REPUBLIC OF TURKEY
ISTANBUL UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
Ph. D. BUSINESS MANAGEMENT PROGRAM

Ph.D. DISSERTATION

INTERACTIONS OF FINANCIAL RISK TOLERANCE, INTERNAL FIT, EXTERNAL FIT AND PERSONALITY TRAITS ON CORPORATE INVESTMENT BEHAVIOR

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İSTANBUL-2023

ÖZ

KURUMSAL YATIRIM SÜRECİNDE FİNANSAL RİSK TOLERANSI, DAHİLİ VE HARİCİ UYGUNLUK İLE KİŞİLİK ETKİLEŞİMİ

Cem ÜNLÜAKIN

Kurumsal yatırım davranışını (KYD) açıklamak şirketler, yatırımcılar ve politika yapıcılar için çok önemlidir. Finansal risk alma ve yatırım kararı arasındaki ilişki, bireysel düzeyde ayrıntılı olarak incelenmiştir. Ancak finansal risk alma davranışını örgütsel düzeyde değerlendirme girişimine literatürde rastlanmamıştır. Bu çalışma, kurumsal finansal risk toleransını (KFRT), 307 üretim şirketinden alınan verilerle ölçmeye çalışarak boşluğu doldurmayı hedeflemektedir. Yatırım teorisinin bir diğer ilgi alanı olan beş faktör kişilik modeli dinamikleri de şirket sahiplerinin/üst yönetiminin açıklık, sorumluluk, dışadönüklük, uyumluluk, duygusal denge özellikleri şeklinde çalışmaya dahil edilmiş ve bu özelliklerin KYD ile ilişkisi açıklanmaya çalışılmıştır.

Başlarken detaylı bir literatür çalışması yapılarak bağımlı değişken olarak açıklanmaya çalışılan kurumsal yatırım davranışı, klasik modellerden, davranışsal modellere kadar uzanan geniş bir yelpaze de araştırılmıştır. Bu kapsamda kurumsal yatırım davranışına ve finansal risk tutumuna etki eden davranışsal öğeler tespit edilerek yatırım için dahili uygunluk (YİDU) ve yatrım için harici uygunluk (YİHU) olmak üzere iki başlık altında sınıflandırılmıştır. Literatür çalışması ışığında 6 hipotez üretilmiştir. Bağımsız değişkenlerden biri olarak kullanılan KFRT için bir ölçek geliştirilmiş ve bu ölçek beş faktör kişilik modeli ölçeği ile birlikte KYD'yi açıklamak için kullanılmıştır. Kurumsal yatırım davranışını daha iyi açıklayabilmek amacıyla YİDU ve YİHU verileri de iki kompozit düzenleyici değişken olarak modellere eklenmiştir. Şirket iletişim bilgileri İstanbul Sanayi Odası ve T.C. Sanayi ve Teknoloji Bakanlığı'ndan temin edilmiştir. Çalışmaya baz teşkil edecek anketler

e-posta yolu ile sanayi şirketlerinin bölgesel dağılımına uyumlu bir oranla rassal olarak iletilmiş, sonuçlar web tabanlı ve anonim olarak toplanmıştır. Ölçek anketine verilen cevapların incelemesi açıklayıcı faktör analizi kullanılarak yapılmış ve içsel tutarlılık da değerlendirilmiştir. Ölçek sorularının oluşturulması ve nihai ölçeğin değerlendirilmesi için içerik, görünüş ve yapısal geçerlilik testleri yapılmıştır. Son olarak ise çoklu regresyon modelleri kullanılarak oluşturulan hipotezler test edilmiştir.

Sonuçlarımız, üst yönetimin beş faktör kişilik özelliğinin KYD ile anlamlı bir ilişki içinde olmadığını, ancak KFRT'nin anlamlı bir şekilde KYD'yi açıkladığını göstermektedir. Şirketler için KYD'yi ve finansal risk tutumunu etkileyen öğeler dahili ve harici yatırıma uygunluk (YİDU, YİHU) olarak literatür üzerinden sınıflandırılarak iki kompozit düzenleyici değişken olarak modele eklendiğinde, KFRT için model uyumluluğu artarken, beş faktör kişilik özelliklerinden, YİHU'nun moderasyonunda, sadece sorumluluk anlamlı hale gelmiştir.

Çalışma Türkiye dahilinde yapılmıştır. Değişik ülkeler için test edilmesi çalışma sonuçlarının genellenebilirliğini arttıracaktır.

Bireylerin kişilik özellikleri ile yatırım kararları arasında bir ilişki olduğunu gösteren çalışmaların aksine (Chitra ve Sreedevi, 2011; Gambetti ve Giusberti, 2019; Mayfield ve diğerleri, 2008; Oehler ve diğerleri, 2018), üst yönetimin kişilik özellikleri söz konusu olduğunda, kurumsal düzeyde anlamlı bir ilişki görülmemektedir. Bu aynı zamanda yatırım kararlarında yöneticilerin özelliklerinin şirketlerinin tutumlarıyla ilişkili olduğu sonucuyla da çelişmektedir (Graham ve diğerleri, 2013; Kuzmicheva, 2014). Ancak sorumluluk kişilik özelliği ile çevre arasında bir etkileşim olduğu görülmektedir. Sorumluluk, kurumsal yatırım davranışını açıklamak için harici yatırım uygunluğunun düzenleyiciliği eşliğinde anlamlı hale gelmektedir. Bireysel düzeyden farklı olarak, kurumsal düzeyde kişilik özellikleri ile yatırım davranışı arasındaki ilişkinin anlamsız kalmasına neden olan dinamikler ve harici yatırıma uygunluğun düzenleyiciliğinde sadece sorumluluk özelliğinin anlamlı olmasının sebepler üzerinde çalışılabilecek ilgi çekici noktalardır.

Kurumsal finansal risk toleransı, şirketin dahili ve harici yatırıma uygunluğu, kurumsal yatırım davranışını açıklamak için yeni değişkenler olarak öne çıkmaktadır. KFRT, kurumsal yatırım davranışını tek başına ve YİDU/ YİHU düzenleyiciliğinde anlamlı bir şekilde açıklamaktadır. Bu sonuçlar Shao ve diğerleri'nin (2013), risk tutumu ile kurumsal yatırım davranışı arasındaki ilişkiyi gösteren çalışmalarıyla uyumludur. En geniş ifadeyle, kurumsal finansal risk toleransının, şirketin hem dahili hem de harici yatırım uygunluğunun düzenleyiciliğinde kurumsal yatırım davranışını anlamlı şekilde açıkladığı sonucuna varılabilir. Yeni önerilen değişkenler KFRT, YİDU ve YİHU'nun diğer kültürel ve kurumsal yatırımla ilgili değişkenlerle etkileşiminin incelenmesi, kurumsal karar vermeyi anlamak yolunda yeni bir kulvar olabilir.

Kurumsal düzeyde finansal risk toleransını davranışsal boyutuyla ölçmeye yönelik literatürdeki ilk çalışma olması, kurumsal yatırım literatürüne dahili ve harici yatırıma uygunluk adı altında iki yeni kompozit değişken katması ve kurumsal yatırım davranışını açıklamak için anlamlı modeller önermesi.

Anahtar Kelimeler: Kurumsal Yatırımı Davranışı, Finansal Risk Toleransı, Finansal Belirsizlik Yönetimi, Şirket Yönetiminin Beş Faktör Kişilik Özellikleri, Yatırıma Dahili ve Harici Uygunluk

ABSTRACT

INTERACTIONS OF FINANCIAL RISK TOLERANCE, INTERNAL FIT, EXTERNAL FIT AND PERSONALITY TRAITS ON CORPORATE INVESTMENT BEHAVIOR

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Explaining corporate investment behavior (CIB) is crucial for companies, investors and policy makers. The relationship between financial risk taking and investment decision has been studied in detail on an individual level. However an attempt to assess financial risk taking behavior on an organizational level is not encountered in literature. This study fills the gap by attempting to measure corporate financial risk tolerance (CFRT) with data from 307 production companies and employs hypothesis testing as a confirmatory analysis in a theoretical framework from literature. The dynamics of Big 5 y using CFRT and Big 5 as independent variables to explain corporate investment behavior (CIB). Our results indicate that Big 5 traits of top management are not significantly related with CIB, yet CFRT is. Subsequently items impacting CIB and financial risk tolerance identified from literature are classified as internal (IFFI) and external fit for investment (EFFI) and are incorporated as two composite moderating variables. As a result the model fit improves with both IFFI and EFFI for CFRT, however for Big 5, only conscientiousness trait becomes significant in the moderation of EFFI.

Keywords: Corporate Investment Behavior, Financial Risk Tolerance, Financial Uncertainty Handling, Big Five of Company Management, Internal and External Fit for Investment

PREFACE

What are the driving forces for a company to take financial risk and make capital investment? This question gave the start of the study. In order to answer this question well, it was mandatory to understand and explain the corporate investment behavior in as much detail as possible. So the corporate investment behavior was chosen as the dependent variable and the quest for deriving new independent variables from literature to explain corporate investment started. A thorough search of literature encompassing almost 150 years was made. External adaptation and internal integration principle was taken into consideration to understand the problem in its entirety. It was an obstacle to reach companies to collect the necessary data, which was overcome thanks to the official contact addresses of production companies provided by İstanbul Chamber of Industry and the Ministry of Industry and Technology of Turkey. The information was used in strict abidance of personal data protection law. At the end of this long journey it was possible to contribute to explaining corporate investment behavior by introducing new variables to literature.

ACKNOWLEDGEMENT

I would like to thank my thesis advisor Prof. Dr. Aktaş and committee members for all of their guidance through this process. My special thanks go to the İstanbul Chamber of Industry and the Ministry of Industry and Technology of Turkey. This study would not materialize without your support.

From the deep of my heart I want to thank my Dad, Mustafa, who inherited me the curious mind that never gets satisfied; my Mom, Birsen, who taught me to love; my lovely Wife, Demet, who has always kept me grounded and cherished, and my sweet Daughter, İpek, who has brought in joy and vigor to my life. This thesis would not be possible if not for your moral encouragement.

Cem ÜNLÜAKIN

ISTANBUL, 2023

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LIST OF SYMBOLS

α	:	Cronbach's Alpha
β	:	Regression Coefficient
F	:	F-test Score
M	:	Mean
N	:	Sample Size
p	:	Level of Significance
***p**	:	95% Significance
****p**	:	99% Significance
R	:	Regression Coefficient
Adj R^2	:	Adjusted Regression Squared
r		Correlation
χ2	:	Chi-Square Distribution

LIST OF ABBREVIATIONS

App	:	Appendix
AVE	:	Average Variance Extracted
Big 5	:	Big Five Factor Model of Personality
CFRA	:	Corporate Financial Risk Attitude
CFRC	:	Corporate Financial Risk Capacity
CFRK	:	Corporate Financial Risk Knowledge
CFRP	:	Corporate Financial Risk Propensity
CFRT	:	Corporate Financial Risk Tolerance
$\chi 2$	:	Chi-Square Distribution
CI	:	Capital Investment
CIB	:	Capital Investment Behavior
CIL	:	Corporate Investment Level
CR	:	Construct Reliability
df	:	degree of freedom
DV	:	Dependent Variable
EFA	:	Exploratory Factor Analysis
EFFI	:	External Fit for Environment
H	:	Hypothesis
IFFI	:	Internal Fit for Investment
IV	:	Independent Variable
KMO	:	Kaiser-Meyer-Okin
OLS	:	Ordinary Least Square Regression
p.	:	page
PCA		Principal Component Analysis
pp.	:	plural pages
SD	:	Standard Deviation
SE	:	Standard Error
Sig.	:	Significance
SPSS	:	Statistical Package for Social Science
VIF	:	Variance Inflation Factor

INTRODUCTION

Capital investment is of foremost importance for both long-term macroeconomic development and short-term variations in business cycles. The allocation of capital across firms and industries is at least as important as the timing of business cycles and the allocation of investment over time. Therefore understanding the components of capital investment behavior is crucial for companies, investors and policy makers.

Capital investment has been the subject of a vast and, at times, a controversial literature (Jorgenson, 1963: 247; Hubbard, 1998: 193-194, 220-222; Stein 2003). The determinants of capital investment are firmly rooted theoretically, however there is little agreement on the type of relationship between capital investment and the theoretical determinants in empirical studies.

