but Same Probability

As summarized in preceding sections, it is highly believed that since asymmetries in firm characteristics and resources are persistent, risks are more likely to result in unbalanced outcomes; in other words, one firm can incur more losses or gains than its peers. Therefore, the key to a firm achieving positive added value or competitive edge is the existence of asymmetries between a firm and its counterparts.

To illustrate, the vast majority of pundits, notable economists and even eminent central bankers were oblivious to crystal clear portents of the GFC in 2007. Unfortunately, these all-seeing and all-knowing individuals imperfectly surmised the likelihood of this watershed; in turn, engendered substantial distress in economies across the globe. Furthermore, the COVID-19 pandemic is a prominent epitome of the asymmetric risk impact across countries. The impact of COVID-19 on the GDP growth rate is demonstrated in Figure 2.3 (Statista, 2023) below at the national and regional levels. As it stands, there exists an imbalance among European countries due to their respective peculiarities. From an inter-industry perspective, tourism-driven countries (e.g., Spain, Italy and Greece) were worse off in comparison with their counterparts, since international mobility was all but entirely ceased worldwide. In a similar fashion, the loss of GDP was uneven at the regional level. In particular, Latin America and the Euro area were hit most in comparison with other continents.

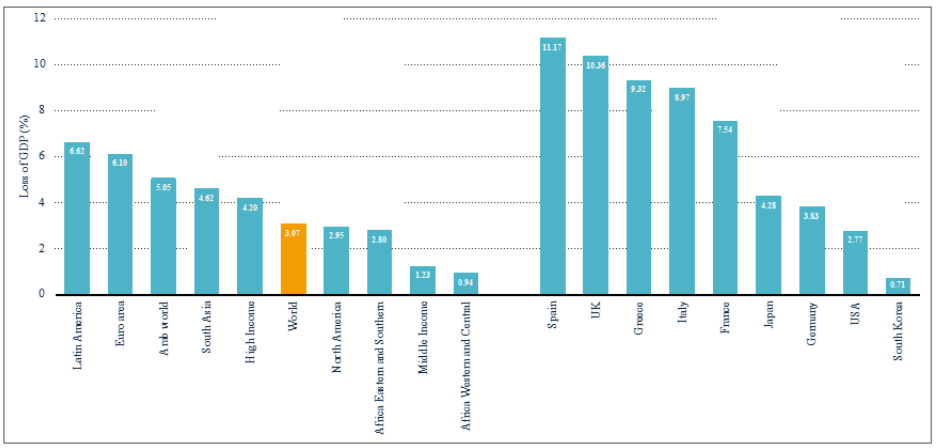

Figure 2.3. Loss of GDP per selected continents and countries in 2020.

In a similar stand, the outbreak of COVID-19 wrought havoc on almost all industries as illuminated in Figure 2.4 (Statista, 2023) below. Specifically, two industries (manufacturing and travel and transportation) were hit at most relative to other industries, for manual labor is of vital importance in these two sectors.

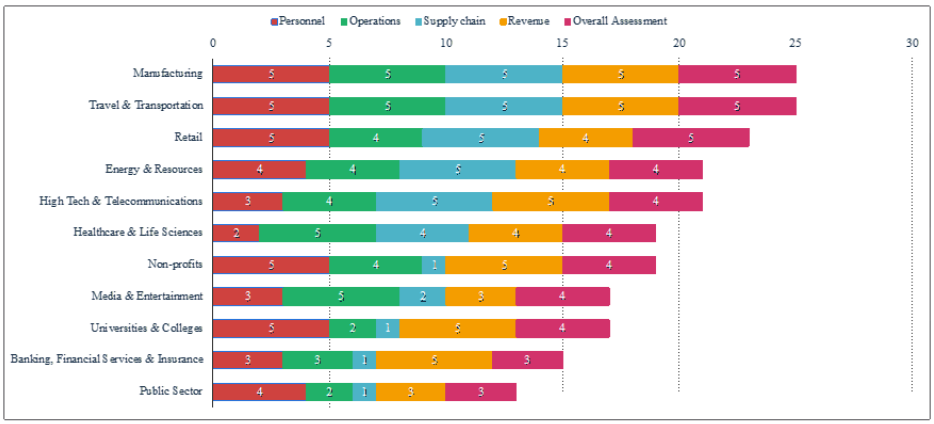

Figure 2.4. Projected coronavirus (COVID-19) impact index by industry and dimension-minor (1) to severe (5) in 2020.

In contrast to common intuition suggests that HILP incidents are less likely to be anticipated, these high-profile incidents can be recognized by industry experts. These so-called predictable surprises do possess three signaling characteristics. The initial trait of predictable surprises is that they are the outcomes of other risks, which are known to decision-makers. Second, these risks will result in an organization-wide impact. Last, organizations should respond in return for predictable surprises. The predictable surprises include epidemics, pandemics, cyberattacks, hurricanes, floods, financial fraud, economic recessions, oil spills and other catastrophes, whether natural or human-caused. As illustrated in Figure 2.5 (Statista, 2023 and Worldbank, 2023) below the world has witnessed a periodic series of exogenous shocks and therefore it is prudent to suggest that a crisis is likely to unearth every 5 years from the spotlight of statistics. Indeed, it is self-evident that crises seem to be ample rather than sparse from a statistical point of view. This cyclic frequency of crises can be interpreted in such a way that there exists a certain degree of learning curve instead of liability of foreignness (lack of knowledge or state of ignorance) among organizations.

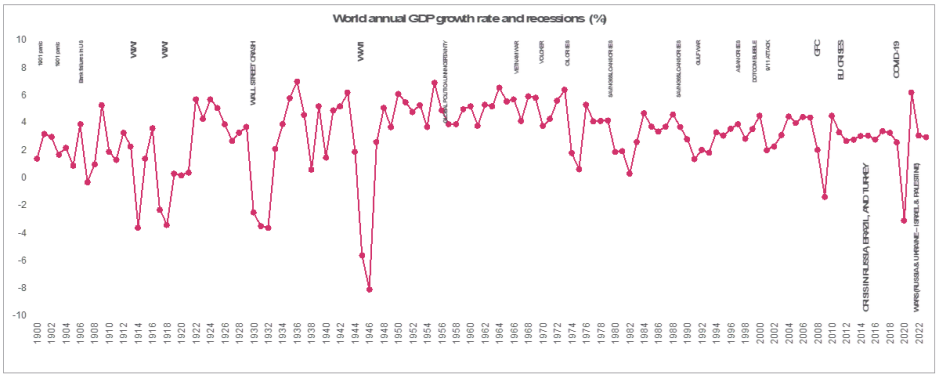

Figure 2.5. The historical annual GDP growth rate of the World and pastrecessions.

In accordance with Figure 2.5 above, it is appropriate to deduce that extant studies fail to cover an elaborate causality between firm asymmetries and firm risk due to their myopic inclination. Generally, prior studies are prone to adopt a sample period of three to five years following the crises so that such myopic studies imperfectly construe the bedrock of the interaction between firm characteristics and firm risk. Supportively, Figure 2.6 (Statista, 2023) below highlights the average time in months to recover back to pre-crisis level. On average, the recovery period lasts 90 months and 60 months in real and nominal terms respectively. Particularly, there exists a substantial difference in recovery times per crisis type. The adverse effects of structural recessions (e.g., GFC, Oil crisis, dot-com bubble), which are fueled by structural problems, generally persevere approximately 134 months and 111 months in real and nominal terms individually. A cyclical recession (e.g., SandL crises), which stems from tightened monetary policies, demands 73 months (in real terms) and 50 months (in nominal terms) to restore to the pre-crisis phase. Lastly, an event-driven recession (e.g., COVID-19 and War in Ukraine) recuperates within 15 months in nominal terms and 71 months in real terms. Apparently, the time horizons of previous studies are insufficient to investigate the asymmetry-risk nexus, for the required recovery period is longer than the sample period of extant studies. In another saying, the crises are inherently long-lasting rather than short-lived.

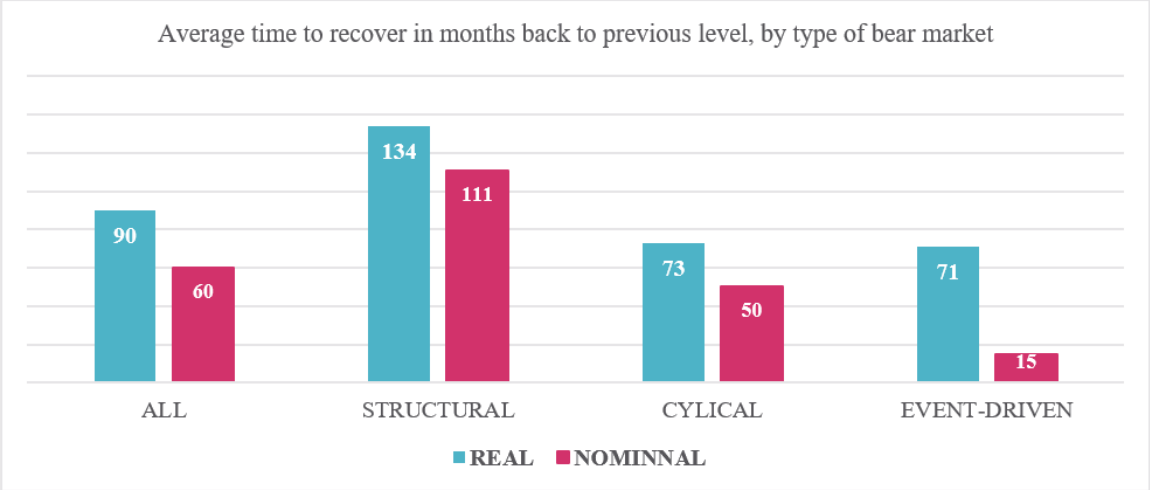

Figure 2.6. Average time to recover back to the previous level, by type of bear market (Source: Statista).

2.3. Definition of Vulnerability and Organizational Resilience

As abovesaid in preceding sections, the conventional wisdom states that risk is the product of likelihood and impact. However, this traditional approach is solely convenient with high-frequent incidents with relatively clear cause-and-effect relationships; in turn, insufficient to tackle unlikely events (e.g., GFC and COVID-19). The principal reason behind this pitfall is that infrequent events do not bear a clear cause-and-effect relationship due to insufficient available data; thereby, it is pertinent to anticipate that the probability/impact matrix *per se* imperfectly represents the entire picture. As illustrated in Figure 2.7, RM is of utmost convenience in a controlled environment. Nevertheless, RM remains incapable and narrow-scoped to express such HILP events in that ignorance is here to stay due to the decreasing knowledge concerning their outcomes and their probability of occurrences. Rather than adopting the traditional RM approach, firms should embrace resilience thinking to cope with uncertainties. Simply put, firms should turn their face from a *predict-and-plan* mindset to a monitor-and-react approach. Under this resilience mentality, ignorance is insignificant because organizations are able to resist to or recuperate from unexpected adverse incidents without foresight (Oehmen *et al.*, 2020).

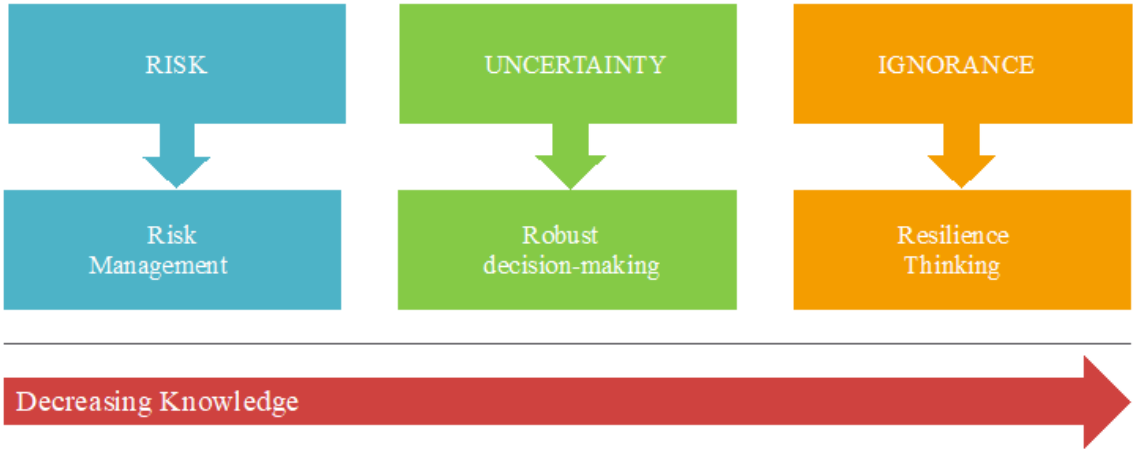

Figure 2.7. Context and responses to different levels of certainty(Own elaborate).

Seemingly, the conventional RM approach is inappropriate to address HILP incidents, for these events reside within the fat tail of probability distribution. In practice, it is crystal clear some companies incurred substantial losses (more vulnerable or less resilient), whereas others were exposed to negligible losses (less vulnerable) or even experienced gains (more resilient) in the wake of crises. Vulnerability refers to the susceptibility of an entity from the spotlight of preparedness, agility and adaptability. The vulnerability is composed of three components: sensitivity, exposure and adaptive capability (Oehmen *et al.*, 2020). As it stands, vulnerability is significantly associated with impact (*sensitivity*) and likelihood (exposure). That is, a higher vulnerability will entail a higher impact at the firm-level. Provided that firms do not possess proper and duly responses and control strategies; the probability of a risk incident will increase. Thus, the evaluation of vulnerabilities fosters firms to manage their risk threshold. Vulnerability assessments facilitate the anticipation of risk events, prevention of risk occurrences, adaptation to a new environment and resistance to capital buffer and financial distress. There exists no one-size-fits-all risk assessment scale; in turn, firms should define their own scales to satisfy their demands and needs in the pursuit of crisis management.

Generally speaking, an organization is considered more vulnerable in case of being more exposed and more sensitive to an external incident, all else equal. Conversely, a firm is regarded as more resilient in the event of less exposure and less sensitive to

an exogenous shock, *ceteris paribus*. Drawing this line of reasoning, it is an inevitable fact that organizational resilience (OR thereafter) is of utmost importance in the management of uncertainties and crises. The term resilience is originally stemmed from the Latin word *resilire*, which means *to rebound* (Matysek-Jedrych *et al.*, 2022). A large and growing amount of research has deployed the concept of resilience among diverse disciplines (e.g., psychology, disaster management and firm survival). In the same vein, the term resilience has been exploited across numerous levels; from micro levels (individual) to macro levels (i.e., economies) to societies. Of these levels, OR is of our central concern throughout this study. Resilience, from the spotlight of organizational behavior, can be considered *a firm's ability to survive, acclimate and nurture in a dynamic and uncertain environment* (Rai *et al.*, 2021, p. 5). Albeit diverse and numerous definitions of OR in the business literature, firm resilience can be considered a process rather than a stationary state and is composed of five facets. First, OR paves the way for *preparedness* to guard against uncertainties through operational and financial aspects. Therefore, resilient firms are able to develop an *ability* to anticipate potential perils prior to their existence. Second, OR is the backbone of firm *resistance* counter to undesired incidents; therefore, resilient firms can seize the opportunity to mitigate or even circumvent the adverse effects of existential crises. Third, OR engenders a superior *adaptive capacity or robustness*, which enables resilient firms to preserve their survival in the face of endogenous and exogenous variations and thus acclimate to an ever-changing environment. Fourth, OR facilitates the *recovery* from unexpected events and thus resilient firms can restore to their pre-crisis condition or enhance their performance throughout the post-crisis phase. Last, OR nourishes *organizational learning* in that firms are compelled to come up with novel ideas to outpace their pre-crisis performance.

Given the importance of OR in the management of uncertainties and crises, it is widely recognized that the strategic fit between firms' resource configurations and their respective environments is critical to their viability. Provided that the existing business milieu is replete with pronounced uncertainties, instabilities and turbulences, resilience capacity is the key ingredient of crisis preparedness. In other words, OR is significantly

associated with organizational resource endowment. Along this line, RBV states that resources and capabilities, that enable firms to gain a competitive edge, are scarce and imperfectly mobile. Furthermore, Resource dependency theory (RDT thereafter) is an effort to address the effect of external resources on firm behavior. The fundamental facet of RDT is that self-sufficiency is inapplicable in a real-world context. In another saying, an organization single-handedly imperfectly accumulates or generates must-have resources to operate and compete in the market. In this regard, firms incessantly strive to internalize external resources to fortify their resilience in the face of market disruptions. Another interpretation of RDT is that vulnerability remains ever-present to some extent in that organizations are obliged to utilize external resources to remain competitive in the market.

In short, as the business environment is subject to permanent disruptive changes, firms demonstrate an increasing propensity to adjust their posture in line with new equilibrium. The RBV and RDT assert that resilience capacity is closely associated with firm resources. Table 2.2 below illustrates the leading sources of OR that have been adopted by extant studies (Matysek-Jedrych *et al.*, 2022). Seemingly, firm-specific attributes (e.g., financial performance, knowledge base, tangible assets, intellectual capital and brand equity) and interfirm factors (e.g., network ties and supplier dependency) play an important role in OR. More importantly, it is apparent in Table 2.2 that OR is highly dependent on firm-specific attributes rather than external resources. Along this line, it can be assumed that since each firm has different attributes, there is an asymmetric vulnerability among organizations in an uncertain context. From the spotlight of vulnerability, risk is sui generis, for firms do differ in their respective resource composition. Drawing this line of reasoning, firm-specific attributes play a pivotal role in organizational flexibility and adaptivity (firm resilience). Therefore, the traditional risk formula can be revamped as follows from a conceptual lens; f(Risk)= Likelihood*Impact*Firm-specific features (Vulnerabilities and Organizational resilience).

Table 2.2. Literature-based and expert-based sources of organizational resilience during the pandemic (Own elaborate).

# of OR	**Category**	**Explanation**
OR 1	Access to financial resources	A firm's access to liquidity (ability to raise cash when it needs it either from internal or external sources)
OR 2	Access to human capital	Access to experienced human capital and know-how, especially on managerial level
OR 3	Digitization level	Incorporation of digital technologies into business processes, including supply chain management
OR 4	Cooperation (interfirm arrangements)	Degree of codependence and coopetition between the company and other entities participating in the value creation process
OR 5	Firm size	Firm size is measured in turnover, number of employees and total assets
OR 6	Ownership structure	Origin of the capital (private owned or state-owned)
OR 7	Corporate affiliation	Affiliation to corporate groups (affiliates with strategic interest)
OR 8	Responsiveness	The ability to address the market requirements maintaining reliability and reputability of an organization effectively and efficiently
OR 9	Portfolio redundancy	The degree of dependence and level of switching costs associated with the company's existing supplier and customer portfolio
OR 10	Flexibility and organizational slack	The ability of company to alter processes, resource allocation, structure and governance mechanisms as a response to market changes, production volume or product variability
OR 11	Innovativeness	The ability to offer new products/services to the existing customers
OR 12	RandD Intensity	The ratio of RandD expenditure to total expenditure for the year

In the first place, the bulk of prior studies has been fixated on the liaison between firm-specific attributes and firm risk at the country level (i.e., Tsiapa, 2017; Cefis *et al.*, 2020; Varum and Rocha, 2012 and Ma and Zhang, 2022). To a lesser extent, the effect of firm-level determinants on firm risk has been scrutinized at the regional level (i.e., Spailara and Tsoukas, 2103; Kausar *et al.*, 2022; and Alcalde-Fradetas and Ramírez-Alesón, 2015). Notwithstanding those prior studies at both national and regional levels

yielded fruitful deductions in regard to the interaction between firm peculiarities and firm-level risk, the findings of these studies might be biased and imperfect. The root cause behind this incompleteness is the inclusion of a multitude of industries in their research sample. Since each industry differs from one another due to intrinsic features (i.e., RandD intensity, capital intensity, regulatory regime, ownership structure and competitiveness), an interfirm analysis might lead to imperfect interpretations of the precise nature in regard to the asymmetry-risk nexus. Furthermore, recent studies have virtually flocked to GFC (i.e., Cucculelli and Peruzzi, 2018; Chiaramonte *et al.*, 2016; Salunkhe *et al.*, 2023; Chatzoudes *et al.* 2022; Mac an Bhaird, 2023; and Peric and Vitezic, 2025), 1997 Asian Crisis (i.e., Spailara and Tsoukas, 2013; Lemmon and Lins, 2003; and Tan, 2015) and COVID-19 (i.e., Wenzel *et al.* 2021; Nguyen *et al.*, 2023, Kaya, 2022, Chatzoudes *et al.* 2022; and Matysek-Jedrych *et al.*, 2022) in comparison with other crises or turmoil. What is worse, the time frame of these studies tends to be short-lived (approximately 3-5 years); in turn, these studies fail to cope with the interplay between firm asymmetries and firm-level risk per Figure 2.7. The last straw of extant studies is the substantial disregard of the pre-crisis phase within their analysis. Rather, the post-crisis stage looms large in their empirical analyses. Under these circumstances, prior studies have underrepresented the core causality between two paradigms. As a result, the interconnection between firm asymmetry and firm-level risk remains a largely unexplored area of research.

Secondly, notwithstanding that a considerable number of studies have attempted to examine the impact of firm peculiarities on a wide range of corporate outcomes (i.e., profitability, growth and value), sparse attention has been paid to the fact that crises may reveal a different level of risk exposure for each incumbent. Rather, the studies to date have tended to focus on business outcomes instead of firm-level risk. The first group of prior studies attempted to examine stock price responses to crises. From a theoretical lens, it is pertinent to deduce that the market will negatively value the emergence of crises given their high potential risks. In this regard, the occurrence of a crisis engenders a negative stock market reaction, indicating a decline in the firm value. To strengthen this assertion, (Calomoris *et al.*, 2012) unraveled that GFC entailed a

significant negative stock price in their sample of 16,000 firms in 44 countries between 1997 and 2008. This empirical evidence is in line with the findings of Ichev and Marinc (2018) indicating that the Ebola outbreak yielded a sharp fall of 7% in the stocks of firms located in the vicinity of the provenance of the Ebola virus disease and financial markets. In a similar stand, the Zika virus resulted in a reduction of 6% in the global stock market in the wake of transforming into a pandemic (Nova, 2020). On the flip side, Hossain *et al.*, (2023) found that hi-tech firms experienced an exponential upsurge in their stocks during post-COVID despite the destructive effects of this pandemic. Specifically, the so-called FANG stocks (primarily, Facebook, Amazon, Netflix and Google are included, yet sometimes Microsoft and Apple are also annexed into the mix) have demonstrated an unprecedented upheaval since the COVID-19 outbreak. As it stands, the impact of crises on firm stock returns remains inconclusive and is markedly dependent upon industry characteristics. Therefore, it is inappropriate to draw a sound conclusion concerning the link between crises and stock volatility without the inclusion of industry peculiarities. The second group of prior studies centers on the likelihood of firm survival (i.e., Cefis *et al.*, 2020; Bourletidis and Triantafyllopoulos, 2014; and Osiyevskyy, 2023), firm growth (i.e., Peric and Vitezic, 2015), hazard rate (i.e., Spailara and Tsoukas, 2015; Cefis *et al.*, 2020; and Varom and Rocha, 2012), exit rate (i.e., Yazdanfar and Ozdahman, 2020; and Power *et al.*, 2020), default risk (i.e., Cathcart *et al.*, 2020 and Liu *et al.*, 2018) and firm insolvency (i.e., Bonaccorsi di Patti *et al.*, 2015; Marimuthu *et al.*, 2014; and Kaya, 2022). At the most fundamental level, it is prudent to stipulate that crises curtail firm survival and firm growth, whereas downturns exacerbate hazard rate, default risk, exit rate and insolvency risk given the decreasing demand and credit crunch in the event of recessions. Nonetheless, prior studies fail to corroborate these predicted results. Whilst the findings of certain studies are consistent with the expectations, some research provides strong empirical evidence for the opposite interaction. Once again, this remarkable difference among empirical findings of previous research stems from the different characteristics of firms in their research sample. The last group of prior studies concentrates on financial profitability (i.e. Drobetz *et al.*, 2017; Shinkle, 2012; and Bui *et al.*, 2021), financial flexibility and soundness (i.e., Ibhagui and Olokoyo, 2018; Chen, 2013; and Wieczorek-Kosmala and

Blach, 2019a), financial leverage (i.e. Reddy *et al.*, 2022; Novita *et al.*, 2021; and Kim *et al.*, 2017), financial liquidity (i.e. Agarwal *et al.*, 2019; Larasati and Wahyudin, 2020; Pratono, 2018) and capital structure (i.e. Ouatik El-Alaoui *et al.*, 2019 and Bukalska and Król, 2020) From a theoretical standpoint, it is appropriate to stipulate that crises elicit inferior financial performance given their devastating impacts on firm earnings, market demand and lending supply. Therefore, it is essential to strengthen theoretical standpoints with empirical evidence to draw a sound conclusion regarding this nexus. Nevertheless, the prior studies present confounding empirical results regarding the impact of crises on financial metrics. To illustrate, it was found that firms are more likely to increase their profitability following GFC (i.e. Aljazzazen and Balawi, 2022), whereas the opposite interaction was confirmed in other studies (i.e., Vo, 2023 and Lin *et al.*, 2012). To strengthen this ambiguity, it was empirically discovered that firm liquidity is prone to increase during crises (i.e., Meier *et al.*, 2013 and Picolo *et al.*, 2018), whereas there exists a substantial shrinkage in cash flow and earnings due to the decreasing demand (i.e., Hafner and Pidun, 2022 and Alcalde-Fradetas and Ramírez-Alesón, 2015). In contrast to the expectations, the financial impact of crises is inclined to be bidirectional rather than unidirectional. The bilaterality is originated from the asymmetries among firms. Thirdly, as highlighted beforehand, there exist sparse empirical studies on the relationship between firm asymmetries and firm-level risk in the business literature; however, these studies enable us to gain deeper insights with respect to the interaction between these two paradigms. Among firm asymmetries, prior studies primarily have attempted to investigate the impact of firm size and firm age on idiosyncratic risk during uncertainties. The first and foremost motive behind this intention is that older and younger firms are expected to be more resilient in comparison with their younger and smaller peers since larger and older firms possess more collateral value and are equipped with better financial and resource endowments. In accordance with theoretical evidence, it was found that larger and younger firms experience less volatility in their returns (ROA and ROE) compared to their younger and smaller counterparts (i.e., Haneberg, 2021; Walls and Dyer, 1996; and Walls, 2005). On the other hand, it was discovered that smaller firms tend to have a lower Z-score in relation to larger firms (i.e., Miletic *et al.*, 2019; Parnell and Crandall, 2021; and

Coriccelli and Fregerio, 2019). The most important standpoint of the proponents of smaller firms is that the principal prerequisites for resilience during crises are flexibility, agility and responsiveness, which are the common characteristics of small firms (i.e., Berlemann *et al.*, 2021). To support this assertion, a study based on U.S. firms found that the number of small firms has displayed unprecedented growth as global barriers become less transparent. Moreover, the market shares of large firms have been shrinking since the 1960s due to the globalization wave (Friedman, 1998). Furthermore, financial ratios, particularly leverage and liquidity ratios, have received growing attention in the RM academia. Considering the credit crunch and market illiquidity during lean times, it is widely recognized that a lower debt-equity ratio and a higher cash balance are expected to cushion firm risks. Unlike predictions, it was empirically unearthed that high-leveraged and cash-poor firms are less likely to experience default risk due to the too-big-to-fail syndrome. That is, lenders are prone to support these large and overleveraged firms throughout austerity periods (i.e., Haneberg, 2021; Sullivan-Taylor and Branicki, 2011). Apart from firm size, firm age and financial parameters, a considerable amount of research has examined other firm-level determinants to shed more light on the asymmetry-risk nexus. To illustrate, much attention has been paid to the corporate governance components such as ownership structure (private vs. state), board composition, presence of Chief Risk Officer and audit committee, shareholder concentration, institutional ownership and CEO duality. The traditional wisdom states that corporate governance is of utmost significance in risk exposure and risk propensity among firms (i.e., Badriyah *et al.*, 2015; Balachandran and Faff, 2015; Batra *et al.*, 2022; Essen *et al.*, 2013). Common intuition suggests that privatization, fragmented ownership structure, the existence of CRO and audit committee and CEO singularity are critical to risk mitigation among firms. Yet, prior studies fail to affirm anecdotal evidence. Rather, it was empirically indicated that the impact of corporate governance constituents, (specifically state interference) on firm risk appears to be hypocritical (i.e., Zheng *et al.*, 2017; Huang *et al.*, 2021; Beuselinnck *et al.*, 2017; and Lazzarini and Musacchio, 2020). Moreover, recent studies have been in an effort to explore the diversification-risk nexus at the firm level. The conventional wisdom states that firms are inclined to diversify into international markets and new business segments

to enhance their customer reach and profitability. Nonetheless, it was empirically discovered that both geographical and business diversification engender a U-shape (i.e., Friberg, 2021; Cuervo-Cazurra *et al.*, 2016) or an inverted U-shape (i.e., Gulamhussen et. al, 2014; Sohl *et al.*, 2021) impact on firm risk. In brief, previous studies have presented confounding results with respect to the impact of firm asymmetries on firm risk. This incoherency fundamentally stems from the differences in the research settings of these studies. In principle, the majority of investigated studies focused on multiple industries rather than a single industry. Therefore, their empirical findings seem to be inconclusive due to the differences among industry dynamics.

2.4. Prior Studies on the Impact of Firm-Specific Characteristics and Firm-Level Risk

Considering the literature review, the overall aim of this study is to examine whether any asymmetry in the attributes of firms may result in an unequal level of risk threshold during crises. Another important objective of this study is to address the precise nature of asymmetry-risk interaction in the construction industry. By means of this study, I seek to fill this gap that has been largely neglected by research on RM. Therefore, the reliance on a single industry rather than the adoption of multiple industries will drastically circumvent the variances in the individual effects of firm asymmetries on firm risk because sampled firms will be exposed to the same industry-wide variables. Besides, the study strives to investigate the asymmetry-risk interaction at a global scale. To the best of my knowledge, none of prior studies has examined this issue at this scale; therefore, this study will be a trailblazer in the RM academia. Moreover, another purpose of this study is to embrace an integrated approach by the annexation of numerous firm-specific attributes. In this way, this study will entail deeper insights into how firm asymmetries steer firm risk throughout uncertainties and ambiguities. Nevertheless, extant studies seem to be insufficient and small-scaled in that these previous studies merely deployed a certain or few firm traits to probe the true colors of the asymmetry-risk linkage. Finally, another noteworthy purpose of this study is to materialize a longitudinal analysis rather than an analysis of a particular

case. Unlike prior studies that primarily solely center upon a certain leading crisis (i.e., GFC, Asian crises and COVID-19), the time elapse of this report paves the way for the assessment of numerous crises. What is more, extant studies have been more likely to focus on the post-crisis stage rather than the pre-crisis phase. Hence, prior studies imperfectly draw a sound conclusion concerning the link between firm asymmetries and firm risk. As it stands, recent studies fall prey to myopic behavior (short-termism) and unidimensionality (assessment of a single crisis); therefore, they imperfectly address the real effect of crises on firm risk. On the flip side, this report is of vital importance in that the real effects of firm attributes on firm risk during crises can be executed in depth through the appropriation of a long sample period in empirical analyses.

3. FORMULATION OF HYPOTHESES

So far, sparse attention has been paid to the fact that different firm determinants may entail an unequal firm risk. The studies to date have been predisposed toward tantamount risk rather than idiosyncratic risk. Notwithstanding that scant literature has been materialized to shed more light upon the impact of distinct firm attributes on firm vulnerability through the lens of size, age, network structure and financial position (i.e., Cuervo-Cazurra *et al.*, 2017; Bhagat *et al.*, 2015; Novita *et al.*, 2021), the nexus between firm traits and firm resilience remains an impasse across the RM academia. Does the same risk elicit the same impact on different firms? Is risk severity uniform among firms across the same industry? Rather, does the same risk entail a different level of risk exposure across firms? To date; however, there has been little agreement regarding the precise response to these questions. Therefore, a variety of firm features are determined to grasp full comprehension concerning the interplay between asymmetries and risk impact at the firm level. In congruent with pre-defined firm peculiarities, hypotheses will be formulated. Prior to the formulation of hypotheses, the definition of asymmetry will be perused at length to solidify our understanding in relation to the discrepancy among firm idiosyncrasies.

3.1. Definition of Asymmetry

The term *asymmetry* embodies a myriad of concepts, which have been elaborated in time. From a lexical lens, asymmetry can be defined as *a dearth of parity or equivalence between constituents or facets of something* (Oxford Dictionary, 2012). A further definition of asymmetry is *not identical on both sides of a central line* (Cimon, 2004). In the face of these lexical definitions, a precise definition of asymmetry has been proved elusive. However, these various definitions cast light upon RM literature. Tracing back to the very delineation of asymmetry, it is prudent to anticipate that firms are asymmetric egos, for they *per se* diverge from one another in terms of size, resource composition, culture, capital structure, relative position in the network, customer base

and core competence. In this respect, a taxonomy of asymmetry was introduced to crystallize dissimilarities among firms (Cimon 2004). The following section is to flesh out key theoretical concepts of asymmetries in an elaborate manner.