Broadly speaking, there are three classes of determinants of corporate investment behavior: (1) macro and micro economic determinants on an aggregate economy and firm-specific basis (2) policy factors like governmental stimulus in terms of taxes and subsidies (3) human related factors within the realm of behavioral economics such as bounded rationality, individual and group attitudes and agency issues. First and the second items have been of foremost importance in the development of the mainstream economic theory of capital investment.

This study will start by delineating the extant literature in the above mentioned line of development. Firstly the theory of economics will be summarized to identify the determinants of capital investment behavior and the associated variables starting from the models of classical to neoclassical theory and Tobin’s Q. Secondly, empirical studies that test the theory and policy parameters will be analyzed. And thirdly modern and postmodern studies that attempt to incorporate human element into the models of capital investment behavior will be examined to determine more recent contribution to literature.

Even though classical and neoclassical economic theories differ in terms of how they elaborate utility, value, profit, rationality, and equilibrium functions with mathematically eloquent equations, they both have shared a common caveat in explaining the economic phenomena: The lack of the very important concept of uncertainty which included the issues of both economic volatilities and human behavior. The early economic models approached the concept of capital investment by deterministic models which did not take into account the principle of uncertainty. Not until 1970s, the element of uncertainty was incorporated into economic models of capital investment. The inclusion of uncertainty brought with itself the uncertainties regarding the behavioral side of decision making besides the economic variables.

Following the economic crash of 1987, economists began to question whether capital markets provided the best estimate for the long term fundamental and market value of economic entities. The number of studies that pointed at the poorly informed traders, bounded rationality related poor decision and bubbles started to increase besides those attempting those to test the theory by empirical country specific studies regarding the determinants of capital investment behavior. These studies mainly focus on the relationship between uncertainty, cash flow profiles, leverage level, ease of access to external capital, corporate taxes, cost of capital, the predictive value of stock price and capital investment.

Overall, international comparisons of capital investment behavior based on this line of empirical analysis are incongruent in practice because they produce dissimilar findings with theory and each other. An important reason for the discrepancy between the theory and empirical research and between empirical studies themselves may stem from the differences in the assumptions between the classical and behavioral economic theory. In contrast to the assumptions of classical theory which assumes the absolute rationality and optimization capability of market participants, utilitarian characteristics and the complete self-control of corporate investors who are free of cognitive/processing errors and biases, it is highly probable that the assumptions of behavioral economics such as a satisficing "normal" man prone to cognitive biases and processing errors, with limited self-control dominate to disrupt the eloquent equations of mainstream economic theory. There are as many variations in CIB as the variety of human related factors. Economic decision making can be interpreted as a social learning process in the moderation of cognitive biases. Thus behavioral economics can be interpreted as encompassing a broad area including psychology, sociology and classical economic theory.

This study focuses on the behavioral dimension of the capital investment and aims to understand the interaction of risk handling behavior in corporate investment and distinguish some valid determinants of corporate investment behavior for production companies in Turkey, which ascend from theory, and to devise a scale to measure the financial risk tolerance for companies. The research question can be defined as “What are the driving forces for a company to take financial risk and make capital investment?”

The contribution of this study is fourfold: First it attempts to measure financial risk tolerance on a corporate level, which is proposed to be an important variable regarding corporate investment decision. There is yet no such scale on an organizational level in literature. Second it contributes to literature by analyzing the relationship of Big 5 traits of top management with CIB. Third it defines two important moderating variables as internal and external fit for investment by classifying company and environment specific items relevant to CFRT and CIB in extant literature and employs them as moderators in hypotheses. Fourth it proposes an overall model to explain corporate investment behavior.

CHAPTER ONE

REVIEW OF CAPITAL INVESTMENT THEORY

1.1. Capital Investment in Mainstream Economic Theory

1.1.1. Deterministic Models

One of the most established gospels in macroeconomics is that the relationship between capital investment and output is significantly positive over business cycles. The model developed by Clark (1917), which is called the accelerator theory of investment, equates investment to changes in the desired level of capital, and the desired level of capital is governed by long-term considerations, which are output expectations. This theory assumes that a rise in the output rate of a firm will call for a proportionate rise in capital optimum or desired level. Since it assumes that investment equals optimum capital level, the level of net investment is also proportionate to the change in output. If output level remains constant, net investment will be zero. To obtain a positive net investment, output must increase. However in case output increases but at a decreasing rate, net investment decreases. Net investment becomes negative when output starts to decline. The assumption for the aforementioned cases is that there is symmetrical reaction for increases and decreases in output. Briefly, this theory suggests the common sense that firms have little tendency to invest when they have low expectations of sales for the output produced by the new investment and inclined to invest more with higher sales expectations. This model is also called the naive accelerator because it assumes that capital is optimally adjusted within the same period of a change in output. However this is just a static analysis of a highly dynamic concept of capital investment. According to this model, firms are always in an equilibrium state with no excess capacity and the capital supply is infinitely elastic to make within-a-single-period adjustments possible.

The flexible accelerator theory of investment, which is also known as the capital stock adjustment model, compensates for a major shortcoming in the simple acceleration model that assumes capital level to be adjusted optimally without a time lag, which means firms could adjust their capital levels in the same period of an output change. In this new model, however, it is assumed that a period of time passes between the change in output level and the change in capital investment. This theory was developed in different forms by Goodwin (1951), Chenery (1952), Koyck (1954) and Junankar (1970).

The most well-known approach for this model is the one by Koyck (1954). He extends the theory to conclude that the firms does not make investments from accumulated desired capital level instantaneously but with a time lag. His model assumes that actual capital level depends not only on the current output but on all past output levels. However, the weights of the outputs into the past decrease geometrically. The model also includes the effects of excess capacity on the capital level adjustment and depreciation.

Junankar (1970) discusses the lags from a firm-specific to an aggregate level, and states that in case of an instant output increase, a firm would first try to utilize its inventories to meet the increasing demand and consequently make use of its capital stock in a more efficient way. In case the output demand continues to stay high persistently, the firm will increase its demand for capital stock. The time elapsed until a decision to increase capital investment is called the decision-making lag on top of which comes the administrative lag of capital orders.

Another common theme in explaining capital investment behavior is the profits (Tinberger, 1938; Shapiro, 1955). Shapiro argues that optimum capital level is an integral part of expected profits. When the aggregate profits in an economy increase, this will lead to an expectation that they will continue to increase in the future. According to this model, expected profits are an integral part of profits in previous years, and total profits have a positive relationship with income levels. There exists an optimum capital level at each level of profit, which has a positive relationship with profit levels. In the meanwhile optimum capital level is determined by the interest rates and profit levels. The higher interest rates will result in a smaller optimum capital level at any particular profit level. This model assumes that the national income level and aggregate profit levels; and aggregate profit levels and the optimum capital levels have positive relationships. When the optimum capital stock stays below the actual capital stock at a particular profit level, there becomes an investment to compensate for the discrepancy and vice versa. However there is not a proportional change between profits-investments and income-aggregate profits.

In the liquidity version of the model (Shapiro, 1955) the undistributed profits are assumed to be a source of internal funds for capital investment. It says that there is a sequential dependence such as capital investment depends on profit levels and profit levels depend on national income. When national income and profit levels are high, the undistributed profits of firms will be high. In case the capital markets are imperfect, internal funds are important sources for firms as a cheap recourse. As a result, firms will have high undistributed earnings during periods of high profits and this will further decrease the cost of capital and increase the optimum capital stock. In this kind of a scenario, firms will be inclined to reinvest the extra undistributed profits back into business as capital investment instead of keeping them in bank or paying as dividends. The decreasing profits will lead to less capital investment in contrast.

Modigliani–Miller in their models without corporate taxes, asymmetric information, bankruptcy costs in full market efficiency (1958) and with corporate tax incorporated version (1963) also argue that the capital investment of a firm is dependent only on the profitability expectations of its investment alternatives. Therefore the market value of a company can be predicted by the net present value of its future earnings and it is not dependent on whether it finances growth by stock issues, leverage or retained earnings.

Duesenberry (1959) builds upon the previous theories cited above and proposes the following assumptions: As national income grows capital investment exceeds savings, as capital level grows gross capital investment starts to exceed depreciation, the ratio of capital level to income determines the growth rate in capital and income. Profits have a positive relationship with national income and a negative relationship with capital stock in this model. The model also reckons with consumption as a variable. The Financial Theory of Investment model, developed by Duesenberry takes into account the cost of capital in investment decisions, so it is also called as the cost of capital theory of investment. It is assumed that the prevailing market rate of interest is the cost of capital to the firm and it is constant regardless of investment level, which points at unlimited funds availability for capital investment at prevailing market rates of interest. According to this model, three sources of funds exist for capital investment.

First as external funds, by issuing new stock and equity financing as external funds: Duesenbery points out that the cost of equity for large firms ranges between 7 to 10 percent. The cost of equity should be higher than the cost of borrowed funds and internal financing as retained earnings, because the investors expect a yield higher than the alternative risk free market interest rate. The difference may further change as a result of different tax tariffs.

Second as external funds, borrowing from banks and issuing bonds: The cost of borrowed funds from banks increases as the amount of borrowing increases because as debt repayment to return-on-investments ratio increases, the likelihood of not paying the borrowed funds back, the default risk, increases.

Third as internal funds, the undistributed profits in the balance sheet after dividend payments, allowances and taxes. Internal financing is the most convenient and cheapest among the sources since they are the easiest to access and the cost of using them is very low in the short run. The cost is equal to the opportunity cost of using these funds in alternative options like to obtain risk free market interest, buying stocks of other firms or paying out as dividends.

Meyer and Kuh (1955, 1957) also use external cost of capital as determinants of the long term goals of desired capital investment and they argue that low interest rates do not have much impact on capital investment during recessions since firms use their retained earnings. As a result, the prevailing interest rates or monetary policy have a trivial effect on the cost of capital during recessions. However, as recovery begins firms shift back to using external funds and the importance of prevailing interest rates increases in recovery and booming periods. However this hypothesis focuses only on monetary policy and ignores the impact of fiscal policy on capital investment like the positive and negative impact of a decrease and increase in corporate taxes respectively. Expenditure measures aiming at aggregate demand, changes in depreciation allowances and investment incentives by governments are other factors through which the capital investment behavior can be shaped through fiscal policy.

Jorgenson (1963, 1968, 1969) devised a Neoclassical Model of Investment that assumes the capital investment behavior is based on determining the optimum capital stock and it depends in succession on the profit maximization theory of a firm. The model has assumptions like no uncertainty, no adjustment costs, the perfect competition of firms, full employment in the economy in which capital and labor costs are perfectly flexible, a firm can lend and borrow at any given interest rate in a perfect financial market, the full utilization of capital stock, production function relates output to capital and labor input. capital and labor are homogeneous inputs that produce homogeneous outputs, the price of capital goods is equal to the discounted value of the alternative rental charges, a firm can maximize the NPV of its current and future profits by a perfect evaluation and foresight of all future variables, diminishing returns to scale, current price changes produce a corresponding change in future prices under the same conditions, capital investment is endlessly flexible in that even after the investment is made it can be instantly changed to a new technology at no extra adjustment costs.

In this model it is assumed that the firm maximizes it net present value under two constraints such as the rate of change in the capital stock flow is in proportion to the net investment flow, where net investment equals total investment minus replacement investment and output, labor and capital stock levels are constrained by a production function. The model assumes that the critical determining factor of the optimum capital is the cost of capital to the user and given that most firms prefer owning capital assets to renting them, it allows for equal and substitutable treatment of labor and capital inputs and concludes that the investment demand depends on the rate of interest. The model involves “myopic decision criteria” in capital investment by not assuming any adjustment costs, which grants that firms do not get an advantage when they delay capital investments and by assuming capital to be homogeneous which means it can be exchanged in a purely competitive market. However empirical studies are not in favor of the neoclassical model of investment. They either show no correlation or a weak correlation between the cost of capital and investment. (Shapiro, 1986: 111). This finding has implications for the long held debate between Keynesian and Neoclassical economics too. Neo-Keynesians should not feel content in the way neoclassicists were proved to be wrong because famous Keynesian IS-LM model also fails in this condition. If the cost of capital does not influence capital investment, the IS curve becomes vertical and the Keynesian proposed mechanism of transmission from money to output is no longer valid.

Not until 1970s, the element of uncertainty was incorporated into economic models of capital investment. Standard econometric models have not included the concept of uncertainty and produced unsatisfactory results for the explanation of capital investment behavior. These models had a narrow explanation of the variations in capital investment and did not reflect the results of what really happened in practice (Dixit and Pindyck, 1994: 419). Tobin's Q can be interpreted as the first model to incorporate the concept of uncertainty in capital investment.

Q Theory of Investment proposed by Tobin (1969) relates capital investment decisions to fluctuations in the capital market. It takes into account the expected future profits plus the sentiment of the capital market participants about a firm's market value on top of the neoclassical model of investment and so has an element of uncertainty embedded in it. The model states that the share prices during issuance reflect the investment behavior of the firm, which is dictated by a quotient called Q, equal to market value of capital stock divided by replacement cost of real capital stock. Market value of capital stock is determined by the capital market as share prices and the replacement cost of real capital is the actual cost to the firm if the existing capital stock is repurchased at current market rates.

The model assumes that the net capital investment is dependent on Q. $Q<1$ would imply that the firm would not replace the capital stock worn out whereas $Q>1$ implies the inclination of the firm to make more capital investment. As a corollary, when the share price of a firm increases so does its net capital investment and conversely when share price decreases so does the net capital investment of the firm. Thus as the demand for the shares of a firm increases so does the capacity of the firm to make new capital investments. A rise in the expected return on capital or a fall in the discount rate of market augments Q and therefore the capital investment.

The demand for shares depends on the wealth of the population and the real return on alternative investment opportunities like government bonds and real estate. If there is a decrease in the real interest rates, this would lead to more investment in company shares as compared to investment in other fields, which as a result raise the capital demand and drive Q higher. This models draws on the relationship between the stock market and the capital investment behavior by reflecting on both the current and the future profitability of capital. So when Q is bigger than 1, capital investment is expected to increase. However when Q is below 1, the firms can still make capital investments in anticipation of future profitability and increased share price. Tobin's Q incorporates the uncertainty principle into capital investment theory by variables like share price, replacement cost of current capital and real interest rates, which can, on different occasions, be firm, market, country and globe specific. It also makes a connection between expectations of future profitability, current profitability, uncertainty and capital investment behavior.

1.1.2. Models Incorporating Uncertainty

The concept of uncertainty has started to be investigated from 1970s to understand its impact on the capital investment behavior. Hartman (1972: 258, 265-266) emphasized the importance of capital productivity for the uncertainty effect on capital investment in the early models for the uncertainty-capital investment relationship. This model concludes that if the marginal capital profitability of a company is convex and adjustment costs are symmetrical, which means the capital investments are reversible, the propensity to produce and invest more, increases as uncertainty increases. In addition, the results imply that both wage rate uncertainties and output prices have either a positive or a negative impact on capital investment, while investment does not change with uncertainty on future investment costs.

Bernanke (1980) studied the optimum timing of capital investment under uncertainty given that investment was irreversible and the information on returns was obtained over time. He argues that an investment decision had to be made only in case the deferral cost of investment would be higher than the expected value of information expected to be acquired by waiting. Therefore uncertainty delays new investments by increasing the value of waiting which in turn translated into the instability of aggregate investment. This instability is resolved with new information obtained over time in a business cycle. He concludes that short term variabilities in investment over a business cycle could be explained by this logic.

Contrary to Bernanke's view, in a model by Abel (1983: 228, 231-232) it is argued that capital investment increases as uncertainty increases, which supports the findings of Hartman(1972), irrespective to the type of the adjustment cost curve. Besides, this model also asserts that the relationship between capital investment and Tobin's Q are dependent on adjustment costs. Tobin's Q suggests that under certainty, the capital investment growth rate equals Q growth multiplied by investment elasticity to Q, however the relationship is different under uncertainty. Under uncertainty, if adjustment cost is a non-convex function of capital investment the increase in capital investment is smaller, and if adjustment cost is a convex function of capital investment the increase of capital is greater than what is proposed in Tobin's Q. Abel's model argues that increased uncertainty has a positive impact on capital investment when investments are reversible, whereas the net impact is ambiguous and empirical when capital investments are irreversible.

More recent models emphasize the irreversibility of most capital investments. Two main branches of research exist regarding uncertainty in capital investment: the first which relates uncertainty to investment timing, and the second that analyses how uncertainty influences the investment level. The concept of irreversibility is the salient point between the aforementioned branches. Pindyck (1982, 1988) argue that while irreversibility is a dominant factor in the capital investment level, it is however, not dominant but only relevant in the capital investment timing. Pindyck (1982) proposes a model that employs asymmetric adjustment costs. In the model, it is concluded that uncertainty affects capital investment with respect to the characteristics of adjustment cost curve. If adjustment costs are convex uncertainty may increase capital investment whereas if they are non-convex uncertainty will decrease it. On the other hand, Caballero (1991: 285-286) argues that asymmetric adjustment costs are not enough to explain the negative relationship, but emphasizes the importance of returns to scale and type of competition. He shows that under decreasing returns to scale or imperfect competition, asymmetric cost functions can produce similar results to Abel (1983). However he cannot conclude about the sign of interaction between uncertainty and capital investment.

Recent research starts to dwell on other elements than irreversibility as well and argues that there is a negative relationship between capital investment and uncertainty. Nakamura (1999) shows that increased uncertainty decreases capital investment level if the firm has a risk aversive attitude even under perfect competition. Moreover, Nakamura (2002) shows that under a scenario of capital's lifetime to be smaller than the possible lifetime of the company, and with decreasing returns to scale, an increase in uncertainty leads to a decrease in capital investment. Saltari and Ticchi (2005) disagrees with the model of Nakumara (1999) and proposes two concepts governing capital investment behavior. The first is the flexibility effect which means the convexity of the marginal product productivity and the second is the risk aversion effect which means the attitude of the firm's toward risk taking. The overall impact of these two factors on the capital investment level is determined by the relative strengths of each factor and the result is rather ambiguous and firm specific.

In the second branch of research, timing of capital investment is in focus. Dixit and Pindyck (1994: 13, 18, 214, 244) argues that an increased uncertainty in future values of economic variables calls for an option value of waiting for information. By waiting you forsake a possible revenue but also make a gain on possible sunk cost, an irreversible capital investment, which would be incurred without good information. The difference between the total cost avoided and the total revenue forsaken is the option value of waiting. The real options theory argues that uncertainty in the long run has an ambiguous impact on the capital investment level, however it is obvious that a delay in investment calls for a lower level of investment in the short-run. This argument has salient indications for the timing of capital investment, but not on investment levels in the long run.

On the other hand, Bar-Ilan and Strange (1999) try to combine the impact of uncertainty on the timing and the level of capital investment into a single model by distinguishing between the short and long term influence of uncertainty. They assert that the timing and the level are related if incremental vs lump sum and short term vs long term capital investments can be clearly distinguished. For short term and incremental investments standard irreversibility rules are valid which means that uncertainty decreases capital investment. Yet when investments are lump sum, the model asserts that as uncertainty increases the timing of investment is postponed however the capital investment level can be higher when it is actually made at a later time.

Another important concept in understanding the concept of uncertainty in capital investment behavior is the hangover effect (Abel and Eberly, 1999: 341-345). It results when the marginal revenue product of capital investment is low. In this situation the firms want to sell off a portion of the capital installed however are unable to do so since the investment is irreversible. In this model it is argued that when irreversibility applies, user-cost effect on capital investment is curbed by hangover effect. As a result if irreversibility is high it is expected to have an actual capital stock higher than the desired stock whereas if irreversibility is low it is possible to make more instantaneous adjustments and the actual and desired stock levels will be close to one another when capital productivity is low. This also has implications for labor and capital factor substitutability. The reversal of an installed capital can be compensated by investing more in the labor factor.

It also seems plausible that the relationship between uncertainty and capital investment level depends on the type of capital on a micro level whereas different types of sectors with different irreversibility of capital investment will impact the relationship on a more aggregate level. More aggregate level analyses call for including the sources of systematic variation into the picture such as market structure, assumptions for production factor substitution, the financial position of firm and uncertainty influence on industry versus firm.

Hartman (1972: 265-266) and Abel (1983: 228) argue for a positive relation between uncertainty and capital investment under perfect competition. Caballero (1991: 282-285), on the other hand, argues for a negative relationship under imperfect competition. These models propose that marginal capital productivity is convex in perfect markets and concave in imperfect markets. Moreover Perotti and Kulatilika (1999: 4, 14) propose that in imperfect oligopolistic markets strategic issues can outweigh the impact of irreversibility of capital on investment behavior. A firm in an oligopolistic market can postpone capital investment as a result of increased uncertainty and the associated optional value of waiting. Alternatively, from a strategic point of view it can decide to invest now in anticipation of competitors' inclination to wait. The decision is made by analyzing the size the opportunity cost of investment delay. In oligopolistic markets the profits are higher than perfectly competitive markets in which profits are around zero. As a result it can be proposed that the degree of competition in the market has a salient impact on the uncertainty-capital investment behavior however, the direction of impact is not clear at all.

Ghosal and Loungani (1996: 217-219, 227), propose a statistically significant negative relation between uncertainty and CIB in highly competitive markets whereas the relationship becomes statistically insignificant and vague in markets with lower competition. On the other hand, Guiso and Parigi (1999: 185, 219-220) argue for a more significant negative relationship even in markets with low degrees of competition.

The concept of uncertainty and its relationship with capital investment behavior has also been approached from different angles as industry versus firm specific attitudes. Industry level approach indicate some common points of uncertainty prevailing on an aggregate level for a specific industry whereas the firm specific uncertainties are peculiar to the individual companies and do not apply to the overall industry. Abel (1983: 228) and Caballero (1991: 281-282) argue for a positive interaction between individual uncertainty and capital investment under perfect competition and constant returns to scale. Pindyck (1993: 273-274, 276) on the other hand proposes that if the uncertainty is on industry level, it will have a negative effect on capital investment level. Nonetheless, Bo (2002: 1, 11-12) concludes that if there is individual uncertainty for a company, it has more influence on the capital investment behavior than industry specific uncertainty.

The financial positions of firms and their capacity to get access to funds have also been proposed as a determinant of relationship between uncertainty and capital investment behavior. Barran and Peeters (1998: 86-87) argue that there is a negative relationship between uncertainty and capital investment in low-leveraged companies. They conclude that when the internal funding of a firm increases, the investment behavior is more negatively impacted by uncertainty. It seems that the companies are more negatively sensitive to uncertainty when they use their own resources. The results also have implications for agent-principal perspective as to whether it is easier to make investments when the funding source is external. The study by Ghosal and Loungani (2000; 338, 342) has implications for size of companies and their access to capital markets, and the impact of uncertainty relationship. They assert that in industries with small-size-company domination, the uncertainty has a greater negative impact on capital investment level. Since the communication between large companies and financial institutions are more improved as compared to small companies, the relationship between capital investment and uncertainty is influenced by capital and money market imperfections. Large companies with more professional staff and expertise have easier access to funds during times of economic uncertainty. They also have better high quality data collection mechanisms to decrease uncertainties. However it can also be argued that since large firms have bigger stakes in different territories the absolute risk involved in case of a total default is much larger as compared to small companies, which can shift the appetitive of financial institutions to disperse the risk in their portfolios by lending to more small sized firms. More studies are needed in this field to make a clear conclusion.

Production factor substitution, which is assumed to be present in most studies, is another determinant in uncertainty-capital investment behavior. Factor substitution to be possible the convexity of marginal capital productivity to prices is a necessary condition. The sensitivity to different factor substitutability levels has not been extensively studied in full depth theoretically, however there are some empirical studies regarding the issue. Leahy and Whited (1996: 66) proposed that for firms with greater factor substitution capabilities the capital investment and uncertainty relationship is negative. It seems logical to say that capital investment and uncertainty relation is stronger as factor substitutability capabilities of the firm are higher, however as it arises from previous literature the sign of the relationship is not clear. It was identified in previous studies that the opportunity cost of postponing the capital investment arises as a result of irreversibility of capital, so it can be argued that as labor capital substitutability increases the option value of waiting decreases.