3.1.1. Types of Asymmetries

Firstly, variations among firm attributes (e.g., asset size, host country, venturing experience and so forth) are the key ingredients of eclectic asymmetries. Specifically, the OLI framework (ownership, location and internalization) lays the foundation of eclectic asymmetries. Stemming from this framework, eclectic asymmetries emanate from heterogeneities amidst firms' ownership, locational and internalization advantages (Dunning, 1995). Secondly, strategic asymmetry exists among firms, as they endeavor to experience a competitive edge in comparison with their peers through the capability to act, think and organize differently (Cimon, 2004). Inasmuch as competitiveness is the lifeblood of firm viability, firms zero in on the enhancement of their strategic capabilities. In particular, strategic asymmetry is the cornerstone of firm survival in that firms operate in markedly competitive markets. Thirdly, in parallel with strategic asymmetry, competitive asymmetry can be defined as the level of threat, which a firm presents to its counterparts or competitors. From RM perspective, competitive asymmetry might play a pivotal role in risk severity. That is, the level of risk can be exacerbated for a firm with a lower competitive edge because its peers with a higher competitive edge might debilitate its competitiveness through stealing its market share, shrinking its customer base, introducing new products/processes, or adapting predatory pricing. Thus, it is pertinent to articulate that firms with higher competitive advantage are in superior risk performance in relation to their counterparts with lower competitive edge. Fourthly, the ability to perform power over another firm is attributed to power asymmetry. In another saying, power asymmetry can be interpreted as the dependency of a firm on its peers. By and large, firm size and VRIN resources are the fundamental determinants of power asymmetry (Bogodisto and Wohlgemuth, 2017). Fifthly, the relative position of an ego within a network structure is broadly used to describe network asymmetry, which is germinated through direct and indirect ties of a

firm with its peers. Network asymmetry is of paramount importance in firm resilience, provided that an ego with a central position is more likely to capitalize on benefits, information and knowledge spillovers. Drawing this line of reasoning, firms are prone to gravitate toward a central position within their respective network in the interest of alleviating their relative risk. Last but not least, discrepancies in intangible assets pave the way for knowledge asymmetry amidst firms. It goes without saying that there has been a prompt and substantial transition from an industrial economy to a knowledge economy within the last two decades, particularly in developed economies. The vast majority of economic output is originated from human capital and intellectual resources rather than raw materials and natural resources. In this vein, firms are apt to enhance their innovativeness and inflate their RandD investments so as to cement their knowledge base. Across the current business climate, there exists an eminent knowledge asymmetry among firms in that knowledge is complex, dynamic, expensive and embedded in organizations.

In a nutshell, as though firms share many feathers with their counterparts to a certain extent, asymmetries inherently persist amidst firms due to their disparate peculiarities. Notwithstanding that co-evolution and convergence mitigate disparities among firms since conformity among firms is more likely to materialize in due course owing to peer pressure and bandwagon effect (Douma *et al.*, 2000), asymmetries are still long-lasting. Therefore, it is imperative to comprehend firm asymmetries to have a clearer picture concerning their impact on firm risk because firm asymmetries loom large in risk severity. Within this context, relevant hypotheses will be engendered through firm asymmetries.

3.1.2. Size Asymmetry

Firm size is of vital significance in firm survival, particularly in the wake of crises or external shocks. In this regard, the optimal size of a firm has been extensively scrutinized within RM literature. In this vein, a considerable amount of literature has been centered on whether firm size is significantly associated with firm risk. Nevertheless,

much uncertainty still exists concerning the bond between the two paradigms; therefore, a stalemate persists in the interpretation of empirical evidence on the size-risk linkage.

The generalizability of much-published research on the interaction between firm size and risk is problematic. Initially, the mainstay of smaller firm advocates is that flexibility, rapidity, responsiveness and nimble structural and organizational inertia are the key cornerstones of firm longevity, particularly across high-turbulent business environments (Sullivan-Taylor and Branicki, 2011; Audia and Greve, 2006). In other words, the liability of largeness is substantially detrimental to firm viability since large firms imperfectly adapt, respond and reposition themselves in austerity periods (Meyer *et al.*, 2020). In particular, smaller firms are more likely to enjoy two liabilities in comparison with larger firms (Power *et al.*, 2020). First, smaller firms are more capable of acclimating to changing market conditions due to their feeble inertia, which is called the *liability of obsolescence*. The second strand of liability is *senescence*, stipulating that larger firms are fraught with colossal and rigid bureaucracy; thus, leading to inefficient communication and poor decision-making. In concise, these two liabilities wreak havoc on firm survival throughout downturns; in turn, increase the default risk of firms. In addition to these liabilities, the degree of *complexity* is considerably lower among smaller firms in relation to their larger counterparts. Firm complexity is significantly correlated with transaction costs; in turn, it elicits information leakages among enterprises, which ultimately leads to poor productivity. Besides, the perseverance of internal control is onerous in highly complex organizations (Gordon *et al.*, 2009). Drawing this line of reasoning, it is pertinent to stipulate that large firms are more likely to fall prey to the liability of complexity. Secondly, smaller firms are more refractory to the sunk cost effect relative to their larger counterparts in that the likelihood of exit among smaller firms is notably higher than that of larger firms. Hence, the financial size of investments undertaken by smaller firms is more likely to be at a smaller scale. The main reasoning behind this inclination is that sunk cost, by very definition, is a cost that has been already incurred and more importantly cannot be recovered (Drnevich and West 2021). Thirdly, traditional wisdom dictates that risk tolerance or

risk appetite is positively correlated with accumulated wealth. In other words, firms depict an increasing proclivity to take risks as their wealth increases. Generally speaking, firms are inclined to be risk-averse owing to limited cash flows and uncertain cash returns; in turn, they prefer to shrink their investments during economic recessions or bearish markets. Nevertheless, larger firms may not follow suit; that is, larger firms proportionally take risks in parallel with their increasing financial measures (Walls and Dyer, 2006). Hence, it is plausible to assert that increasing wealth is a testament to increasing firm risk. Last but not least, smaller firms are superior in innovativeness compared to larger firms in the face of resource scarcity and less market influence (Lee *et al.*, 2020). Firms strive to mitigate the destructive impacts of resource paucity, asset parsimony and rapid technological changes. At this juncture, innovation can be considered an important organizational tool to materialize firm growth, specifically in high-tech industries. From this standpoint, smaller firms bear a higher degree of innovativeness compared to larger constituents due to rapid decision-making, less inertia, effective internal communication, adaptability and superior capability of fast learning. What is more significant, smaller firms are prone to exploit narrow market niches rather than realize minimum efficient scale. In concise, smaller firms are more likely to reap the rewards of innovation premium throughout market shocks due to their specific peculiarities mentioned above (Walls, 2005). Thus, it has been anticipated that small to medium-sized enterprises are the lifeblood of national economies and their withdrawal undoubtedly poses a significant threat to the global economy. In the same vein, a study based on U.S. firms found that the number of small firms has displayed unprecedented growth as global barriers become less transparent. Moreover, the market shares of large firms have been shrinking since the 1960s due to the globalization wave (Friedman, 1998). Taken together, the asymmetries in firms' flexibility and responsiveness might be a distinctive competency that enables smaller firms to exploit the outcomes of market shifts more effectively, thereby allowing them to benefit more from downturns than their larger counterpart.

In stark contrast, a considerable amount of literature indicated that larger firms engender superior risk performance in proportion to their smaller counterparts since

larger organizations are able to take advantage of economies of scale. On the other hand, smaller firms are more likely to operate beneath a *minimum efficient scale*; in turn, incur a greater cost disadvantage (Serrasqueiro *et al.*, 2020; Power *et al.*, 2020). Second, larger firms are more diversified in contrast with smaller firms from an organizational structure lens. Hence, larger firms are more likely to be supported by *risk committees* and encapsulate a *Chief Risk Officer* position; in turn, they are more proactive in comparison with others concerning *risk preparedness*. The inclusion of both risk committees and CRO entails appropriate coordination and functionality of ERM; therefore, firms are better off assessing potential risks and responding to these risks accordingly (Badriyah *et al.*, 2015). Third, the RBV theory dictates that firm performance is *sui generis* owing to disparate resource endowments. In this perspective, the key pillars of RBV are path dependence and firm heterogeneity. That is, firms *do* differ in terms of both tangible and intangible assets. Seemingly, large firms are more fraught with tangible assets compared to small firms; in turn, they are able to raise more collateral in return for external financing throughout economic recessions. What is more important, large *tangible assets* pave the way for the realization of economies of scale, which ultimately leads to a drastic shrinkage in unit costs (Van Hoang *et al.*, 2017). Moreover, the presence of intangible assets is of utmost significance in firm growth and sustainability, particularly across knowledge economies. Notwithstanding the conventional wisdom states that the value of intangible assets is less pronounced through the lens of lenders because it is compelling to measure and identify intangible resources, banks put more emphasis on intangible resources rather than tangible resources. The underlying motive beneath this preference is that the relative contribution of intangible assets is significantly higher than that of tangible assets concerning firm growth and competitive advantage. Drawing this line of reasoning, firms with larger intangible assets are more likely to utilize external debt; thereby, financing their investments. This situation leads to increased productivity and growth (Van Hoang *et al.*, 2017). Furthermore, the presence of both intangible resources and tangible resources stimulates effective corporate foresight amidst firms. Put it differently, resourcefulness instigates environmental scanning and ambidexterity practices among firms, particularly among large organizations. Hence, firms are better equipped and prepared for

risks during uncertain environments, which eventually elicits a sound *strategic planning* capability. By way of effective strategic skills, larger firms are better off anticipating opportunities and threats from the very beginning; thereby, designating a pertinent strategic posture to seize the opportunities and mitigate or even circumvent threats in a proactive manner (Meyer *et al.*, 2020). As a knock-on effect of extensive resource endowment, large firms possess more influence than small peers over their external milieu; hence, large firms are more capable of relieving or obliterating such uncertainties. Therefore, the impact of environmental uncertainties on large firms is less evident relative to that on small firms, which leads to an increased probability of survival and decreased likelihood of *hazard rate*. To support this assertion, the number of small businesses, in record time, was exposed to a remarkable decline in the wake of GFC (Drnevich and West, 2021). Fourth, the RBV theory suggests that financial resources and capital structure are the central tenets of firm resilience and vulnerability. In this aspect, large firms are more resilient relative to small firms because large businesses are more dependent on external debts rather than internal funding. What is more significant, since small firms bear less *collateral value*, they are more subjected to short-term debts and tight credit conditions. This situation compels small firms to be more reliant on internal funding and cash flow rather than external funding during crises, which leads to a vicious circle. Therefore, small firms, owing to their limited financial and debt restrictions, are more vulnerable to uncertainties and downturns; in turn, operate beneath survival points and minimum efficient scale (Power and Doran, 2020). Aside from the diversification of external financing, signaling theory suggests that information asymmetry is less marked amidst large firms because both lenders and investors possess limited and superficial information regarding the financial KPIs of small firms (Haron and Nomran, 2016; Prasetyo and Fachrurrozie, 2016). Hence, small firms fall prey to internal financing rather than external financing since information asymmetry plays an important role in the decision between internal and external financing in the eyes of lenders. That is, large firms are more likely to exploit external debt due to the less information asymmetry between the internal side of the organization and the external environment of the firm. Fifth, firms are prone to expand their size in time. In another saying, *financial stability* and *soundness* are directly linked

to firm maturity. It is undoubtedly a fact that proficiency is significantly associated with experience and practice. In this perspective, mature or established firms experience the privilege of steep *learning* and *experience curves* through their life cycle that engender increased productivity and firm resilience against downturns. Besides, the *brand equity* of large firms is higher than that of small firms due to their maturity. Therefore, large firms are more likely to bear greater visibility and attractiveness in the eyes of customers, suppliers and lenders. Based on this assumption, larger firms are more capable of retaining their existing customers, attracting new customers and raising additional capital from both external investors and lenders during uncertainties and downturns (Miletic *et al.*, 2019). Sixth, the geographical coverage of large firms is wider than that of small firms. That is to say, large firms are internationally more diversified in relation to small firms. In parallel, small firms possess a greater reliance on domestic markets rather than international markets. In this regard, large firms are able to enhance their knowledge base due to their higher degree of internationalization; in turn, more resilient to recognize and cope with variations. By the same token, a demand reduction might take a heavy toll on small firms during recessions since they are more dependent upon their respective national market (Miletic *et al.*, 2019). Last, extant studies suggest that governments are more likely to bail out large firms in lieu of small firms. The principal motive is that the mortality or withdrawal of large firms will entail a substantial threat and disruption to the national economy. Thus, both governments and lenders are slanted in favor of large businesses due to the Too Big To Fail (TBTF) bias because these firms transcend the size threshold (Bhagat *et al.* 2015). Furthermore, large firms reap the benefits of political connections and lobbying activities owing to their resourcefulness. Thereby, large firms strive to maximize government protection to surmount the adverse impact of uncertainties and recessions through better tax conditions and financial injections (Dörr *et al.*, 2021).

In concise, inasmuch as the construction industry is a capital-intensive industry and the bulk of incumbents are internationally more diversified, it is prudent to put forth that the superiorities of large firms outpace those of small firms, ceteris paribus. Hence, hypothesis 1 is postulated as follows.

Hypothesis 1: All other things being equal, the firm size is negatively associated with firm-level risk in the construction industry.

3.2. Firm Type Asymmetry

Going public is an important inflection point throughout the lifecycle of an organization. The transition from private to public engenders a fundamental change in the legal and economic structure of a firm. In this sense, a blizzard of studies has attempted to analyze the prominent aftermaths of going public through a risk lens. First, the shareholders of publicly traded firms can seize the opportunity to trade their shares; in turn, increasing their liquidity in return for their shares. In this way, publicly traded firms are better off raising capital at a lower cost in comparison with their private peers (Samet *et al.*, 2018; Farre-Mensa, 2010; and Meles *et al.* 2021). Given poor economic conditions, the privilege of accessing external capital enables publicly traded firms to maintain their required working capital and even take on future new investments. On the flip side, private firms imperfectly seize investment opportunities, for their internal capital may be sparse in the wake of downturns. Seemingly, publicly traded firms are less likely to be vulnerable to exogenous shocks relative to their private counterparts. Second, initial public offerings (IPOs thereafter) are typically preceded by a series of acquisitions due to the infusion of capital. Financially loosened public firms are inclined to acquire potential targets, for such public firms reach a certain financial threshold. Thus, publicly traded firms can mitigate their risks due to the realization of scale and scope economies by acquisitions. Third, publicly traded firms can undertake new investments through capital infusion and thus can sustain long-term growth (Lee *et al.*, 2020). Fourth, professional managers generally are at the helm of publicly traded companies and such agents are of utmost sensitivity to their employability and dignity. Hence, these managers are more likely to adopt a conservative posture; in turn, pursue less risky business activities to shield their marketability (Samet *et al.*, 2018). Fifth, publicly traded firms are characterized by market forces and regulatory scrutiny. Provided that information is up for grabs to any peer across the market, regulatory agencies are capable of responding on the spur of the moment when a publicly

traded firm engages in risk-taking behavior. Hence, publicly traded firms are prone to be risk-averse under the regime of disciplinary forces (DeYoung and Li, 2019). Lastly, publicly traded firms, by and large, possess a less concentrated ownership structure in relation to their private constituents, entailing less information asymmetries among shareholders. This feeble information asymmetry circumvents the entrenchment effect of larger shareholders at the expense of their smaller peers. Therefore, larger shareholders are less likely to expropriate smaller shareholders and thus adhere to common interests rather than self-interests (DeYoung and Li, 2019). All things considered; it is pertinent to suggest that going public is negatively associated with firm risk.

In contrast to the bright sides of going public, a considerable amount of research has demonstrated that there exists a remarkable failure rate in IPOs (Meles *et al.* 2021). Unexpectedly, publicly traded firms are prone to cease (or delist) subsequent to IPOs. To elucidate, IPOs in the US market have experienced a substantial shrinkage between 1973 and 1991 and thus the ten-year delist rate of IPOs increased from 16.9% for the 1973 cohort to 44.2% for the 1980-1991 cohorts (Meles *et al.* 2021). In a similar stand, the findings of an empirical study at a global scale revealed that approximately 15% of IPOs were delisted throughout the initial ten years after going public between 1998 and 2008 (Meles *et al.* 2021). This noteworthy dissolution rate can be interpreted in such a way that publicly traded firms imperfectly meet the objectives of going public. In this respect, extant literature has attempted to investigate the risk-enhancing effect of going public in several ways. First, public disclosure is detrimental to firm risk, for a firm may lose its competitive edge due to the information leakage to its rivals (Farre-Mensa, 2010; Faccio *et al.*, 2011).

Second, managers at publicly traded firms may succumb to overliquidity and thus invest in risky businesses to satisfy their personal incentives (Chemmanur and He, 2011; Benninga *et al.*, 2005). Last, privately held firms generally have a concentrated ownership structure, which enables such firms to track their managers closely. On the other hand, managers are less likely to be monitored in publicly traded firms, for the ownership structure of these firms is dispersed and there exists a greater separation

between ownership and control. Therefore, it is reasonable to opine that going public amplifies firm risk since there exists a misalignment between managers and shareholders due to poor monitoring.

Other things being equal, it is prudent to conclude that the marginal benefit of going public outperforms that of privately held firms, for liquidity is of vital importance during downturns. Since internal capital is curtailed due to the reduced demand, publicly traded firms are better off raising external capital at a lower cost. Thus, hypothesis 2 is postulated as follows.

Hypothesis 2: Going public mitigates firm risk in the construction industry, ceteris paribus.

3.3. Financial Position Asymmetry

Traditional wisdom postulates that financial soundness or health is significantly aggravated during economic recessions or external shocks. That is, a firm with weak financial health is more likely to succumb to recessions, which may even lead to firm mortality. On the other hand, good financial health portends to efficient resource allocation, optimal debt-equity composition, organic firm growth and competitive edge. What is more significant, the real value of financial soundness can be witnessed throughout financial instability, for a firm with good financial health is able to absorb shocks by inhibiting disruptive consequences of adverse events. In this perspective, a handful of leading financial soundness indicators will be addressed to investigate the impact of financial position on firm-level risk.

3.3.1. Past Performance

There exists a sound nexus between performance and risk at the firm level. Notwithstanding that risk management is the prerequisite for performance enhancement, the exact opposite interaction is more likely to prevail. In another saying, supe-

rior performance is essential to increased risk threshold, which is of paramount importance in firm viability. However, to date, the academic literature on this interplay has revealed the emergence of two competing themes.

The first strand of literature states that risk propensity is negatively associated with strong past performance. In contrast, poor past performance is positively correlated with a risk-taking posture (Uhrin *et al.*, 2021; Audia and Greve, 2006). This standpoint has been cemented by the fact the discrepancy between the level of satisfaction and the firm's past performance is the key ingredient of the firm's strategic behavior. At this juncture, past performance is contemplated as a focal point, acting as an organizational decision-making vehicle, which explicitly illuminates the impact of past performance on decision-making attitude (Shinkle, 2011). In the same vein, *behavioral theory* suggests that decision-makers are markedly *bounded-rational* and *satisficing*. In addition, historical patterns rather than future expectations are the central tenets of firm behavior. That is, past performance substantially overwhelms strategic predispositions; in turn, fuels future performance and risk appetite at an organizational level. Drawing upon this line of reasoning, the need for recovery is more likely to take place, triggering risk-seeking behavior in the event of a below-aspiration-level situation. Hence, firms are more prone to attempt risky actions to diminish losses and restore them to targeted levels. On the other hand, firms are expected to be more risk-averse, provided that past performance outpaces aspiration level. This divergent interaction can be expressed by the term Loss Aversion, which is the core premise of *Prospect Theory* (Vo, 2023; Lin *et al.*, 2012). In accordance with this theory, individuals innately are averse to losses, forbearing to incur any losses. Moreover, individuals are more sensitive to losses than gains. In this perspective, *reference dependence, loss aversion* and *diminishing utility* paradigms were incorporated in PT; therefore, these three terms lay the foundation of consumer choices under risk preferences. The first and foremost principle of PT theory is that individuals are reluctant to lose something, which is already in their possession. What is more, the value of losses outperforms that of gains relative to a certain reference point. These explanations underpin why individuals demonstrate an increasing risk propensity in case of below the reference level (e.g., what we do not

possess), whereas individuals are apt to gravitate toward risk aversion given the above-reference-level situation (e.g., what we do possess). These opposite preferences are coined as the *reflection effect* (Tversky and Kahneman, 1981) and cemented through the *endowment effect and status quo bias theory* (Shinkle, 2011). In concise, albeit few discrepancies, both BT and PT share three leading similarities. First, organizations or individuals center upon *aspiration level* (Cyert and March, 1963), *strategic reference point* (Shoham and Fiegenbaum, 2002), or *self-perceived reference point* (Tsai and Luan, 2016) to assess their performance. Second, aspiration level or strategic reference point is utilized to interpret performance either as a *failure*, provided that performance is lower than aspiration level, or as a success given that performance is higher than aspiration level. Third, the urge to surmount a performance failure outweighs the willingness to amplify success; hence, firms or individuals demonstrate an increasing tendency to embrace risks in the wake of weak past performance.

The second strand of literature is based on *threat-rigidity theory*, stipulating that firms are prone to be conservative in the case of a capricious environment (Staw *et al.*, 1981). Under this volatile milieu, firms may embrace constricted information flux, morph into robust structures by implementing solely tested processes and commit to centralized decision-making (Audia and Greve, 2006). Stemming from this line of reasoning, it is plausible to reckon that firms are more likely to be risk-averse rather than risk-seeking given below-aspiration level. The key reasoning behind this assumption is that the below-aspiration level can be interpreted as a *non-repairable gap or a life-threatening* peril. Therefore, firms exhibit an increasing motivational predisposition towards security and abstain from incurring further losses. Particularly, the urge to be risk-averse is intensified on the verge of survival point and bankruptcy, for further losses presumably engender firm failure (Lin *et al.*, 2012).

In a nutshell, perception of threat and proximity to bankruptcy may stimulate psychological anxiety and stress, which ultimately entails poor responsiveness, inefficient information-processing and inflexibility. This rigidity paves the way for preserving a position of safety and thus begets to feeble risk appetite. Taking all these arguments

into consideration, it is pertinent to speculate that underperformance ignites risk aversion owing to the fear of organizational decline.

The second strand of literature is based on *threat-rigidity theory*, stipulating that firms are prone to be conservative in the case of a capricious environment (Staw *et al.*, 1981). Under this volatile milieu, firms may embrace constricted information flux, morph into robust structures by implementing solely tested processes and commit to centralized decision-making (Audia and Greve, 2006). Stemming from this line of reasoning, it is plausible to reckon that firms are more likely to be risk-averse rather than risk-seeking given below-aspiration level. The key reasoning behind this assumption is that the below-aspiration level can be interpreted as a *non-repairable gap* or a *life-threatening* peril. Therefore, firms exhibit an increasing motivational predisposition towards security and abstain from incurring further losses. Particularly, the urge to be risk-averse is intensified on the verge of survival point and bankruptcy, for further losses presumably engender firm failure (Lin *et al.*, 2012). In a nutshell, perception of threat and proximity to bankruptcy may stimulate psychological anxiety and stress, which ultimately entails poor responsiveness, inefficient information-processing and inflexibility. This rigidity paves the way for preserving a position of safety and thus begets to feeble risk appetite. Taking all these arguments into consideration, it is pertinent to speculate that underperformance ignites risk aversion owing to the fear of organizational decline.

Aside from these competing arguments, extant literature has attempted to address to what extent *slack resources* affect risk-taking behavior. From the definition lens, slack can be interpreted as an *excessive resource*, which is the lifeblood of the efficient operation of a firm (Moses, 1992). Traditional wisdom states that there exists a positive interaction between slack resources and risk-taking behavior in that slack resources enable firms to respond against environmental variations or internal volatilities in a timely and proactive manner. What is more significant, slack resources may elicit *experimentation and exploration*, which enable firms to seize the opportunity to experiment new products and markets (Mahto and Khanin, 2015). Based upon these

arguments, it is pertinent to posit that high performance inhibits firm risk since slack resources invigorate resilience against downturns and more importantly provide a pertinent basis for innovation, which is the backbone of firm survival.

Apart from theoretical evidence, there is a remarkable paucity of empirical research investigating the rapport between past performance and risk at the firm level; nevertheless, the empirical findings of these studies fail to resolve the connection between the two paradigms. To shed more light on this interaction, six studies were presented to delve into how underperformance shapes risk behavior at the organizational level. First, it was empirically indicated that risk-taking among the lowest quintile is highest in relation to other quintiles as performance drops below aspiration level (Gooding *et al.* 1996). Second, a decline in performance boosts risk-seeking on both sides of the aspiration level; however, it provides a stronger impact on firms below the aspiration level (Greve, 1998). Third, it was found that inferior performance triggers risk appetite at the organizational level (Ketchen and Palmer 1999). Fourth, risk-taking posture is negatively correlated with performance across all categories (low, medium high) of firm performance (Miller and Chen 2004). The empirical results of these four studies appear to be consistent with both behavioral theory and prospect theory. Nevertheless, the subsequent two studies fall foul of the aforementioned four studies. In contrast to earlier findings, the opposite interaction between firm performance and risk-taking was detected in further two studies. First, lower performance brings about less risk-taking among a sample of declining firms (Wiseman and Bromiley 1996). Second, in a similar fashion, a setback in performance foments risk threshold among high performers; nonetheless, propels risk aversion among poor performers (Miller and Bromiley 1990). The latter two studies have been unable to corroborate the upshot of risk-taking below the aspiration level. Rather, the resultant outcome of these two studies is in accord with the central idea of risk aversion below the aspiration level.

Given the empirical and theoretical evidence, it is sensible to set forth that firm performance is negatively associated with firm risk, *ceteris paribus*. In the face of

confounding theoretical arguments and empirical findings, underperformed firms are more likely to be risk-takers due to the increasing urge to risk-seeking behavior and paucity of slack resources. Thus, hypothesis 3a is postulated as follows;

Hypothesis 3a: Firm performance is negatively associated with firm risk in the construction industry.

3.3.2. Financial Leverage

Aside from financial performance, *capital structure* is one of the leading firm heterogeneities, which is essential to firm flexibility and stability, particularly during exogenous disturbances. From a technical lens, capital structure is defined as the combination of debt and equity in which firms are able to finance their businesses. Nevertheless, there exists no agreement regarding the exact ratio between debt and equity (so-called *leverage ratio*) across business literature. To do so, the extant literature on the capital structure has revealed the emergence of four leading themes (Khasawneh, 2012). First, the *Modigliani-Miller Theorem* articulates that firm value is independent of capital structure, for firms operate under perfectly efficient markets, bereft of tax shields. Therefore, firms do not incur any costs with respect to taxes, bankruptcy, or information asymmetries. As it stands, the proposition of this theory imperfectly fulfills the real mechanism of financial behavior since market imperfections or frictions do persist. Hence, the Modigliani-Miller theorem was ameliorated by the inclusion of tax and thus cost of equity becomes entirely commensurate with the level of leverage. Since an increase in debt level propels the likelihood of default risk, investors are willing to embrace a higher return (cost of equity) to be compensated for additional risks. Besides, the succeeding version of the Modigliani-Miller Theorem states that firms are obliged to pay taxes; in turn, incur transaction costs. In this perspective, the *Transaction Cost Theory* (TCT) speculates that debt is detrimental to firm value, particularly for financially distressed firms. The reorganization and readjustment of debt level is costly, provided that a collective settlement between a firm and its lenders is less likely to materialize, leading to an individual holdout to creditors. Furthermore, lenders

are reluctant to write down their principal payments or replace debt with equity due to regulatory scrutiny. Besides, income from debt forgiveness is taxed. Last but not least, financially distressed firms are more likely to sell their assets at depressed prices (Gunarathna, 2016). All these arguments above reveal that the barrier to reduce debt level is substantially high; in turn, the restructuring of leverage is onerous. Second, the *Agency Theory* suggests that debt is an important organizational tool to maximize shareholder value through the reduction of conflict between shareholders and managers (Tan, 2015). The central premise beneath this viewpoint is that the agency cost of free cash flow is dampened since the available free cash flow to agents is reduced due to the existence of a debt. In this sense, managers are motivated to repay debts in lieu of spending available free cash flow on lavish investments (Ibhagui and Olokoyo, 2018). Third, firms should strike a balance between tax shields of debt financing and costs of financial distress including bankruptcy costs. This exigency paved the way for the emergence of *Trade-off Theory* (TT), asserting that an optimal level of capital structure (target ratio) is imperative to business continuity in a real-world setting (Novita *et al.*, 2021). Finally, the *Pecking Order Theory* (POT) reckons that organizations adhere to specific preference orders from internal financing to debt and equity as a last-ditch effort (Elkhal, 2021). This hierarchy of funding stems from *information asymmetry* between firms and investors; therefore, external peers (e.g., creditors or investors) solicit a higher return to recoup their higher risk relative to internal counterparts. This is because extrinsic users per se possess less information about earnings in contrast to intrinsic users. Put in a nutshell, internal funding, ipso facto, emerges as the cheapest and most convenient source of financing.

Generally speaking, crises or recessions may be counterproductive to firm viability. Thereby, firm performance is influenced to a certain degree and the magnitude and direction of this influence are primarily shaped by the firm resilience. It goes without saying that resilient firms are prone to remain stable and exhibit flexibility despite both indigenous and exogenous variations (DesJardine *et al.* 2021). As though resilience is a latent organizational peculiarity and thus arduous to observe and quantify, financial leverage is the focal point to gain a deeper understanding of the resilience duality (e.g.,

stability and flexibility). Considering the aforementioned theories, it is sensible to put forth that high leverage amplifies the likelihood of default risk (Cathcart *et al.*, 2020; Bonaccorsi di Patti *et al.*, 2015). In other words, excessive leverage and default risk are the recurrent features of lean times (Madaleno and Barbuta-Misu, 2019). This causality is originated from the fact that overleveraged firms are subject to strict debt covenants and limited external financing due to intensified monitoring by lenders; in turn, become more reliant on internal funding. Add insult to injury, firms are more likely to experience a substantial shrinkage in their demand and revenue, generating low levels of cash flows. This vicious circle of inability to raise capital and impaired revenue is detrimental to business continuity and thus may lead to firm fragility in the wake of financial distress (Bui *et al.*, 2021; Kim *et al.*, 2011).

In parallel with theoretical evidence, the empirical findings of selected studies, all but, provide a strong confirmation that an increase in leverage engenders an augmentation in firm risk (see Table 3.1). In lieu of presenting individual effects of financial leverage on different risk parameters, the noteworthy empirical results will be perused at length. First, financial leverage is positively associated with default risk and firm solvency, particularly among high-leveraged firms. Second, high leverage is one of the key determinants of firm fragility and inflicts damage upon financial health and soundness. Third, crises yield a negative impact on firm performance (e.g., ROA and ROE) and curtail investments owing to disrupted cash flows. Last, the recovery speed of firms with low leverage is faster than that of firms with high leverage. In brief, it is pertinent to anticipate that high leverage may pose a serious threat to business continuity by amplifying business risk in the face of downturns.

In light of both empirical and theoretical evidence, it is sensible to propose that there is a strong correlation between financial leverage and firm risk in the construction industry, ceteris paribus. Thus, hypothesis 3b is postulated as follows.

Hypothesis 3b: Financial leverage increases firm risk in the construction industry

Table 3.1. Selected studies regarding the leverage risk nexus.

Author	**Research question**	**Research Setting**	**Major empirical findings**
Cathcart *et al.*, -2020	Impact of leverage on default risk and insolvency	Regression analysis of a sample of more than 6 million firm-year observations of large corporations and SMEs spanning 6 European countries from 2005 to 2015	Financial leverage has a greater impact on the probability of default of SMEs than of large corporations. The difference in default probability between the top and bottom leverage quartiles is 1.24 large firms and 2.87 for SMEs. This difference may be explained by the greater exposure of SMEs to short-term debt and their consequently higher refinancing risk. Indeed, SMEs that recover from the state of insolvency may have similar leverage to defaulted SMEs; however, their liability structure is significantly altered towards long-term debt and away from short-term debt.
Bonaccorsi di Patti *et al.*, -2015	Role of leverage in firm solvency	Sample of 200 Italian limited liability companies from manufacturing, services, and	A10 in leverage is associated with almost a 1 higher probability of default. Moreover, the adverse impact of a drop in sales on firm solvency

Table 3.1. Selected studies regarding the leverage risk nexus. (cont.)

Author	**Research question**	**Research Setting**	**Major empirical findings**
		construction. Logit model of the probability of default as a function of financial and demographic variables between 2009 and 2012	is almost four times larger for firms in the highest quartile of the leverage distribution than for firms in the first quartile. These findings confirm that the firms' financial structure can be a powerful amplifier of macroeconomic shocks. A higher level of borrowers' leverage reduces their resilience during a recession, and this in turn weakens the balance -sheets of banks and their ability to provide credit
Reddy *et al.*, -2022	The effect the capital structure of SMEs has on the firm value and risk	The sample includes 306 firms from 10 European countries comprising 2,142 firm-year observations for the period 2006 to 2013. Trend analysis and OLS	SMEs in the stressed countries were affected more compared to the SMEs in the non-stressed countries. The debt ratios of SMEs in the stressed countries increased during the crisis period, suggesting SMEs have had to sell tangible assets to pay off long-term debt as the long-term debt ratio declined during the crisis period. With declining profitability, increased cost of orrowing, and deteriorating

Table 3.1. Selected studies regarding the leverage risk nexus. (cont.)

Author	**Research question**	**Research Setting**	**Major empirical findings**
			institutional conditions (governance, rule of law, and corruption), SMEs have relied on internal sources of funds during the crisis period.
Madaleno and Barbatu-Missu, -2019	Impact of crisis on financial performance: ROA and ROE	Sample of non-financial firms from European countries considering annual data for the period of 2006 to 2015. Panel data analysis combining time-series with cross-section data.	Crisis exerts a significant positive effect over financial performance as well as liquidity, assets turnover, and labor productivity, meaning that firms tend to put in greater efforts to maintain financial performance in the face of a crisis
Bui *et al.*, -2021	The impact of financial leverage on firm performance among SMEs	Sample of 4,983 firms in Vietnam spanning from 2008 to 2016. Two-step system GMM	The nonlinear relationship between debt financing and firm profitability. This relationship takes the form of an inverted-U shape. Firm profitability only increases to a certain level of leverage.
Rehman and Rehman, -2014	Behavior of leverage and value of the financially constrained and unconstrained privately held enterprises especially, in the period of global credit retrenchment.	Sample of 4i865 private firms in UK spanning from 2004 to 2009. Fixed effects models	Leverage ratio, investment and performance of financially constrained firms are more affected than unconstrained firms in credit retrenchment period.