Besides the linearity assumption between uncertainty and capital investment level as cited in literature there are also studies that argue for a curved relationship. Abel and Eberly (1999: 365-367) suggest that the vague relationship between uncertainty and capital investment behavior in literature stemmed from the fact the there was a curved relationship between the two. They argue for an inverted U shaped relationship. This implies that the relationship is positive for low uncertainty levels whereas it is negative for higher level uncertainties. The behavior at low uncertainty levels could be explained by an increase in risk seeking behavior when small losses are anticipated (Kahneman and Tversky, 1979). As uncertainty level increases so does the trigger value for capital investment and the possibility of hitting this trigger value. The interaction between the trigger value and the possibility of hitting it are also involved in the investment decision. So the uncertainty and capital investment behavior relationship becomes even more complicated.

Bo and Lensin (2005: 307, 328) proposes that the inverted U-shaped curve is a result of the fact that negative and positive shocks are perceived differently by firms. Firms associate negative shocks with higher uncertainty than positive shocks. It can also be argued that the inverted U shaped relationship stems from the level of "competition in the industry. It is plausible to assume that high competitive markets call for a higher perception of uncertainty.

However a clear finding as to how exactly uncertainty impacts capital investment has not been reached. So the topic seems relevant both theoretically and empirically as the literature is not clear even about the sign of relationship. As argued by Dixit and Pindyck (1994: 3-315), even the conventional NPV-framework that is heavily used to evaluate the profitability of possible investments needs to be remodeled by taking into account the concept of uncertainty.

A classification of literature in mainstream economic theory is as in Table 1. The determinants that influence capital investment behavior have been identified and classified under firm, industry and national level. When this classification is made it is easier to clearly see where the focus of attention is from where the studies have amassed. It is evident that firm specific studies are abundant in mainstream economic literature. This should be due to the fact that it is hard to make generalizations on a mathematical basis in bigger groups like industries and nations. Besides, the studies have been outlined with respect to the timeline. This enables one to see where the focus of attention is shifting through years. In this regard it is observed that the studies incorporating uncertainty have gained more attention in recent years. As can be seen in the literature cited so far, the theory is ambiguous and varied about the determinants of capital investment behavior and the interaction of the components determining the timing and level of capital investment.

Table 1 : Determinants of CIB in Mainstream Economics

Firm Level	Industry Level	National Level
Business cycles (Tugan-Barranovsky,1894; Schumpeter, 1934)	Market demand (Clark, 1917; Goodwin, 1951; Chenery, 1952; Koyck, 1954; Junankar, 1970)	National income (Shapiro, 1955; Duesenberry, 1959)
Output level (Clark, 1917; Goodwin, 1951; Chenery, 1952; Koyck, 1954; Junankar, 1970)	Assumptions of factor substitutability – industry level (Jorgenson, 1963, 1968, 1969; Leahy & Whited, 1996; Abel & Eberly,1999)	Recession vs. Boom (Meyer & Kuh, 1955, 1957)
Opportunity cost of cash (Duesenberry, 1959)	Underlying market structure, small vs. big firms domination, competition (Hartman, 1972; Abel, 1983; Caballero, 1991; Ghosal & Loungani, 1996; Nakamura, 1999; Perotti & Kulatilika, 1999; Guiso & Parigi,1999; Ghosal & Loungani,2000)	Interest rates (Shapiro, 1955; Duesenberry, 1959; Jorgenson, 1963, 1968, 1969)
Replacement investment (Jorgenson, 1963, 1968, 1969)	Level of uncertainty-industry level (Pindyck, 1993; Bo, 2002)	Savings (Duesenberry, 1959)
Type of capital (Jorgenson, 1963, 1968, 1969)	Strategic impulses-industry level (Perotti & Kulatilika, 1999)	Level of taxation (Duesenberry, 1959; Modigliani-Miller, 1963; Atkinson & Stiglitz, 1976)
Level of uncertainty-firm level (Tobin, 1969; Abel, 1983; Caballero, 1991; Ghosal & Loungani,1996; Barran & Peeters,1996; Leahy & Whited, 1996; Perotti & Kulatilika, 1999; Guiso & Parigi,1999; Ghosal & Loungani,2000; Nakamura, 1999, 2002; Bo, 2002; Bo & Lensin, 2005)		Strategic impulses (Perotti & Kulatilika, 1999)
Tobin's Q - stock price over book value (Tobin, 1969)		
Financial conditions of the firm		
Ease of access to external funding		

(Duesenberry, 1959; Barran & Peeters,1996; Ghosal & Loungani,2000)		
Profitability (Tinberger, 1938; Shapiro, 1955; Modigliani-Miller, 1958, 1963; Duesenberry, 1959)		
Excess cash (Shapiro, 1955; Duesenberry, 1959; Meyer & Kuh, 1955, 1957; Barran & Peeters,1996)		
Cost of capital (Meyer & Kuh, 1955, 1957; Duesenberry, 1959; Jorgenson, 1963, 1968, 1969; Abel & Eberly,1999)		
Marginal productivity of capital (Hartman, 1972; Abel, 1983; Caballero, 1991; Abel & Eberly,1999; Saltari & Ticchi, 2005)		
Level of uncertainty-output prices (Hartman, 1972)		
Level of uncertainty-wages (Hartman, 1972)		
Irreversibility or reversibility of Investment (Hartman, 1972; Bernanke, 1980; Abel, 1983; Pindyck, 1982, 1988; Abel & Eberly,1999; Perotti & Kulatilika, 1999)		
Optimum timing (Bernanke, 1980; Pindyck, 1982, 1988; Dixit & Pindyck,1994; Perotti & Kulatilika, 1999)		
Returns to scale (Abel, 1983; Caballero, 1991; Nakamura, 2002)		
Hangover effect (Abel & Eberly,1999)		
Risk attitude (Nakamura, 1999; Saltari & Ticchi, 2005)		

Strategic impulses-firm level (Perotti & Kulatilika, 1999)		
Long-term vs. short term uncertainty (Bar-Ilan & Strange, 1999)		
High vs. low uncertainty (Abel & Eberly, 1999)		
Lump-sum vs. incremental (Bar-Ilan & Strange, 1999)		
Life time of capital (Nakamura, 2002)		
Factor substitutability (Jorgenson, 1963, 1968, 1969; Leahy & Whited, 1996; Abel & Eberly,1999)		
Firm size (Ghosal & Loungani,2000)		
Positive vs. negative shocks (Bo & Lensin, 2005)		

1.2. Capital Investment in Empirical Studies

Following the economic crash of 1987, economists began to question whether capital markets provided the best estimate for the long term fundamental and market value of economic entities. The number of studies that pointed at the poorly informed traders, bounded rationality related poor decision and bubbles started to increase besides those attempting those to test the theory by empirical country specific studies regarding the determinants of capital investment behavior. These studies mainly focus on the relationship between uncertainty, cash flow profiles, leverage level, ease of access to external capital, corporate taxes, cost of capital, the predictive value of stock price and capital investment.

Fazzari et al (1988) analyzed US manufacturing firms to understand the relationship between the ease of access to capital markets and their response to the changes in cost of capital and tax-based incentives within the frame of a Q theory of investment. They contrasted the capital investment behavior of fast growing firms using up their internal finances with that of mature firms that paid dividends. It was concluded that as firms had more difficult access to external funds, the capital investment became more sensitive to internal financial sources, which meant that the positive relationship between investment and cash flow got stronger.

Barro (1990) analyzed US and Canadian firms to test the impact of real stock prices on capital investment. Contrary to the empirical view mostly stemming from the studies of von Furstenberg (1977), Clark (1979) and Summers (1981) that Q type variables as a measure of market value of capital had little power to predict capital investment, he found evidence to support that there was a significantly positive relationship between real stock markets prices and aggregate investment particularly for long time series. The real stock prices still held its explanatory value when a cash flow variable like after-tax corporate profits was added. Similar results were obtained for the Canadian firms, however with less explanatory power.

Hoshi et al. (1990) examined Japanese firms to investigate evidence to show that incentive and information issues in the capital markets influenced corporate investment. They worked on two sets of firms; the first group with close ties to Japanese banks therefore had no difficulties to accede to liquidity and the second group that did not have bank affiliations and to which access to liquidity was more difficult. For bank affiliated firms with easy access to capital markets liquidity had no impact on capital investments and the main determinant was Tobin's Q, whereas for the latter liquidity was very important and Tobin's Q was insignificant. On the other hand, Hoshi et al. (pp. 1-2) also showed that firms with a main bank affiliation had smaller losses significantly in case of financial strain. The main bank helped the firms in times of financial uncertainties but in return for an interest higher than standard time and even sent bank officials to participate in the company management, which was called the "risk-sharing" hypothesis.

Morck et al. (1990) were inspired by a common concern in the economic literature and public policy discussions that stock market was just a sideshow with a deviant behavior to direct investment erratically. Keynes deemed fluctuations in stock markets as mostly irrational and therefore not useful signals for the profitability of investments. Morck et al. empirically evaluated the impact of stock market on capital investment both on firm and aggregate level. They argued that changes in the stock returns had little explanatory power to capital investment behavior by claiming that these changes had little value to corporate managers as new information about their own firms. By including growth in cash flow and sales as variables they reduced the explanatory power of stock returns on investment substantially. Contrary to theory, they showed that the cost of external financing did not influence the relationship between relative stock returns and investment. They also argued that capital markets through stock returns was not a dominant determinant of capital investment behavior and that firm and industry level considerations were more essential for public policy than macro level discussions of business cycles and allocation of aggregate investment over time. They could not find evidence to support the conviction that the stock markets assessed long-term economic expectations, and hence guided long-term investment, was not supported by the data either. High stock prices could signal good times and entice managers to invest at low financing costs to high investment through low financing costs. However such encouragement could be misleading, self-fulfilling or even lead managers astray, resulting in risky or overinvestments. All in all, they qualified the evidence as that the stock market could at times be an imprecise predictor of the future, which should not receive much attention and as it is did not much affect aggregate investment. Capital markets might not be a complete sideshow, but they were not very central to capital investment behavior either.

Blanchard et al. (1990) reviewed the US firms regarding their Q ratios and tried to answer whether corporate managers should follow stock market signals as dictated by stock market prices when they made investment decisions instead of their own assessment of fundamentals such as NPV of expected profits and dividends. They decomposed Tobin’s Q into the product of fundamentals and valuation to analyze the relationship of the two with capital investment. They concluded that fundamentals were strongly, but not overwhelmingly, more influential than stock prices on investment.

Lang et al (1996) showed a negative correlation between level of leverage and future growth potential at the firm level for US companies. This held true for diversified firms at the business segment too. The negative relationship between leverage level and potential growth was valid for firms with low Tobin's Q ratio, but not for firms with high Tobin’s Q or those in high-*Q* industries. They concluded that level of leverage does not decrease the potential to grow for firms with good investment opportunities, but hinders growth potential for firms with insufficient communication with capital and money markets. In a similar vein, Aivizian et al (2005) analyzed the impact of financial leverage on the capital investment behavior of publicly traded Canadian firms. The study elicits a negative relationship between financial leverage and capital investment, which is significantly stronger for firms with weaker growth potential and concludes that leverage has a disciplinary role for firms with weaker growth prospects.

Peeters (2001) studied the Belgian and Spanish firms to understand the impact of uncertainty on capital investment behavior. The capital markets in the two countries were dominated by small and medium sized firms not quoted in the stock exchange. Previous empirical studies had already drawn attention to the significance of financial distress for the two economies (Peeters, 2001: 236). She concluded that uncertainty had non-negligible influence on the capital investment behavior and tended to decrease investment for certain companies. The negative relationship between output price uncertainty and capital investment was compatible with the results by Ghosal and Loungani (1996: 217) for US competitive firms. The relation between output uncertainty and investment seemed strongest for the large and high-leveraged firms in Spain and somewhat weaker for large Belgian firms. However the relationship between sales uncertainty and investment was less clear, which was in contrast to the findings by Guiso and Parigi (1999: 185) which discerned a strong relationship for Italian manufacturing firms.

Chen et al. (2009) studied the determinants of aggregate capital investment for the US firms. They found that a big portion of investment variability came from current cash flow disturbances rather than news about the future due to the fact that cash holdings, net payouts and external financing were not sufficient to break the relationship between earning shocks and capital investment. Since the results evidenced that current earning shocks did not contain any information about the future and that alone was able to predict the capital investment strongly, they concluded that it was difficult to attribute variability in investment to Tobin's Q.

Bloom (2009) analyzed US manufacturing firms to suggest how uncertainty shocks influenced capital investment. He concluded that firms halted investment activity and hiring in the immediate aftermath of uncertainty shocks. However in the medium term, there was a sharp rebound as an overshoot to make up for the previous stopover. Gilchrist et al. (2014) reviewed US firms and argued that variations in idiosyncratic uncertainty influenced capital investment to a great extent and the uncertainty impacts investment through changes in credit spreads, notwithstanding the uncertainty level. They also discerned that fluctuations in volatility influenced aggregate economy via financial frictions as a result of agency issues arising from the asymmetrical information among financial market players. Individual firms adapted a classical wait-and-see approach due to the information asymmetries and irreversibility of capital and this in turn influenced aggregate investment. They concluded that changes in the credits spreads of corporate bonds were an important determinant of capital investment.

Dang (2013) studied capital structures of UK firms to find out why some firms preferred to hold zero leverage in their balance sheets despite the advantages of debt financing. They tried to clarify the issue of whether a firm hold zero debt due to financial constraints or as a strategical decision to dampen underinvestment motivation of high debt and to obtain financial flexibility. The results suggested that holding zero leverage served strategic purposes of firms for more flexibility and to prevent investment distortions.

Arif and Lee (2014), analyzed the United States, Canadian, the United Kingdom, German, French, and Japanese economies to examine the empirical relationship between the level of capital investments and business cycles. The commonly held opinion starting with Tugan-Barranovsky (1894) and Schumpeter (1934) was that aggregate capital investment was a function of the stages of business cycles, according to which during booms when access to capital was easy and growth prospects for the overall economy was high there was a capital overinvestment. On the contrary during busts when there were financial frictions and low growth prospects there was a capital underinvestment. They used a bottom-up approach from firm specific balance sheet data to obtain aggregate capital investment in an attempt to test the aforementioned long held view. Their findings suggested that economic growth and long-term earnings forecasts were too high after overinvestment periods and were too low after underinvestment periods. Previous studies have evidenced that corporate managers contributed to this noise trading by individual misjudgments of fundamentals. Arif and Lee showed that the aggregate overinvestment in the economy resulted from the collection of the individual misjudgments of expected fundamentals. The corporate managers were not individually very irrational however when all individual misjudgments were placed one on the other the resultant effect amounted to a substantial over or under investment similar to the findings of a future study by Hassan and Mertens (2017: 1100-1101). The individual misjudgment of the corporate managers could also be interpreted as being influenced by the attitude of financial market players voting their sentiments by stock prices (Morck et al, 1990: 198-200). All in all, Arif and Lee found evidence in support of business cycle literature and explained the periodicity of over/under investment as biased expectations for fundamentals and concluded that aggregate capital investment is an alternative predictor of overall sentiment in the economy.

Kothari et al. (2017) studied the US firms for empirically testing the theoretical framework of capital investment behavior. They found that capital investment level was significantly and positively related to firm specific profit levels and stock returns but only weakly related to stock volatility, interest rates and default spreads. They were not able to support the hypothesis defined in theoretical models with irreversible investment that capital investment would drop in times of a spike in uncertainty or that capital investment would decrease after a rise in either short or long term interest rates. The results were also contradictory to the empirical studies that suggested a negative relationship between uncertainty and capital investment (Bloom, 2009; Baker et al., 2013; Gilchrist et al., 2013). Interestingly, they attributed the decrease in investment following the 2008 financial crisis to a slump in company profits and thus the cash flow profiles in that period rather than the general uncertainty prevailing in markets.

Hanazaki and Hada (2018) analyzed Japanese manufacturing companies in an attempt to find a broadly defined capital investment function and in particular estimate a plant and equipment investment function. They tested two hypotheses. The first was whether Japanese firms were too safety-oriented regarding capital investment. The second was whether there was a difference between fixed asset investments like plant and equipment versus M&A and R&D investments. They found that the investment function broadly defined, which meant plant and equipment investments together with M&A and R&D, had a generally stronger explanatory power. They concluded that the long-term decrease in plant and equipment investments after the Lehman Brother's bankruptcy triggered crisis was due to the safety orientation of Japanese companies as they shifted investments from plant and equipment to M&A and R&D.

Besides capital investment behavior before and 2 years after Lehman Shock differed from that in the immediate aftermath. The time brackets of analysis were the first period (FY 2002-2007) and the third period (FY 2010-2014) and the second period (FY 2008-2009). The magnitude of coefficients for the rate of capital return as dictated by liquidity and cash flow were far greater in the second period than in the first and the third. Besides in the second period plant and equipment investment, and M&A and R&D investments decreased simultaneously which could be explained by an anxiety factor. This anxiety was due to the uncertainties caused by the economic bubble burst and the associated plunge in cash flow.

Comparing the firms with financial surpluses with those of deficits, they found that the cost of capital and the rate of capital return in firms with deficits were more significant in explaining CIB. These results indicated that firms with financial deficits were willing to make capital investment at relatively higher costs of capital. Besides the estimation results showed that the cash flow coefficients for firms with surpluses are close to those in firms with deficits which can be interpreted as similar evaluation of cash flow factor for both types of companies. As a result firms in financial deficit were inclined to accept investments with similar cash flow profiles even at higher costs of capital. These findings were also in parallel to the prospect theory which called for more generous risk seeking attitude in case further losses were incurred. They concluded in favor of supporting their initial hypotheses. The broadly defined capital investment function performed significantly better from the function estimated by equipment and plant investment. This finding supports the fact that firms have switched from equipment and plant investment to investment more broadly defined with M&A and R&D included, but the long-term investment trend was still not strong. Besides the firms willing to make an investment were heavily influenced by liquidity factors and Tobin's Q, which were also in favor of supporting the hypothesis that Japanese firms were too safety oriented.

There have also been similar efforts to explain the capital investment behavior in developing countries. After the liberalization of financial markets, Athey and Laumas (1994) analyzed Indian firms and asserted that market demand was replaced by internal liquidity in the determination of the level of capital investment. Kumar et al. (2001, 2002) proposed that financial constraints were influential in determining the investment level in Indian firms. In an attempt to analyze whether ex-post liberalization, market demand was still not influential in determining the capital investment level of firms as compared to availability of internal funds, firms' profitability and creditworthiness, Surajit (2008) analyzed the investment-accelerator relationships in the frame of neoclassical theory of Jorgenson. The study argued for a significant support for the investment-accelerator relationship where internal liquidity was relatively more influential than profitability in determining the capital investment level in Indian firms. The firms' creditworthiness to external creditors was also a prominent determinant.

Scandizzo (2005) studied the firms of Arabian League to find a significantly positive relationship between cash flow and investment particularly for innovative firms.

Xu et al (2010) analyzed the Chinese companies to examine the relationship between uncertainty and capital investment and the impact of government intervention on investment and uncertainty nexus. They discerned that there was a negative relationship between firm specific uncertainty and investment only for non-state firms while for the state firms the relationship was positive. The risk seeking attitude among state firms with fewer investment opportunities was stronger. For the firms with financial difficulties the negative relationship between investment and uncertainty disappeared, more strongly for state firms due to risk shifting to the state. They concluded that state interference induces weaker corporate governance and disrupts investment behavior.

Nuguyen and Dong (2013) showed that fixed capital intensity, business risk, leverage, business risk and cash-flow were determinants of capital investment for Vietnamese firms. Cash-flow was the most significant determinant which implied that companies used internal funding foremost besides external funding. However they could not find any support for Tobin's Q impacting the capital investment. On the other hand an intensity in fixed capital and the ease of access to leverage called for more future capital investment. Interestingly, the concentration of ownership and leverage were significantly and negatively correlated. The impact of sales growth on investment was insignificant which implied that it alone did not guarantee a positive cash flow. Business risk and firm size were both found to be significantly and negatively correlated with capital investment level.

Omet et al. (2015) investigated the corporate investment behavior of listed manufacturing companies in Jordan in the period after the establishment of the capital market to find out the main determinants leading to investment. The empirical results discerned that capital investment responded to capital market valuation as reflected in Tobin's Q, whereas the leverage levels of firms did not have a significant impact on the level of corporate investment. As a result they concluded that the sentiment of the capital markets for a specific firm as reflected in the stock evaluation price of the company in Tobin's Q was crucial in its potential to make new capital investment.

Ajide (2017) studied the impact of firm-specific factors and macro institutional measures on corporate investment in Nigeria by analyzing quoted non-financial firms. He argued that the checks and balances for corruption, regulatory quality, and political stability have significant impact on corporate investment decisions. On the other hand firm-specific factors such as cash flow, cost of borrowed funds, and current level of leverage were influential where cash flow was positively and the remaining factors were negatively correlated with capital investment.

Xie et al (2019) examined the five-year plan in China to identify the impact of state ownership on capital investment behavior during uncertainties caused by economic policy changes. They found that under policy uncertainty non-state firms experienced a greater rise in underinvestment and after the resolution of the uncertainty a higher rise in overinvestment. But the rise in overinvestment in state-controlled firms was stronger over the final years of the five-year plan. The discrimination in investment behavior between state and non-state firms were particularly strong for firms in policy-supported industries and politically unconnected ones. They also evidenced that state firms had a stronger increase in sales growth in the aftermath of a five-year plan. They concluded that state firms had an advantage over non-state firms in terms of improved investment behavior during policy changes however state firms due to political priorities might have to get involved in unprofitable projects too.

Danso et al. (2019) studied Indian firms to show how financial leverage impacts capital investment and the interaction of this relationship with information asymmetry and growth. They concluded that there was a significantly negative relationship between financial leverage and capital investment. The relationship was stronger for high information asymmetrical firms. The strength of the negative relationship was stronger for low-growth firms than high growth ones.

The general tendency from the empirical studies point to “Invest more if you have more cash and less debt” regardless of uncertainties which can best be explained by the risk seeking spirit of capitalism. It reminds of an analogy to the red queen hypothesis but in which species have been replaced by firms competing with each other to beat the competition and stay alive. "It takes all the running you can do, to keep in the same place" (Carrol, 1871: 33). Therefore a company as long as the conditions serve never prefers to stay with uninvested cash, but looks for investment alternatives, tries to earn more, and to get a return higher than the riskless money market alternatives and the competitors' returns to be a step ahead of the rivals. It looks as though the firm owners were aware that once they have stumbled and fallen, the flag would be submitted to another player by the red queen.

However, there are also studies that explain the timing of using the cash in hand for investment, called the "financial flexibility" hypothesis which emphasizes that firms hold reserves while at the same time decreasing their leverage as a mechanism to increase investment capacity for possible opportunities. This hypothesis argues that high growth firms due to either information asymmetries or transaction costs will be strategically inclined to hold large cash reserves and low debts to maintain borrowing capacity in anticipation of future investment opportunities. One such research by Arslan-Ayaydin et al. (2012) reviewed East Asian firms during credit crises between 1994 and 2009 and suggested that firms with high financial flexibility had particularly more capacity to seize investment opportunities and these firms outperformed others.

Government intervention in the form of corporate taxes, pricing and allocation of credit such as loans at subsidized interest rates, interest rate ceilings, bail-outs of firms in financial distress and government loan guarantees also has an impact on the corporate investment behavior. Despite liberalization efforts and free capital markets, credit instruments are still used by governments to manage economic, social, and political problems. Dailami and Kim (1991) analyzed the Korean firms to test the hypothesis that the easy access to low cost borrowing supported by governments may not lead to investments in prolific assets but instead to financially speculative ones, the results of which they believed could also guide the policymakers to make better decisions. They found evidence to support their hypothesis that there was a positive relation between level of speculative corporate investment and ease of access to subsidized loans.

As discussed earlier, Atkinson and Stiglitz (1976), in a theoretical approach, argued tentatively that corporate taxes were irrelevant to the capital investment levels, which implied the corporate tax with interest deductibility and appropriate depreciation was, marginally a lump sum tax. Stiglitz simply explained it "if it were profitable to hire a worker or buy a new machine before tax, it would still be profitable to do so after tax." Supporting this claim, capital investment did not improve much after Australia lowered its corporate taxes to 30% after 1987. Before that period with tax rates between 45-49% private sector capital investment was around 20.7% of GDP whereas after the introduction of lower tax rates it amounted to only 22.1% (Schroeder and Chester, 2014, p.183-184).