Table 3.1. Selected studies regarding the leverage risk nexus. (cont.)

Author	**Research question**	**Research Setting**	**Major empirical findings**
Novita *et al.*, -2018	Impact of leverage on firm fragility and soundness	Nonfinancial firms from Indonesia spanning from 2005 to 2016. All industries except financial sector OLS	First, leverage has a statistically significant correlation with firm's fragility. Second, leverage has an effect on firm's financial soundness during industry crisis firms with higher leverage, higher tangibility and lower size will experience fragility during downturn
Novita *et al.*, -2021	Role of leverage in firm vulnerability during financial crisis	Sample comprises non-financial firms in Indonesia, Malaysia, and Korea during the period 2007-2019. Logistic regression All industries except financials sector	A higher degree of leverage is more likely to reduce a firms' financial health as expected, but surprisingly the effect is higher during the industry crisis than the global financial crisis
Bancel and Mittoo, -2011	Impact of global financial crisis on financial flexibility	Survey and interview of CFOs in 8.000 French firms in 2009	Firms with greater internal financing have significantly lower crisis impact. They are also more likely to have lower leverage, higher cash-to-asset ratios, and report a lower effect on their business operations. By contrast, the relation between the firm's level of access to external financing (self- reported by CFOs) and the crisis impact is much weaker. We also find that firms

Table 3.1. Selected studies regarding the leverage risk nexus. (cont.)

Author	**Research question**	**Research Setting**	**Major empirical findings**
			with high short- term debt are significantly more concerned about financial distress, working capital problems, access to external financing, and more likely to sell assets during the crisis than firms with high long-term debt. Our analysis indicates that an index based on the firm's leverage, liquidity, and operating ratios, similar to the Altman Z-score, might be a better financial flexibility measure than long-term debt ratio and corruption) , SMEs have relied on internal sources of funds during the crisis period.
Tan, -2015	Impact of Asian financial crisis on firm performance	Sample of 277 firms from eight East Asian Economies spanning from1993 to 2002. OLS	Firms with low financial leverage tend to perform better than firms with high financial leverage. Additionally, the crisis magnifies the negative relationship between financial distress and firm performance. High- leverage firms experience worse performance during a crisis. Firms are expected to underperform during a crisis. High-leverage firms are expected to underperform relative to low-leverage firms

Table 3.1. Selected studies regarding the leverage risk nexus. (cont.)

Author	**Research question**	**Research Setting**	**Major empirical findings**
Elkhal, -2019	The relationship between business risk and financial distress	WACC theoretical analysis	Financial leverage fuels business risk since cash flow is contaminated with high leverage.
Gunarathna, -2016	The effect of financial leverage on financial risk	Sample of 15 companies in hotels and travels, and chemicals and pharmaceuticals industries in Sri Lanka spanning from 2005 to 2015. OLS.	Leverage ratio, investment and performance of financially constrained firms are more affected than unconstrained firms in credit retrenchment period.
DesJardine *et al.*, -2017	organizational resilience manifests through organizational outcomes in a generalized environmental disturbance	Sample of 963 U.S. -based publicly listed firms from 2008 to 2013. OLS and 2OLS	In terms of recovery speeds, firms that were more profitable, less overvalued (i.e., had lower intangible assets), less financially leveraged, or more efficient recovered faster than other firms. More profitable firms or firms with less debt experienced less severe losses than other firms. More capitally intensive firms also experienced smaller losses from the crisis. Older firms experienced smaller losses than younger firms

3.3.3. Financial Liquidity

Another purpose of this section is to have a clearer picture concerning the association between firm risk and *financial liquidity*, which is an important financial metric to demonstrate a firm's ability to meet its financial obligations in due time. Traditional wisdom states that firms should strike a balance between debt and equity in the pursuit of an optimal capital structure. To this end, the *trade-off theory* speculates that debt is tax deductible and thus firms should capitalize on debt to a limited extent that the marginal cost of debt outweighs the marginal benefit of debt. This theory corroborates the proliferation of *high-levered firms* across the business landscape. Unlike the trade-off theory, the *pecking order theory* stipulates that the cost of internal financing is lower than that of external financing due to information asymmetries; therefore, internal financing bears precedence over external financing. This line of reasoning paves the way for the meteoric propagation of *firms with low cash balances* regardless of any debt-level target. Having said that, these two theories imperfectly shed light upon the widespread existence of firms with zero debt and high cash balances. As it stands, there exists a remarkable gap between theory (i.e., debt holdings) and practice (i.e., cash holdings) in a real-world context (Acharya *et al.*, 2012; Weidemann, 2017; Meier *et al.*, 2013). To exemplify, both Microsoft and Google are the paragons of zero-debt and cash-rich firms across the globe. Likewise, both US and European firms have demonstrated an increasing propensity to enhance their financial flexibility in the form of high cash balances and low debt levels following the GFC.

This theory-practice gap entails an intriguing question: Why do firms accumulate cash despite the tax deductibility of debts? To that end, extant literature has attempted to unearth the determinants of cash holdings through distinct vantage points. Firstly, not only financially constrained firms but also financially unconstrained firms tend to hoard cash in accordance with the world-renowned proverb alleging that Cash is King (Weidemann, 2017). The underlying motive behind this zeitgeist is that *financial slack* lays the foundation of firm flexibility in response to the ever-changing business environment (Deb *et al.*, 2016). By and large, a crisis is preceded by a *credit crunch*,

which leads to the coexistence of tightened monetary policies and high financing costs. What is worse, firms are more likely to experience a sharp decline in their cash flows due to the bearish market; thereby, generating an increasing demand for capital increase (Gruener, 2015). At this juncture, the *financial surplus* can be considered an important organizational tool to enhance organizational resilience in the face of internal and external uncertainties. In particular, firms can reap the benefits of internal financing and thus mitigate their default risk despite the limited lending supply. This precautionary feature of cash-rich firms substantiates that available financial slack cushion liquidity risk and thus foils the adverse effect of downturns (Conz *et al.*, 2023). In concise, firm liquidity is of vital salient in the wake of crises, for it cements organizational resilience and safeguards organizational security through the immunity to potential losses (Picolo *et al.*, 2018). Secondly, despite the common intuition supposes that both endogenous and exogenous variations backfire and thus engender dire consequences for firms, market turbulences may catalyze experimentation and innovation under the context of Knightian uncertainty. Since innovation and RandD are significantly correlated with long gestations and uncertainties, idle (unabsorbed) financial resources pave the way for testing novel ideas to gain a competitive edge. Within this perspective, a high cash balance is critical to build an *entrepreneurial spirit* among firms to pursue innovative opportunities. Continuous and rapid technological improvements have transformed the key tenets of the basic economic environment in which firms operate, changing the existing equilibrium and acting as a double-edged sword. On one hand, firms engage in exploration and exploitation activities to tilt the scale. On the flip side, an incumbent may be sidelined by its peers utilizing superior technology. Consequently, a high degree of financial liquidity may entail unequal competitiveness among firms, for unabsorbed financial slack generates innovativeness and entrepreneurial attitude among organizations (Wieczorek-Kosmala and Błach, 2019). Thirdly, cash-rich firms are more likely to undertake future potential investments, despite the paucity of external debts; in turn, reap the benefits of scale and scope economies (Bukalska and Krol, 2020; Picolo *et al.*, 2018). This flexibility of expansion enables cash holdings to penetrate less affected business segments; hence, such firms can maintain or even amplify their cash flows due to new investments. Fourthly, financial liquidity is an important indicator of a

hostile takeover in the eyes of the acquirer. That is, a substantial amount of financial slack is a testament to good corporate governance and thus provides a sound basis for anti-takeover measures. Thereby, potential acquirers are more reluctant to acquire cash holdings. Lastly, the existence of abundant resources impedes intrafirm disputes since agents are able to possess sufficient resources to pursue their own agendas. On the other side of the coin, agents are more prone to bargain their resource shares at the expense of their counterparts owing to resource scarcity. This tug-of-war provokes intrafirm conflicts, which ultimately lead to inefficiency within the company (Gruener, 2015). Given these arguments above, firm liquidity is an important value-creation vehicle for firms; thereby, it is reasonable to speculate that cash is negatively associated with firm risk, particularly throughout crises.

In stark contrast, both theoretical and anecdotal evidence asserts that slack promotes firm risk rather than risk mitigation since the created value is appropriated by other stakeholders in place of shareholders. From the spotlight of *slack as inefficiency*, whilst financial slack engenders value creation in the context of adaptation, agents are inclined to appropriate that value in line with their self-interests (Deb *et al.*, 2016). It is widely recognized that firms are prone to optimize their resources, provided that firms do possess limited resources. In the same vein, the *free cash flow hypothesis* states that managers of cash holdings are more likely to invest in low-return projects; thereby, leading to resource misallocation (Jensen, 1986). By the same token, the agency theory states that a high cash balance enables managers to succumb to *overinvestment* in order to satisfy their interests. Put it differently, stakeholders, particularly self-serving managers, are inclined to appropriate rents at the expense of shareholders; thereby, endangering firm risk.

Furthermore, financial slack can exacerbate suboptimal behaviors due to the relaxation effect, which significantly curtails critical and strategic thinking (Bertrand and Mullainathan, 2003). In other words, the behavioral theory of firms states that managers tend to abstain away cognitive-laden decisions and thus imperfectly utilize their intellectual capital at an ultimate level, which is attributed to the term *quiet life*.

This relaxation is counterproductive to firm risk among cash-rich firms, for such organizations may be unable to detect potential threats owing to poor cognitive assessment.

Taking all these arguments into consideration, it is more pertinent to opine that the value creation trait of firm liquidity outweighs the value appropriation facet of financial slack during shocks. Since firms do experience limited credit supply and debt is not an impeccable substitute for cash due to market frictions and information asymmetries, firm liquidity can solidify business autonomy and maintain business continuity through raising capital internally despite the substantial shrinkage in demand and thus in retained earnings, *ceteris paribus*. Thus, hypothesis 3c is postulated as follows.

Hypothesis 3c: All other things being equal, financial liquidity decreases firm risk in the construction industry

3.4. Corporate Diversification Asymmetry

Previous to the introduction of the hypothesis stemming from corporate diversification (CD thereafter) asymmetry, the narrative of CD definition will be fleshed out to adopt a better understanding regarding why firms *do* differ from this standpoint. Albeit a cascade of identical definitions of the term CD in the literature, the definition of CD depicted in Figure 3.1 lays the foundation of the hypothesis in question (Jang *et al.*, 2019). As illuminated in Figure 8, the taxonomy of CD is materialized in terms of physical presence and business line. In this regard, *international diversification* (ID thereafter) and *regional diversification* (RD thereafter) stand for the geographical scope of CD. The essential difference between ID and RD is the physical and cultural proximity (relatedness) between the host market and the foreign market (Mammen *et al.*, 2021). That is, the degree of relatedness of RD is inevitably higher than that of ID. On the other hand, industry diversification (IND thereafter) corresponds to the business scope of CD. In analogous to geographical scope, relatedness among business segments has an impact on the classification of IND. On the condition that a firm engages in identical business segments (e.g., real estate, general building and roads),

such diversification refers to *product diversification* (PD thereafter). On the flip side, provided that a construction firm is involved in an unrelated business line, this sort of IND is denominated as *construction-unrelated diversification* (CUD thereafter). For the sake of simplicity, the total geographical diversification outside national confines will be taken as international diversification for this study. That is, there exists no conceptual difference between ID and RD; thus, will be merged under ID.

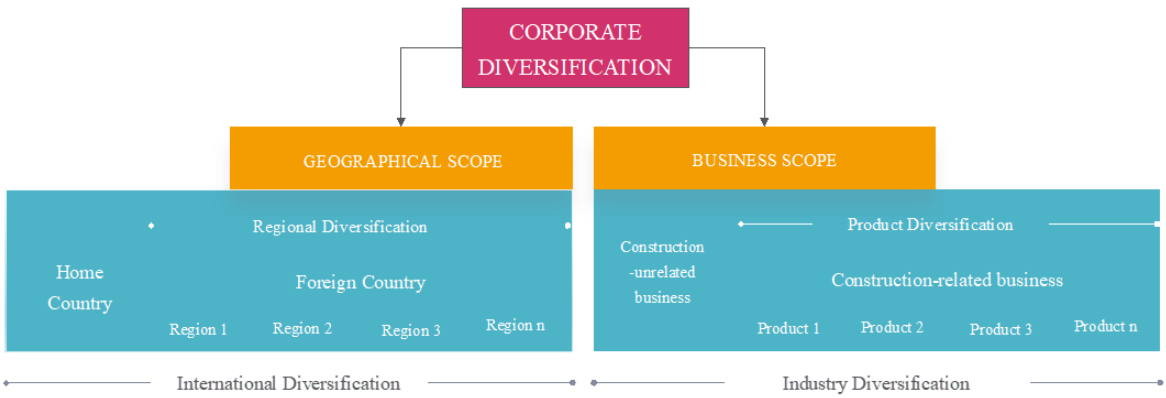

Figure 3.1. Types of corporate diversification (Own elaborate).

Following the definition of CD, another objective of this report is to explore the ID-risk nexus at the firm level. In accordance with the traditional consensus not to put all eggs in one basket, organizations are prone to transcend their national confines owing to globalization, stagnant domestic markets and volatile market externalities (Wang *et al.*, 2022; Eduardsen and Marinova, 2020). In this context, a substantial number of studies have been published on this interaction. Undoubtedly, the first and foremost motives beneath international dispersion are revenue enhancement, profit maximization and competitive edge (Wu *et al.*, 2020). Diametrically opposed, firms imperfectly fulfill their intended goals in international dispersion (Krapl, 2015). The empirical evidence of whether ID curtails or aggravates firm risk is weak and even inconclusive (Jiang *et al.*, 2023). A mountain of studies has revealed that ID decreases firm risk by lowering the systematic risk (Olibe *et al.*, 2008), moderating cash flow volatility (Jung *et al.*, 2018), increasing revenue (Qian and Li, 1998; Wang *et al.*, 2022), extending market coverage (Sun *et al.*, 2019), improving firm survival (Onali and Mascia, 2022) and being less reliant on the domestic market (Jung *et al.*, 2018).

On the contrary, ID is considered an additional risk source due to increased transaction cost (Figueira-de-Lemos *et al.*, 2011), augmented managerial complexity (Qian and Li, 1998) and greater market variability (Mammen *et al.*, 2021). Furthermore, ID may have no bearing on firm riskiness, provided that the pros and cons of ID even out each other (Krapl, 2015).

Apart from empirical evidence, the ID-risk nexus will be supplemented through theoretical foundations. The proponents of ID primarily state that ID paves the way for the realization of scale economies and efficient resource allocation, which ultimately leads to a sharp decline in production costs (Seho *et al.*, 2021). Second, international expansion may breed a *coinsurance effect*, which enables firms to offset a reduction in demand across one country through an increase in demand across another country (Almaghrabi, 2022). Third, ID may reinforce operational flexibility through switching options. In another saying, firms can shift among different countries when opportunities arise or wither (Elango, 2021). Fourth, the *Portfolio theory* speculates that international diversity alleviates earning volatility and profit fluctuation by decreasing dependency on a single market or country (Cavusgil *et al.*, 2020). Furthermore, since the vast majority of construction firms exploit their respective local markets at almost ultimate level and their relative domestic market, except China, are all but saturated, the exposure to the home market is counterproductive to their firm risk. Fifth, multinationality leads to a substantial contribution to firm expertise and the accumulation of valuable information, which is called experiential learning (Borda *et al.*, 2017). Utilizing experiential learning, internationally diversified firms are competent to recognize crucial external variations (knowledge) across different markets and in turn, internalize this knowledge on their merits. Moreover, experiential learning is the key ingredient of innovation stock, which is the cornerstone of firm viability and resilience. Considering the benefits of experiential learning, the impact of uncertainty (thus risk) diminishes forthright since knowledge accumulates inconsistent with the Uppsala model (Cuervo-Cazurra *et al.*, 2016). Sixth, a firm with a higher degree of ID is less likely to be susceptible to competitive risk. As such, international dispersion facilitates to retract from a certain country where rivalry is fierce, namely *competi-*

tion avoidance. In addition, internationalization encourages firms to retaliate against aggressive moves performed by their rivals (Elango, 2010). Seventh, the degree of internationalization is fundamental to political risk. By way of international diversity, firms are less vulnerable to unfavorable consequences of political alterations and pressures including but not limited to government intervention, governmental change, corruption and expropriation (Elango, 2010; Krapl, 2015; Olibe *et al.*, 2008).

Eighth, ID fortifies the ability to reap the benefits of arbitraging prices, taxes and other financial regulatory paradigms through transfer pricing across network structures (Elango, 2010; Li and Cheng, 2023). Ninth, international expansion is more likely to reduce firm mortality similar to corporate conglomerates (Krapl, 2015). Tenth, firms with greater ID manage to amplify their debt capacity and thus raise additional capital in comparison with their peers with lower ID owing to their extensive resources and customer base; thereby, they can capitalize on profitable investments, which ultimately cements their financial health (Krapl, 2015; Olibe *et al.*, 2008). Last but not least, firms pursue international diversity in that their peers penetrate foreign markets. This tendency is attributed to psychological factors rather than internal motives, which mainly refer to the *bandwagon effect or peer pressure* (Vaatanen *et al.*, 2009).

On the contrary, the dissenters of ID allege that ID is counterproductive to firm riskiness in lieu of being a risk-alleviating effect (Cavusgil *et al.*, 2020). In the first place, ID leads to inferior risk performance since internationally diversified firms are less likely to exit any market given the largeness of fixed and sunk costs (Godart *et al.*, 2012). Second, the transaction costs, monitoring costs and coordination costs are higher among firms with higher ID relative to firms with lower ID. This substantial cost gap is originated from increased structural and managerial complexity stemming from ID (Varum and Rocha, 2012; Onali and Mascia, 2022; Mammen *et al.*, 2021). Third, lack of market knowledge (so-called liability of foreignness) elicits inefficient decision-making under the set of different societal and cultural variables. This impaired decision-making, triggered by the knowledge gap, broadens the perception of unknowns and uncertainties (Figueira-de-Lemos *et al.*, 2011). Fourth, ID may jeop-

ardize firm riskiness due to exchange rate risk given the imperfections among purchasing power parity. Drawing upon this causality, the exposure to the FX rate may magnify systematic risk due to fluctuations amidst foreign returns in local currency (Likitwongkajon and Vithessonthi, 2022). Fifth, agency theory states that information asymmetry is more eminent among firms with a higher degree of ID in comparison with firms with a lower degree of ID and thus this discrepancy spurs managers at internationally diversified organizations to undertake risk-taking behavior. Hence, the firm risk is more likely to increase among these firms due to the increasing cost of agency (Jung *et al.*, 2018; Krapl, 2015). Sixth, Institutional theory speculates that the number of governmental authorities is positively associated with political risks given the different sets of regulations, tax regimes, custom tariffs and trade barriers (Olibe *et al.*, 2008). Last but not least, RBV recommends that firms *do* possess limited resources and thus ID takes a heavy toll on firm risk due to resource dilution. This can be interpreted in such a way that resource allocation turns out to be inefficient as resources are allocated among an increasing number of markets (Sun *et al.*, 2019). Moreover, resource transferability is complicated and onerous among internationally diversified firms because of higher entry barriers and therefore engenders an inferior resource optimization (Mammen *et al.*, 2021).

Albeit contradictory and inconclusive results on the ID-risk nexus in prior studies, the latter line of thought is expected to take precedence across the construction industry, all else equal. The principal motive underlying this preference is that the liability of foreignness and the liability of newness offset the gains of ID due to increased complexity and higher transaction costs. Furthermore, ID is innately a financial burden on a firm's balance sheet and thus increases financial risk. Moreover, the variations among external parameters (e.g., macroeconomic, cultural and political) are less likely to be embraced by firms in that these deviations are beyond firms' control. Considering all aforesaid explanations listed above, it is apposite to assume that the smaller share of international business is significantly associated with positive risk performance. Thereby, hypothesis 4a is postulated as follows;

Hypothesis 4a: Geographic diversification is positively correlated with firm risk across the construction industry.

Aside from ID, there exists a growing body of literature that recognizes the importance of business diversification in firm risk. Along this line, a plethora of disparate precursors has been brought to the surface whether IND is a risk discount or risk premium (Dhir and Dhir, 2015). Of these precursors, Figure 3.2 below is provided to highlight underlying rationales in the pursuit of business diversity.

The pioneers of IND advocate that management tools and principles should not be restricted to a single business. Rather, management theories state that firms should engage in multiple business lines in the interest of experimental knowledge (Raei *et al.*, 2015). Second, IND spurs the materialization of scale economies, which ultimately leads to substantial cost savings, through penetration into new markets (Friberg, 2021; Bodnar *et al.*, 1997; Volkov and Smith, 2014). Third, the *internalization theory* suggests that firm-specific assets are the key ingredient of firm survival and competitive edge due to their intactness, complexity and specificity. Therefore, firms may seize the opportunity to leverage their internal resources into new applicable business segments, reaping the benefits of scope economies (Ramirez and Escuer, 2002). Fourth, business diversity paves the way for weak correlation among firms' profit streams and this *coinsurance effect* enables such firms to amplify their debt capacity (Rogers, 2021; Yücel and Önal, 2015). Fifth, firms with higher IND are more likely to extend their intellectual capital owing to their multi-market liaisons, cementing their viability. Equally important, these diversified firms are prone to cooperate rather than compete in that they compete with one another across multiple business segments. This strategic convergence springs from a steep learning curve, fostering the appraisal of mutual presence across different markets (Rogers, 2021). Sixth, it is pertinent to admit that diversified firms are larger and possess more tangible assets and financial resources in relation to single-segment firms. Within this perspective, diversified firms are less vulnerable to downturns compared to specialized firms due to their more access to external capital (i.e., debt capacity). This greater debt capacity enables firms to carry out their prof-

itable investments and alleviate agency costs (Bodnar *et al.*, 1997; Volkov and Smith, 2014). Seventh, firms are inclined to exploit synergetic interrelationships owing to their excessive capacity and intangible assets, particularly across related business segments (Thanh *et al.*, 2021). Whilst traditional wisdom states that the marginal cost of business diversification outpaces the benefits of business diversity as unrelatedness widens, the bright line amidst business segments has been vague and disappeared due to globalization and digitalization (Thanh *et al.*, 2021). What is more, the unrelatedness discount on firm risk has not been empirically corroborated in the literature (Mammen *et al.*, 2021; Yücel and Önal, 2015). Last but not least, single-segment firms are more susceptible to recessions since the likelihood of their future growth is significantly associated with the growth of their respective market and incumbents' competitive edge (Ramirez and Escuer, 2002).

In marked contrast, the opponents of IND firmly enunciate that business diversity is a risk premium on the account of increased transaction costs, agency costs, greater complexity and inefficient resource allocation. To begin with, transaction cost theory alleges that business diversity inherently elicits an upsurge in coordination costs associated with increasing complexity (Borda *et al.* 2017). Second, incidental to this greater complexity, the information asymmetry between managers and shareholders gains prominence, which leads to divergence between the self-interest of managers and firm objectives. Therefore, managers are more likely to demonstrate an increasing proclivity toward risky decisions, which may be detrimental to firm survival.

Furthermore, another information asymmetry may arise between central management and other business divisions; hence, the firm risk may become more severe owing to poor communication and discontinued information flux among business divisions (Wang *et al.*, 2023). Third, an inefficient resource allocation may transpire among diversified firms, exposing them to dire consequences of the *cross-subsidization hypothesis*. This paradigm clearly speculates that diversified firms imperfectly allocate their resources to the most efficient markets in terms of quality and quantity basis and thus stronger business lines *do* subsidize weaker segments with low cash flows and high

risks (Onali and Mascia, 2022). As a result of cross-subsidization, diversified may be unable to reap the benefits of portfolio theory and the coinsurance effect (Ali *et al.*, 2016).

Another aftermath of agency problems is overinvestment due to access to additional capital or the absence of transparency (Hund *et al.*, 2010; Bodnar *et al.*, 1997; Anderson *et al.*, 2011). Last but not least, firms are more inclined to centralize their operations and thus reconcentrate towards their core competencies to sustain growth and maximization of shareholder value during lean times. This centralization triggered by a capricious environment safeguards firms in the wake of recessions (Raei *et al.*, 2015).

Considering these studies outlined above, the empirical evidence is rather controversial and thus there exists no general agreement concerning the causality between business diversification and firm risk. Seemingly, business diversification is hypocritical and acts as a double-edged sword in the RM literature. Despite this stalemate, since the majority of firms are expected to be in dire straits throughout lean times and thus adopt a belt-tightening attitude, it is reasonable to indoctrinate that the marginal costs of business diversification overshadow the gains from business diversity.

The underlying cause of this situation is centripetal force, which compels firms to refocus their core business and therefore discharge low profitable business lines. Furthermore, customers are supposed to be more price-sensitive and conscientious in their buying behavior. Because of this austerity, market demand may experience a nosedive in record time, which eventually wreaks havoc on firms' cash flow. Thus, hypothesis 4b is postulated as follows;

Hypothesis 4b: Business diversification is positively correlated with firm risk across the construction industry.

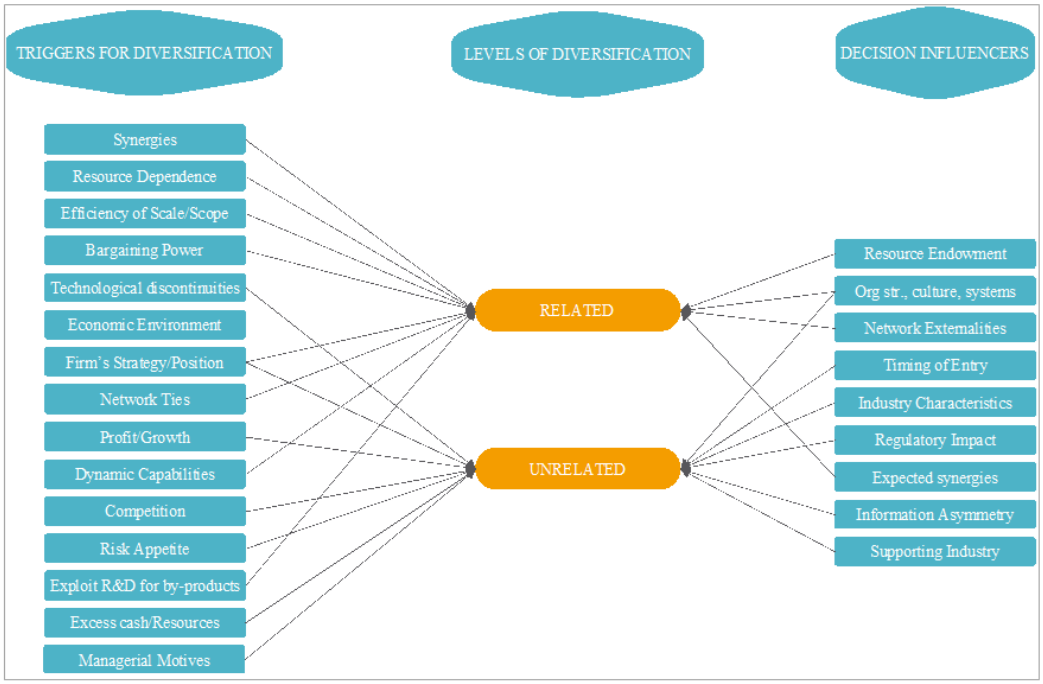

Figure 3.2. Triggers of business diversification (Own elaborate).

3.5. Ownership Structure Asymmetry

The global business landscape has witnessed a serious structural metamorphosis of denationalization in recent decades. The bulk of countries, regardless of their political tendencies, have tilted towards privatization to enhance the efficiency of their assets. Remarkably, a considerable number of countries followed suit due to the *bandwagon effect* (alas herd behavior and penguin effect) rather than self-determination and proper assessment of the cause-and-effect relationship. Typically, the first and foremost aim of privatization is to foster competition, enrich market efficiency and improve the performance of state-owned enterprises (SOEs thereafter) (Alipour, 2013). In this sense, a myriad of research has attempted to address the association between privatization and firm performance (Batra *et al.*, 2022). Unlike the traditional conception that privatization engenders superior performance, the privatization-performance nexus is empirically ambidextrous (Zheng *et al.*, 2017). Aside from the privatization-performance paradox, the impact of privatization on firm risk *hitherto* has received scant attention in the RM literature. Thus, the linkage between privatization and firm risk remains a largely unexplored area of research. Notwithstanding that there exists a

sparse empirical study regarding the privatization-risk nexus, the primary aim of this section is to shed more light on the interaction of these two paradigms.

In contrast to the conventional wisdom that state ownership elicits inferior performance, complete privatization has not confiscated the global landscape at full throttle. Surprisingly, a certain number of countries have not fallen prey to the privatization zeitgeist; therefore, appeal to partial privatization and even maintain full ownership (Beuselinck *et al.*, 2017; Boubakri *et al.*, 2017). The leading cause behind this tendency is that the presence of government stakes facilitates the management of uncertainties and the resolution of problems (Lazzarini and Musacchio, 2020). During crises or uncertainties, state apparatus can markedly infuse capital influx within the economy, shrink discovery and coordination costs and improve responsiveness relative to private sectors (Lin *et al.*, 2020; Lazzarini and Musacchio, 2020). To illustrate, the adverse effects of GFC and COVID-19 were substantially mitigated through government involvement. Otherwise, the extent and duration of these crises would be drastically severe and longer than they used to be. From the constitutional spotlight, governments should be egalitarian to any firm; however, this level-playing field is very unlikely to materialize in practice. SOEs seem to have precedence to access external capital compared to private firms owing to their governmental ties in lean times. Along this line, the presence of a governmental stake enables SOEs to raise capital and thus circumvents default risk (Beuselinck *et al.*, 2017). On the contrary, private firms may experience serious financial constraints; thus, may downsize or even go bankrupt due to capital inadequacy. Generally speaking, governments go to great lengths to retain SOEs alive; therefore, governments are adamant and willing to provide financial injections to financially stressed SOEs throughout downturns. Second, firms should provide a swift response to crises; otherwise, they will be more vulnerable to default risk. In this regard, state apparatus can be considered an important organizational tool to access talent, resources and connections to handle ambiguities. On the other hand, private firms may bereft of the required capacity to respond to crises in an efficient manner. Thereby, the likelihood of mortality is higher among private firms than SOEs, for *speed premium* is of paramount importance to cope with crises (Lazzarini and Musacchio,

2020). Third, the presence of government paves the way for social stability (e.g., job security and excess labor), which is the backbone of the proper functioning of markets. In another saying, SOEs may pursue social tasks in lieu of profitability to maintain cohesiveness within the society. Nonetheless, private firms *per se* are profit-driven and thus minimize their costs accordingly. The mass layoff of countless employees in the wake of GFC and COVID-19 is an outstanding example of the profit maximization motive of private firms. Unlike private firms, SOEs are inclined to retain their turnover rate intact throughout post-crisis periods (Lin *et al.*, 2020). Fourth, SOEs are more likely to induce market efficiency through maximization of resource mobility towards capital-intensive industries. Such industries are the lifeblood of national welfare; in turn, the mobilization of these industries entails long gestation, sizeable capital expenditures and a substantial workforce. In this regard, state apparatus lays the foundation of market stimulus through the reinvigoration of capital-intensive industries. Conversely, private firms, albeit unconstrained firms, are inclined to refrain from capital-intensive industries due to the sheer uncertainty concerning the magnitude and duration of crises. Last, governments tend to parlay SOEs to reign over vital industries of society, stemming from the notion of *commanding heights* (Lin *et al.*, 2020). Consequently, SOEs succeed to reap the rewards from such markets. In short, SOEs are less likely to be susceptible to uncertainties through implicit and explicit governmental guarantees, the ability to respond swiftly, sustainability of social well-being and extensive tangible and intangible resources.