However there are conflicting findings in the empirical studies too. Federici and Prisi (2015) studied the Italian firms to understand the relationship between capital investment and taxation. In order to avoid aggregation bias and to be able to find out the differences across individual firms, they approached the topic on a micro level. They argued that due to higher taxation, sunk costs could lead to irreversible nature of investments generating a behavioral hysteresis or inertia in a firm's entry and exit behavior even in the case of reduced profits. Regarding the level of leverage, the estimated coefficients were significantly negative for both short and long term debt, but the effect of long term debt was stronger, which indicated that long term debt kept the firms back from exploring new investment alternatives. The negative relationship between leverage and investment was also in congruence with the similar prediction of agency theory. The results strongly asserted that the level of leverage and its maturity had a negative impact on the capital investment level of the firm under different control variables. They also suggested that younger firms are generally less influenced by taxation due to lower profitability. They concluded that the level of taxation negatively influenced the capital investment behavior of Italian firms and that cash flow and the level of leverage played an important role in behavioral shaping.

Azarmi and Schmidt (2016) analyzed the S&P 500 firms to find out the impact of corporate taxes on capital investment and concluded that there was a negative relationship between corporate taxes and capital investment level. Astonishingly they argued that there was also a negative relationship between sales revenue and market value added and corporate investment. They attributed this finding to either agency issues due to turnaround policies indicating that firms at times invest more on advertising and to resume current operations or to management's attempt to take a socialistic stance and safeguard the labor capital.

The classification of empirical studies in three levels such as firm, industry and national is supplied in Table 2. It is noteworthy that the number of studies on a firm level is still higher as compared to industry and national level. Some behavioral phenomena like uncertainty shocks, political stability and collective misjudgments also start to appear.

Table 2 : Determinants of CIB in Empirical Studies, *beyond Theoretical Findings

Firm Level	**Industry Level**	**National Level**
*Dividends (Fazzari et al.,1988)	*New information - industry level (Morck et al.,1990)	*Government incentives (Fazzari et al.,1988; Dailami & Kim, 1991)
*Growth potential (Fazzari et al.,1988; Lang et al.,1996; Aivizian et al., 2005; Danso et al., 2019)	*Debt subsidies (Dailami & Kim, 1991)	Level of taxation (Fazzari et al.,1988; Federici & Prisi, 2015)
Cash reserves/flow (Fazzari et al.,1988; Barro, 1990; Athey & Laumas, 1994; Kumar et al., 2001, 2002; Scandizzo, 2005; Surajit, 2008; Chen et al., 2009; Nuguyen&Dong, 2013; Federici & Prisi, 2015; Kothari et al., 2017; Ajide, 2017; Hanazaki & Hada, 2018)	Tobin's Q - industry level (Lang et al.,1996)	Uncertainty shocks - country level (Bloom, 2009)
*Maturity of company (Fazzari et al.,1988; Federici & Prisi, 2015)	Uncertainty shocks – industry level (Bloom, 2009)	*Collective misjudgments defined as collective irrationality (Arif & Lee, 2014; Hassan & Mertens, 2017)
Tobin's Q - firm level (Fazzari et al.,1988; Barro, 1990; Hoshi et al., 1990; Blanchard et al., 1990; Lang et al.,1996; Omet et al.,2015; Hanazaki & Hada, 2018)	*State vs non-state firms (Xu et al, 2010; Xie et al., 2019)	Interest rates (Kothari et al., 2017)
Ease of access to external funds (Fazzari et al.,1988; Hoshi et al., 1990; Dailami & Kim, 1991; Lang et al.,1996; Kumar et al., 2001, 2002; Nuguyen & Dong, 2013)	*Collective misjudgments defined as collective irrationality (Arif & Lee, 2014; Hassan and Mertens, 2017)	*Political stability (Ajide, 2017)
Cost of capital (Fazzari et al.,1988; Ajide, 2017; Hanazaki & Hada, 2018)	*Government intervention/support/bail-outs (Xie et al., 2019)	Government intervention/support/bail-

		outs (Xie et al., 2019)
*Bank affiliation (Hoshi et al., 1990)		*Government policy changes (Xie et al., 2019)
*New information - firm level (Morck et al.,1990)		
*Market participants' sentiment as reflected in real stock prices (Barro, 1990)		
*Sufficient communication with capital and money markets (Lang et al., 1996)		
Level of diversification (Lang et al.,1996)		
*Level of debt (Lang et al.,1996; Aivizian et al., 2005; Dang, 2013; Nuguyen & Dong, 2013; Federici & Prisi, 2015; Ajide, 2017; Danso et al., 2019)		
Uncertainty – sales (Guiso&Parigi,1999)		
Uncertainty - output price (Peeters, 2001)		
Financial constraints (Kumar et al, 2001, 2002; Xu et al, 2010)		
Innovativeness (Scandizzo, 2005)		
*Creditworthiness to external creditors (Surajit, 2008)		
Profit levels (Surajit, 2008; Federici & Prisi, 2015; Kothari et al., 2017)		
*Earning shocks (Chen et al., 2009)		
*Uncertainty shocks – firm level (Bloom, 2009; Xu et al, 2010; Baker et al., 2013; Gilchrist et al., 2013; Hanazaki & Hada, 2018; Xie et al.,		

2019)		
Number of investment alternatives (Xu et al, 2010)		
*State vs nonstate firms (Xu et al, 2010; Xie et al., 2019)		
*Corporate governance - corruption, regulatory quality (Xu et al, 2010; Ajide, 2017)		
*Financial flexibility (Dang, 2013)		
Firm size (Nuguyen & Dong, 2013)		
*Financial flexibility (Arslan-Ayaydin et al., 2012; Dang, 2013)		
Fixed capital intensity (Nuguyen & Dong, 2013)		
Business risk (Nuguyen & Dong, 2013)		
Idiosyncratic uncertainty (Gilchrist et al., 2014)		
Business cycles as under-over-investment cycles (Arif & Lee, 2014)		
*Asymmetrical information (Gilchrist et al., 2014; Danso et al., 2019)		
*Credit spreads (Gilchrist et al., 2014)		
Irreversibility of capital (Gilchrist et al., 2014; Federici & Prisi, 2015)		
*Sunk cost phenomenon defined as behavioral hysteresis (Federici & Prisi, 2015)		
*Short vs long-term debt (Federici & Prisi, 2015)		
Stock volatility (Kothari et al., 2017)		
Default spreads (Kothari et al., 2017)		

*Safety orientation (Kothari et al., 2017)		
Stock returns (Kothari et al., 2017		
Distinguish F&A from M&A and R&D (Hanazaki & Hada, 2018)		
*Under/over investment (Xie et al., 2019)		

CHAPTER TWO

REVIEW OF CORPORATE INVESTMENT IN BEHAVIORAL PERSPECTIVE

2.1. Basic Assumptions

Overall, international comparisons of capital investment behavior based on this line of empirical analysis are incongruent in practice because they produce dissimilar findings with theory and each other. An important reason for the discrepancy between the theory and empirical research and between empirical studies themselves may stem from the differences in the assumptions between the classical and behavioral economic theory. In contrast to the assumptions of classical theory which assumes the absolute rationality and optimization capability of market participants, utilitarian characteristics and the complete self-control of corporate investors who are free of cognitive/processing errors and biases, it is highly probable that the assumptions of behavioral economics such as a satisficing "normal" man prone to cognitive biases and processing errors, with limited self-control dominate to disrupt the eloquent equations of mainstream economic theory. There are as many variations in CIB as the variety of human related factors. Economic decision making can be interpreted as a social learning process in the moderation of cognitive biases. Thus behavioral economics can be interpreted as encompassing a broad area including psychology, sociology and classical economic theory. It is appropriate at this point to shortly discuss the criticisms of mainstream economics, which in itself will also pinpoint the outline of behavioral economic approach and the main echoles in behavioral economics.

2.2. Behavioral Economics' Criticism against Mainstream and the Echoles in Behavioral Economics

The criticism of mainstream economics goes back to Veblen (1898: 389) where he opposes to the concept of rational man derisively as a "lightning calculator of pleasures and pains, who oscillates like a homogeneous globule of desire of happiness under the impulse of stimuli that shift him about the area, but leave him intact”. Gilad et al (1984: 4-6) points to the fact that mainstream economics has a narrow perspective in the way it handles economic phenomena mostly due to its strict positivism as dictated by diligent methodologies for research and its sole dependence on deduction. Eichner (1983: 508, 517) discerns that mainstream economists should admit that mathematical proofs of a theory can be necessary but not sufficient. Otherwise the results cannot go beyond being mathematically eloquent proofs with no relevance. Hausman (1992: 279-280) criticizes the mainstream for being completely separate from other social sciences and depending merely on mathematical methodology, which he claims to hinder the theoretical progress. Thaler (1996: 227) questions the three keys assumptions of mainstreamers about human nature: rationality, self-interest and self-control. He claims that the mainstream economists are not inclined to test these assumptions. It could be because as of yet it is not possible to incorporate the uncertainty arising from human nature into mathematical models. However when behavioral economists did so, they have realized that “humans are dumber, nicer and weaker than Homo Economicus” (Thaler, 1996: 227). Rabin (2002: 659, 672) states that there is still resistance among mainstream economists to behavioral research, which he finds frustrating and surprising and that mere formal mathematical approach of the mainstream cannot go beyond making simplified and stylized models of economics, which ignores the psychological reality. As it is, the mainstream can go no further than being a sketch of what in reality is happening. The major criticisms about mainstream economics dwell on its absolute positivistic approach, narrowness and unholistic attitude that excludes human related uncertainty.

Tomer (2007: 469-475) classifies behavioral economics under 8 different echoles as the Michigan School, the Carnegie School, Psychological Economics, X-Efficiency Theory, Behavioral Macroeconomics, Evolutionary Theory, Behavioral Finance, and Experimental Economics.

A prominent proponent of incorporating psychology into economics and one of founders of behavioral economics is Katona (1942, 1949a, 1949b, 1951, 1953), with his concentrated early emphasis on the role of psychology in economics and business decisions. He is also the leader of Michigan School in behavioral economics. Katona emphasizes the necessity of empirical observations on behavior rather than theory by using questionnaires and interviews to obtain information about subjective intervening variables (1953: 307-314). This technique allows one to reach deeper knowledge about attitudes, expectations, aspirations and habituations. He supports the use of psychological principles in macroeconomics and proposed implementing measures to gauge consumer expectations which turned out to be the well-known Michigan Consumer Sentiment Index. He, unlike pure theorists, does not assume rational behavior in the beginning but instead attempts to find out conditions where near-rational behavior existed (1951: 16). He is also particular in that he distinguishes between “habitual behavior” influenced by customs, habits, attitudes and “genuine decision making” guided by complete rationality (1953, 309-316), which has opened the venue for new studies.

Simon is the other founding father in behavioral economics, the leading member of the Carnegie School in this field. The concept of bounded rationality, though had been skirted around but not yet named, was coined by Simon (1972) then by March (1978), which will be detailed under bounded rationality. Simon mentioned the limits of human rationality in decisions as early as almost eight decades ago (Simon, 1944: 18-20). Simon is special in that he was the vanguard daring to challenge the basic assumptions of neoclassical economic theory by taking an interdisciplinary stance. He is among the few who first realized the importance of analyzing the architecture of complexity and posited a method to explicate power law distributions by preferential attachment (Mandelbrot, 1959: 90, 97-98).

Building upon mainly the cognitive psychology and behavioral decision research, the psychological economics particularly focuses on systematic differences between the findings of neoclassical economics and empirical psychological findings to end up with a more realistic depiction of economic behavior. Kahneman, Tversky, Rabin, Thaler, Camerer, Fehr, Laibson and Loewenstein are leading members of this echole (Tomer, 2007: 470). They uncover the anomalies of predetermined mainstream economic models and their assumptions to reformulate models that better explain the economic behavior and they empirically test these models (Camerer et al., 2004: 7). They mainly challenge the assumptions of rationality, self-control and self-interest to human decision makers as assumed by mainstream economists. Prospect theory (Kahneman and Tversky, 1979) is the most well-known contribution from this echole, which mainly challenged the economic utility theory, the details of which will be explained under prospect theory.