In contrast to the arguments outlined above, a large and growing body of research has attempted to address the risk-alleviating effect of privatization in several ways (Dong *et al.*, 2014). Traditional wisdom states that state ownership leads to impaired productivity and inferior performance due to two specific externalities: *excludability and non-diminishability.* Excludability is a notion that there exists no defined ownership of public goods; thus, any party within reach is able to seize the opportunity to consume such goods at their sole discretion. This obscure ownership engenders overconsumption, which ultimately leads to less resilience of SOEs against uncertainties (Wehrheim *et al.*, 2020). Non-diminishability can be interpreted in such a way

that there exists an incessant consumption since the consumption of any party is indifferent to that of other parties. That is, the independence of consumption results in a vicious circle, which ultimately elicits poor productivity and increased firm risk (Liu *et al.*, 2018). Second, the risk-alleviation impact of privatization is originated from the double-agency problem (Liu *et al.*, 2018). The first layer of agency problems stems from information asymmetries between controlling shareholders (government in SOE context) and minority shareholders. At this juncture, government interference is conducive to the *free-rider problem*, which catalyzes SOEs to abuse managerial freedom inconsistent with long-term shareholder value creation (Zheng *et al.*, 2017). Put it differently, significant state-ownership concentration comes at the expense of value maximization by means of more reliance on social tasks (e.g., reduction of unemployment, prevention of income polarization and satisfaction of labor unions). The second layer of the agency problem is attributed to a conflict of interest between managers (agents) and controlling shareholders (state). This misalignment results from the divergence of shareholders' interests to the personal agenda of managers. In other words, managers demonstrate an increasing proclivity to transfer resources to their partisans and materialize frivolous spending on colossal projects in the pursuit of enhancing their reputation and extending their tenure (Dong *et al.*, 2014, Liu *et al.*, 2018). This situation leads to excessive risk-taking among SOEs on the condition that SOEs are replete with imprudent labor contracts. Furthermore, shareholders are less willing to monitor their managers, for profitability is not their primary concern. In addition, SOEs inherently are supplemented with soft budget constraints; thus, managers succeed in experiencing the freedom to allocate resources at their sole discretion, inasmuch as they are not responsible for their incompetence. On the other hand, managers at private companies are strictly centered on profit maximization and they are directly liable to their shareholders (Kang and Kim, 2012; Lazzarini and Musacchio, 2020; Zheng *et al.*, 2017). Another adverse effect of this agency problem is the information deficit between the government and managers. That is, managers are inclined to conceal information from their shareholders to retain their positions. This information asymmetry impedes governments to perform poor and ill-timed decision-making. Third, managers of private firms are equipped with detailed knowledge and the majority of such organizations

are fraught with CRO positions and audit committees. Therefore, it is prudent to assert that private firms are more capable of dealing with uncertainties, thereby leading to a lower firm risk. Finally, private firms are more reluctant to engage in risk-taking behavior due to the threat of a hostile takeover. Fundamentally, firms with subpar performance are inclined to be natural candidates for acquisition. Drawing this line of reasoning, private firms are prone to enhance their firm value ahead of the curve to inhibit any takeover from potential acquirers. Considering these theoretical foundations discussed above, it is appropriate to surmise that privatization cushions firm risk.

In a similar stand with theoretical evidence, the empirical evidence on the privatization - risk nexus is hypocritical. On one hand, state ownership is positively associated with firm risk (i.e., Zhu and Yang, 2016; Berger *et al.*, 2005; Iannotta *et al.*, 2007; Cornett *et al.*, 2010; Al-Tamimi *et al.*, 2013; Lassoued *et al.*, 2016, Ho *et al.*, 2019), firm value in the post-crisis period (i.e., Beuselinck *et al.*, 2017), entrenchment effect and thus volatility (i.e., Tadele *et al.*, 2022) and outperformance during downturns due to government backup (Acharya and Kulkarni, 2011; Liu *et al.*, 2018). On the other hand, privatization decreases firm risk (i.e., Boubakri *et al.* 2013a; Boubakri *et al.* 2013b; Boubakri *et al.* 2017). The vast majority of these empirical studies were performed in the banking industry and across a certain country. To the best of our knowledge, sparse attention has been paid to the privatization-risk nexus in the construction industry.

Given both theoretical and empirical evidence, it is sensible to propose that there is an inverse correlation between state ownership and firm risk in the construction industry, ceteris paribus. The root cause behind this preference is that state apparatus is of vital importance, for the construction industry is capital-intensive. Even further, government interference expedites the access to capital during downturns in that lenders are markedly selective due to the *flight to quality* effect in the wake of crises and thus private firms may not raise required external capital to perform their daily business given the decreased demand in the event of recessions. Thus, hypothesis 5a is postulated as follows.

Hypothesis 5a: Privatization is positively associated with firm risk across the construction industry.

It has been widely recognized that political interference is detrimental to market efficiency. In contrast to this conventional wisdom, certain countries are reluctant to forego their participation in their respective economy. Of these countries, China emerges as a blazing example that the Chinese domestic market is brimming with a slew of SOEs. In a similar stand, the number of Chinese firms in our research sample outpaces that of other countries and none of the Chinese firms is private. Provided that privatization engenders superior performance, two intriguing questions need to be asked: Why is the Chinese market heaped with myriad SOEs and how has China accomplished the fastest economic growth within the last century by depending upon its SOEs? This creates a paradox in privatization literature. The *China puzzle* corresponds to the notion that China has demonstrated unprecedented economic growth in recent decades, whilst the Chinese market is destitute of appropriate market mechanisms and featured through substantial state interference. In this vein, special attention is paid to this fact in our empirical analysis. Given the presence of the China puzzle, another purpose of this section is to gain a deeper comprehension of whether China differs in contrast to other countries in the matter of privatization. Since SOEs loom large in the Chinese market, it is logical to assume that the China puzzle is a risk-reducing effect. Thus, hypothesis 5b is postulated as follows.

Hypothesis 5b: All else equal, the risk of Chinese firms is lower than that of their peers in other countries.

3.6. Cultural Asymmetry

Culture is, *inter alia*, an eminent firm-level determinant in that culture is of utmost importance in firm survival and therefore bears a direct and immediate effect on a firm's decision-making behavior and risk appetite. Along this line, a myriad of studies has attempted to shed more light upon how culture shapes *individ-*

ual decision-making (e.g., risk-taking, time preference and altruism), *economic milieu* (e.g., economic growth, governance norms of institutions, cross-border agreements and structure of financial system), *financial acumen* (e.g., leverage, dividend payments, debt maturity, earnings management, capital structure and firm disclosure), *investment strategies* (e.g., MandAs, asset allocation and stock market participation) and *corporate peculiarities and outcomes* (e.g., CEO risk-taking, firm risk tolerance, and variability in earnings) (Delis *et al.*, 2023; Frijns *et al.*, 2022; Power *et al.*, 2020; Diez-Esteban *et al.*, 2019). This voluminous research can be interpreted in such a way that culture is critical to firm risk owing to its pervasive influence on corporate behavior and outcomes, particularly given the presence of incomplete information and absence of experience (Diez-Esteban *et al.*, 2019). What is more important, the mainstream regarding the drivers of GFC 2007/8 is that both culture and excessive risk-taking are root causes of this crisis, which is supported by 73% of interviewees surveyed by PwC and The Economist's Intelligence Unit among financial services professionals in May 2008 (Gaganis *et al.*, 2019). In a similar fashion, it has been empirically found that risk-seeking cultures are exposed to greater losses in relation to risk-averse cultures during crises (Andries and Balutel, 2022; Kanagaretnam *et al.*, 2014). The findings of these studies affirm that culture emerges as an important organizational feature to cope with uncertainty, decode the external milieu and thus undertake pertinent actions (Power *et al.*, 2020).

A handful of disparate frameworks have been exploited to investigate the impact of culture on aforesaid attributes, consisting of Hofstede (1980, 2001, 2010), Schwartz (1994, 2006), GLOBE (House *et al.*, 2004), Trompenaars (1993) and the World Values Survey (Inglehart, 1990, 1997). Albeit certain discrepancies amidst these frameworks, there exists a marked similarity among them. Of these frameworks, Hofstede has received the most attention in academia, for his framework is the archetype and pioneer in this field. Supportively, the number of citations to Hofstede's framework significantly outnumbers that of other frameworks. To illustrate, based on the Google Scholar database by 2015, whilst the number of citations to Hofstede's framework oversteps the threshold of 100,000, this number for GLOBE corresponds to circa 4,000 (Beugels-

dijk *et al.*, 2015). Aside from its dominance compared to its peers, the applicability of cultural dimensions in his framework is more convenient to most industries. In the same vein, Hofstede's framework is selected to provide a basis for this report despite a handful of criticisms (Liu *et al.*, 2015; Beugelsdijk *et al.*, 2015). Whereas traditional consensus admits that culture is stable and inherited to further generations intact, theories of cultural change allege that culture is exposed to a certain degree of convergence, divergence, or combination of both (Beugelsdijk *et al.*, 2015). Apart from the pervasiveness and persistence feature of culture, the recurrent concern of critics is that the proposed six dimensions of Hofstede's framework imperfectly suffice to cover culture to an ultimate extent. Furthermore, Hofstede's framework was invented a half-century ago and thus its validity has been contested in the literature in that cultural convergence is more likely to take place among countries due to technological advancements and globalization (Beugelsdijk *et al.*, 2015). Concisely, much of the criticism that Hofstede's framework has attracted relates to its temporal stability and obsoleteness. In the face of a few criticisms, Hofstede's framework still remains the most effective social science tool at hand to gain a deeper understanding of how culture shapes corporate risk-taking behavior and corporate outcomes.

Hofstede's framework is composed of six dimensions: Individualism, Power Distance, Uncertainty Avoidance, Masculinity/Femininity, Long-Term Orientation and Indulgence. *Individualism* accounts for the degree to which individuals in a society are connected into groups. *Power distance* index is defined as "the extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally". *Uncertainty avoidance* index is defined as a society's tolerance for ambiguity in which people embrace or avert an event of something unexpected, unknown, or away from the status quo. *Masculinity* is defined as a preference in society for achievement, heroism, assertiveness and material rewards for success. Its counterpart represents a preference for cooperation, modesty, caring for the weak and quality of life. *Long-term orientation* index associates the connection of the past with the current and future actions/challenges. A lower degree of this index (short-term) indicates that traditions are honored and kept, while steadfastness is

valued. Societies with a high degree in this index (long-term) view adaptation and circumstantial, pragmatic problem-solving as a necessity. *Indulgence* refers to the degree of freedom that societal norms give to citizens in fulfilling their human desires. Indulgence is defined as "a society that allows relatively free gratification of basic and natural human desires related to enjoying life and having fun". Based upon these definitions, UAI, LTO and Indulgence dimensions will be exploited to assess the relationship.

To begin with, UAI demonstrates the level of discomfort and anxiety of individuals in a society in the wake of uncertainty and ambiguity. By definition, a culture with high UAI is supposed to be risk-averse and thus is inclined to follow established rules and norms. On the other hand, a culture with low UAI is conducive to unpredictability and ambiguity; in turn, bears a risk-taking behavior (Li *et al.*, 2013; Delis *et al.*, 2023; Frijns *et al.*, 2022; Power *et al.*, 2020; Diez-Esteban *et al.*, 2019). Furthermore, there exists a two-pronged effect of culture on firm risk. The former impact of culture is centered upon formal institutions (e.g., rule of law, investor protection and banking system), whose establishment purpose is to encourage risk-taking across their respective nations. However, formal institutions with high UAI may curtail entrepreneurial spirit within the confines of their relative country since it is firmly anticipated that a culture with high UAI is replete with a rigid and clear set of rules and a higher risk premium prevails for their loan agreements (Delis *et al.*, 2023). Therefore, whilst countries with high UAI are expected to encompass the banking system in their economy, their peers with low UAI embrace equity-oriented systems (Gaganis *et al.*, 2019). To illustrate, the economy of Germany (UAI=65) is heaped with banks, whereas the USA (UAI=46) is primarily dependent on equity-market financing (Li *et al.*, 2013). The latter impact is concentrated upon the ownership structure (e.g., managers, shareholders and creditors) of organizations. Previous studies revealed that cultures with high UAI are inclined to elude novel ideas and innovation due to the absence of far-sightedness. On the other hand, countries with low UAI tend to pursue innovation strategies, for they are open to new ideas (Li *et al.*, 2013; Gaganis *et al.*, 2019; Diez-Esteban *et al.*, 2019). Moreover, there has been a surge of interest in the nexus between UAI and the capital structure of a firm. It has been widely accepted that cultures with high UAI

are averse to long-term debt and thus prefer to raise internal capital, leading to a lower debt ratio due to fear of unpredictability. This avoidance becomes more explicit during crises; hence, firms with high UAI portray an increasing propensity to accumulate cash in order to recoup their losses in the wake of recessions (Mohsni *et al.*, 2021). This proposition is in accordance with proposed H3b and H3c, which postulate that firms with higher liquidity and lower leverage are more resilient compared to their peers with lower liquidity and higher leverage. Moreover, prior studies suggest that firms with high UAI are likely to less diversified in terms of geographical and industry lens due to dire consequences of ambiguity. As postulated in H4a and H4b, ID and IND are negatively associated with firm risk. Drawing this line of reasoning, it is pertinent to speculate that firms with high UAI are supposed to be more resilient in the wake of recessions. Thus, hypothesis 6a is postulated as follows;

Hypothesis 6a: UAI is negatively correlated with firm risk across the construction industry.

Secondly, another objective of this section is to examine the linkage between LTO and firm risk. Prior to this, fundamental tenets of LTO will be elaborated to enhance our understanding concerning the precise nature between the two paradigms. To date, there has been no universally accepted definition of LTO. The generalizability of much-published research on the definition of LTO is problematic. Thus, various definitions will be presented to get deeper insights into LTO. In retrospect, Confucian values regarding time, tradition, perseverance and saving for the future lay the foundation of LTO. In the sequel, it was initially coined as an attitude of forward-looking versus present and past-looking (Hofstede, 1991). Moreover, LTO is defined as a cultural value of viewing time holistically, valuing both the past and the future rather than deeming actions important only for their effects in the here and now of the short-term (Sulphey, 2020; Bearden *et al.*, 2006). In addition, LTO refers to the tendency to prioritize the long-range implications and impact of decisions and actions that come to fruition after an extended time period (Lumpkin *et al.* 2010). Last but not least, LTO is a multifaceted construct, which is composed of continuity, futurity and perseverance

(Lumpkin and Brigham 2011). Notwithstanding that a large and diverse volume of studies has attempted to define LTO, the gist of the extant literature on LTO is that time horizon is of utmost importance and sustainability is the main product of LTO (Flammer and Banal, 2017; Chun *et al.*, 2021).

Based upon these definitions above, it is logical to assume that LTO is significantly associated with resilience since the first and foremost aim of firms is survival rather than short-term profitability. It is an indisputable fact that resilience is the cornerstone of firm survival to absorb exogenous shocks and inhibit the adverse effects of downturns (Chun *et al.*, 2021). Drawing this line of reasoning, it is sensible to stipulate that LTO is a risk-alleviating effect in that LTO fortifies firm resilience through saving and investing in thriftiness and perseverance to achieve firm strategic objectives (Diez-Esteban *et al.*, 2019). Likewise, prior studies revealed that short-termism is detrimental to firm viability and even leads to firm mortality in extreme circumstances (Diez-Esteban *et al.*, 2019). GFC stands out as a blazing example of the destructive effect of LTO since investors fell prey to excessive risk-taking by promoting short-term profitability rather than long-term value creation (Gonzalez and Andre 2014). The short-termism cost is originated from the conflict of interests between managers and shareholders. Typically, managers are more prone to embrace myopic posture due to career concerns (Gibbons and Murphy, 1992), short-term compensation (Stein, 1988) and market pressure to meet or exceed analysts' earnings forecasts (Flammer and Banal, 2017). Therefore, such managers may destroy firm value by promoting immediate gains at the expense of long-term value. On the other hand, shareholders are inclined to be more long-term oriented since they place a greater emphasis on sustainable competitive edge and long-term growth. This misalignment is a time-based agency problem.

Furthermore, sparse attention has been paid to the fact that LTO paves the way for the implementation of novel ideas. The central tenets of innovation are a long gestation period and a high mortality rate. Therefore, LTO provides an unwavering basis for innovation, whilst managerial myopia shuns to engage in innovation activities. In addition, LTO engenders firms to establish and solidify relationships with their

constituents given longer time horizons (e.g., employees, customers, competitors and society). By way of these close ties across their network, firms manage to internalize external resources and thus enhance their legitimacy, visibility and reputation. A positive reputation may entail a myriad of benefits including cost reduction, enabling firms to charge premium prices and attracting key constituents; thus, enhancing firm survival and creating a competitive advantage.

In deference to the propositions discussed above, it is sensible to propose that LTO is a value-enhancing cultural dimension. In a nutshell, frugality and meticulousness do prevail in cultures with high LTO and thus such cultures are less concerned with the promotion of riskier decisions. Rather, long-term health is the sweet spot of such cultures on account of uncertainty concerns and strong dedication to ensure sustainability. Thus, hypothesis 6b is postulated as follows;

Hypothesis 6b: LTO is negatively correlated with firm risk across the construction industry.

Finally, another aim of this section is to explore the impact of IVR on firm risk. Whilst a considerable amount of interest has been paid to the interaction between other dimensions and firm risk in the literature, IVR-firm risk nexus has received scant attention in academia (Alipour and Yaprak, 2022). This scarcity of interest is originated from the fact that the IVR dimension was annexed to Hofstede's framework in 2010; thus, few studies have examined the association between these two paradigms thenceforward (Alipour and Yaprak, 2022; Abdelrahim, 2021; Choi, 2020; Haq *et al.*, 2018; Hofstede *et al.*, 2010; Tian *et al.*, 2018). Cross-cultural theories firmly speculate that firm and managerial postures do differ across cultures (House *et al.*, 2004; Kreiser *et al.*, 2010; Taras *et al.*, 2010). Within this perspective, it is sensible to opine that IVR shapes firm risk in certain ways. To begin with, it is widely accepted that indulgent societies are complemented by a lenient set of rules and regulations, whereas restraint societies are prone to form a close-knit with rules and regulations. Rule orientation is an important impediment to change and thus it is plausible to argue that low IVR stymies

risk propensity due to the peril of unpredictability and uncertainty. Unlike restraint societies, countries with high IVR appreciate ambiguities and are less obedient to rules and norms; in turn, embrace risk-taking behavior. Second, short-termism, frivolous spending and thriftlessness are persistent across indulgent societies. Consequently, such societies are inclined to discount negative aftermaths of losses due to poor planning of future outcomes and the absence of negligence. On the other hand, meticulousness and frugality are the cornerstone attributes across restraint cultures. Drawing this line of reasoning, indulgent societies are more likely to embrace risk-taking owing to myopia and prodigality (Alipour and Yaprak, 2022; Abdelrahim, 2021).

Last but not least, indulgence is strongly associated with gratification and hedonism. Besides, the strength of self-control is weak among indulgent societies. Supportively, it has been empirically found that indulgence increases the probability of risk-taking on the condition of overgratification and feeble self-control (Freeman and Muraven, 2010; Romer *et al.*, 2010). İndividuals succumb to potential unfavorable repercussions of their preferences (e.g., smoking and alcohol). Reflecting this proposition at the organizational level, it is reasonable to opine that indulgent firms fall prey to immediate time and imperfectly grasp the adverse effects of their risky choices. Therefore, indulgent firms are expected to be risk-takers, unlike their restraint peers (Alipour and Yaprak, 2022). In a nutshell, it is sensible to propose that indulgence spurs risk propensity. The underlying reason is that indulgent firms are less tolerant of rule orientation and rigidity. Furthermore, indulgence catalyzes the discount of future losses due to hedonism, myopic behavior and infrugality. Thus, hypothesis 6c is postulated as follows;

Hypothesis 6c: IVR is positively correlated with firm risk across the construction industry.

4. METHODOLOGY

4.1. Research Setting

To shed light upon to what extent firm-level determinants influence firm risk, a handful of hypotheses were cultivated. Basically, each hypothesis is designated to investigate an individual firm asymmetry. In this regard, the general explanatory framework in the form of a path diagram is depicted in Figure 4.1 to represent the predefined impact of selected firm peculiarity on firm risk.

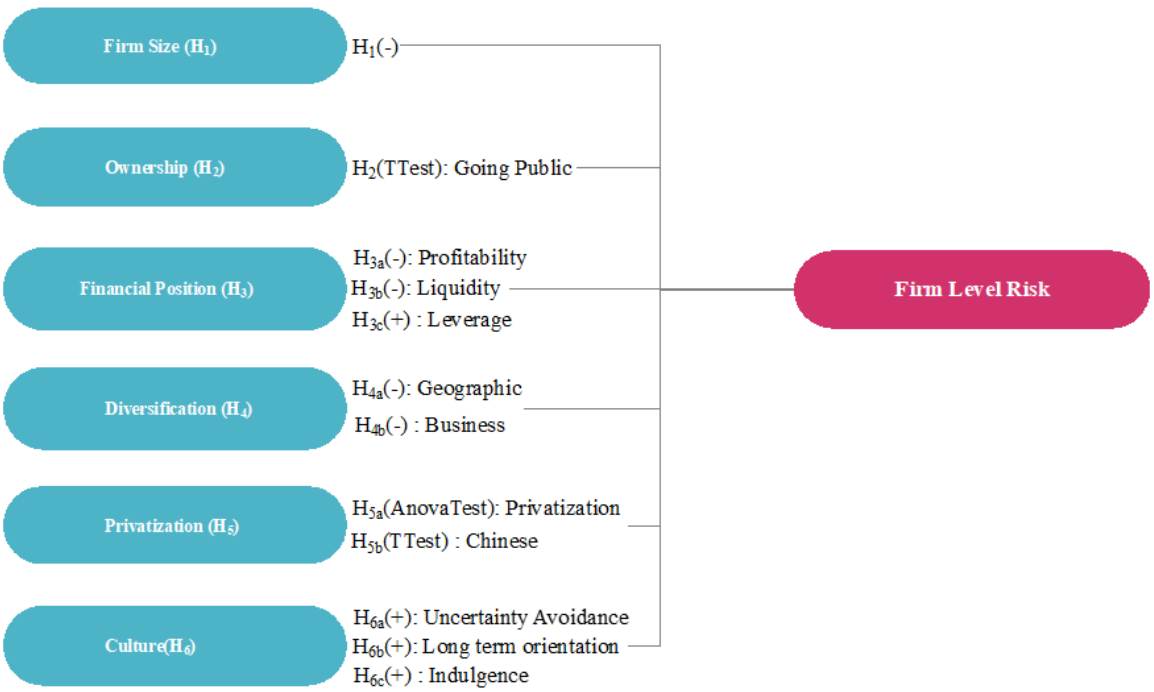

Figure 4.1. Theoretical framework and hypotheses.

4.2. Data Collection

The test of hypotheses is performed amidst publicly listed firms in the construction industry under an empirical setting. Since this study is heavily dependent upon financial parameters, the relevant data was obtained through the DataStream database and missing data was complemented through corresponding annual reports. In accordance with the initial sampling filter of minimum market capitalization of $250 million,

308 publicly listed firms were determined as of 13 May 2023 by the implementation of the Construction and Engineering (NEC) code. Secondly, firms with nonconstruction core competence were removed from the sample. Thirdly, firms with less than 5 consecutive firm-year data were eliminated from the analysis. Lastly, firms with inconsistent data (e.g., mainly Chinese) were disregarded, for they may falsify empirical analysis. In short, the aforementioned sampling filters resulted in a substantial shrinkage in sampling size, leading to a total of 192 firms spanning across a time horizon of 40 years, between 1983 and 2022.

Following the exertion of sampling filters, leading descriptive statistics of firms will be highlighted. Initially, the composition of firms is represented at the country level in Figure 4.2. As it appears, 192 firms are dispersed among 37 different countries by 2022. What stands out in this figure is that both China and Japan outnumber other countries in the sample, accounting for approximately 19% share apiece. These two countries are followed by India (18 firms) and USA (11 firms) respectively. Seemingly, the total share of the first four countries is slightly bigger than that of the remaining 33 countries.

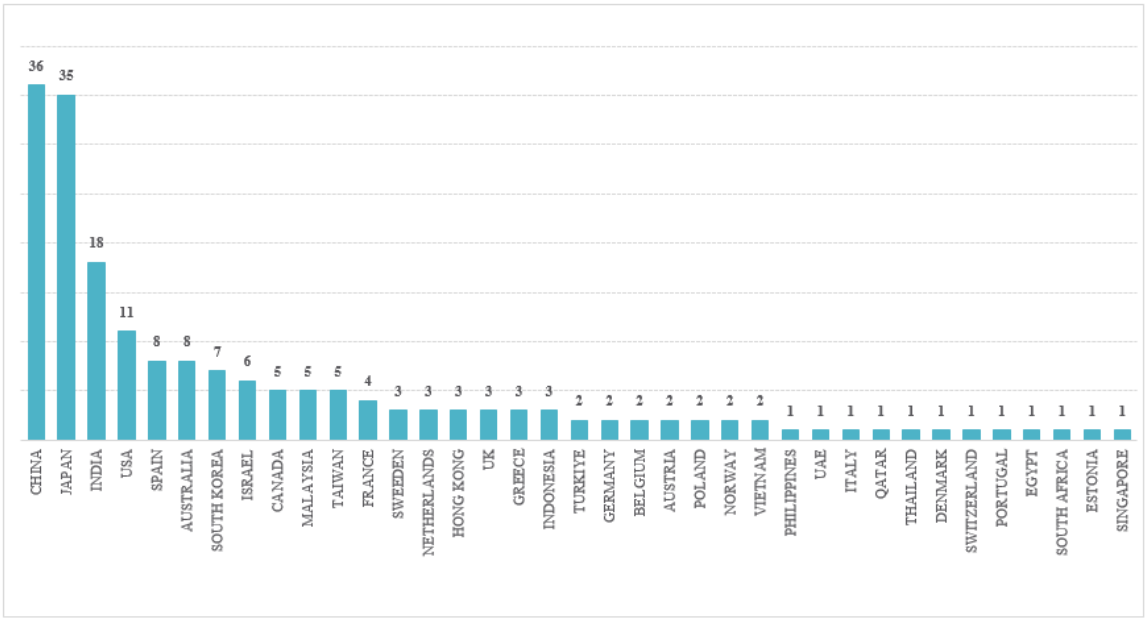

Figure 4.2. The distribution of firms in the sample at country level by 2022, (This figure is compiled by the author).

Aside from country distribution, the composition of firms is illustrated at continent level by 2022 (see Figure 4.3). The firms in the sample are categorized under six different geographical regions. The most striking interpretation of Figure 4.3 is that almost two-third of firms are incorporated in Asian market. Besides, the number of firms in European and North American markets are 41 and 16 respectively. On the other hand, the total number of firms in remaining three countries is 11, which ultimately results in a marginal effect in the sample. In short, approximately 95% of firms are originated from three continents (e.g., Asia, Europe and North America).

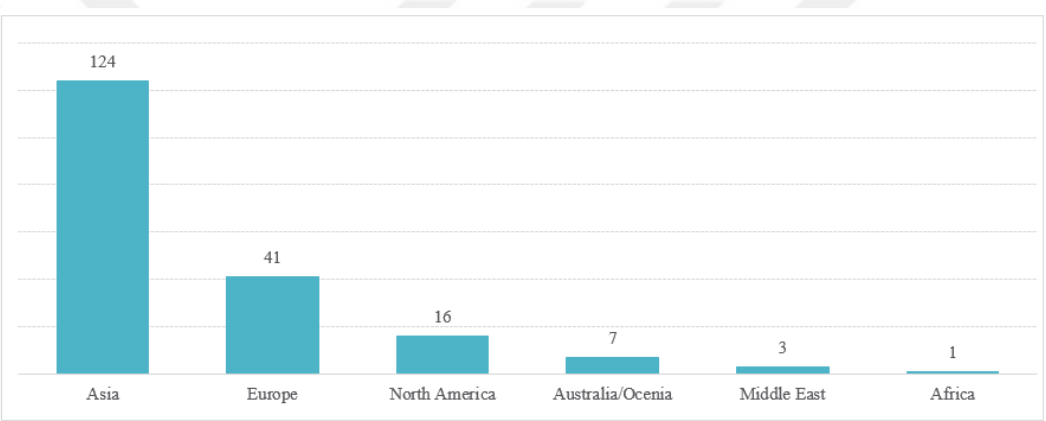

Figure 4.3. The distribution of firms in the sample at continent level by 2022, (This figure is compiled by author).

4.2.1. Variables

4.2.1.1. Dependent Variable (DV). Risk has emerged as a crucial component in the field of business continuity in the face of a turbulent business environment. Therefore, the measurement of risk gains prominence as a fundamental component of firm resilience to foil dire consequences of exogenous variations. In this regard, a multitude of risk measures have been utilized to quantify firm risk across extant literature through the lens of corporate product diversification, international geographic diversification, vertical integration, business strategy and industry characteristics, organizational processes and corporate structures (Miller and Reuer, 1996). Table 4.1 below displays the breakdown of risk constructs to get a clearer picture concerning how prior studies have quantified firm risk.

Seemingly, there exists no universal settlement concerning the measurement of firm risk albeit its extensive incorporation in empirical studies. The Achilles heel of prior studies is that there exists no clear-cut differentiation between measures of risk and other parameters, which are the determinants of risk. In contrast to the conventional wisdom that efficient risk management engenders superior performance, the reverse interaction is more likely to persist in this study. Within this perspective, financial ratios are considered firm-level asymmetries, which play an important role in firm risk, rather than risk measures. Second, the terms risk and risk-taking are often used interchangeably and without precision. Indeed, risk-taking is defined to represent risk preference or appetite, which ultimately amplifies risk and volatility among performance outcomes. Thus, risk should be classified as either choice (e.g., managerial risk-taking) or outcome (firm risk). Considering this distinction, outcomes are chosen as the focal point of this study (Santacruz, 2019). Thirdly, ex-ante measures (e.g., DD and Quantitative Financial Health) fall prey to optimism bias, stipulating that forecasts are more likely to outpace actual values and thus overcapitalize future earnings (Ruefli *et al.*, 1999). Fourth, CAPM (Beta and Alpha) measures are excluded to operationalize firm risk since these measures mainly are exploited to estimate systematic risk, which is innate to the overall market and thus impacts the overall market rather than individual firms. In this perspective, the utilization of CAPM is inconsistent with this report because the primary aim of this study is to investigate the impact of firm specificities rather than market entirety (Miller and Reuer, 1996, Ruefli *et al.*, 1999). Last, the implementation of Z-score is problematic owing to its complexity and it shares many feathers with volatility measures, for variance is the key ingredient of these two approaches (Moreno *et al.*, 2021).

Under these circumstances, ex-post measures (e.g., Standard deviation of ROA, ROE and ROS) were selected to estimate income stream uncertainty in that risk is substantially reliant upon historical return variability. Of these three return parameters, the standard deviation of ROA is preferred because the vast majority of prior studies have utilized ROA in relation to other return parameters (Gonzalez *et al.*, 2020; Miller and Reuer, 1996; Bettis and Mahajan, 1985; Dewan and Ren, 2011; Upadhyay,

2014; Fiegenbaum and Thomas, 2004; Henkel, 2008; Hutchinson *et al.*, 2015; Santacruz, 2019). Furthermore, ROA is the leading financial variable, which is markedly appropriate to compare firms across the same industry.

Table 4.1. Different measurements of firm risk.

Author	**Variable**	**Explanation**
Miller and Bromiley -1990	Financial ratios: ROA, ROE, Tobin's q, Capital Intensity, RandD Intensity, Leverage	Traditional wisdom states that risk can be interpreted in terms of financial ratios. Superior performance is attributed to lower risk.
Gonzalez *et al.*, (2020); Miller and Reuer, -1996 Ruefli *et al.*, (1999); Santacruz -2019	Quantitative Financial Health Distance to Default (DD) Value at Risk (VaR)	Using a predictive model, Morningstar's Quantitative Financial Health reflects the probability that a company will face financial distress in the near future (Morningstar, 2018). This is a measure of how much a share price might fall with a given probability (p), given normal market conditions, in a set time period: VaRp(Y) = Prob(Y Y ∗) = p
Hasan and Cheung, -2023 Arrfelt *et al.*, -2016	Systematic risk (Beta and Alpha)	This is a measure of stock volatility in relation to the market so as to measure systematic risk
Gonzalez *et al.*, (2020); Miller and Reuer, (1996); Henkel, (2008); Santacruz, (2019); Hutchinson	Volatility	Standard deviation of ROA and ROE to measure fluctuations

Table 4.1. Different measurements of firm risk. (cont.)

Author	**Variable**	**Explanation**
et al., (2015); Miller and Reuer, (1996); Fiegenbaum and Thomas, -2004		
Cool *et al.*, -1989 Deephouse and Wiseman -2000	Z-score= $\frac{ROA+\frac{Equity}{Total}Assets}{StdDevROA}$	The Z-score relates a firm's capital level to the variability in its return on assets (ROA), revealing how much variability in returns can be absorbed by capital without the firm becoming insolvent
Dolz *et al.*, -2019	Firm survival, default risk, bankruptcy, or market exit	Firm survival is a classic measure of the long-term performance of companies. In general, it is the ultimate proof of long-term success, a test of the permanent adaptation to the business environment
Nguyen *et al.*, -2023	Distance-to-Default	Distance between the expected value of assets of the company and the default point and then splits this difference by an estimation of the volatility of the company in a time horizon.
Moreno *et al.*, (2021); Tsiapa, -2022	Sharpe Ratio= $\frac{=(Rx-Rf)}{StdDevRx}$	Rx = Expected portfolio return; Rf = Risk-free rate of return; StdDevRx = Standard deviation of portfolio return (volatility)

4.2.2. Independent Variables (IVs)

4.2.2.1. Firm Size. Extant literature is fraught with myriad disparate measurements of firm size. Typically, the academic literature *hitherto* has conceptualized firm size in terms of total revenue, market capitalization and total employee number. In addition to these three paradigms, firm size can be quantified by means of total assets in that construction industry is considerably capital-intensive. Among these four parameters, the natural logarithm of total revenue was selected as a proxy for firm size in the construction industry. The procurement of relevant data for total revenue was performed through the DataStream financial database and annual reports of construction firms.

4.2.2.2. Firm Type. To measure firm type, a dummy variable is set to 1 if a firm is privately held and 0 otherwise.

4.2.2.3. Financial Position. Hypothesis 3 is composed of three statements. The first statement is to address the impact of *firm past performance* on firm risk. There exist two competing themes to conceptualize firm performance in academic literature. On one hand firm performance can be embodied in terms of financial measures. On the other hand, non-financial constructs have been used as complementary to financial variables to measure firm performance. In this regard, it goes without saying that the common use of financial and non-financial measures rather than individual representation is more convenient to express firm performance, for nonfinancial variables (e.g., customer loyalty, employee satisfaction, brand equity and so forth) are the backbone of firm value. Nonetheless, firm performance will be demonstrated through financial parameters, for the bulk of data in this report is finance-oriented. Moreover, the quantification of nonfinancial parameters is formidable and time-consuming. Of financial metrics, ROA, ROE and ROIC were initially considered to measure firm performance; nevertheless, ROIC comes into prominence in that it is more illuminating than both ROA and ROE. ROA is computed as the ratio of net income to total assets. Yet, since firm risk is represented in terms of the standard deviation of ROA, other options

were contemplated to measure firm performance. ROE refers to the ratio of net income to shareholder's equity and thus disregards the impact of debt on profitability (overleverage). Furthermore, ROE can be easily increased due to manipulations (e.g., write-downs, share buyback), which drastically reduce the value of shareholder's equity. Therefore, ROIC was selected to represent firm performance in the empirical setting. ROIC corresponds to the ratio of NOPAT to invested capital. ROIC is pertinent to analyze how well a firm utilizes its capital to yield profits. Moreover, ROIC enables to compare firms with different capital structure.

Second, *financial leverage* is the center of our attention in relation to financial position. Extant literature has utilized a wide range of financial metrics to measure firm leverage. Of these diverse indicators, financial leverage will be primarily defined in terms of Debt/Equity to represent the indebtedness of a firm. Moreover, the representation of firm leverage will be supplemented through additional two metrics: namely, *Asset/Equity and (Total Debt-Cash)/EBITDA*. This is because the sole usage of Debt/Equity imperfectly suffices to demonstrate the firm's real leverage. That is, the inclusion of these two metrics provides deeper insights concerning the ability of a company to repay its debt obligations with its assets and the ability of a company to pay all debt obligations, including repayment of principal and interest.

Last, *liquidity* is an important financial tool to provide a sense with respect to the ability of a borrower to pay off its current debt obligations without raising external capital. Thus, liquidity ratios (e.g., Current ratio, Quick ratio and Cash Cycle) enable firms to gain deeper insights into how quickly firms turn their assets into cash to cover their short-term liabilities. In this regard, firm liquidity will be represented through *Current Ratio*, which compares current assets to current liabilities and *Quick Ratio*, which is a stricter test of liquidity than the Current Ratio. The inclusion of Quick Ratio will enable firms to realize the importance of near-cash and more liquid assets (so-called *quick assets*) rather than less liquid assets (e.g., inventory and prepaid expense) to clear their liabilities.

4.2.2.4. Diversification. In the pursuit of H4, GD implicates the geographic scope of corporate diversification, which corresponds to the physical expansion beyond national confines. Drawing this line of definition, GD will be enumerated among leading variables in academia. Since one dimension is insufficient to operationalize geographical diversification (GD), international business literature is inundated with profuse measurements of GD. The vast majority of extant literature has concentrated on the *foreign sales ratio*, which refers to the percentage of foreign sales to total sales (Eckert and Trautnitz, 2010). Furthermore, increasing attention has been paid to the *foreign asset ratio*, which corresponds to the percentage of international assets to total assets, particularly across capital-intensive industries (Esposito, 2022). In a similar fashion, a considerable deal of studies have attempted to define GD in terms of *foreign employee ratio*, which accounts for the percentage of international employees to total employees, specifically among labor-intensive industries. Despite their widespread incorporation in numerous empirical studies, these three ratios fail to measure internationalization thoroughly due to their unidimensionality. Thereby, a considerable amount of literature has demonstrated an increasing proclivity towards a handful of multidimensional measures. To illustrate, *international market diversification*, an entropy measure, has been receiving growing attention from academia. This measure takes both the number of global market regions in which a firm operates and the relative importance of each global market region to total sales into consideration. Furthermore, *country breadth*, the number of international countries in which a firm operates and *country depth*, the number of subsidiaries a firm has in a particular country, have been at the center of much interest until quite recently (Elango, 2010). Whilst these measures pertain to disparate facets of GD, the foreign sales ratio will be employed to measure the degree of internationalization owing to its simplicity. The data in question will be attained from the DataStream database and annual reports of firms. The computation of the foreign sales ratio is provided in the equation below. GD is bounded between 0 and 1, with values close to 0 indicating low geographic diversification and values close to 1 indicating high geographic diversification.

$$Geographicaldiversification = \frac{(Totalrevenue - Domesticrevenue)}{Totalrevenue} x100 \qquad (4.1)$$

Secondly, ID, in line with H4, is aimed to reflect the business scope of corporate diversification in order to represent the concentration of unrelated business activities in comparison with core business activity. The sheer volume of research on diversification is a testament to the prominence and relevance of the topic. The repercussion of this phenomenon is the concurrent proliferation of measures and techniques across international business literature. The first strand of techniques is the *categorical measurement*, which is subjective and lies in the conceptualization of the core activities of the firm. In this regard, four major categories are defined to delineate business diversification: single business, dominant business, related business and unrelated business. This classification is originated from *specialization ratio* (Rs), which accounts for the proportion of the firm's largest business entity and *related ratio* (Rr), which crystallizes the share of the firm's largest related business. In light of these two ratios, unrelated diversified firms fall into the range of (Rs < 0.70 and Rr < 0.70). Despite fruitful insights, this mechanism is scant and inadequate owing to being information-demanding and time-consuming (Rumel, 1974). The second strand of techniques is called the *business count approach*, which is subjective and hinged upon a classification system in line with Standard Industrial Classification (SIC) system based upon economic activities. Therefore, business count measures contend with the group difference in line with business diversity. Of these count measures, the leading proxy to measure ID is the *Herfindahl index* (HI), which is defined as:

$$HI_{(i,t)} = \sum_{j=1}^{M} \left(\frac{S_{j,i,t}}{\Sigma_j S, J, \dot{I}, t} \right)^2 \tag{4.2}$$

where Sj, i, t indicates the sales revenue for segment j in firm i at time t. Here, HIi, t equals 1 for single-segment firms (Wang *et al.*, 2023; Rogers, 2001; Deng *et al.*, 2014). Thus, a decreasing value of HI implies an increasing degree of ID. Moreover, HI was modified (Berry, 1971) and thus *Berry-Herfindahl* index is defined as follows;

$$Berry - HerfindalIndex = 1 - \left(\Sigma_j m_{ij}^2\right) / \left(\Sigma_j m_{ij}\right)^2 \, j = 1, K, M \tag{4.3}$$

where mij = proportion of jth classified group to ith firm's total sales and M is the number of classified groups in which a firm operates. In this measure, if a firm operates

in a single classified group, the Berry-Herfindahl index of diversification is zero and it becomes close to 1 if the firm's total sales are divided equally among any number of classified groups (Che and Lienberg, 2017). Furthermore, an entropy approach emerged to digitize ID in the literature (Jacqemine and Berry, 1979). The formula for entropy measure is as follows;

$$Entrophy\ index\ of\ total\ diversification = \Sigma_j m_i j ln(1/m_i j) j = 1, K, M \qquad (4.4)$$

This measure is designed to decompose the total diversification measure into managerially meaningful elements of total diversification: unrelated and related diversification and international (related and unrelated) market diversification. Another branch of business count measure is the *discrete two-dimensional categorical diversification* measure developed by Varadarajan and Ramanujam (1987). A feature of this conceptualization is that it does not require data on sales or revenues of activities, but still provides insights into both the degree of diversification and its direction.

This method distinguishes between two distinct patterns of diversification to capture Rumelt's classification: Mean Narrow Spectrum Diversification (MNSD) and Broad-Spectrum Diversification (BSD). Varadarajan and Ramanujam define BSD as the number of 2-digit SIC codes in which a firm concurrently participates. MNSD is defined as the number of four-digit SIC codes a firm operates in divided by the number of two-digit SIC categories in which the firm participates. This method treats BSD and MNSD as the two dimensions of a four-cell matrix, where each cell represents the totality of a firm's past diversification activities in various two- and four-digit industry categories. The matrix contains the following cells: firms with very low diversity are classified in cell A, B contains related diversified firms, C represents unrelated diversified firms and firms with very high diversity are grouped in cell D.

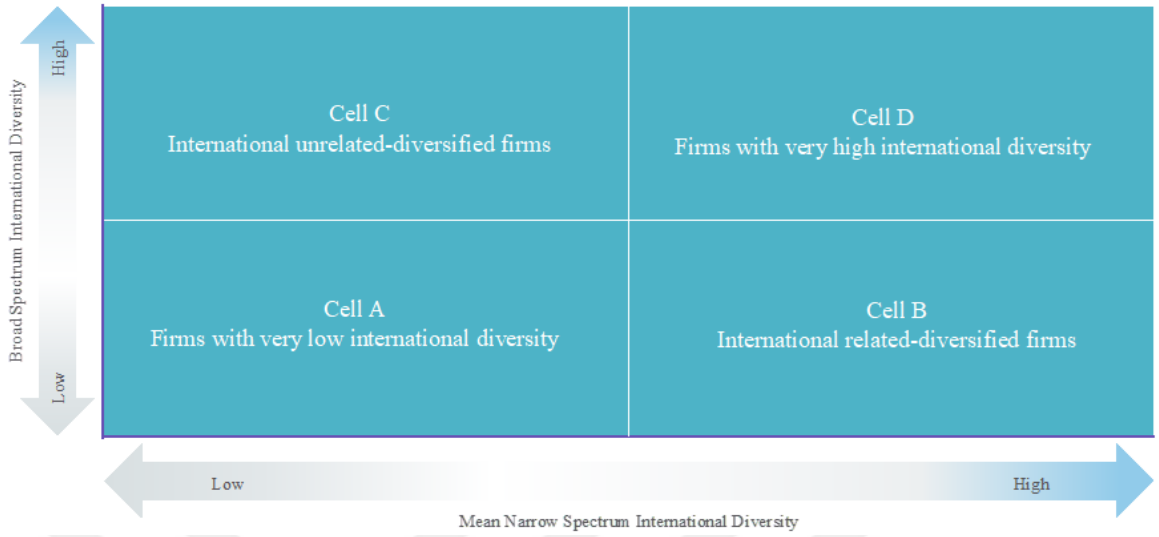

Figure 4.4. Conceptualization of firm diversity (Own elaborate).

The third strand of measure is the utilization of a *dummy variable*, which is set to 1 if a firm engages in ID and 0 otherwise. The last approach is built on the *noncore business ratio*, which corresponds to the percentage of noncore business sales to total sales (Jang *et al.*, 2019). Taking all these techniques into consideration, the noncore business ratio is selected due to its simplicity and ease of calculation. Besides, both categorical and business count measures were eliminated owing to their complexities. Concisely, IND will be measured as follows;

$$Industrial\ diversification = \frac{1 - constructionsales}{Totalsales} x100 \tag{4.5}$$

4.2.2.5. Privatization. In the era of deregulation and globalization, the ownership structure has shifted from public to private. Nonetheless, a certain number of firms *still* retain a certain share of governmental stake in their ownership structure. In this regard, it is imperative to distinguish three ownership models (e.g. pure state, pure private and hybrid) from one another to gain deeper insights with respect to the impact of privatization on firm risk during lean times. In this line, ownership types are coded for state, private and hybrid as 1, 2 and 0 respectively in accordance with previous studies (Zheng *et al.*, 2017; Dong *et al.*, 2014; Wijesiri, 2016). Owing to its simplicity and easiness, this proxy measure bears precedence in relation to other counterparts such as *ownership Herfindahl index* (OHI), the percentage of shares held by the largest

shareholders (C1), the percentage of the two largest shareholders (C2), the percentage of the first three largest shareholders (C3), the percentage of the first five largest shareholders (C5) and *privatization ratio*, which equals to the percentage of private stake to total stake, (Iwasaki *et al.*, 2022; Zeitun and Tian, 2007). Since Chinese firms outweigh their peers from other countries in terms of quantity and financial magnitude in the sample, it is intriguing to examine the impact of the host country on risk at the firm level. Thereby, a dummy variable of *Chinasation* is set to 1 if a firm is incorporated in China and 0 otherwise.

4.2.2.6. Culture. Discrepancies in culture and societal values are of utmost significance in organizational resilience since almost all firms operate beyond their national confines. A priori, culture does impinge upon perceptions and thus molds responsiveness at the organizational level. Therefore, firms should embrace cultural distinctions and cope with this diversity to preserve their continuity.

Extant literature has capitalized upon a wide range of different frameworks including *Hofstede* (1980, 2001, 2010) *Schwartz* (1994), *GLOBE* (House *et al.*, 2004), *Trompenaars* (1993) and the *World Values Survey* (Inglehart, 1990 and 1997). Of these frameworks, Hofstede looms large in prior studies; in turn, three cultural dimensions (e.g., UAI, LTO and IND) are obtained from Hofstede's framework, which has been extensively exploited last fifty years (Gaganis *et al.*, 2019).

In principle, the value of each cultural facet varies from 0 to 100; thus, a score more than 50 is regarded as high on this particular dimension. From a theoretical lens, nations with a higher value of IND are more likely to place importance on individual freedom, self-interest, autonomy and risk-taking. On the other hand, countries with higher scores of UAI and LTO are more likely to heed cohesion, harmony, conflict avoidance, self-denial, sacrifice and risk aversion. Within this perspective, values per these three cultural dimensions are assigned to firms inconsistent with their host country. At this juncture, it should be accentuated that cultural values are assumed to remain stable throughout firm longevity in our empirical analysis, as though cultural change

theories state that culture is unstable and thus vulnerable to convergence, divergence, or a combination thereof (Beugelsdijk *et al.*, 2017).

4.2.3. Control Variables (CVs)

To shed more light on casualties on the firm risk that are not handled through the aforementioned hypotheses, a cluster of control variables has been incorporated. First, *firm* age has been at the center of much attention in the literature in that firm age bears an influence on firm resilience owing to spillover effects of learning curve and experience curve. Stemming from this line of reasoning, it is pertinent to purport that firms become more adept at how to perform things in due course.

Thus, firm age is included as a control variable and represented as the gap between the relevant fiscal year and its incorporation date. Second, a country-specific variable, *annual GDP growth*, is identified as a control variable to address the time-varying effects on firms' local markets. GDP growth is the leading metric, which enables outsiders to gain deeper insights with respect to the health of the host economy. Because all firms are reliant upon their domestic market to a certain extent, this macroeconomic parameter plays a pivotal role in firm risk. Hence, this relevant data is attained from the *World Development Indicators* database.

Last, an important macroeconomic parameter, the *annual Inflation rate*, is also considered as a control variable, which is a worldwide phenomenon to measure increases in prices. It is an indisputable fact that inflation is directly associated with production costs and the supply of credit. Thus, the annual inflation rate is calculated as the percentage change in the consumer price index (CPI) and provided by *World Development Indicators* database. In the sequel, Table 4.2 below demonstrates a snapshot of all variables along with their corresponding sources.

Table 4.2. Variable measures and data sources.

Variable	**Type**	**Operational measure**	**Source**	**Predicted relationship**
Firm risk	Dependent variable	Standard deviation of ROA f or last 3 years	Datastream and annual reports	
Firm size	Independent variable	Natural logarithm of total revenue in standardized USD	Datastream and annual reports	Negative
Firm type	Independent variable	Dummy variable: 0 for publicly listed firms and 1 for privately held firms	Datastream and annual reports	Negative
Financial performance	Independent variable	ROIC and EBITDA margin	Datastream and annual reports	Negative
Financial leverage	Independent variable	Debt to Equity and Net Debt to EBITDA	Datastream and annual reports	Positive
Firm liquidity	Independent variable	Current ratio and Quick ratio	Datastream and annual reports	Negative
Geographical diversification	Independent variable	Foreign sales / Total sales	Datastream and annual reports	Positive
Industry diversification	Independent variable	(1 - construction sales)/ Total sales	Datastream and annual reports	Positive
Privatization	Independent variable	Dummy variable: State: 1, Private: 2, and Hybrid: 0	Datastream and annual reports	Positive
Uncertainty avoidance index (UAI)	Independent variable	0-100	Hofstede	Negative

Table 4.2. Variable measures and data sources. (cont.)

Variable	**Type**	**Operational measure**	**Source**	**Predicted relationship**
Long term orientation (LTO)	Independent variable	0-100	Hofstede	Negative
Indulgence (IND)	Independent variable	0-100	Hofstede	Positive
Firm age	Control variable	The number of years since the firm's formative year	Datastream and annual reports	Negative
Annual GDP growth rate	Control variable	Annual increase in GDP	World Bank	Negative
Annual Inflation rate	Control variable	Annual increase in CPI	World Bank	Positive

4.3. Empirical Model Development

In accordance with extant studies, an avalanche of different statistical approaches were applied to analyze the effect of firm determinants on firm risk: including but not limited to OLS (Spailara and Tsoukas, 2013), 2OLS (Sabatino, 2016), Panel data analysis (Bourletidis and Triantafyllopoulos, 2014), qualitative analysis (Varum and Rocha, 2014), hazard models (Iwasaki and Kim, 2018), linear regression models (Ma and Zhang, 2011; Tsiapa, 2022), panel regression (FR15) and structural equation modeling (Chatzoudes *et al.*, 2022; Osiyevskyy *et al.*, 2023; Matysek-Jedrych *et al.*, 2022). Among these diverse statistical methods, linear regression analysis comes to the fore as the most accepted and well-reputed statistical tool in the literature (Koronis and Ponis, 2018). In the same vein, the empirical analysis in this report will be materialized through this preferred approach. The underlying reason behind this preference is that the strength and direction of the relationship between a dependent variable and independent variables can be easily illustrated. Furthermore, the statistical significance of explanatory variables can be addressed by linear regression models. In other saying, statistically significant predictors of a dependent variable can be crowded out

rather than insignificant predictors. Moreover, the linear regression model has been extensively adopted in various disciplines, ranging from economics to the natural and social sciences; in turn, it has been well-understood in the academia. Therefore, the linear regression model is superior to other statistical models due to its simplicity and accuracy in the eyes of data analysts and statisticians. Last but not least, the computational burden of a linear regression model is not substantial and thus it is of utmost convenience to a large-scale data set (Maulud and Abdulazeez, 2020). Drawing upon this line of reasoning, the existence of each predicted relationship will be analyzed in conjunction with its respective magnitude and direction at the firm asymmetry level. Linear regression is aimed at modeling the interaction between a dependent variable and a set of independent variables at a linear threshold. Therefore, the linear regression model of this empirical analysis is illustrated as follows;

$$\begin{aligned} StdDevROA_{(i,k)} &= \beta_0 + \beta_1 SIZE_{(i,k)} + \beta_2 FirmType_{(i+k)} \\ &+ \beta_3 FirmPerformance + \beta_4 FirmLeverage_{(i+k)} \\ &+ \beta_5 FirmLiquidity_{(i+k)} + \beta_6 GeographicalDiversificaiton_{(i,k)} \\ &+ \beta_7 IndustryDiversificaiton_{(i,k)} + \beta_9 UAI_{(i,k)} + \beta_{10} LTO_{(i,k)} \\ &+ \beta_{11} Indulgence_{(i,k)} + \beta_{12} FirmAge_{(i,k)} + \beta_{13} GDPrate_{(i,k)} \\ &+ \beta_{14} Inflation_{(i,k)} \end{aligned} \tag{4.6}$$

where i is the date of the fiscal year and k is the firm concerned, StdDevROA is how volatile a firm is relative to its preceding two years for firm k and *Size, Firm Type, Firm Performance, Firm Leverage, Firm Liquidity, Privatization, Geographical Diversification, Industry Diversification, UAI, LTO* and *Indulgence* are independent variables, which are gathered on the grounds that firms do differ at each asymmetry. The cluster of control variables is composed of *Age, GDP growth rate* and *Inflation rate.*

5. EMPIRICAL RESULTS

5.1. Descriptive Statistics

Descriptive data were generated for all variables in Table 5.1. First, as highlighted beforehand, 192 firms were scattered across 37 countries in 6 different regions by 2022. Furthermore, *N* (4,275) refers to the cumulative sum of the years that a firm operates. As highlighted in Figure 5.1, there is a small number of firms before 1994 and the sample size has started to increase drastically since 1994. The average firm-year data is 22.27 years (4,275/192), which is consistent with the growth pattern of the sample size. By the same token, the value N for certain variables (e.g., Business diversification and Current ratio) is lower than 4,275, for data for these variables are not available for all years. Moreover, Valid N (1,495) accounts for the cumulative sum of fiscal years that data for each variable is available for the fiscal year in question. Second, our dependent variable *Firm risk* (Standard deviation of ROA) varies from 0.00 to 0.42 with a standard deviation of 0.02. Third, apparently, the vast majority of firms seem to be mature with a mean value of 57.1 years of age. Fourth, total revenue possesses a minimum value of 0.30 million USD and a maximum value of 305,407 million USD along with a mean value of 4,073.48 million USD, suggesting that firms tend to be financially large in the sample. Fifth, domestic share alternates between 0.01 and 1.00 with a mean value of 0.77, indicating that firms in the sample are, on average, reliant on domestic markets. Sixth, business diversification shuttles from 0.00 and 1.00 with a mean value of 0.24, stipulating that firms in the sample are less diversified in unrelated business segments. In other words, firms are prone to operate in both construction and construction-related markets. Seventh, liquidity (current ratio) ranges from -0.34 to 71.84 with a mean value of 1.48. This reveals that sampled construction firms are, generally, in good financial health, meaning that their current assets (e.g. cash, receivables and inventory) are greater than their current liabilities. Eighth, the mean values of UAI, LTO and Indulgence are 60.72, 68.75 and 43.11 respectively, suggesting that firms in the sample are inclined to be less tolerant towards uncertainty and ambiguity. Last

but not least, Firm type (1= privately held and 0= publicly traded) possesses a mean value of 0.06, advocating that a considerable number of sampled firms are traded in the stock exchange. Put in a nutshell, descriptive statistics for all variables were presented to collate and summarize quantitative data; therefore, salient trends among firm characteristics were detected to gain deeper insights concerning construction firms in the sample.

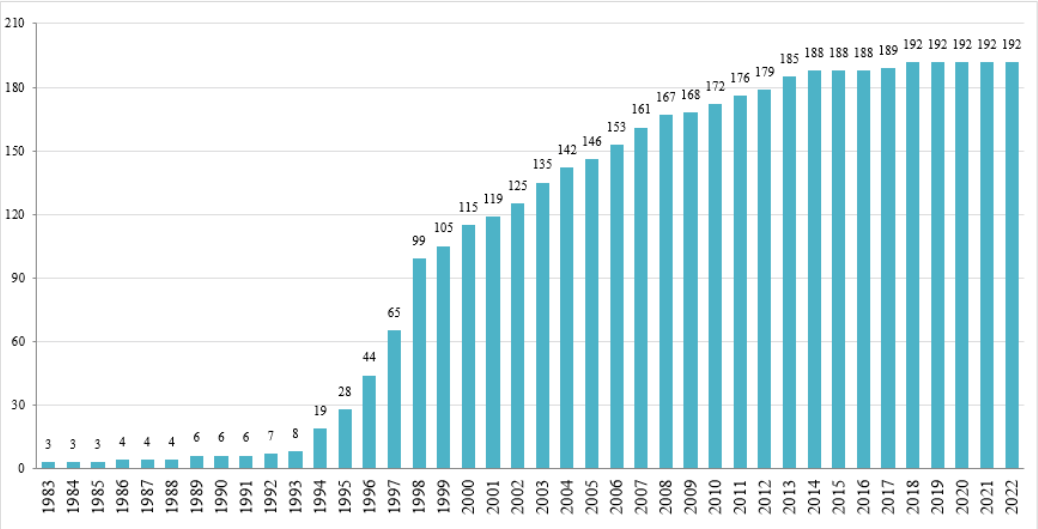

Figure 5.1. Number of firms by year in the sample.

Table 5.1. Descriptive statistics.

Variable	**N**	**Range**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Country (37 different countries)	4.275	36	1	37	10.97	9.14
Chinazation (Dummy)	4.275	1	0	1	0.16	0.37
Continent (8 different regions)	4.275	7	1	8	2.60	1.02
Firm Age	4.275	219	0	219	57.10	39.22
Firm Type (Dummy)	4.275	1	0	1	0.06	0.24
Standard Deviation of ROA (Firm Risk)	3.800	0.43	0.00	0.43	0.02	0.03

Table 5.1. Descriptive statistics. (cont.)

Variable	**N**	**Range**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Market Capitalization in million USD	3.957	1.463.215.54	0.00	1.463.215.54	4.073.48	36.927.57
Total Revenue in million USD	4.271	305.406.70	0.30	305.407.00	5.463.41	15.477.76
Net Margin (%) - Profitability	4.265	9.78	-6.33	3.45	0.04	0.18
Operating Margin (%) - Profitability	4.262	8.46	-4.94	3.53	0.06	0.16
EBITDA Margin (%) - Profitability	4.262	6.29	-4.78	1.51	0.08	0.12
ROA (%) - Profitability	4.132	1.31	-0.56	0.75	0.03	0.05
ROE (%) - Profitability	4.113	27.93	-4.41	23.51	0.11	0.44
ROIC (%) - Profitability	4.101	8.79	-3.33	5.46	0.08	0.22
EV/EBITDA (%) - Profitability	3.797	9.487.44	-185.03	9.302.40	16.77	157.07
Domestic Market Share	2.906	1.54	0.01	1.00	0.77	0.24
Geographic Internation-alization	2.906	1.00	0.00	1.00	0.24	0.25
Construction Market Share	3.307	1.00	0.00	1.00	0.76	0.24
Business Diversification	3.312	1.00	0.00	1.00	0.24	0.24
Privatization (Dummy)	4.275	2.00	0.00	2.00	0.96	0.43
Quick Ratio - Liquidity	4.086	60.42	-0.32	60.10	1.18	1.36
Current Ratio - Liquidity	4.257	72.18	-0.34	71.84	1.48	1.67

Table 5.1. Descriptive statistics. (cont.)

Variable	**N**	**Range**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
(Total Debt - Cash)/ EBITDA - Leverage	2.504	278.32	0.00	278.32	5.71	14.93
Debt/Equity - Leverage	4.225	427.29	-0.27	427.02	1.33	6.88
Assets/ Equity - Leverage	4.227	740.83	-5.86	734.97	4.69	12.33
Hofstede Uncertainty Avoidance Index	4.275	92.00	8.00	100.00	60.72	25.80
Long term orientation	4.275	86.00	14.00	100.00	68.45	22.07
Indulgence Annual Inflation (%)	4.145 4.265	78.00 89.68	0.00 -4.01	78.00 85.67	43.11 2.39	16.76 3.89
Annual GDP Growth Rate (%)	4.270	25.85	-11.33	14.52	3.48	3.75
Valid N (listwise)	1.419					

5.2. Pearson Correlation Matrix

Prior to the presentation of empirical models and results, a correlation analysis amidst independent variables is of paramount significance in the pursuit of healthy results. To do so, Pearson correlations are rendered in Figure 5.2 below. Rather than narrating each correlation individually, it is worthwhile to summarize the salient correlations among independent variables. Initially, the mainstream correlation substantiates between firm size and firm age ($\beta = 0.324, p < 0.01$). This positive association suggests that firms tend to amplify their revenue in due time. Furthermore, firm size is positively correlated with geographic internationalization ($\beta = 0.0296, p < 0.01$), whilst negatively correlated with business diversification ($\beta = -0.054, p < 0.01$). This can be interpreted in such a way that firms are prone to transcend their national confines as their revenue grows, whereas they are reluctant to diversify into

unrelated markets in contrast to their increasing throughput. Surprisingly, the negative correlation between firm size and all profitability variables except ROE ($\beta = -0.132, \beta = -0.094, \beta = -0.132, \beta = -0.065, \beta = -0.157, p < 0.01$) reveals that there is a decreasing trend between total revenue and firm profitability. This contradiction can be explained by greater complexity and higher sunk costs, attributed to liability of largeness. Second, whilst there exists a positive correlation between profitability variables and liquidity variables in general (i.e.,$\beta = 0.338, \beta = 0.669, p < 0.01$), a negative fashion is pronounced between firm profitability and firm leverage (i.e., $\beta = -0.256, \beta = -0.127, p < 0.01$). These opposing correlations imply that profitable firms tend to accumulate cash throughout downturns; however, financially constrained firms imperfectly raise external capital during lean times. Third, it is a crystal-clear fact that macroeconomic conditions are critical to firm viability. In the same vein, annual inflation is negatively correlated with the NetDebt/EBITDA ratio ($\beta = -0.055, p < 0.01$). In a similar fashion, there exists a negative but insignificant association between inflation and the remaining two leverage variables (Debt/Equity, $\beta = -0.001$ and Assets/Equity, $\beta = -0.005$). This clear trend of decreasing leverage during soaring inflation signifies that firms suffer from raising external debt owing to higher financing costs in the wake of high inflation periods. By the same token, the GDP growth rate is significantly correlated with domestic market share ($\beta = 0.235, p < 0.01$). Since the majority of sampled firms are reliant upon their respective domestic market and GDP growth is an indicator of the economic health of the host country, firms are inclined to cement their presence in their respective home country during better economic conditions. In addition, firms engage in unrelated business segments to explore growth opportunities coupled with increasing national welfare, which is corroborated by the positive correlation between GDP growth rate and business diversification ($\beta = 0.037, p < 0.05$). Last but not least, the cultural dimension UAI bears a strong correlation with LTO ($\beta = .341, p < 0.01$), suggesting that firms that are culturally less tolerant of uncertainties are supposed to be more long-term oriented. In a similar vein, LTO embraces a negative interaction with Indulgence ($\beta = -0.309, p < 0.01$), stipulating that far-sighted firms hesitate to sacrifice their long-term gains at the expense of spontaneous decisions. In short, the Pearson correlation matrix was generated

to reveal intercorrelations among predefined independent variables; therefore, a myriad of prominent interplays was crowded out by closer inspection. In this way, a slew of regression models will be constructed in accordance with the Pearson correlation matrix. Provided that correlations amongst independent variables affect the significance of other explanatory variables, a multitude of correlations in a linear regression model might entail a multicollinearity effect, which reveals that certain independent variables are *all but* identical. Such similarity elicits a high correlation among explanatory variables; therefore, the individual influence of such highly correlated explanatory variables cannot be distinguished from one another. Therefore, such highly correlated explanatory variables will be regressed separately in our regression models to enhance the accuracy and validity of empirical analysis.

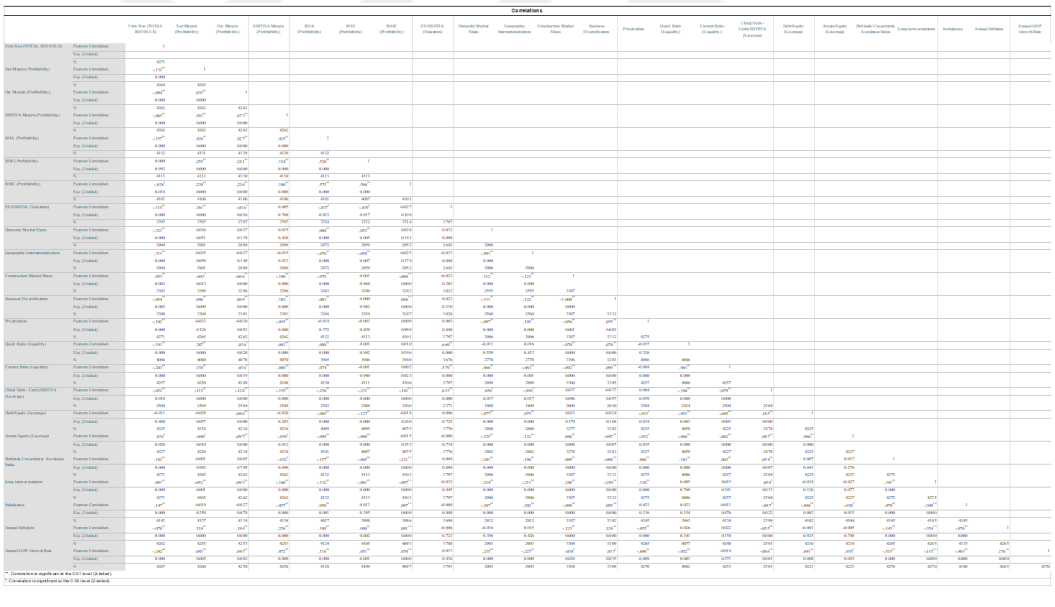

Figure 5.2. Pearson correlation matrix.

5.3. Empirical Models and Results

A sheer number of regression models were exercised to test the aforementioned six hypotheses. Of these models, a certain or a combination of various firm asymmetries is regressed on the dependent variable in accordance with the Pearson Correlation matrix depicted in Figure 5.2. The primary motive behind the implementation of numerous models is to mitigate the multicollinearity effect in the pursuit of model optimization. Therefore, a plethora of regression models was obtained and the detailed composition

of selected models amongst our model pool is illustrated in Table 5.2. By the same token, the regression results for each model are reported in Table 5.3 below.

Table 5.2. Composition of selected regression models.

Type	**Variable**	**Hypothesis**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Independent	Firm size	H1	*+	+	+	+	+
Independent	Firm Type	H2	+	+	-	+	-
Independent	ROIC	H3a					
Independent	Debt/ Equity	H3b	+	+	+	+	-
Independent	Quick ratio	H3c	+	+	+	+	+
Independent	Geographic Internationalizationa - Domestic Market Shareb	H4a	+	+	+	+	+
Independent	Business Diversificationa - Construction Market Shareb	H4b	+	+	+	+	+
Independent	Privatization	H5a	+	-	-	-	-
Independent	Chinese Impact	H5b	+	+	-	-	-
Independent	UAI	H6a	+	+	+	+	+
Independent	LTO	H6b	+	+	+	-	+
Independent	Indulgence	H6c	+	-	+	+	-
Control	Firm age	C1	+	+	+	-	+
Control	Inflation	C2	+	+	+	-	+
Control	GDP growth rate	C3	+	+	+	-	+

Table 5.3. Regression outputs of selected models.