X-Efficiency Theory develops around the idea that attempts to explain the conceptual background for the limited optimization of firms, which initiates with the article by Leibenstein (1966). It suggests that people thus the firms do not always maximize utility as proposed by the mainstreamers. This inefficiency of inputs to produce the maximum output occurs due to an X factor, which results in a deficiency of both output maximization and cost minimization. The main factors for the X-inefficiencies can be the relaxation of maximization behavior, monopoly power, inertia, state control, the lack of motivation, incomplete contracts, discretion, and agency issues. It challenges mainly the rationality assumption of firm decisions as to whether people do really maximize, however tolerates the self-interest assumption. The leading members of this echole are Leibenstein, Altman, Frantz, Maital, and Tomer (Tomer, 2007: 471).

Behavioral Finance has very close relationships with the concepts of especially psychological economics thus can be interpreted as an applied branch of behavioral economics. Its main issue is to clarify why market players behave contrary to the rational man assumption of the mainstream and make irrational mistakes. These mistakes are assumed to be systematic and to persist for long periods of time (Shleifer, 2000: 2). These deviations from rationality arise from either the psychology of investors as they make their valuations and build their beliefs or how different market players take advantage of such mistakes and market inefficiencies. The leading names of the echole are Thaler, Shiller, Shleifer, and Shefrin (Tomer, 2007: 474). They underscore the problematique of under and over reactivity to information as the possible cause of market trends in general and bubbles and crashes in extreme. The immoderation of the reactivity level can be ascribed to overconfidence, overoptimism, lack of attention, herding and noise trading.

Behavioral Macroeconomics tries to originate a theory from the spiritual grounds of the General Theory of Keynes, but which depends on psychology and sociology, in an attempt to strengthen macroeconomic theory. Akerlof is the leading name in this echole (Tomer, 2007: 472). He identifies the major problems in several markets as the difficulty of discriminating good and bad quality and the quality uncertainty stemming from asymmetric information (Akerlof, 1970). He also draws on other behavioral echoles by emphasizing the near rational decision making of individuals while arguing the efficacy of monetary policies (Akerlof, 2002: 417-418) and by referring to a reference point and loss aversion attitude of workers in wage evaluations (p.420). He argues that the differences between theory and empirical results arise due to the different dimensions of human behavior (p.428).

Evolutionary Economics was initiated by Nelson and Winter (1982) in an attempt to describe economic development inspired by evolution, however has its roots in Veblen (1898) and Schumpeter (1939). They draw on evolutionary ideas of natural selection and the survival of the fittest and concentrate on firms' predictable and regular patterns of behavior. These routines are likened to the genes in biology that form the basis for natural selection. If a firm has better routines, its likelihood of survival increases (Nelson and Winter, 2002: 40). They argue that adaptive efficiency defines economic efficiency. The utility by their definition can be viewed as having arisen from the preferences of the ancestors to survive and may no longer be valid in the current environment. This echole has cooperation with Reinert's *the Other Canon Foundation* (Andersen, 2009), both supporting heterodox economics.

Experimental Economics makes use of laboratory or field experiments in an attempt to collect data to estimate effects size, test economics hypotheses, understand market reactions, and make conclusions about economic behavior. The design of experiments is an important part of this echole. It can be traced back to and experimental study of market behavior by Smith (1962). It can be either field or laboratory experiments that can be carried out on an individual or group basis. Smith (1989: 152) argues that economics is heading towards being a discipline of science with propositions that can be tested by experiments instead of being just theoretical. Smith (2000: 11) also claims that market institutions can be interpreted as "social tools" that guide individuals and ensure more rational attitude. This is interesting in that it brings an explanation to the fact that although individuals are expected to have irrational attitudes the resulting market behavior is more rational in total. Smith is recognized to be the leading name of this echole by and large (Tomer, 2007: 475). Bergstrom (2003: 181) argues that Smith, with his colleagues, has contributed to this field by convincing the economists that economics could be an experimental science.

A detailed and well thought-out comparison of the different groups with the mainstream and among themselves with respect to a set of dimensions as narrowness, rigidity, intolerance, mechanicalness, separateness, and individualism can be found in Tomer (2007). As is clear from the discussion of the differences between behavioral and mainstream economics it is hard if not impossible to determine the dimensions of a phenomenon like capital investment behavior that is heavily influenced by human cognition without taking an interdisciplinary approach and incorporating psychological and sociological factors.

The discrepancies between the theory and empirical studies and also among empirical studies themselves as propounded in the first two sections point to the fact that there may be broader concepts of human behavior shaping the CIB, which could have an essence from human nature and national cultures in general and the personalities of decision makers and organizational cultures in particular influencing the process of economic decision. The behavioral aspect of capital investment in literature can be categorized under three broad captions as the general bias of human mind in the form of bounded rationality and stereotypical attitudes that apply systematically to most of the human decision makers, the discrepancies arising from individual and organizational differences, and national level issues.

2.3. Behavioral Determinants of CIB on an Individual Level

2.3.1. Bounded Rationality, Cognitive Biases and Prospect Theory

The first such broad concept that could explain the corporate investment behavior by the common shortcomings of human nature has been provided by bounded rationality (Simon, 1972). As a continuation of the discussion of the concept of uncertainty as discussed in the theoretical framework of capital investment, the notion of bounded rationality arose from the fact that when individuals were involved in the decision making processes the rationality was limited by cognitive limitations of people, the tractability of decisions involved and the time limitation to make the decision. As a result human decision makers as opposed to fully rational men were inclined to satisfice rather than to optimize.

Simon (1955) challenged the concept of economic man, a man of both almost perfect economic wisdom and rationality, knowing near absolutely about all related issues in his environment and has a very clear mind set, with a stable set of preferences, and able to make precise, rational decisions and to calculate the best option among the alternatives. However this definitely is not the case in decision making when human beings are involved. He suggests that human beings use heuristics to decide rather than to optimize by strict mathematical rules. They follow this approach due to the complexities of the situation, human incapacity to process and calculate the expected utility of each alternative and the psychological burden of other problems still waiting to be handled. He used the term “bumbling kind of rationality” to define this heuristic approach. Later he called this “Bounded Rationality” (Simon, 1972). In 1970s the concepts of bounded rationality were the milestones rising up against those of rational choice theory (Becker, 1976) which attempted to apply the economic man approach to a breadth of human activity. Rationality was bounded because there were limits to human-beings’ thinking capacity, available information, and time. Gigenzer and Goldstein (1996) rested on Simon’s ideas to propose ecological rationality which asserted that the rationality of a decision stemmed from the structures in the environment and people made the most of the available information and their processing capabilities to reach near optimum solutions.

The key concepts of cognitive biases in decision making that line the boundaries of bounded rationality are more commonly studied in individual investment settings. Although it is hard to identify these cognitive biases one to one with more institutionalized corporate investment decisions, their impact on the rationally bounded decisions of corporate owners and managers who are neither immune to cognitive biases as they make capital investment cannot be disregarded. Thus it is worthwhile to discuss the key concepts that address to both corporate and individual investment decisions here in its entirety. Herding due its substantial place and close relation with CIB in literature, will be analyzed in more detail separately after the delineation of prospect theory.

Overconfidence means people overestimate their past, present and future performances or potentials. It is a strong reflection of optimistic bias. Plausible mechanisms of how it influences decisions are through its impact on risk taking attitude and unrealistic optimism. Broihanne et al. (2014) showed that there was a positive relationship between risky and overconfident behavior among finance professionals and overconfidence persisted both in general and financial domains. Kahneman (2011: 248) calls the optimistic bias to be the most substantial of the cognitive biases which leads to an illusion of control (pp. 252, 257) to make people believe that they have control on their actions and lives. Risk taking and overconfidence bias may well have neurological essence the details of which will be discussed under risk handling attitude.

Self-attribution bias is the inclination of a person to attribute positive outcomes to internal and negative outcomes to external factors. If a person has an internal "locus of control" (Rotter, 1954) he is inclined to attribute positive outcomes to internal factors like hard work and persistence that are within his control whereas if he has external locus of control, he attributes to external factors like luck or other subjects out of his control. Internal orientation was argued to induce high achievement orientation (Rotter, 1966). In general, people are inclined to make internal attributions for positive outcomes and external attributions for negative outcomes (Miller and Ross, 1975: 223-224).

Mental accounting (Thaler, 1999) is a bias that happens when a person treats the money he owns in separate categories or mental accounts based on where it comes from and where it goes to, which leads to irrational investment and spending behavior. The concept of fungibility of money highlights this bias. Money fungibility principle calls for treating money the same regardless of its source and intent, which means whether you earned it or were granted without effort and whether you will invest it, spend it from a budget or put in a wealth account should all be treated equally. This principle serves as the solution for hindering mental accounting bias. It is observed that people often break this principle in windfall situations (Thaler, 1999: 197). Mental accounting bias has implications for the owner and manager attitudes for capital investment from an agency perspective.

Confirmation or confirmatory bias arises because people are inclined to search for and process information to confirm what they already believe, which strongly distorts decision making even when it is based on evidence. It can appear under different guises, which induces people to process, favor, recall information and make inferences in a way congruent with their prior personal values and beliefs and satisfies their desire to believe (Nickerson, 1998: 197).

Sunk cost fallacy or bias occurs when people continue to hold the same attitude or behavior merely because of already committed resources like money, effort and time (Arkes and Blumer, 1985). It has strong explanation power in the rationalization of the situation arising from the irreversibility of capital investment.

Narrative bias arises because people have a tendency to find and give meaning to events and to assign patterns to them, which at times can be completely random. They are inclined to build a network of relationships and create their illusions of causalities, probably in an attempt to control the world around them and in turn feel themselves more secure. It results in seeing unrelated events as stories in which there are strong causal relationships among incidents, which in fact is nothing more than attaching a pattern to something that really is not there. The meaningful stories are more preferable to human mind than random events. As for the means of how narrative bias impacts our cognition, Betsch et al. (2015: 241) argues that narrative bias impacts a person while assigning a probability to an event and associating a perceived risk to that event.

Endowment effect means people assign a greater price to the same entity while selling than buying. It is closely related to the mere ownership effect in social psychology, which asserts that people assign a greater value on something they own than the same thing they do not due to the psychological association between the owner and the object. This stems from a cognitive bias to evaluate something more favorably just because one owns it (Beggan, 1992: 229-230). It has strong implications for evaluating the possible differences in corporate investment behaviors of owners and managers from an agency perspective.

Representativeness bias arises when people make wrong inferences about the probability of an outcome due to the similarity of events and objects. In a more theoretical explanation it reflects an inappropriate level of confidence about the resemblance of a sample to the whole population (Lecoutre et al., 1990: 565). It is the result of a heuristic algorithm that runs in the background to make predictions more easily (Lecoutre et al., 1990: 564). Representative heuristics can lead to the insensitivity to prior probabilities of previous outcomes, predictability, sample size, the misinterpretation of chance and regression, and the illusion of validity (Tversky and Kahneman, 1974: 1124-1126).

Anchoring or priming bias arises because people often use a starting reference point as an anchor while making decisions. As a result people are inclined to depend excessively on the very first piece of information they obtain, which causes a prejudice in decision making (Tversky and Kahneman, 1974: 1128). This bias impacts the interpretation of the future information by the anchor assimilating new information towards itself and distorts the decision making process.

Availability bias arises in decision making situations when people evaluate the probability of an event by referring to the easiest cases that readily come to mind (Tversky and Kahneman, 1974: 1127). As a result people give more importance to the things they can easily remember while making decisions although they may not be pertinent to the current case and this leads to systematic errors.

Hindsight bias arises when people, in contrast to reality, overestimate their capacity to have predicted the outcome when in fact it was impossible to have done so under the circumstances of the past, pointing at the reshaping of the memories of the past in a personal perspective within the light of the recently acquired information. It is perfectly described as “I knew-it-all along” bias (Fischhoff and Beyth, 1975: 1; Synodinos, 1986: 107). It is interesting that hindsight bias has been proven to have neuropsychological roots and close relationship with schizophrenia. Schizophrenic individuals have a tendency to hindsight bias as compared to the general population (Woodward et al., 2006: 461). Nevertheless it looks plausible to assume that hindsight bias fosters overconfidence bias.

Home bias is the inclination of people to invest mostly in domestic alternatives instead of foreign ones, disregarding advantages of diversification. In a similar vein people have a tendency to invest in familiar alternatives rather than moving into unchartered ones. This also implies that people prefer to stay in their comfort zones.