Type	**Variable**	**Hypothesis**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Independent	Firm size	H1	-0.149**	-0.141**	-0.174**	-0.158**	-0.162**
Independent	Firm Type	H2	0.050*	0.049*	N.I.	0.057**	N.I.
Independent	ROIC	H3a	-0.058**	-0.051*	-0.057**	-0.057**	N.I.
Independent	Debt/ Equity	H3b	0.037	0.056**	0.034	N.I.	0.053*
Independent	Quick ratio	H3c	-0.046*	-0.039	-0.058*	-0.045*	-0.044*
Independent	Geographic Internationalizationa - Domestic Market Shareb	H4a	0.044a	0.049*a	-0.046*b	N.I	-0.047*b
Independent	Business Diversificationa - Construction Market Shareb	H4b	0.039a	0.032a	-0.043*b	-0.047*b	-0.032b
Independent	Privatization	H5a	-0.010	N.I.	N.I.	N.I.	N.I.
Independent	Chinasation	H5b	-0.101**	-0.131**	N.I.	N.I.	N.I.
Independent	UAI	H6a	0.030	-0.01	0.073**	0.089**	0.053*
Independent	LTO	H6b	0.103**	0.100**	0.091**	N.I.	0.061**
Independent	Indulgence	H6c	0.066*	N.I.	0.104**	0.057**	N.I.
Control	Firm age	C1	-0.078**	-0.065**	-0.066**	N.I.	-0.037
Control	Inflation	C2	0.112**	0.107**	0.128**	N.I.	0.117**
Control	GDP growth rate	C3	-0.018	-0.035	-0.031	N.I.	-0.068**
**Correlation is significant at the 0.01 level							
*Correlation is significant at the 0.05 level							
N.I. : Not Included							

6. DISCUSSION

A recapitulation of the results, in accordance with Table 5.3, is presented to underscore the impact of all independent variables on firm risk in conjunction with their respective predicted nature and significance (see Table 6.1). In the sequel, a comprehensive discussion of each hypothesis will be materialized in the ensuing sections.

Table 6.1. Summary of empirical results.

Type	**Variable**	**Hypothesis #**	**Predicted Relationship**	**Empirical result**	**Significance**
Independent	Firm size	H1	Negative	Supported	Significant ($p<0.01$)
Independent	Firm Type	H2	Negative	Supported	Significant ($p<0.05$)
Independent	Firm performance	H3A	Negative	Supported	Significant ($p<0.01$)
Independent	Firm leverage	H3B	Positive	Supported	Significant ($p<0.05$)
Independent	Firm liquidity	H3C	Negative	Supported	Significant ($p<0.05$)
Independent	Geographic Internationalization	H4A	Positive	Supported	Significant ($p<0.05$)
Independent	Business Diversification	H4B	Positive	Supported	Significant ($p<0.05$)
Independent	Privatization	H5A	Positive	Partially supported	Significant ($p<0.05$)
Independent	Chinasation	H5B	Negative	Supported	Significant ($p<0.01$)
Independent	Uncertainty Avoidance Index	H6A	Negative	Not supported	Significant ($p<0.01$)
Independent	Long-term Orientation	H6B	Negative	Not supported	Significant ($p<0.01$)
Independent	Indulgence	H6C	Positive	Supported	Significant ($p<0.01$)
Control	Firm Age	CI	Negative	Supported	Significant ($p<0.01$)
Control	Annual Inflation	CII	Positive	Supported	Significant ($p<0.01$)
Control	Annual GDP growth rate	CIII	Negative	Supported	Significant ($p<0.01$)

6.1. Size Asymmetry

Hypothesis 1 aimed to shed more light on the impact of firm size on firm risk. Along this line, it was predicted that an increase in firm size is connected with a decline in firm risk. In concordance with expectations, strong evidence was found between firm size and firm risk in all regression models (see Table 5.3). Therefore, *Hypothesis 1* was supported by empirical results (i.e., β= -.174, p<0.01). The findings of empirical models indicate that an increasing size is critical to mitigate firm risk, for larger firms are more likely to exploit scale and scope economies. What is more, larger firms are more resilient to crises and downturns, for they bear superior resource endowments and financial slack in comparison with their smaller peers (Gordon *et al.*, 2009; Dörr *et al.*, 2021; Miletic *et al.*, 2019). Therefore, larger organizations are more likely to raise external debt given their more collateral value. Furthermore, larger firms can allocate more resources to analyze and observe their external milieu; thereby, amplifying their proactiveness in the face of turbulent environments. In addition, larger firms are more likely to encompass CRO, risk committee and audit committee in their respective organizational structure; therefore, risk-taking behavior can be curtailed through internal mechanisms (Lin *et al.*, 2020). On the flip side, the empirical results fail to advocate the advantages of being a smaller firm from the spotlight of firm risk, unlike the findings of past studies (Atanasov and Nitschka, 2017; Vithessonthi and Tongurai, 2015; Chatzoudes*et al.*, 2019; Varum and Rocha, 2012). Apparently, smallness is perilous to firm risk despite its unique efficacies (i.e., responsiveness, innovativeness, adaptivity, smaller sunk costs and weak organizational inertia). To summarize, the advantages of largeness outweigh those of smallness in the wake of crises.

6.2. Ownership Asymmetry

Hypothesis 2 attempted to relate ownership structure (going public) to firm risk throughout lean times. It was contemplated that going public prunes firm risk in that publicly traded firms are better off raising external capital at a lower cost given the decreased demand in the event of recessions. Pursuant to our prediction, empirical

findings corroborate that going public is significantly associated with firm risk as per Model 1 ($\beta = 0.050, p < 0.05$), Model 2 ($\beta = 0.049, p < 0.05$) and Model 4 ($\beta = 0.057, p < 0.01$). Hence, further analysis was carried out to compare the differences in firm risk between privately held firms and their publicly traded counterparts. To do so, an Independent T-test was performed and thus a significant difference in mean scores was obtained (see Table 6.2). As reported in Table 6.2, the mean value of firm risk for publicly traded firms (0.0188) is lower than that for privately held firms (0.0320). This statistically significant difference heralds that going public is negatively associated with firm risk and thus *Hypothesis 2* was empirically supported.

Table 6.2. T-test group statistics for ownership structure.

Firm Type		**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Standard Deviation of ROA (Firm Risk)	Public	3691	0.0188111618	0.03056250242	0.00050305664
	Private	509	0.0319918342	0.04504777491	0.00431479429

As highlighted beforehand, liquidity is relatively higher among publicly traded firms in relation to their private peers (Samet *et al.*, 2018; DeYoung and Meles *et al.*, 2021). As such, publicly traded firms might secure the required working capital throughout the austerity period considering the plummeting demand. Even further, such profuse liquidity instigates publicly traded firms to undertake new investments or engage in acquisitions; in turn, reaping the rewards of scale economies (Samet *et al.*, 2018; DeYoung and Meles *et al.*, 2021). Furthermore, regulatory scrutiny impedes publicly traded firms from adopting excessive risk-taking. In light of better access to external capital and inhibitory market disciplines, the empirical findings consistently illustrate that going public significantly cushions firm risk.

6.3. Financial Position Asymmetry

Hypothesis 3 was laid out to ascertain the chemistry between financial soundness (healthiness) and firm risk. To do so, the financial soundness was represented through three key financial metrics. To begin with, it was professed that outperformance is

negatively correlated with firm risk. That is, firms are prone to be more risk-averse given that performance outpaces aspiration (self-reference) level. Both BTOF and PT state that individuals or organizations are indisposed to lose something in their possession (Pratono, 2018). On the other hand, individuals or organizations are inclined to be more risk-seeking in the wake of below-aspiration-level, which is the so-called *what we do not possess* condition (Kliger and Tsur, 2011). With respect to the underperformance situation, firms demonstrate an incremental risk proclivity to repair the gap between aspiration level and subpar performance. As it stands, the urge to remedy a performance failure far outweighs the willingness to invigorate success; therefore, firms are predisposed to appreciate risks in case of inferior performance. Furthermore, outperformance can be considered a slack resource, which reinforces firm resilience and financial flexibility. Thereby, outperformed firms coupled with augmented resilience and improved flexibility are more likely to absorb exogenous shocks and thus circumvent dire consequences of crises. In harmony with expectations, strong evidence was found in models 1, 2, 3 and 4 (see Table 5.3). *Hypothesis 3a* is strongly supported by empirical results ($\beta = -0.058, p < 0.01; \beta = -0.051, p < 0.05; \beta = -0.057, p < 0.01$ and $\beta = -0.057, p < 0.01$). The empirical models explicitly unfold that financial performance is of utmost importance in the mitigation of firm risk. The empirical evidence is consistent with the results of previous studies (Uhrin *et al.*, 2020; Tsai and Luan, 2016; Shrinkle, 2012). Drawing this line of reasoning, it is reasonable to suggest that underperformed firms are more vulnerable to adverse effects of crises.

Secondly, Hypothesis 3b was poised to unearth the liaison between financial leverage and firm risk. Based on theoretical and anecdotal evidence, it was proposed that financial leverage is inimical to firm risk (Cathcart *et al.*, 2020; Reddy *et al.*, 2022; Novita *et al.*, 2018). The underlying reason behind this proposition is that overleverage paves the way for strict lending norms from lenders due to the credit crunch during crises; in turn, highly leveraged firms suffer to raise external financing and thus become more reliant on internal financing (Bui *et al.*, 2021). Even worse, internal financing imperfectly suffices to maintain day-to-day businesses owing to the substantial decline in earnings. Therefore, highly leveraged firms are more likely to reach an impasse in that not only

such firms are unable to enhance their debt capacity but also, they incur a noteworthy shrinkage in their throughput. In conceit with predictions, a strong and positive correlation was individually detected in empirical Model 2 ($\beta = 0.056, p < 0.01$) and Model 5 ($\beta = 0.053, p < 0.05$) and thus Hypothesis 3b is strongly supported by empirical analysis and harmony with empirical findings of previous studies (Khasawneh, 2020; Gerlach et.al., 2015; Fosu *et al.*, 2016). The empirical findings of this study can be interpreted in such a way that an increase in financial leverage is significantly associated with an increase in firm risk. Considering all these empirical results, it is pertinent to dictate that firms should strike a balance between equity and debt in their capital structure. Albeit the tax deductibility privilege of debt, firms should not utilize their debt capacity to the backbone and indeed they should retain a buffer for additional debt to sustain their financial and operational sustainability in the face of a limited supply of credit and decreasing demand during post-crises periods.

Lastly, Hypothesis 3c was developed to anatomize the rapport between financial liquidity and firm risk. Along this line, it was proposed that firm liquidity is negatively correlated with firm risk. The first and foremost reason behind this proposition is that cash-rich firms resort to their accumulated cash to sustain their financial sustainability despite the coexistence of tightened monetary policies and decreased earnings in the post-crisis era (Larasati and Wahyudin, 2020; Meier *et al.*, 2013; Adusei, 2021). Therefore, cash holdings are less vulnerable to downturns in comparison to their cash-poor peers, for cash-rich firms can raise internal financing to maintain their survival given the limited lending supply and the sharp decline in their cash flows. Besides, financial surplus lays the foundation of an entrepreneurial attitude, which is an important organizational tool to experiment novel ideas and innovate new products and processes (Conz *et al.*, 2023). Furthermore, a high cash balance encourages firms to seize the opportunities in crises at lower value. In this sense, firms with high cash balances are more likely to reap the benefits of scale and scope economies; thereby, expanding their presence in contrast to the prevailing conservatism trend among firms during crises. In parallel with expectations, strong evidence was found in models 1, 3, 4 and 5 (see Table 5.3). Hypothesis 3c is strongly supported by em-

pirical results ($\beta = -0.046, p < 0.05; \beta = -0.058, p < 0.05; \beta = -0.045, p < 0.05$ and $\beta = -0.044, p < 0.05$) and the findings of this study overlap with those of other studies (Picolo *et al.*, 2018; Iftikhar *et al.*, 2021; Dottori and Micucci, 2018). The empirical results overtly reveal that firm liquidity mitigates firm risk in that cash surplus satisfies the required working capital, which is barely materialized from external sources due to the limited credit supply and disrupted cash flows. Even more, cash-rich firms might be seized with expansionism rather than conservatism; hence, cash holdings can widen their economic output through new investments or acquisitions in lean times. In brief, each hypothesis related to financial soundness was significantly supported and therefore it is reasonable to suggest that financial health plays a pivotal role in firm risk during crises. Considering these empirical results, firms should not only limit their indebtedness to a certain extent but also accumulate a certain threshold of cash to secure themselves against credit crunch and declining demand.

6.4. Corporate Diversification Asymmetry

As summarized beforehand, the CD is composed of ID and IND; thus, the purpose of Hypothesis 4 is to have a clearer picture concerning how these two types of diversification affect firm risk. Initially, Hypothesis 4a postulates that an increase in ID is positively correlated with an increase in firm risk. Notwithstanding that firms are prone to transcend their national confines due to the key added values of ID (i.e., scale and scope economies, coinsurance effect, switching opportunity, revenue enhancement, less reliance on the host country and extended market coverage), the marginal cost of ID outperforms the marginal benefit of ID owing to increased complexity, liability of foreignness, exposure FX risk, augmented information asymmetry between shareholders and managers and sizeable sunk costs (Onali and Mascia, 2022; Mamnen *et al.*, 2022; Elango, 2010; Figueira-de-Lemos *et al.*, 2010). Drawing this line of reasoning, it was proposed that ID is detrimental to firm risk during crises. At this juncture, it is important to accentuate that the testing of Hypothesis 4a was materialized through two ratios: Domestic market share and International market share. The main cause behind the inclusion of the former variable is that certain firms are

entirely local and thus the value of international market share for these firms corresponds to 0. Besides, the mean value of domestic market share is 0.77 in our sample (see Table 5.1). Thus, it was expected that whilst domestic market share is negatively associated with firm risk, the opposite correlation is predicted to take place between international market share and firm risk. In line with the expectations, a strong and positive correlation was confirmed between international market share and firm risk in Model 1 ($\beta = 0.044, p < 0.05$) and Model 2 ($\beta = 0.049, p < 0.05$) respectively. Moreover, a strong yet negative correlation was obtained between domestic market share and firm risk in Model 3 ($\beta = 0.044, p < 0.05$) and Model 5 ($\beta = 0.049, p < 0.05$) respectively. These empirical results affirm that ID is detrimental to firm risk, which coincides with the empirical evidence of extant studies (Jung *et al.*, 2018; Cavusgil *et al.*, 2020; Sun *et al.*, 2019). Considering these empirical findings, it is pertinent to conclude that Hypothesis 4a is strongly supported.

Table 6.3. ANOVA test results.

Privatization	**Privatization**		**Mean Difference**	**Std. Error**	**Sig.**	**95% Confidence Interval**	
						Lower Bound	**Upper Bound**
Tukey HSD	Hybrid	Private	-0.00825028306*	0.00156327654	0.000	-0.0119155755	-0.0045849907
		Government	0.00048464980	0.00236801017	0.977	-0.0050674387	0.0060367383
	Private	Hybrid	0.00825028306*	0.00156327654	0.000	0.0045849907	0.0119155755
		Government	0.00873493286*	0.00194622022	0.000	0.0041717823	0.0132980834
	Government	Hybrid	-0.00048464980	0.00236801017	0.977	-0.0060367383	0.0050674387
		Private	-0.00873493286*	0.00194622022	0.000	-0.0132980834	-0.0041717823
Games-Howell	Hybrid	Private	-0.00825028306*	0.00098686445	0.000	-0.0105663364	-0.0059342297
		Government	0.00048464980	0.00108506021	0.896	-0.0020639054	0.0030332050
	Private	Hybrid	0.00825028306*	0.00098686445	0.000	0.0059342297	0.0105663364
		Government	0.00873493286*	0.00096929551	0.000	0.0064584563	0.0110114094
	Government	Hybrid	-0.00048464980	0.00108506021	0.896	-0.0030332050	0.0020639054
		Private	-0.00873493286*	0.00096929551	0.000	-0.0110114094	-0.0064584563
* The mean difference is significant at the 0.05 level.							

Aside from the privatization-risk nexus, another purpose of this section is to gain deeper insights into whether China markedly differs from other countries in the spotlight of privatization. Unlike other countries, China is replete with SOEs and it is widely recognized that the Chinese market imperfectly endorses appropriate market mechanisms due to the prominent government intervention (Lin *et al.*, 2020; Kang and Kim, 2012). Common intuition states that state interference results in market frictions and imperfections, whereas this traditional wisdom is unlikely to prevail in the Chinese market. This abnormal behavior leads to the emergence of *China puzzle* in the business world, stipulating that China has experienced unprecedented economic growth in recent decades, whereas the Chinese market has been under the auspices of the government. Since nearly one-fifth of sampled firms are Chinese in our research setting, Hypothesis 5b proposes that the risk of Chinese firms is lower than that of their peers in other countries. In accordance with predictions, the empirical results indicate that there exists a significant decrease in firm risk associated with Chinasation. As displayed in Table 5.3, Chinasation is negatively correlated with firm risk in Model 1 ($\beta = -0.101, p < 0.01$) and Model 2 ($\beta = -0.131, p < 0.01$) respectively. Following the detection of statistical significance, independent sample t-tests were materialized to evaluate whether incorporation in China intrinsically shapes firm risk. Apparently, the mean value of firm risk for Chinese entities is lower than that of their non-Chinese counterparts (see Table 6.4). Given the empirical findings, it is sensible to deduce that government interference is of vital importance in the protection of firms throughout crises in China. For this reason, Chinese firms do not embrace the privatization wave in contrast to firms in other countries. As a result, Hypothesis 5b is strongly supported.

Table 6.4. Independent t-test for chinasation asymmetry.

Chinasation		N	Mean	Std. Deviation	Std. Error Mean
Standard Deviation of ROA (Firm Risk)	nonChinese	3140	0.0202184098	0.03085473288	0.00055062632
	Chinese	660	0.0142928807	0.03204561056	0.00124737370

6.5. Culture Asymmetry

Culture is of utmost significance in individual perception and interpretation of the exogenous variations; in turn, determination of pertinent reactions towards the external environment. Drawing this line of reasoning, conventional wisdom anticipates that culture is fundamental to firm risk due to its pervasive impact on firm behavior and organizational outcomes given the presence of incomplete information and dearth of necessary experience (Delis *et al.*, 2023; Frijns *et al.*, 2022). Along this line, Hypothesis 6a postulates that UAI is negatively correlated with firm risk during crises. The key reasoning beneath this assumption is that UAI is positively associated with the level of discomfort and anxiety in the event of uncertainty and ambiguity (Frijns *et al.*, 2013; Gaganis *et al.*, 2019). Hence, it is coherent to assume that a firm with high UAI is expected to be risk-averse; thereby, prone to abide by established rules and norms. In stark contrast, strong evidence was found in models 3, 4 and 5 (see Table 5.3). Hypothesis 6a is strongly rejected by empirical results ($\beta = 0.073, p < 0.01; \beta = 0.089, p < 0.01$ and $\beta = 0.053, p < 0.05;$). The empirical results were unexpected and thus suggest that UAI is positively associated with firm risk. A possible explanation for this inconsistency might be that the desire for uncertainty and minimization of current risks might lead to the proliferation of future risks (Chatterjee *et al.*, 2014). To exemplify, cultures with high UAI tend to experience defensive medicine to prevent illnesses. In this regard, both doctors and patients are more likely to favor the immediate use of antibiotics rather than wait-and-see treatment. Therefore, the urge to have control (mitigation of present risks) might entail the underestimation of future adverse effects (e.g. antibiotic-resistant bacteria); in turn, heightening future risk (Chatterjee *et al.*, 2014) Moreover, Hypothesis 6b was tested to examine the impact of LTO on firm risk. It was proposed that LTO is negatively associated with firm risk. The underlying reason behind this anticipation is that LTO is essential to firm resilience, for the primary objective of any organization is to maintain long-term sustainability rather than short-term profitability (Flammer and Bansal, 2017; Sulphey, 2020). It is widely recognized that a high LTO solidifies organizational resilience through saving and investing in thriftiness and perseverance to accomplish firm strategic objectives

(Herrera-Echeverry *et al.*, 2020). Therefore, it is sensible to postulate that LTO is a risk-alleviating effect. In contrast to expectations, strong evidence was found in models 1, 2, 3 and 5 (see Table 5.3). Thus, *Hypothesis 6b* is strongly rejected by empirical results ($\beta = 0.103, p < 0.01; \beta = 0.100, p < 0.01; \beta = 0.091, p < 0.05$ and $\beta = 0.061, p < 0.01$). Surprisingly, LTO was found to increase firm risk.

Last, Hypothesis 6c was introduced to investigate the effect of Indulgence on firm risk. Along this line, it was predicted that Indulgence is positively correlated with firm risk. In parallel with predictions, strong evidence was found in models 1, 3 and 4 (see Table 5.3). Thus, *Hypothesis 6c* is strongly supported by empirical results ($\beta = 0.066, p < 0.05; \beta = 0.104, p < 0.01$ and $\beta = 0.057, p < 0.05$). These empirical findings substantiate that firms with high IVR appreciate ambiguities and are less obedient to rules and norms; in turn, adopt a risk-seeking attitude (Alipour and Yaprak, 2022). Furthermore, since short-termism, frivolous spending and thriftlessness are central facets of indulgence, firms with high IVR tend to underweight the adverse effects of losses given the poor planning of future outcomes and gross negligence. Besides, indulgence is directly related to gratification and hedonism and thus self-control is supposed to be delicate among indulgent societies (Abdelrahim, 2021). In view of these assumptions, indulgence is more likely to thrust risk-seeking behavior given the coexistence of overgratification and self-abandonment.

6.6. Control Variables

Each control variable yielded a significant result in empirical analyses. To begin with, particular attention was paid to the *Firm age* owing to its effect on the learning curve and management capabilities. Traditional wisdom dictates that firms are more likely to be well-versed in business management in the course of their life cycle (Marimuthu *et al.*, 2014; Bhagat *et al.*, 2013; Godart *et al.*, 2012). Therefore, it was predicted that firm age is negatively associated with firm risk. In the same direction with predictions, the empirical results denote that there exists a strong positive correlation between firm age and firm risk (see Table 5.3). Firm age seems to

be one of the risk-mitigating factors ($\beta = -0.078, p < 0.01; \beta = -0.065, p < 0.01$ and $\beta = -0.066, p < 0.01$). The empirical models underscore that the risk of older firms is lower than that of their younger peers. This risk-alleviating effect of firm age is originated from the fact that mastery is a time-dependent feature and broad experience to cope with uncertainties can be obtained within a certain time period. Therefore, older firms are less likely to be vulnerable to crises given their more experience and superior adeptness.

Secondly, the annual inflation rate was incorporated into the regression models, in that inflation is detrimental to firms' financial health and even might lead to default risk. From a theoretical standpoint, it is widely recognized that high inflation might annihilate free cash flow in real terms albeit an increase in nominal terms. This situation can be aggravated by the sharp decline in demand during crises. What is more, firms might suffer from raising external debt owing to high-interest rates. In this line, it is prudent to suggest that firms might be exposed to a cash crunch and limited lending supply in the hyperinflation era. Incompatible with predictions, it has been unraveled that the inflation rate deteriorates firm risk. As illustrated in Table 5.3, the inflation rate is positively related to firm risk in Model 1 ($\beta = 0.112, p < 0.01$), $Model2(\beta = 0.107, p < 0.01)$, Model 3 ($\beta = *.128, p < 0.01$) and Model 5 ($\beta = 0.117, p < 0.01$) respectively.

Lastly, the annual GDP growth rate was included to address the causation between the health of the host economy and firm risk. As depicted in Table 5.3, the GDP growth rate has a negative impact on firm risk in Model 5 ($\beta = *0.068, p < 0.01$). This implies that firms that operate in countries with higher GDP growth rates are more resilient to crises in comparison with their counterparts that operate in countries with lower GDP rates.

7. CONCLUSION

7.1. Contribution to the Literature

This study has been structured to investigate the impact of firm asymmetries on firm-level risk during uncertainties or crises across the construction industry. In this respect, the central question pioneered as a lighthouse throughout this report is:

How do firm asymmetries influence firm risk during crises?

The straight and swift response to this question is that firm-level determinants *undoubtedly* impact firm risk throughout recessions. This study explicitly displays that risk exposure is not uniform among construction firms during crises given the distinct features of firms. Provided that sparse attention has been paid to the fact that disparate firm traits might elicit unequal risk exposure among construction firms, this report is of utmost significance in several ways.

To begin with, evidence of asymmetry-risk linkage was purely anecdotal in hindsight. Generally speaking, risk assessment is *per se* significantly associated with qualitative data (e.g., expert judgements, experiences, surveys, interviews and so forth); in other words, decision-makers are unable to provide precise numerical value (crisp value) concerning both likelihood and consequences of each risk event. Thus, this study represents a major breakthrough in such a way that the findings of this study provide strong empirical confirmation through the deployment of a comprehensive quantitative approach.

Secondly, in contrast to the widespread standpoint that risk severity is uniform across firms, the extent to which characteristics of a firm moderate the linkage between risk severity and firm asymmetries remains a largely unexplored area of research. The principal premise of the relationship between risk analysis and firm-level determinants

is that risk severity is uniform, which affects all firms on equal footing. Diametrically opposed to the traditional RM approach, the empirical findings of this study uncover that risk is asymmetric among firms, for they bear different attributes and resource bases. In short, all hypotheses vindicated that any asymmetry in firm peculiarities elicits an uneven level of risk exposure at the individual level. Firstly, larger construction firms are better off coping with crises in comparison with their smaller counterparts. Secondly, going public diminishes firm risk during crises, for publicly traded firms possess the precedence of raising external capital at a lower cost. Thirdly, financial health cushions the adverse effects of external shocks during uncertainties. Along this line, firms should not entirely utilize their debt capacity and even accumulate cash; therefore, they can raise not only external capital but also internal capital considering the limited credit supply and sharp decline in their free cash flows. Fourth, both geographical and unrelated business diversity appear to undermine firm risk during crises given the greater structural complexity, inefficient resource allocation and liability of newness and foreignness. Fifth, SOEs are less likely to be vulnerable to external variations through implicit and explicit governmental guarantees, their ability to respond to uncertainties swiftly, the preservation of social well-being and their extensive tangible and intangible resources. In particular, notwithstanding that China is deprived of pertinent market mechanisms and the vast majority of firms have been under the aegis of the government, Chinese firms outperform their peers in other countries in regard to crisis management. Sixth, indulgent organizations imperfectly ward off crises on the condition of overgratification and feeble self-control. Seventh, older firms are superior to weather exogenous shocks in comparison with their younger counterparts given the risk discount impact of firm age on the learning curve and management skills. Lastly, macroeconomic variables impinge upon firm risk, for they remain ever-present. Specifically, high inflation may lead to firm mortality during crises, for an increase in inflation inevitably paralyzes free cash flows in real terms and thus firms imperfectly maintain the required working capital in the face of decreasing demand throughout downturns. Moreover, firms that operate in countries with higher GDP growth rates (financially healthy nations) are more resilient to crises in comparison with their counterparts that operate in countries with lower GDP rates (financially unhealthy nations).

Thirdly, another contribution of this study is to implement the asymmetry-risk nexus in the construction industry. So far, there exists no conclusive evidence to what extent firm asymmetries influence firm risk across the construction industry. Through this study, I seek to bridge the gap that has been not fully understood in the RM literature. The construction industry is the paragon for this study, for the construction industry is *per se* capital-intensive and firms are prone to pursue a multitude of projects in one fell swoop; thus, firms are more likely to incur risks given the greater complexity and sunk costs. In brief, the selection of the construction industry for this study is a remarkable case in point.

Fourthly, another aim of this study is to adopt a longitudinal analysis instead of an analysis of an individual case. To illustrate, a sheer number of studies have attempted to address the impact of GFC and COVID-19 on firm outcomes by means of numerous metrics (i.e., Cucculelli and Peruzzi, 2018; Chiaramonte *et al.*, 2016; Salunkhe *et al.*, 2023; Wenzel *et al.* 2021).

Indeed, these previous studies have centered upon firm performance rather than firm risk. That said, extant studies predominantly have concentrated on the post-crisis phase rather than the pre-crisis stage. Therefore, the causality between firm asymmetries and firm risk remains inconclusive due to the myopic behavior of prior studies and less reliance on the pre-crisis period. As illustrated in Figure **??**, firms have witnessed a crisis in a sporadic manner within the last century. The time interval of our empirical analysis corresponds to 40 years (1983-2022) and therefore we were able to handle numerous crises in our empirical models. Employing a long-time lag, the real effects of firm attributes on firm risk during crises were handled at length.

Lastly, this study has been organized to approach the asymmetry-risk nexus in a nascent and collective manner. Prior studies have strived to express the interaction between firm asymmetries and firm risk through a certain or combination of a few firm-level determinants.

Nevertheless, none of the prior studies suffice to cover this rapport in a holistic manner. Utilizing a wide range of firm characteristics (firm size, financial health, ownership structure, diversification, privatization and culture), an integrated approach was deployed to see the entire picture regarding the asymmetry-risk alliance.

7.2. Theoretical and Managerial Implications

This study breeds a handful of practical implications for organizations and managers in the construction industry. The empirical results discover that larger construction firms bear a competitive edge relative to their smaller peers with respect to the management of uncertainties and ambiguities. In this regard, construction firms should expand their size through the enhancement of their market coverage and the extent of business. At this juncture, it is worthwhile to draw the attention that firms should pay heed to the level of their geographic and business diversification. The empirical findings ascertain that penetration into foreign markets and engagement into unrelated business markets are counterproductive to firm risk during crises given the liability of newness and liability of foreignness. In light of this empirical evidence, it is pertinent to make a deduction that construction firms should internationalize in foreign markets in the vicinity of their host country. Therefore, geographical proximity might mitigate the negative aftermaths of international diversification for such firms. In a similar stand, firms should diversify into construction-related business segments rather than unrelated business lines. The absorptive capacity theory states that firms should strike a certain degree of business proximity to reap the benefits of knowledge spillover in newly diversified business segments. Otherwise, the marginal costs of business diversification might outweigh the benefits of business diversity. Furthermore, the financial health of firms is critical to battle against crises. Firms should not utterly utilize their borrowing capacity and thus embrace a low debt/equity ratio. Therefore, firms with a low debt/equity ratio can raise additional debt unlike their highly-leveraged peers because lenders become extremely selective due to the limited credit supply and thus they refrain from providing credits to financially constrained firms owing to their higher likelihood of default risk. Apart from leverage, liquidity is of vital importance for firms

to maintain their required working capital in the event that firms are more likely to experience a substantial shrinkage in their cash flows and might be unable to raise external debt due to the strict debt covenants and a potential credit crunch. Hence, firms should amplify their cash balance to cushion exogenous shocks, inasmuch as neither internal capital nor external debt is adequate for firms to maintain their day-to-day business during lean times. Along this line, firms might also pursue going public in the pursuit of liquidity enhancement. Information asymmetry is negligible between lenders/investors and publicly traded firms due to their openness and transparency; therefore, publicly traded firms are able to raise capital at a lower cost. Drawing this line of reasoning, going public can be considered a risk-reducing effect given its cash-generating feature. Moreover, a governmental stake is inevitable to diminish firm risk throughout downturns. Under the auspices of government scrutiny, firms are more likely to acquire a financial aid package from their respective governments through implicit and explicit means. In contrast to complete privatization, state interference is essential to weather uncertainties, for private firms cannot eliminate all negative consequences of crisis considering their limited resource endowment. Last but not least, the intellectual capital of firms should be composed of individuals (particularly CEOs and top managers) with low indulgence. The empirical findings indicate that indulgence increases the probability of risk-taking on the condition of overgratification and feeble self-control. Therefore, a high indulgence might elicit to the demise of a firm due to the excessive risk-seeking stemmed from pronounced information asymmetry between managers and shareholders.

7.3. Limitations and Future Research

The primary purpose of this section is to address potential limitations, which might be pernicious to the validity and accuracy of this study. In accordance with these limitations, suggestions for future research will be provided to enhance the academic and empirical quality of this report. The fundamental limitation of this study is the focalization of a single industry. Provided that industries differ from one another owing to their peculiarities, the applicability of empirical results to other industries,

specifically labor-intensive industries, is ill-advised. Therefore, this study should be deployed across other industries to gain a better understanding of the interaction between firm asymmetries and firm-level risk. This is the only possible way to generalize our findings at the inter-industry level. Secondly, another leading backdrop of this study is the shrinkage of dataset. Typically, the risk remains ever-present in secondary data sources, in that not all necessary data are within reach to perform an empirical analysis. Thus, the number of firms has been reduced from 308 to 192 owing to the data unavailability and inconsistency. Notwithstanding that the ultimate sample satisfies and meets the statistical demands, the exclusion of any construction firm from the sample certainly endangers the accuracy and reliability of empirical findings. In this regard, another possible area of future research would be to restock excluded firms in the empirical analysis. In particular, the number of privately held firms is relatively far lower than that of publicly traded firms in the research sample, for data privacy is at the top of the ladder among privately held firms. Along this line, further investigation and analysis with respect to the impact of private ownership structure on firm risk is strongly recommended. Thirdly, a handful of variable-oriented factors might jeopardize the accuracy of empirical findings. Concerning Hypothesis 4, geographical diversification and industry diversification are measured in terms of *international revenue/total revenue and unrelated construction revenue/total revenue* respectively. Nonetheless, these two operational measures imperfectly suffice to represent corporate diversification to the full extent because they disregard the breadth and depth characteristics of diversification. Thus, future research should utilize concentration and entropy measures to quantify corporate diversification thoroughly (see Section 4.2.2.4.). In regard to Hypothesis 5, ownership types are coded for state, private and hybrid as 1, 2 and 0 respectively in accordance with previous studies for the sake of simplicity and data unavailability. Nevertheless, in parallel to corporate diversification, privatization cannot be measured utterly through dummy variables. Hence, it is worthwhile for future studies to deploy other quantitative measures (see Section 4.2.2.5.) in order to evaluate the precise nature of the privatization-risk nexus. With regards to Hypothesis 6, three cultural dimensions (UAI, LTO and IND) are obtained from Hofstede's framework, which has been extensively exploited last fifty years. Albeit its widespread presence,

Hofstede framework has been subjected to several criticisms. Whilst conventional wisdom reckons that culture is unwavering and inherited to further generations intact, theories of cultural change strictly dictate that culture is vulnerable to a certain degree of convergence, divergence, or combination of both. In addition to the pervasiveness and persistence feature of culture, the recurrent concern of critics is that the proposed six dimensions of Hofstede's framework imperfectly suffice to cover firm culture at the ultimate extent. Furthermore, Hofstede's framework was invented half-century ago and thus its validity has been contested in the literature, in that cultural convergence is more likely to take place among countries due to technological advancements and globalization. Moreover, national culture is degraded to an organizational level in this study and thus it is assumed that cultural dimensions remain uniform at the individual level. Nevertheless, this is not the case in a real-world setting. To illustrate, the board of directors of a firm might be composed of different individuals from different countries. In addition, the nationality of the CEO might be different than the host country. Therefore, future research should pay attention to cultural differences at the individual level. In short, empirical models engendered invaluable conclusions, despite several shortcomings. However, this report can be ameliorated by further research in accordance with future directions originating from the aforesaid limitations.

REFERENCES

Abdelrahim Y., 2021, "The Influence of Indulgence and Long-Term Orientation on a Country's Risk Aversion", *Journal of Organizational Management Studies*, Vol. 1, pp. 1-9.

Acharya V.V. and N. Kulkarni, 2011, "What Saved The Indian Banking System: State Ownership or State Guarantees", *The World Economy*, Vol. 35, No. 1, pp. 19-31.

Acharya V.V., T. Philippon and M. Richardson, 2016, "Measuring Systemic Risk for Insurance Companies", *The Economics, Regulation and Systemic Risk of Insurance Markets*, Vol. 1, pp. 100-123.

Acharya V.V., S.A. Davydenko and I.A. Strebulaev, 2012, "Cash Holdings and Credit Risk", *Review of Financial Studies*, Vol. 25, No. 12, pp. 3572-3609.

Adusei M., 2021, "The Liquidity Risk-Financial Performance Nexus: Evidence from Hybrid Financial Institutions", *Managerial and Decision Economics*, Vol. 43, No. 1, pp. 31-47.

Agarwal V., G. Aragon and Z. Shi, 2019, "Liquidity Transformation and Financial Fragility: Evidence from Funds of Hedge Funds", *Journal of Financial and Quantitative Analysis*, Vol. 54, No. 6, pp. 2355-2381.

Al-Tamimi H., A. Hussein and N. Jellali, 2013, "The Effects of Ownership Structure and Competition on Risk- Taking Behavior: Evidence from UAE Conventional and Islamic Banks", *The International Journal of Business and Finance Research*, Vol. 7, No. 2, pp. 115-124.

Alcalde-Fradetas N. and M. Ramírez-Alesón, 2015, "Long-Run Profits in Times of

Crisis: A Comparison between European Smes and Large Companies", *Estudios de Economía*, Vol. 42, No. 1, pp. 79-97.

Ali S., S. Haider Hashmi and T. Mehmood, 2016, "Corporate Diversification and Firm Performance: An Inverted U-Shaped Hypothesis", *International Journal of Organizational Leadership*, Vol. 5, No. 4, pp. 393-410.

Alipour A. and A. Yaprak, 2022, "Indulgence and Risk-Taking Behavior of Firms: Direct and Interactive Influences", *Journal of International Management*, Vol. 28, No. 2, pp. 100945-100965.

Alipour M., 2013, "Has Privatization of State-Owned Enterprises in Iran Led to Improved Performance", *International Journal of Commerce and Management*, Vol. 23, No. 4, pp. 281-305.

Aljazzazen S. and A. Balawi, 2022, "Risk and Uncertainty in Consumer Decision-Making: An Overview of Principles and Perspectives", *Modern Management Review*, Vol. 27, pp. 7-19.

Almaghrabi K.S., 2022, "COVID-19 and the Cost of Bond Debt: The Role of Corporate Diversification", *Finance Research Letters*, Vol. 46, pp. 102454-102468.

Amorim Varum C. and V.C. Rocha, 2012, "The Effect of Crises on Firm Exit and the Moderating Effect of Firm Size", *Economics Letters*, Vol. 114, No. 1, pp. 94-97.

Amoroso S., P. Moncada-Paternò-Castello and A. Vezzani, 2017, "Randd Profitability: The Role of Risk and Knightian Uncertainty", *Small Business Economics*, Vol. 48, No. 2, pp. 331-343.

Anderson R.I., J.D. Stowe and X. Xing, 2011, "Does Corporate Diversification Reduce Firm Risk? Evidence from Diversifying Acquisitions", *Review of Pacific Basin*

Financial Markets and Policies, Vol. 14, No. 03, pp. 485-504.

Andries A.M. and D. Balutel, 2022, "The Impact of National Culture on Systemic Risk", *Economic Systems*, Vol. 46, No. 2, pp. 100972-100992.

Arrfelt M., M. Mannor, J.D. Nahrgang and A.L. Christensen, 2016, "All Risk-Taking Is Not the Same: Examining the Competing Effects of Firm Risk-Taking with Meta-Analysis", *Review of Managerial Science*, Vol. 12, No. 3, pp. 621-660.

Atanasov V. and T. Nitschka, "Firm Size, Economic Risks and The Cross-Section of International Stock Returns", *The North American Journal of Economics and Finance*, Vol. 39, pp. 110-126, 2017.

Audia P.G. and H.R. Greve, 2006, "Less Likely to Fail: Low Performance, Firm Size and Factory Expansion in the Shipbuilding Industry", *Management Science*, Vol. 52, No. 1, pp. 83-94.

Badriyah N., R.N. Sari and Y.M. Basri, 2015, "The Effect of Corporate Governance and Firm Characteristics on Firm Performance and Risk Management as an Intervening Variable", *Procedia Economics and Finance*, Vol. 31, pp. 868-875.

Baek S. and J.F.O. Bilson, 2015, "Size and Value Risk in Financial Firms", *Journal of Banking andamp; Finance*, Vol. 55, pp. 295-326.

Balachandran B. and R. Faff, 2015, "Corporate Governance, Firm Value and Risk: Past, Present and Future", *Pacific-Basin Finance Journal*, Vol. 35, pp. 1-12.

Bancel F. and U.R. Mittoo, 2011, "Financial Flexibility and the Impact of the Global Financial Crisis: Evidence from France", *International Journal of Managerial Finance*, Vol. 7, No. 2, pp. 179-216.

Batra S., M. Saini and M. Yadav, 2022, "Impact of Corporate Governance on Firm Risk: A Literature review", The IUP Journal of Applied Finance, Vol. 21, No. 3, pp. 39-55.

Bearden W.O., R.B. Money and J.L. Nevins, 2006, "A Measure of Long-Term Orientation: Development and Validation", *Academy of Marketing Science Journal*, Vol. 34, No. 3, pp. 456-467.

Beaulieu M.C. and H. Mrissa Bouden, 2015, "Firm-Specific Risk and IPO Market Cycles", *Applied Economics*, Vol. 47, No. 50, pp. 5354-5377.

Beaulieu M.C. and H. Mrissa Bouden, 2019, "Does Idiosyncratic Risk Matter in IPO Long-Run Performance?", *Review of Quantitative Finance and Accounting*, Vol. 55, No. 3, pp. 935-981.

Benninga S., M. Helmantel and O. Sarig, 2005, "The Timing of Initial Public Offerings", *Journal of Financial Economics*, Vol. 75, No. 1, pp. 115-132.

Berger A.N., G.R.G. Clarke, R. Cull, L. Klapper and G.F. Udell, 2005, "Corporate Governance and Bank Performance: A Joint Analysis of the Static, Selection and Dynamic Effects of Domestic, Foreign and State Ownership", *Journal of Banking and Finance*, Vol. 29, pp. 2179-2221.

Berlemann M., V. Jahn and R. Lehmann, 2021, "Is The German Mittelstand More Resistant To Crises?", *Small Business Economics*, Vol. 59, No. 3, pp. 1169-1195.

Bertrand M. and S. Mullainathan, 2003, "Enjoying the Quiet Life? Corporate Governance and Managerial Preferences", *Journal of Political Economy*, Vol. 111, No. 5, pp. 1043-1075.

Bettis R.A. and V. Mahajan, 1985, "Risk/Return Performance of Diversified Firms",

Management Science, Vol. 31, No. 7, pp. 785-799.

Beugelsdijk S., R. Maseland and A. van Hoorn, 2015, "Are Scores on Hofstede's Dimensions of National Culture Stable over Time? A Cohort Analysis", *Global Strategy Journal*, Vol. 5, No. 3, pp. 223-240.

Beuselinck C., L. Cao, M. Deloof and X. Xia, 2017, "The Value Of Government Ownership During the Global Financial Crisis", *Journal of Corporate Finance*, Vol. 42, pp. 481-493.

Bevan L., 2022, "The Ambiguities of Uncertainty: A Review of Uncertainty Frameworks Relevant to the Assessment of Environmental Change", *Futures*, Vol. 137, pp. 102919-10300.

Bhagat S., B. Bolton and J. Lu, 2015, "Size, Leverage and Risk-Taking of Financial Institutions", *Journal of Banking and Finance*, Vol. 59, pp. 520-537.

Bodnar G., C. Tang and J. Weintrop, 1997, *Both Sides of Corporate Diversification: The Value Impacts of Geographic and Industrial Diversification*, National Bureau of Economic Research.

Bogodistov Y. and V. Wohlgemuth, 2017, "Enterprise Risk Management: A Capability-Based Perspective", *Journal of Risk Finance*, Vol. 18, No. 3, pp. 234-251.

Bonaccorsi di Patti, E., D'Ignazio, A., Gallo, M. and Micucci, G. , 2015, "The Role of Leverage in Firm Solvency: Evidence from Bank Loans", *Italian Economic Journal*, Vol. 1, No. 2, pp. 253-286.

Borda A., J.M.G. Geleilate, W. Newburry and S.K. Kundu, 2017, "Firm Internationalization, Business Group Diversification and Firm Performance: The Case of Latin American Firms", *Journal of Business Research*, Vol. 72, pp. 104-113.

Boubakri N., J.C. Cosset and W. Saffar, 2013, "The Role of State and Foreign Owners in Corporate Risk-Taking: Evidence from Privatization", *Journal of Financial Economics*, Vol. 108, No. 3, pp. 641-658.

Boubakri N., J.C. Cosset and W. Saffar, 2017, "The Constraints on Full Privatization: International Evidence", *Journal of Corporate Finance*, Vol. 42, pp. 392-407.

Boubakri N., J.C. Cosset, W., 2013, "Saffar, The Role of State and Foreign Owners in Corporate Risk Taking: Evidence From Privatization", *Journal of Economics and Business*, Vol. 108, pp. 641-658.

Boubakri N., S.A. Mansi, W. Saffar, 2013, "Political Institutions, Connectedness and Corporate Risk-Taking", *Journal of International Business Studies*, Vol. 44, pp. 195-215.

Bourletidis K. and Y. Triantafyllopoulos, 2014, "Smes Survival in Time of Crisis: Strategies, Tactics and Commercial Success Stories", *Procedia - Social and Behavioral Sciences*, Vol. 148, pp. 639-644.

Bruni S., R. Pittiglio and F. Reganati, 2014, "Heterogeneity in Firm Performance during an Economic Crisis", *Business, Management and Economics Engineering*, Vol. 12, No. 1, pp. 1-14.

Bui D.T., H.H. Nguyen and V.M. Ngo, 2021, "Financial Leverage and Performance of Smes in Vietnam: Evidence from the Post-Crisis Period", *Economics and Business Letters*, Vol. 10, No. 3, pp. 229-239.

Bukalska E. and M. Król, 2020, "Profitability - Financial Liquidity Relation under Bank Dependence during the Financial Crisis. Case of Polish Companies", *Journal of Applied Economic Sciences*, Vol. 15, No. 1, pp. 169-185.

Calomiris C., I. Love and M.S.M. Peria, 2012, "Stock Returns' Sensitivities to Crisis Shocks: Evidence from Developed and Emerging Markets", *Journal of International Money and Finance*, Vol. 31, No. 4, pp. 743-765.

Cathcart L., A. Dufour, L. Rossi and S. Varotto, 2020, "The Differential Impact of Leverage on the Default Risk of Small and Large Firms", *Journal of Corporate Finance*, Vol. 60, pp. 101541-101641.

Cavusgil S.T., S. Deligonul, P.N. Ghauri, V. Bamiatzi, B.I. Park and K. Mellahi, 2020, "Risk in International Business and Its Mitigation", *Journal of World Business*, Vol. 55, No. 2, pp. 101078-101100.

Cefis E., E. Bartoloni and M. Bonati, 2020, "Show Me How To Live: Firms' Financial Conditions and Innovation During The Crisis", *Structural Change and Economic Dynamics*, Vol. 52, pp. 63-81.

Chatterjee S., G. Atav, J. Min and D. Taylor, 2014, "Choosing the Sure Gain and the Sure Loss: Uncertainty Avoidance and the Reflection Effect", *Journal of Consumer Marketing*, Vol. 31, No. 5, pp. 351-359.

Chatzoudes D., P. Chatzoglou and A. Diamantidis, 2022, "Examining the Impact of Firm-Specific and Environmental-Specific Factors on Short and Long-Term Firm Survival during an Economic Crisis", *EuroMed Journal of Business*, Vol. 17, No. 4, pp. 698-730.

Chemmanur T.J. and J. He, 2011, "IPO Waves, Product Market Competition and the Going Public Decision: Theory and Evidence", *Journal of Financial Economics*, Vol. 101, No. 2, pp. 382-412.

Chen R.R., N.K. Chidambaran, M.B. Imerman and B.J. Sopranzetti, 2014, "Liquidity, Leverage and Lehman: A Structural Analysis of Financial Institutions in Crisis",

Journal of Banking andamp; Finance, Vol. 45, pp. 117-139.

Chen S., 2013, "How Do Leverage Ratios Affect Bank Share Performance during Financial Crises: The Japanese Experience of the Late 1990s", *Journal of the Japanese and International Economies*, Vol. 30, pp. 1-18.

Chen W.D., Y. Chen and S.C. Huang, 2021, "Liquidity Risk and Bank Performance during Financial Crises", *Journal of Financial Stability*, Vol. 56, pp. 100906.

Cheong C. and H.V. Hoang, 2021, "Macroeconomic Factors or Firm-Specific Factors? An Examination of the Impact on Corporate Profitability Before, During and After the Global Financial Crisis", *Cogent Economics Andamp; Finance*, Vol. 9, No. 1, pp. 1959703-1959723.

Chiaramonte L., H. Liu, F. Poli and M. Zhou, 2016, "How Accurately Can Z-Score Predict Bank Failure?", *Financial Markets, Institutions and Instruments*, Vol. 25, No. 5, 2016.

Choi K.S. , 2020, "National Culture and Randd Investments", *The European Journal of Finance* Vol. 26, No. 6, pp. 500-531.

Chun D., Z. Zhang, E. Cohen, L. Florea and O.F. Genc, 2021, "Long-Term Orientation and the Passage of Time: Is It Time To Revisit Hofstede's Cultural Dimensions? International", *Journal of Cross Cultural Management*, Vol. 21, No. 2, pp. 353-371.

Cimon Y., 2004, "Knowledge-Related Asymmetries in Strategic Alliances", *Journal of Knowledge Management*, Vol. 8, pp. 17-30.

Conz E., G. Magnani, A. Zucchella and A. De Massis, 2023, "Responding to Unexpected Crises: The Roles of Slack Resources and Entrepreneurial Attitude to Build Resilience", *Small Business Economics*, Vol. 61, No. 3, pp. 957-981.

Cool K., I. Dierickx and D. Jemison, 1989, "Business Strategy, Market Structure and Risk-Return Relationships: A Structural Approach", *Strategic Management Journal*, Vol. 10, No. 6, pp. 507-522.

Coricelli F. and M. Frigerio, 2019, "Interenterprise Credit and Adjustment during Financial Crises: The role of firm size", *Journal of Money, Credit and Banking*, Vol. 51, No. 6, pp. 1547-1580.

Cucculelli M. and V. Peruzzi, 2018, "Post-Crisis Firm Survival, Business Model Changes and Learning: Evidence from the Italian Manufacturing Industry", *Small Business Economics*, Vol. 54, No. 2, pp. 459-474.

Cuervo-Cazurra A., L. Ciravegna, M. Melgarejo and L. Lopez, 2018, "Home Country Uncertainty and the Internationalization-Performance Relationship: Building an Uncertainty Management Capability", *Journal of World Business*, Vol. 53, No. 2, pp. 209-221.

Cyert R.M. and J.G. March, *A Behavioral Theory of the Firm*, Englewood Cliffs, NJ: Prentice Hall, 1963.

Dachin A. and A. Rusei, 2013, "Regional Determinants of Small Business Survival during the Crisis in Romania", *Acta Universitatis Danubius. OEconomica, Danubius University of Galati*, Vol. 9, No. 4, pp. 200-208.

Deb P., P. David and J. O'Brien, 2016, "When is Cash Good or Bad For Firm Performance?", *Strategic Management Journal*, Vol. 38, No. 2, pp. 436-454.

Deephouse D.L. and R.M, 2000, "Wiseman, Comparing Alternative Explanations for Accounting Risk-Return Relations", *Journal of Economic Behavior Andamp; Organization*, Vol. 42, No. 4, pp. 463-482.

Delis M.D., I. Hasan, M. Iosifidi and C. Tsoumas, 2023, "Economic Preferences for Risk-Taking and Financing Costs", *Journal of Corporate Finance*, Vol. 80, pp. 102423-102435.

Dequech D., 2011, "Uncertainty: A Typology and Refinements of Existing Concepts", *Journal of Economic Issues XLV*, Vol. 1, pp. 621-640.

DesJardine M., P. Bansal and Y. Yang, 2017, "Bouncing Back: Building Resilience through Social and Environmental Practices in the Context of the 2008 Global Financial Crisis", *Journal of Management*, Vol. 45, No. 4, pp. 1434-1460.

Dewan S. and F. Ren, 2011, "Information Technology and Firm Boundaries: Impact on Firm Risk and Return Performance", *Information Systems Research*, Vol. 22, No. 2, pp. 369-388.

Dey P.K, 2012, "Project Risk Management Using Multiple Criteria Decision-Making Technique and Decision Tree Analysis: A Case Study of Indian Oil Refinery", *Production Planning and Control*, Vol. 23, No. 12, pp. 903-921.

DeYoung R. and L. Li, 2019, "Publicly Traded Versus Privately Held Commercial Banks: Sensitivity To Growth Opportunities", *Journal of Financial Services Research*, Vol. 56, No. 1, pp. 39-71.

Dhir S. and S. Dhir, 2015, "Diversification: Literature Review and Issues", *Strategic Change*, Vol. 24, No. 6, pp. 569-588.

Díez-Esteban J.M., J.B. Farinha and C.D. García-Gómez, 2018, "How Does National Culture Affect Corporate Risk-Taking?", *Eurasian Business Review*, Vol. 9, No. 1, pp. 49-68.

Díez-Esteban J.M., J.B. Farinha and C.D. García-Gómez, 2019, "Are Religion and Cul-

ture Relevant for Corporate Risk-Taking? International Evidence", *BRQ Business Research Quarterly*, Vol. 22, No. 1, pp. 36-55.

Doff R., 2008, "Defining and Measuring Business Risk in an Economic-Capital Framework", *The Journal of Risk Finance*, Vol. 9, No. 4, pp. 317-333.

Dolz C., M. Iborra and V. Safón, 2019, "Improving the Likelihood of SME Survival during Financial and Economic Crises: The Importance of TMTS and Family Ownership for Ambidexterity", *BRQ Business Research Quarterly*, Vol. 22, No. 2, pp. 119-136.

Dong Y., C. Meng, M. Firth and W. Hou, 2014, "Ownership Structure and Risk-Taking: Comparative Evidence from Private and State-Controlled Banks in China", *International Review of Financial Analysis*, Vol. 36, pp. 120-130.

Dörr J.O., G. Licht and S. Murmann, 2021, "Small Firms and the COVID-19 Insolvency Gap", *Small Business Economics*, Vol. 58, No. 2, pp. 887-917.

Dottori D. and G. Micucci, 2018, "Corporate Liquidity in Italy and Its Increase in the Long Recession", *Economia Politica*, Vol. 35, No. 3, pp. 981-1014.

Douma M., J. Bilderbeek, P. Idenburg and J.K. Looise, 2000, "Strategic Alliances: Managing the Dynamics of Fit", *Long Range Planning*, Vol. 33, pp. 579-598.

Drnevich P.L. and J. West, 2021, *Performance Implications of Technological Uncertainty, Age and Size for Small Businesses*, Journal of Small Business Management.

Drobetz W., R. Haller, I. Meier and V. Tarhan, 2017, "The Impact of Liquidity Crises on Cash Flow Sensitivities", *The Quarterly Review of Economics and Finance*, Vol. 66, pp. 225-239.

Dunning J.H., 1995, "Reappraising the Eclectic Paradigm in an Age of Alliance Capitalism", *Journal of International Business Studies*, Vol. 26, No. 3, pp. 461-92.

Eduardsen J. and S. Marinova, 2020, "Internationalisation and Risk: Literature Review, Integrative Framework and Research Agenda", *International Business Review*, Vol. 29, No. 3, pp. 101688.

Elango B., 2010, Influence of Industry Type on the Relationship Between International Operations And Risk, Journal of Business Research, Vol. 63, No. 3, pp. 303-309.

Elkhal K., 2019, "Business Uncertainty and Financial Leverage: Should the Firm Double Up on Risk?", *Managerial Finance*, Vol. 45, No. 4, pp. 536-544.

Ellsberg D., 1961, "Risk, Ambiguity and the Savage Axioms", *The Quarterly Journal of Economics*, Vol. 75, pp. 643-669.

Erin O., O. Bamigboye and J. Arumona, 2020, "Risk Governance and Financial Performance: An Empirical Analysis", *Business: Theory and Practice*, Vol. 21, No. 2, pp. 758-768.

Essen M., P. Engelen and M. Carney, 2013, "Does 'Good' Corporate Governance Help In A Crisis? The Impact of Country- and Firm-Level Governance Mechanisms in the European Financial Crisis", *Corporate Governance An International Review*, Vol. 21, No. 3, pp. 201-224.

Faccio M., M. Marchica and R. Mura, 2011, "Large Shareholder Diversification and Corporate Risk-Taking", *The Review of Financial Studies*, Vol. 24, No. 11, pp. 3601-3641.

Farshchian M.M. and G. Heravi, 2018, Probabilistic Assessment of Cost, Time and Revenue in a Portfolio of Projects Using Stochastic Agent-Based Simulation, Journal

of Construction Engineering and Management, Vol. 144, No. 5, pp. 04018028-04018058.

Fernández E., S. Iglesias-Antelo, V. López-López, M. Rodríguez-Rey and C.M. Fernandez-Jardon, 2019, "Firm and Industry Effects on Small, Medium-Sized and Large Firms' Performance", *BRQ Business Research Quarterly*, Vol. 22, No. 1, pp. 25-35.

Fiegenbaum A. and H. Thomas, 2024, "Strategie Risk and Competitive Advantage: An Integrative Perspective", *European Management Review*, Vol. 1, No. 1, pp. 84-95.

Figueira-de-Lemos F., J. Johanson and J.E. Vahlne, 2011, "Risk Management in the Internationalization Process of the Firm: A Note on the Uppsala Model", *Journal of World Business*, Vol. 46, No. 2, pp. 143-153.

Flammer C. and P. Bansal, 2017, "Does a Long-Term Orientation Create Value? Evidence from a Regression Discontinuity", *Strategic Management Journal*, Vol. 38, No. 9, pp. 1827-1847, 2017.

Florescu M.S., 2012, "Analysis of Economic Risk in European Investment Projects, Romanian Journal of Economics", *Institute of National Economy*, Vol. 34, No. 1, pp. 47-67.

Fosu S., A. Danso, W. Ahmad and W. Coffie, 2016, "Information Asymmetry, Leverage and Firm Value: Do Crisis and Growth Matter?", *International Review of Financial Analysis*, Vol. 46, pp. 140-150.

Freeman N. and M. Muraven, 2010, "Self-Control Depletion Leads to Increased Risk-Taking", *Social Psychological and Personality Science* Vol. 1, No. 2, pp. 175-181.

Friberg R, 2021., "All the Bottles in One Basket? Evaluating the Effect of Intra-Industry Diversification on Risk", *Long Range Planning*, Vol. 54, No. 1, pp. 101973-

101982.

Friedman D.x 1998, “Is Big Back? Or Is Small Still Beautiful?”, http://www.inc.com/magazine/19980401/ 899 _pagen _2.html, accessed on December 12, 2023.

Frigo M.L. and R.J anderson, 2011, “Strategic Risk Management: A Foundation for Improving Enterprise Risk Management and Governance”, *Journal of Corporate Accounting Andamp; Finance*, Vol. 22, No. 3, pp. 81-88.

Frijns B., A. Gilbert, T. Lehnert, A. Tourani-Rad, 2013, *Uncertainty Avoidance, Risk Tolerance and Corporate Takeover Decisions*, Journal of Banking and Finance.

Frijns B., F. Hubers, D. Kim, T.Y. Roh and Y. Xu, 2022, “National Culture and Corporate Risk-Taking around the World”, *Global Finance Journal*, Vol. 52, pp. 100710-100728.

Gaganis C., I. Hasan, P. Papadimitri and M. Tasiou, 2019, “National Culture and Risk-Taking: Evidence from the Insurance Industry”, *Journal of Business Research*, Vol. 97, pp. 104-116.

Gerchak Y., E. Hassini and S. Ray, 2002, “Capacity Selection under Uncertainty with Ratio Objectives”, *European Journal of Operational Research*, Vol. 143, No. 1, pp. 138-147.

Gerlach R., I. Obaydin and R. Zurbruegg, 2015, “The Impact of Leverage on the Idiosyncratic Risk and Return Relationship of Reits around the Financial Crisis”, *International Review of Economics Andamp; Finance*, Vol. 38, pp. 207-219.

Ghosal V. and Y. Ye, 2019, “The Impact of Uncertainty on the Number of Businesses”, *Journal of Economics and Business*, Vol. 105, pp. 105840.

Gibbons R. and K.J. Murphy, 1992, "Optimal Incentive Contracts in The Presence of Career Concerns: Theory and Evidence", *Journal of Political Economy*, Vol. 100, No. 3, pp. 468-505.

Godart O., H. Görg and A. Hanley, 2012, "Surviving the Crisis: Foreign Multinationals versus Domestic Firms", *The World Economy*, Vol. 35, No. 10, pp. 1305-1321.

Gonzalez A. and P. André, 2014, "Board Effectiveness and Short Ter- Mism", *The Journal of Business Finance and Accounting*, Vol. 41, No. 1-2, pp. 185-209.

Gooding R.Z., S. Goel and R.M. Wiseman, 1996, "Fixed Versus Variable Reference Points in the Risk-Return Relationship", *Journal of Economic Behavior and Organization*, Vol. 29, pp. 331-350.

Gordon L.A., M.P. Loeb and C.Y. Tseng, 2009, "Enterprise Risk Management and Firm Performance: A Contingency Perspective", *Journal of Accounting and Public Policy*, Vol. 28, No. 4, pp. 301-327.

Graff I.Y., 2016, *How Uncertainty Avoidance Affects Firm İnvestments After A Crisis*, Radboud Unıversıty.

Greve H.R., 1998, "Performance, Aspirations and Risky Organizational Change", *Administrative Science Quarterly*, Vol. 43, pp. 58-86.

Gruener A., 2015, *Financial Slack and Firm Performance during Economic Downturn*, The International academic forum.

Gunarathna V., 2016, "How Does Financial Leverage Affect Financial Risk? An Empirical Study in Sri Lanka", *Amity journal of Finance*, Vol. 1, pp. 57-66.

Hafner C. and U. Pidun, 2021, "Getting Family Firm Diversification Right: A Con-

figurational Perspective on Product and International Diversification Strategies", *Journal of Family Business Strategy*, Vol. 13, pp. 100456-100472.

Haneberg D.H., 2021, "How Combinations of Network Participation, Firm Age and Firm Size Explain Smes' Responses to COVID-19", *Small Enterprise Research*, Vol. 28, No. 3, pp. 229-246.

Haq M., D. Hu, R. Faff and S. Pathan, 2018, "New Evidence on National Culture and Bank Capital Structure", *Pacific-Basin Finance Journal*, Vol. 50, pp. 41-64.

Haron R. and N. Nomran, 2016, "Determinants of Working Capital Management Before, During and After the Global Financial Crisis of 2008: Evidence from Malaysia", *The Journal of Developing Areas*, Vol. 50, pp. 461-468.

Hasan M.M. and A.W.K. Cheung, 2023, "Organization Capital and Firm Risks", *China Accounting and Finance Review*, Vol. 25, No. 3, pp. 338-367.

Helton J.C., 1994, "Treatment of Uncertainty in Performance Assessments for Complex Systems", *Risk Analysis*, Vol. 14, pp. 483-511.

Henkel J., 2008, "The Risk-Return Paradox for Strategic Management: Disentangling True and Spurious Effects", *Strategic Management Journal*, Vol. 30, No. 3, pp. 287-303.

Herrera-Echeverry H., J. Haar, D. Velasquez-Gaviria and S. Upadhyay, 2020, "Board Long-Term Orientation, Earnings Management, Disclosure and Risk", *Engineering Economics*, Vol. 31, No. 4, pp. 398-410.

Hofstede G., 1980, *Culture'sConsequences:International Differences in Work-Related Values*, SAGE Publications: Beverly Hills, Los Angeles.

Hofstede G., 2001, *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*, second ed. Sage, Thousand Oaks, CA.

Hofstede G., G.J. Hofstede and M. Minkov, 2010, *Cultures and Organizations: Software of the Mind, Rev. 3rd ed. McGraw-Hill*, New York, United States.

Hossain A.T., A. Masum and J. Xu, COVID-19, 2023, "Blessing in Disguise for the Tech Sector: Evidence from Stock Price Crash Risk", *Research in International Business and Finance*, Vol. 65, pp. 101938-101352.

House R.J., P.J. Hanges, M. Javidan, P.W. Dorfman, V. Gupta, Culture, 2004, *Leadership and Organizations: The GLOBE Study of 62 Societies*, SAGE Publications: London, U.K.

Huang W., J.W. Goodell and A. Goya, 2021l, "In Times Of Crisis Does Ownership Matter? Liquidity Extraction through Dividends during the 2007-2009 Financial Crisis, Journal of International Financial Markets", Institutions and Money, Vol. 73, pp. 101380-101395.

Hund J., D. Monk and S. Tice, 2010, "Uncertainty about Average Profitability and the Diversification Discount", *Journal of Financial Economics*, Vol. 96, No. 3, pp. 463-484.

Hutchinson M., M. Seamer and L. Chapple, 2015, "Institutional Investors, Risk/Performance and Corporate Governance", *The International Journal of Accounting*, Vol. 50, No. 1, pp. 31-52.

Iannotta G., G. Nocera and A. Sironi, 2007, "Ownership Structure, Risk and Performance in the European Banking Industry", *Journal of Banking and Finance*, Vol. 31, pp. 2127-2149.

Ibhagui O.W. and F.O. Olokoyo, 2018, "Leverage and Firm Performance: New Evidence on the Role of Firm Size", *The North American Journal of Economics and Finance*, Vol. 45, pp. 57-82.

Ichev R. and M. Marinc, 2018, "Stock Prices and Geographic Proximity of Information: Evidence from the Ebola Outbreak", *International Review of Financial Analysis*, Vol. 56, pp. 153-166.

Iftikhar A., L. Purvis and I. Giannoccaro, 2021, "A Meta-Analytical Review of Antecedents and Outcomes of Firm Resilience", *Journal of Business Research*, Vol. 135, pp. 408-425.

Inglehart R., 1990, *Culture Shift in Advanced Industrial Society*, Princeton University Press: Princeton, New York.

Inglehart R., 1997, *Modernization and Postmodernization: Cultural, Economic and Political Change in 43 Societies*, Princeton University Press: Princeton, New York.

Iwasaki I. and B. Kim, 2018, *Firm Failure in Russia during Economic Crises and Growth: A Large Survival Analysis*, RRC Working Study Series, Russian Research Center, Institute of Economic Research, Hitotsubashi University, Tokyo, Japan.

Jang Y., N. Kwon, Y. Ahn, H.S. Lee and M. Park, 2019, "International Diversification and Performance of Construction Companies: Moderating Effect of Regional, Product and Industry Diversifications", *Journal of Management in Engineering*, Vol. 35, No. 5, pp. 04019015-04019035.

Jensen M.C. , 1986, Agency Costs of Free Cash Flow, Corporate Finance and Takeovers, American Economic Review, Vol. 76, No. 2, pp. 323-329.

Jensen M.C. , 1986, "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers",

American Economic Review, Vol. 76, No. 2, pp. 323-329.

Jensen J. and S. Sublett, 2017, *Redefining Risk and Return*, Palgrave Macmillan.

Jiang F., D. Kong, Z. Lu, Y. Ma and Y. Yi, 2023, "Geographic Dispersion and Corporate Resilience during the COVID-19 Pandemic", *International Review of Financial Analysis*, Vol. 88, pp. 102684.

Jung S., M. Dalbor and S. Lee, 2018, "Internationalization as a Determinant of Systematic Risk: The Role of Restaurant Type", International Journal of Contemporary Hospitality Management, Vol. 30, No. 8, pp. 2791-2809.

Kahle K.M. and R.M. Stulz, 2013, "Access to Capital, Investment and the Financial Crisis", *Journal of Financial Economics*, Vol. 110, No. 2, pp. 280-299.

Kahneman D. and A. Tversky, 1979, "Prospect Theory: An Analysis of Decision under Risk", *Econometrica*, Vol. 47, pp. 263-291.

Kanagaretnam K., C. Lim and G. Lobo, 2014, "Influence of National Culture on Accounting Conservatism and Risk-Taking in the Banking Industry", *The Accounting Review*, Vol. 89, No. 3, pp. 1115-1149, 2014.

Kang Y.S. and B.Y. Kim, 2012, "Ownership structure and firm performance: Evidence from the Chinese Corporate Reform", *China Economic Review*, Vol. 23, No. 2, pp. 471-481.

Karma O. and P. Sander, 2006, "The Impact of Financial Leverage on Risk of Equity Measured by Loss-Oriented Risk Measures: an Option Pricing Approach", *European Journal of Operational Research*, Vol. 175, No. 3, pp. 1340-1356.

Kausar S., A. Rashid and Z.A. Shah, 2023, "Idiosyncratic Risk Puzzle and Its Pricing:

Do Firm Characteristics Matter? Evidence of Brics Countries", *Borsa Istanbul Review*, Vol. 23, No. 1, pp. 149-168.

Kay J. and M. King, 2020, *Radical Uncertainty: Decision-Making For an Unknowable Future*, London, UK: The Bridge Street Press.

Kaya O., 2022, "Determinants and consequences of SME insolvency risk during the pandemic", *Economic Modelling*, Vol. 115, pp. 1-14.

Keynes J.M., 1936, *The General Theory of Employment*, Interest and Money.

Khalfan T. and S. Wendt, 2020, "The Impact of Financial and Economic Crisis on Leverage: The Case of Icelandic Private Firms", *International Journal of Managerial Finance*, Vol. 16, No. 3, pp. 297-315.

Khasawneh A.Y., 2020, "Leverage and Bank's Performance: Do Type and Crises Matter?", *Macroeconomics and Finance in Emerging Market Economies*, Vol. 14, No. 2, pp. 111-125.

Kim K., S. Patro and R. Pereira, 2017, "Option Incentives, Leverage and Risk-Taking", *Journal of Corporate Finance*, Vol. 43, pp. 1-18.

Kliger D. and I. Tsur, 2011, "Prospect Theory and Risk-Seeking Behavior by Troubled Firms", *Journal of Behavioral Finance*, Vol. 12, No. 1, pp. 29-40.

Knight F., Risk., 1921, *Uncertainty and Profit*, Schaffner and Max, Boston, MA: Hart.

Koronis E. and S. Ponis, 2018, "Better Than Before: The Resilient Organization in Crisis Mode", *Journal of Business Strategy*, Vol. 39, No. 1, pp. 32-42.

Krapl A.A., 2015, "Corporate International Diversification and Risk", *International*

Review of Financial Analysis, Vol. 37, pp. 1-13.

Kreiser P.M., L.D. Marino, P. Dickson and K.M., 2010, "Weaver, Cultural Influences on Entrepreneurial Orientation: The Impact of National Culture on Risk Taking and Proactiveness in Smes", *Entrepreneurship Theory and Practice*, Vol. 34, No. 5, pp. 959-984.

Lang M. and M. Maffett, 2011, "Transparency and Liquidity Uncertainty in Crisis Periods", *Journal of Accounting and Economics*, Vol. 52, No. 2-3, pp. 101-125.

Larasati H. and A. Wahyudin, 2020, "The Effect of Liquidity, Leverage and Operating Capacity on Financial Distress with Managerial Ownership as a Moderating Variable", *Accounting Analysis Journal*, Vol. 8, No. 3, pp. 214-220.

Lassoued N., H. Sassi and M.B.R. Attia, 2016, "The Impact of State and Foreign Ownership on Banking Risk: Evi- Dence From The MENA Countries", *Research in International Business and Finance*, Vol. 36, pp. 167-178.

Lazzarini S.G. and A. Musacchio, 2020, "Leviathan as a Partial Cure? Opportunities and Pitfalls of Using the State-Owned Apparatus to Respond to the COVID-19 Crisis", *Revista de Administração Pública*, Vol. 54, No. 4, pp. 561-577.

Lee B.S. and M.Y.L. Li, 2012, "Diversification and Risk-Adjusted Performance: a Quantile Regression Approach", *Journal of Banking Andamp; Finance*, Vol. 36, No. 7, pp. 2157-2173.

Lee B.X., F. Preston and G. Green, 2012, *Preparing for High-Impact, Low-Probability Events: Lessons from Eyjafjallajökull*, Preparing for High-impact, Low-probability Events, Square, London.

Lee, C.C., M.P. Chen and S.L. Ning, 2017, "Why Did Some Firms Perform Better in

the Global Financial Crisis?", *Economic Research-Ekonomska Istraživanja*, Vol. 30, No. 1, pp. 1339-1366.

Lee, C.C., S. Ning, M.F. Hsieh and C.C. Lee, 2020, "The Going-Public Decision and Rent-Seeking Activities: Evidence from Chinese Private Companies", *Economic Systems*, Vol. 44, No. 1, pp. 100744.

Lemmon M.L. and K.V. Lins, 2003, "Ownership Structure, Corporate Governance and Firm Value: Evidence from the East Asian Financial Crisis", *The Journal of Finance*, Vol. 58, pp. 1445- 1468.

Li J. and Z.G. Shao, 2020, "Leverage Effects of Financial Markets in Financial Crisis", *International Journal of Modern Physics*, Vol. 31, No. 05, pp. 2050072-2050095.

Li K., D. Griffin, H. Yue and L. Zhao, 2013, "How Does Culture Influence Corporate Risk-Taking?", *Journal of Corporate Finance*, Vol. 23, pp. 1-22.

Li L. and X. Cheng, 2023, *Do Geopolitical Risks Increase Corporate Risk-Taking?—Based on the Perspective of Diversification Expansion*, Corporate Governance: An International Review, New York.

Likitwongkajon N. and C. Vithessonthi, 2022, "Internationalization, Foreign Exchange Exposure and Firm Risk", *International Review of Financial Analysis*, Vol. 83, pp. 102334-102345.

Lin K.J., X. Lu, J. Zhang and Y. Zheng, 2020, "State-Owned Enterprises in China: A Review of 40Years of Research and Practice", *China Journal of Accounting Research*, Vol. 13, No. 1, pp. 31-55.

Lin S.H., Y.J. Chen, T.L. Wang, H.C. Wang and Y.C.A. Liu, 2012, "The Decision Behavior of Taiwan Firms Investing in China: Evidence From Different Industries",

Review of Pacific Basin Financial Markets and Policies, Vol. 15, No. 01, pp. 1250002.

Liu J., F. Meng and R. Fellows, 2015, "Exploratory Study of Understanding Project Risk Management from the Perspective of National Culture", *International Journal of Project Management*, Vol. 33, No. 3, pp 564-575.

Liu L., D. Luo and L. Han, 2018, "Default Risk, State Ownership and the Cross-Section of Stock Returns: Evidence from China", *Review of Quantitative Finance and Accounting*, Vol. 53, No. 4, pp. 933-966.

Liu X. and Z. Jin, 2018, "Effects of Unexpected Financial Slack on Smes' Diversification and Growth: Evidence from China", *Nankai Business Review International*, Vol. 9, No. 4, pp. 500-518.

Lumpkin G.T. and K.H. Brigham, 2011, "Long-Term Orientation and Intertemporal Choice in Family Firms", *Entrepreneurship Theory and Practice*, Vol. 35, pp. 1149-1169.

Lumpkin G.T., K.H. Brigham and T.W. Moss, 2010, "Long-Term Orientation: Implications for the Entrepreneurial Orientation and Performance of Family Businesses", *Entrepreneurship and Regional Development*, Vol. 22, No. 3/4, pp. 241-264.

Luo L.M., H.T. Lee, C.C. Chiu and C.W. Lee, 2023, "The Relations of Corporate Risk, Operating Efficiency and Firm Size to Managerial Compensation: Evidence from Taiwan Stock Market-Listed Companies", *Asia Pacific Management Review*, Vol. 28, No. 2, pp. 194-203.

Ma B. and J. Zhang, 2022, "Tie Strength, Organizational Resilience and Enterprise Crisis Management: an Empirical Study in Pandemic Time", *International Journal of Disaster Risk Reduction*, Vol. 81, pp. 103240-103260.

Mac an Bhaird C., 2013, "Demand for Debt and Equity Before and After the Financial Crisis", *Research in International Business and Finance*, Vol. 28, pp. 105-117.

Madaleno M. and N. Barbuta-Misu, 2019, "The Impact of Economic Crisis on the Financial Performance of the European Companies", *Ekonomika*, Vol. 98, No. 2, pp. 6-18.

Mahto R.V. and D. Khanin, 2015, "Satisfaction with Past Financial Performance, Risk Taking and Future Performance Expectations in the Family Business", *Journal of Small Business Management*, Vol. 53, No. 3, pp. 801-818.

Mammen J., T.M. Alessandri and M. Weiss, 2021, "The Risk Implications of Diversification: Integrating the Effects of Product and Geographic Diversification", *Long Range Planning*, Vol. 54, No. 1, pp. 101942-101965.

March J.G. and Z. Shapira, 1987, "Managerial Perspectives on Risk and Risk Taking", *Management Science*, Vol. 33, No. 11, pp. 1404-1418.

Marimuthu M., L. Arokiasamy, W. Foon and I. Kolandaisamy, 2014, "Size Effect and Insolvency Profiles among the Smes: An Empirical Investigation", *Global Business and Management Research: An International Journal*, Vol. 6, pp. 290-299.

Martynova N., L. Ratnovski and R. Vlahu, 2020, "Bank Profitability, Leverage Constraints and Risk-Taking", *Journal of Financial Intermediation*, Vol. 44, pp. 100821-100841.

Matysek-Jedrych A., K. Mroczek-Dabrowska and A. Kania, 2022, "Beyond the COVID-19 Pandemic: What Builds Organizational Resilience Capacity?" *International Journal of Emerging Markets*, Vol. 100, pp. 104177-104197.

Maulud D.H. and A.M. Abdulazeez, 2020, "A Review on Linear Regression Compre-

hensive in Machine Learning", *Journal of Applied Science and Technology Trends*, Vol. 01, No. 04, pp. 140 -147.

Meier I., Y. Bozec and C. Laurin, 2013, "Financial Flexibility and the Performance during the Recent Financial Crisis", *International Journal of Commerce and Management*, Vol. 23, No. 2, pp. 79-96.

Meles A., D. Salerno, G. Sampagnaro and M. Fu, 2021, "The Going-Public Decision and Firm Risk", *Journal of Financial Stability*, Vol. 54, pp. 100882.

Meyer T., v. d. Gracht, H. A., and Hartmann, E., 2020, "How Organizations Prepare for the Future: A Comparative Study of Firm Size and Industry" *Transactions on Engineering Management*, vol. 69, no. 2, pp. 511-523,

Miletic M., P.T. Kramaric and B. Plazibat, 2019, "What Determines Financial Soundness Of Croatian Listed Firms?", *UTMS Journal of Economics, University of Tourism and Management, Skopje, Macedonia*, Vol. 10, No. 2, pp. 189-200.

Miller K.D. and P. Bromiley, 1990, "Strategic Risk and Corporate Performance: An Analysis of Alternative Risk Measures", *Academy of Management Journal*, Vol. 33, No. 4, pp. 756-779.

Miller K.D. and W. Chen, 2004, "Variable Organizational Risk Preferences: Tests of the March-Shapira Model", *Academy of Management Journal*, Vol. 47, pp. 105-115.

Miller, K.D. and J.J. Reuer, 1996, "easuring Organizational Downside Risk", *Strategic Management Journal*, Vol. 17, No. 9, pp. 671-691.

Milliken F.J., 1987, "Three Types of Perceived Uncertainty about the Environment: State, effect and response uncertainty", *The Academy of Management Review*, Vol. 12, pp. 133-143.

Mohsni S., I. Otchere and S. Shahriar, 2021, "Board Gender Diversity, Firm Performance and Risk-Taking in Developing Countries: The Moderating Effect of Culture", J*ournal of International Financial Markets, Institutions and Money*, Vol. 73, pp. 101360.

Moreno I., P. Parrado-Martínez and A. Trujillo-Ponce, 2022, "Using the Z-Score to Analyze the Financial Soundness of Insurance Firms", *European Journal of Management and Business Economics*, Vol. 31, No. 1, pp. 22-39.

Morris S., Risk, 1997, "Uncertainty and Hidden Information", *Theory and Decision*, Vol. 42, No. 3, pp. 235-269.

Moses O.D., 1992, "Organizational Slack and Risk-Taking Behaviour: Tests of Product Pricing Strategy", *Journal of Organizational Change Management*, Vol. 5, No. 3, pp. 38-54.

Nguyen H., A.V. Pham, M.D. Pham and M.H. Pham, 2023, "Business Resilience: Lessons from Government Responses to the Global COVID-19 Crisis", *International Business Review*, Vol. 32, No. 5.

Nooteboom B. , 1989, "Diffusion, Uncertainty and Firm Size", *International Journal of Research in Marketing*, Vol. 6, pp. 109-128.

Novita S., B. Tjahjadi and A. Irwanto, 2018, "Industry and Financial Crises in Fragile and Zombie Firms: Does Leverage Matter?", *Journal of Business and Economics Review*, Vol. 3, No. 3, pp. 51-58.

Novita S., B. Tjahjadi and F. Ismiyanti, 2021, "Leverage and Firms' Vulnerability: Do Crises and Industry Matter?", *International Journal of Economics and Management*, Vol. 15, pp. 161-174.

Oehmen J., G. Locatelli, M. Wied and P. Willumsen, Risk, 2020, "Uncertainty, Ignorance and Myopia: Their Managerial Implications for B2B firms", *Industrial Marketing Management*, Vol. 88, pp. 330-338.

Olibe K.O., F.A. Michello and J. Thorne, 2008, "Systematic Risk and International Diversification: an Empirical Perspective", *International Review of Financial Analysis*, Vol. 17, No. 4, pp. 681-698.

Onali E. and D.V. Mascia, 2022, "Corporate Diversification and Stock Risk: Evidence from a global shock", *Journal of Corporate Finance*, Vol. 72, pp. 102150-102164.

Osiyevskyy, O., G. Shirokova and Ehsani, M., 2023, "The Role of Effectuation and Causation for SME Survival amidst Economic Crisis", *International Journal of Entrepreneurial Behavior and Research*, Vol. 29 No. 7, pp. 1664-1697

Ostrowska, M. and S. Mazur, 2015, "Risk in A Crisis Situation", *Procedia Economics and Finance*, Vol. 23, pp. 1054-1059.

Otero González, L., P. Durán Santomil and A. Tamayo Herrera, 2020, "The Effect of Enterprise Risk Management on the Risk and the Performance of Spanish Listed Companies", *European Research on Management and Business Economics*, Vol. 26, No. 3, pp. 111-120.

Ouatik El-Alaoui, A., O. Ismath Bacha, M. Masih and M. Asutay, 2018, "Does Low Leverage Minimise the Impact of Financial Shocks? New Optimisation Strategies Using Islamic Stock Screening for European Portfolios", *Journal of International Financial Markets, Institutions and Money*, Vol. 57, pp. 160-184.

Park, K. F. and Z. Shapira, 2018, *Risk and Uncertainty, The Palgrave Encyclopedia of Strategic Management*, Palgrave Macmillan, London.

Parnell, J. A. and W. Crandall, 2021, "What Drives Crisis Readiness? An Assessment of Managers in the United States: The Effects of Market Turbulence, Perceived Likelihood of a Crisis, Small- to Medium-Sized Enterprises and Innovative Capacity", *Journal of Contingencies and Crisis Management*, Vol. 29, No. 4, pp. 416-428.

Peric, M. and V. Vitezic, 2015, "Impact of Global Economic Crisis on Firm Growth", *Small Business Economics*, Vol. 46, No. 1, pp. 1-12.

Picolo, J. D., C.B. Dal Magro, T.P. da Silva and L. Bernardo, 2018, "The Influence of the Financial Slack on the Economical Performance of Brazilian and Chilean Companies", *Cuadernos de Economía*, Vol. 41, No. 115, pp. 19-30.

Power, B., G. Ryan and J. Doran, 2020, "A Micro-Analysis of Irish Firm Deaths during the Financial Crisis (2006-2010)", *The Irish Journal of Management*, Vol. 39, No. 1, pp. 1-16.

Prasetyo, R. and F. Fachrurrozie, 2016, "Analysis of Factors Effecting on The Probability of Financial Distress." *Accounting Analysis Journal*, Vol. 5, No. 4, pp. 370-380.

Pratono, A.H. (2018). "Does Firm Performance Increase with Risk-Taking Behavior under Information Technological Turbulence? Empirical Evidence from Indonesian SMEs", *Journal of Risk Finance*, Vol. 19 No. 4, pp. 361-378.

Qian, G. and J. Li, 1998, "Multinationality, Global Market Diversification and Risk Performance for the Largest U.S. Firms, *Journal of International Management*, Vol. 4, No. 2, pp. 149-170.

Raei, R., R. Tehrani and B. Farhangzadeh, 2015, "A Study on Relationship between Diversification Strategy, Firm Performance and Risk: Evidence from Tehran Stock Exchange", *International Journal of Business and Social Science*, Vol. 6, No. 1, pp.

1379-1399.

Rai, S.S., S. Rai and N.K. Singh, 2021, "Organizational Resilience and Social-Economic Sustainability: COVID-19 Perspective", *Environment, Development and Sustainability*, Vol. 23, pp. 12006-12023.

Ramírez Alesón, M. and M.E. Escuer, 2002, "The Impact of Product Diversification Strategy on the Corporate Performance of Large Spanish Firms, *Spanish Economic Review*, Vol. 4, No. 2, pp. 119-137.

Raynor, M., 2002, "Diversification as Real Options and the Implications of Firm-Specific Risk and Performance, the Engineering Economist, Vol. 47, pp. 371-389.

Reddy, K., N. Mirza and N. Yahanpath, 2022, "Capital Structure Determinants during the Sovereign Debt Crisis Period," *Australasian Business, Accounting and Finance Journal*, Vol. 16, No. 4, pp. 29-63.

Rogers, M., 2001, "The Effect of Diversification on Firm Performance, *Melbourne Institute Working Study*, Vol. 1, pp. 12-25.

Röhn, O., A.C. Sánchez, M. Hermansen and M. Rasmussen, 2015, *Economic Resilience: A New Set of Vulnerability Indicators for OECD Countries", OECD Economics Department Working Studys*, OECD Publishing, Paris,

Romer, D., A.L. Duckworth, S. Sznitman and S. Park, 2010, "Can Adolescents Learn Self-Control? Delay of Gratification in the Development of Control over Risk Taking," *Prevention Science*, Vol. 11, No. 3, pp. 319-330.

Rowe A., 1977, *An Anatomy of Risk*, New York.

Rowe, W. D., 1994, "Understanding uncertainty", *Risk Analysis*, Vol. 14, pp. 743-750.

Ruefli, T.W., J.M. Collins and J.R. Lacugna, 1999, "Risk Measures in Strategic Management Research: Auld Lang Syne?", *Strategic Management Journal*, Vol. 20, No. 2, pp. 167-194.

Rutkowska-Ziarko, A., 2022, "Market and Accounting Measures of Risk: The Case of the Frankfurt Stock Exchange, Risks, Vol. 10, No. 1, pp. 14-26.

Sabatino, M., 2016, "Economic Crisis and Resilience: Resilient Capacity and Competitiveness of the Enterprises." *Journal of Business Research*, Vol. 69, No. 5, pp. 1924-1927.

Salunkhe, U., Rajan, B. and V. Kumar, 2023, "Understanding Firm Survival in A Global Crisis", *International Marketing Review*, Vol. 40 No. 5, pp. 829-868.

Samet, A., N. Boubakri and S. Boubaker, 2018, "Does Public-Private Status Affect Bank Risk Taking? Worldwide Evidence," *Journal of International Financial Markets, Institutions and Money*, Vol. 53, pp. 287-306.

Santacruz, L., 2019, "Measures of Firm Risk-Taking: Revisiting Bowman's Paradox", *Managerial Finance*, Vol. 46, No. 3, pp. 421-434.

Savage, L., 1954, *The Foundations of Statistics*, John Wiley and Sons, New York.

Schmielewski, F. and T. Wein, 2013, "Are Private Banks the Better Banks? An Insight into the Principal-Agent Structure and Risk-Taking Behavior of German Banks," Journal of Economics and Finance, Vol. 39, No. 3, pp. 518-540.

Schwartz , S.H., 1994, "Beyond Individualism/Collectivism: New Cultural Dimensions Of Values. In Individualism and Collectivism: Theory, Method and Applications, Kim U, Triandis HC, Kagitçibasi C, Choi SC, Yoon G (eds), *SAGE Publications: Thousand Oaks*, Vol. 6, pp. 85-119.

Schwartz, S. H., 2006, "A Theory of Cultural Value Orientations: Explication and Applications", *Comparative Sociology*, Vol. 5, pp. 137-182.

Šeho, M., M. Ibrahim and A. Mirakhor, 2021, "Does Sectoral Diversification of Loans and Financing Improve Bank Returns and Risk in Dual-Banking Systems?", *Pacific-Basin Finance Journal*, Vol. 68, pp. 101619-101629.

Serrasqueiro, Z., J. Leitão and D. Smallbone, 2018, "Small-and Medium-Sized Enterprises (SME) Growth and Financing Sources: Before and after the Financial Crisis", *Journal of Management and Organization*, Vol. 27, pp. 1-16.

Shinkle, G.A., 2011, "Organizational Aspirations, Reference Points and Goals", *Journal of Management*, Vol. 38, No. 1, pp. 415-455.

Shoham, A. and A. Fiegenbaum, 2002, "Competitive Determinants of Organizational Risk-Taking Attitude: The Role of Strategic Reference Points, *Management Decision*, Vol. 40, pp.127-141.

Shubik, M., 1954, "Information, Risk, Ignorance and Indeterminacy", *The Quarterly Journal of Economics*, Vol. 68, No. 4, pp. 629-640.

Singh, G., S.U. Chernikov and S. Singh, 2017, "The Inquisition of Uncertainty Avoidance Index in the Emanation of Entrepreneurial Development", *Journal of Entrepreneurship and Management*, Vol 6, No. 3, pp. 81-99.

Sohl, T., B.T. McCann and G. Vroom, 2022, "Business Model Diversification: Demand Relatedness, Entry Sequencing and Curvilinearity in the Diversification-Performance Relationship", *Long Range Planning*, Vol. 55, No. 6, pp. 102215-102225.

Sostakas, A., 2015, *Uncertainty Avoidance and Its Influence on Entrepreneurship among Lithuanians*, Lund University School of Economics and Management.

Spaliara, M.E. and S. Tsoukas, 2013, "What Matters For Corporate Failures in Asia? Exploring the Role of Firm-Specific Characteristics during the Asian Crisis," *Structural Change and Economic Dynamics*, Vol. 26, pp. 83-96.

Startienė, G. and R. Remeikienė, 2007, "Methodology of Business Risk Analysis and its Practical Application in the Enterprises Working in the Global Market", *Engineering Economics*, Vol. 3, no. 53, pp. 7-16.

Statista, 2023, *Impact of the Coronavirus Pandemic on the Global Economy*, Statistics and Facts.

Staw, B., L. Sandelands and J. Dutton, 1981, "Threat Rigidity Effects in Organizational Behavior: A Multilevel Analysis", *Administrative Science Quarterly*, Vol. 26, pp. 501-524

Stein, J.C., 1988, "Takeover Threats and Managerial Myopia, *Journal of Political Economy*, Vol. 96, No. 1, pp. 61-80.

Stulz, R., 2014, *Governance, Risk Management and Risk-Taking in Banks*, National Bureau of Economic Research, New York.

Sullivan-Taylor, B. and L. Branicki, 2011, "Creating Resilient SMES: Why one Size Might Not Fit All", *International Journal of Production Research* Vol. 49, pp. 5565-5579.

Sulphey, M.M., 2020, "A Study on the Effect of Long-Term Orientation and Risk Propensity on Resilience", *International Journal of Sociology and Social Policy*, Vol. 40, No. 11, pp. 1585-1610.

Sun, W., J. Price and Y. Ding, 2019, "The Longitudinal Effects of Internationalization on Firm Performance: The Moderating Role of Marketing Capability", *Journal of*

Business Research, Vol. 95, pp. 326-337.

Tan, T.K., 2015, "Financial Distress and Firm Performance: Evidence from the Asian Financial Crisis", *Journal of Finance and Accountancy*, Vol. 11, pp. 1-25.

Tang, C.Y. and S. Tikoo, 1999, "Operational Flexibility and Market Valuation of Earnings, Strategic Management Journal, Vol. 20, No. 8, pp. 749-761.

Taras, V., B.L. Kirkman and P. Steel, 2010, "Examining The Impact of Culture's Consequences: A Three-Decade, Multilevel, Meta-Analytic Review of Hofstede's Cultural Value Dimensions", *Journal of Applied Psychology*, Vol. 95, No. 3, pp. 405-425.

Taylan, O., O.A. Bafail, R.M.S. Abdulaal and M.R. Kabli, 2014, "Construction Projects Selection and Risk Assessment by Fuzzy AHP and Fuzzy TOPSIS Methodologies", *Applied Soft Computing*, Vol. 17, pp. 105-116.

Tekin, H., 2020, "Firm Size and Dividend Policy of European Firms: Evidence from Financial Crises", *Marmara Üniversitesi Avrupa Topluluğu Enstitüsü Avrupa Araştırmaları Dergisi*, Vol. 28, pp. 123-145.

Thanh, V.H., N.M. Ha and M. Mcaleer, 2021, "Asset Investment Diversification, Bankruptcy Risk and the Mediating Role of Business Diversification", *Annals of Financial Economics*, Vol. 16, No. 01, pp. 2150001-2150020.

Tian, M., P. Deng, Y. Zhang, M.P. Salmador, 2018, "How Does Culture Influence Innovation? A Systematic Literature Review", *Management Decision*, Vol. 56, No. 5, pp. 1088-1107.

Trompenaars, F., 1993, *Riding the Waves of Culture: Under- standing Diversity in Global Business*, Irwin Professional Publishing: Chicago, IL.

Tsai, H.F. and C.J. Luan, 2016, "What Makes Firms Embrace Risks? A Risk-Taking Capability Perspective", *Business Research Quarterly*, Vol. 19, No. 3, pp. 219-231.

Tsiapa, M. 2022, "Performance of Large Firms in Greece during the Unstable Period of 2011-2016: Lessons from the Weak Parts of Europe", *European Journal of Management and Business Economics*, Vol. 31 No. 1, pp. 94-114.

Tucker, E., 2015, *Business Continuity from Preparedness to Recovery, A Standards Based Approach*, Elsevier, Amsterdam.

Uhrin, Á., J. Moyano-Fuentes and S.B. Cámara, 2020, "Firm Risk and Self-Reference on Past Performance as Main Drivers of Lean Production Implementation", *Journal of Manufacturing Technology Management*, Vol. 31 No. 3, pp. 458-478.

Upadhyay, A., 2014, "Board Size, Firm Risk and Equity Discount", *Journal of Risk and Insurance*, Vol. 82, No. 3, pp. 571-599.

Van Hoang, T.H., C. Gurău, A. Lahiani and T.L. Seran, 2017, "Do Crises Impact Capital Structure? A Study of French Micro-Enterprises", *Small Business Economics*, Vol. 50, No. 1, pp. 181-199.

Varadarajan, P.R. and V. Ramanujam, 1987, "Diversification and Performance: A Reexamination Using a New Two-Dimensional Conceptualization of Diversity in Firms", *Academy of Management Journal*, Vol. 30, pp. 380-393.

Varum, C.A. and V.C. Rocha, 2011, "Do Foreign and Domestic Firms Behave Any Different During Economic Slowdowns?", *International Business Review*, Vol. 20, No. 1, pp. 48-59.

Veliyath, R., S.P. Ferris and K. Ramaswamy, 1994, "Business Strategy and Top Management Compensation: The Mediating Effects of Employment Risk, Firm Perfor-

mance and Size", *Journal of Business Research*, Vol. 30, No. 2, pp. 149-159.

Vithessonthi, C. and J. Tongurai, 2015, "The Effect of Firm Size on the Leverage-Performance Relationship During the Financial Crisis of 2007-2009", *Journal of Multinational Financial Management*, Vol. 29, pp. 1-29.

Vo, D. H., 2023, "Market Risk, Financial Distress and Firm Performance in Vietnam", *Plos One*, Vol. 18, No. 7, pp. 0288621-0288641.

Volkov, N.I. and G.C. Smith, 2015, "Corporate Diversification and Firm Value during Economic Downturns", *The Quarterly Review of Economics and Finance*, Vol. 55, pp. 160-175.

Walls, M.R., 2005, "Corporate Risk-Taking and Performance: A 20 Year Look at the Petroleum Industry", *Journal of Petroleum Science and Engineering*, Vol. 48, No. 3-4, pp. 127-140.

Walls, M.R. and J.S. Dyer, 1996, "Risk Propensity and Firm Performance: A Study of the Petroleum Exploration Industry", *Management Science*, Vol. 42, No. 7, pp. 1004-1021.

Wang, C., X. Liu and J. He, 2022, "Does Diversification Promote Systemic Risk?", *The North American Journal of Economics and Finance*, Vol. 61, pp. 101680-101780.

Wang, Q., J. Shen and E.W.T. Ngai, 2023, "Does Corporate Diversification Strategy Affect Stock Price Crash Risk?", *International Journal of Production Economics*, Vol. 258, pp. 108794-108815.

Wehrheim, D., H.D. Dalay, A. Fosfuri and C. Helmers, 2020 "How Mixed Ownership Affects Decision Making in Turbulent Times: Evidence from the Digital Revolution in Telecommunications", *Journal of Corporate Finance*, Vol. 64, pp. 101626-101640.

Weidemann, J.F., 2017, "A State-Of-The-Art Review of Corporate Cash Holding Research", *Journal of Business Economics*, Vol. 88, No. 6, pp. 765-797.

Wenzel, M., S. Stanske and M.B. Lieberman, 2021, "Strategic responses to crisis", *Strategic Management Journal*, Vol. 42, No. 2.

Westergaard-Nielsen, N. and I. Neamtu, 2012, "How Are Firms Affected by the Crisis and How Do They React." *IZA Discussion Study*, Vol. 1, pp. 6671-6692.

Widianingsih, Y.P., D. Setiawan, Y.A. Aryani and E. Gantyowati, 2023, "The Relationship Between Innovation and Risk Taking: The Role of Firm Performance", *Risks*, Vol. 11, No. 8, pp. 144-157.

Wieczorek-Kosmala, M., 2021, "Covid-19 Impact on the Hospitality Industry: Exploratory Study of Financial-Slack-Driven Risk Preparedness", *International Journal of Hospitality Management*, Vol. 94, pp. 102799-102823.

Wieczorek-Kosmala, M. and J. Błach, 2019, "Financial Slack And Company's Risk Retention Capacity", *Multiple Perspectives in Risk and Risk Management*, Vol. 1, pp. 145-168.

Wiseman, R.M. and P. Bromiley, 1996, "Toward a Model of Risk in Declining Organizations: An Empirical Examination of Risk, Performance and Decline", *Organization Science*, Vol. 7, pp. 524-543.

WorldBank, 2023, *World Development Indicators*, Global Development .

Wu, J., L. Chen, M. Chen and B.N. Jeon, 2020, "Diversification, Efficiency and Risk of Banks: Evidence from Emerging Economies", *Emerging Markets Review*, Vol. 45, pp. 100720-100735.

Yazdanfar, D. and P. Öhman, 2020, "Financial Distress Determinants among Smes: Empirical Evidence from Sweden", *Journal of Economic Studies*, Vol. 47 No. 3, pp. 547-560.

Yildiz, A.E., I. Dikmen, M.T. Birgonul, K. Ercoskun and S. Alten, 2014, "A Knowledge-Based Risk Mapping Tool For Cost Estimation Of International Construction Projects", *Automation in Construction*, Vol. 43, pp. 144-155.

Yücel, E. and Y.B. Önal, 2015, "Industrial Diversification and Risk in an Emerging Market: Evidence from Turkey", *Emerging Markets Finance and Trade*, Vol. 51, No. 6, pp. 1292-1306.

Zheng, C., S. Moudud-Ul-Huq, M.M. Rahman and B.N. Ashraf, 2017, "Does The Ownership Structure Matter For Banks' Capital Regulation And Risk-Taking Behavior? Empirical Evidence from a Developing Country", *Research in International Business and Finance*, Vol. 42, pp. 404-421.

Zhu, W. and J. Yang, 2016, "State Ownership, Cross-Border Acquisition and Risk-Taking: Evidence from China's Banking Industry, *Journal of Banking and Finance*, Vol. 71, pp. 133-153.

APPENDIX A: USED DATABASES REGISTERED BY BOĞAZİÇİ UNIVERSITY

All GDP and inflation data were obtained from World Bank Database.

Furthermore, figures in Section 2.2.1 were retrieved from Statista.



Figure A.1. Both Statista and World Bank databases are officially accessible by Boğaziçi University students and staffs.