Psychologists showed that when humans are subject to an environment of limited knowledge and capacity to process information they are inclined to use satisficing sets of rules to make decisions (Gigerenzer, 1997: 211). This kind of mental shortcuts are called heuristics. Kahneman and Tversky opened up the venue of the study of heuristics in intuitive decision making. They showed that complex problems became easier to process when heuristics were used (Kahneman and Tversky, 1973). Nevertheless they also discerned through experiments that using heuristics induced predictable, systematic and repetitive errors especially in statistical deductions. (Kahneman and Tversky, 1974: 1130-1131). Their research and publications led the way to a vast literature of cognitive biases which can be interpreted as systematic judgmental errors of humans. Some of those fallacies and biases that systematically distort human judgment will be covered shortly.

Kahneman and Tversky (1979) proposed a critique of expected utility theory proposed by Bernoulli (1738) then developed by Neumann and Morgenstern (1944), which behavioral economists assume as a better representation of investment decision making. With respect to expected utility theory expected utility is calculated by using the same general formula used to calculate expected value. Instead of multiplying probabilities with monetary amounts, the probabilities are multiplied by expected utility values. However expected utility theory falls short of defining an initial reference point, which is framing, and capturing the asymmetricality of utility function for gains and losses. Rabin and Thaler (2001: 221-224) criticize what expected utility theory implies by stating that it is unlikely that individuals who are not risk averse for small gambles as a result of decreasing marginal utility would show extreme risk aversion under larger stakes. A solution to this issue defined by Rabin and Thaler is suggested by extended prospect theory in which outcomes are evaluated in relation to the status quo, which is a reference point, instead of evaluating merely the final outcome.

The prospect theory (Kahneman and Tversky, 1979) mainly proposes two themes as the perception of the alternatives (framing) and the evaluation of gains and losses (weighting). The term "decision frame" is a term referred to the decision-maker’s perception of incidences, results, and probabilities related to a particular alternative. So the framing is two-fold. The first part is how the problem is formulated and the second part is what the habits, norms and individual characteristics of a decision maker are.

Prospect theory asserts that preferences among risky alternatives manifest different outcomes not consistent with utility theory and that individual choices will rely on how one frames the problem. If the problem is framed to make the outcome appear as a gain, then this will tempt the decision maker to be more risk averse. If the problem is framed to make the outcome appear as a loss, then the decision maker will tend to be more risk seeking. Placing more weight on outcomes that are certain as compared to outcomes that are only probable is called the certainty effect. It can alternatively be described as changing the probability by a constant percentage is more influential if the outcome were initially certain than were it to be only probable. This indicates that people prefer not to move away from the status quo, which is the reference point. People are more risk seeking when losses are considered however they are more risk averse when gains are incurred. This is called the reflection effect, where people tend to avoid risks under the gain domain, and to seek risks under the loss domain which means minimum risk aversion is expected under the loss domain, which results in the S shaped utility function (Tversky and Kahneman, 1979). S shaped utility function also explains the loss aversion principle pointing to people's inclination to prefer avoiding losses to obtaining equivalent gains, because losses have more emotional impact than equal levels of gains. Nonetheless, people are inclined to discard similarities shared by all alternatives under consideration, which is called isolation effect. It leads to different preferences when the same choice is presented with similar items. This concept is related to the framing effect discussed above.

By summarizing the findings of his own and his research colleagues’ work Kahneman (2011) devised a two-system model of human cognition, called System 1 and System 2. An almost identical model with the same title was already proposed by Stanovich and West (2000: 658:660). System 1 is mostly unconscious and automatic decisions that does not necessitate much case specific information processing and depends on heuristics. On the other hand, System 2 is a controlled process which combines the processes of analytical thinking like gathering information, analyzing them, formulating hypotheses, testing them, developing solutions and evaluation. Since System 1 is intuitive and instinctive it tries to jump to quick solutions through associations by making use of unconscious mind. System 2, acting on the conscious level, puts brakes on System 1 and tries to make slow but analytical conclusions (Kahneman, 2011: 16-105). System 1 funnels complex problems to System 2, however it may not be always possible for System 1 to correctly decide which cases are to be funneled. The difference between System 1 and System 2 can be likened to understanding the difference between correlation and causality.

The last but not the least is the nudge theory, drawing on all previously detailed biases, demonstrates that when people are left with limited information and capacity to process it, indirect feedbacks in the form of subtle guidance lead to desired behavior. Nudge theory aims to improve the understandability and management of the cognitive biases which lead to mental short cuts called heuristics. Understanding these heuristics is key to changing the behaviors of people because heuristics have substantial influence on behaviors (Thaler and Sunstein, 2008: 23-125). Nudge theory is special in that in contrast to the classical theories of reinforcement, punishment and direct instruction to change behaviors, by total awareness of a fundamental principle of action-reaction in the universe, it calls for indirect encouragement and empowerment. By eliminating the direct action nudge theory also attempts to minimize the possibility of resistance. From this point of view leaders can be interpreted as choice architects.

Opposing to the concept of economic man and advising alternatives to a pure rational stance, in an attempt to conceptualize the theory of choice into a more multifaceted approach and to point to the need of evaluating the economic, social and political dimensions of investment simultaneously, Heap et al (1992) criticize the inflexible and limited conception of rational decision theory. They analyze the successes and failures of the extant orthodox theory and try to lead the followers to alternative theories. They propose a model where the theory of choice starts with a rational agent, advances to interactive-cooperative alternatives and results in a collective decision making with an ambition to establish social justice. The study is non-technical and more of a philosophical work which asserts a solution for the theory of choice based on economical, philosophical and political grounds. It concludes that commonly accepted ideas about social justice are not possible to be achieved with society level values based on individualistic rational choice.

Radner (1996) even goes further to assert that a satisfactory theory of bounded rationality and indeterminacy are essential for reformulating the theory of the firm, in which he defines bounded rationality in terms of costly rationality such as the costs of communication, observation, and tedious calculation and “truly bounded rationality as not knowing the implications of everything for certain”, and the indeterminacy as a non-cooperative equilibrium with incomplete information in dynamic games.

2.3.2. Herding and Corporate Investment Behavior

Herding bias is special for the purposes of this study in that it is one of the most studied topics in CIB. It arises when people follow the crowds and rationalize their actions because everybody else is doing it, without considering their own judgment or logic, and emphasizes the duals roles of emotion and logic. Concepts like speculative attacks, economic bubbles and crashes which can be interpreted as overreactions have been explained by this phenomenon. In these instances herding bias seems to have a compounding effect on a moderate reaction.

Farrell and Saloner (1985) develops a model in which they argue that firms follow each other in technological investments in a bandwagon fashion as long as there is not an excess inertia which arises due to limited information. They call for better communication within business networks to overcome this inertia.

Herding bias influences investment decisions not only in extreme cases as in bubbles and crashes but also in routine corporate activities like capital investment. Bikhchandani et al. (1992) found that corporate managers had a tendency to follow financial experts in investment behavior rather than relying on their own expertise. It is plausible to assume that this would induce a compounding herding behavior on the overall market participants too.

Bikhchandani and Sharma (2000) review the theoretical and empirical researches in attempt to find out the existence of herding in different markets. They conclude that most empirical studies have been conducted in developed countries and the evidence shows that the herding behavior among managers is not prevalent in these countries. Regarding the limited number of studies in developing countries, the herding behavior seems more likely. The authors attribute the finding to the nontransparency of the business environment with poor accounting and reporting standards and the costly acquisition of information. They also argue that reputational herding might be another reason (p. 307).

Devenow and Welch (1996) discerned that career reputation concerns were the main point of motivation for corporate managers as they mimicked investment behavior of their peers. They point out that the current challenge of the literature is the lack of empirical studies. They criticize that the scarce existing literature heavily depends on price or investment patterns due to easier access to data. They recommend that methods to measure the traffic in communication channels must be devised and the relation as to who follows who must be discovered (p. 612). In a similar vein, Garber (2000) implied that the most common bias of corporate managers is their tendency to follow peers in other companies.

Hanazaki and Takeuchi (2001) analyzed the corporate investment behavior of manufacturing firms in major developed economies of Japan, France and US to obtain the distinguishing characteristics of Japanese investment behavior with a clear focus on the corporate governance structures of Japanese firms, and the unique “main bank” system. Besides it attempts to clarify the impact of the unique Japanese employment system on capital accumulation from an internationally comparative perspective. They focus mainly on two aspects: First, to answer whether some unique features of Japanese firms such as yokonarabi (herding) and long term perspectives of corporate managers having lower turnover as compared to counterparts have an impact on corporate investment behavior and second, by fitting an investment function to each country, to find differences in estimated variables between countries to be able to decide about the specific corporate investment behaviors. The findings of the study failed to show any clear support for the positive impact of above mentioned Japanese features culture on corporate investment behavior and the main determinant of the corporate investment behavior of Japanese firms was cash flow. Besides Japanese firms were more sensitive to macroeconomic factors of profitability than to firm-specific profitability. Regarding the overall trends in all three countries return-on-assets, cash flow and capital stock level had a positive explanatory power to predict new capital investment whereas debt-equity ratio and interest rate were trivial. Herding behavior was strongest among largest firms probably in an attempt to keep their current market shares, and the herding behavior of the Japanese firms have decreased over time and became comparable to French and US firms in recent years. However the study failed to support the general conviction of long term orientation of Japanese managers.

Bo et al. (2013) examined the board of directors of Chinese firms regarding board age, gender diversity, board independence, CEO duality and board size to explain the herding behavior. They found that companies with boards of younger, more female, more independent members, and a CEO who is not the chair were more inclined to make similar levels of capital investment as their peers in the same industry. Besides the herding behavior was in favor of the shareholders' interests in that it increased the firm performance.

Scharfstein and Stein (2013) build a theoretical model and make some inferences about the reasons of herding behavior in corporate investment. They claim that corporate managers follow other managers' investment decisions by the fear of ruining their reputations in the labor market by diverging from the multitudes or to gain reputation in the labor market by making the same decision with the winners. They call this the "sharing-the-blame" effect (p. 466). A study by Morck et al. (1989: 842) supports the rationality of herding behavior observed among corporate managers. The findings show that top managers are dismissed mainly due to low performance compared to industry but not due to industry-wide failures, which leads the managers to herding behavior. Whether company owners herd among themselves too or how they influence each other in capital investment decisions is worthwhile to investigate. Scharfstein and Stein (2013: 476) also mentions an interesting finding that the banks follow each other in lending to the less developed and developing countries in a herding bias. So it looks plausible to assume that the electronic money created and canalized to specific economies by banks in a herding fashion is in turn canalized to investment by companies in a similar fashion. The analysis of this herding behavior as to what or who guides it at bank and company level can give valuable insights. Besides it was not possible to encounter a study in literature that investigated the type of industry by countries to which the banks favored to direct the loans either. The analysis and stratification of countries vs. the type of industry the loans are directed to can help us "follow the money" and might give valuable insights.

Alabass (2019) investigated the herding bias of Pakistani managers in capital investment decisions and the impact of this tendency on corporate performance. He concluded that herding behavior in capital investment decisions significantly increased the corporate performance and argued that it mitigated the agency problems.

Although it is the subject that has been studied most extensively in terms of cognitive biases and CIB, the number of studies that investigate the relation between herding and corporate investment is few, and further research is needed to elucidate the relationship in different markets and under various scenarios.

2.3.3. Risk Attitudes and CIB on an Individual Level

Risk attitude is modelled as a mediatory variable between the cultural dimension of individualism and CIB as will be discussed under national culture (Shao et al., 2013). In a similar vein it is plausible to assume that it also mediates the relationship between individuals' characteristics like gender, age, personality and CIB. Thus the relationship of risk attitude with the premediatory variable as individual characteristics and dependent variable as CIB will be detailed in this section.

Subsequent to the prospect theory, individual variations like age and gender and their influences on risk attitudes have been studied in detail. Hartog, et al. (2002) investigate the relationship between individual characteristics and risk attitudes in Netherlands. They argue that risk aversion is higher for females, civil servants, and is lower for the self-employed, the less affluent, and the less educated (p. 23).

Sasaki and Kanachi (2005) study the impact of individual characteristics and trial repetition on how people make decisions under uncertainty in Japan. They show that when people take on a repetitive decision task involving multiple steps the certainty effect disappears and males have higher tendency to choose uncertain gains to certain ones (p. 244). Besides impulsivity predicted tendency to uncertain gains. The finding that impulsivity is associated with risk taking necessitates further interpretation as it shows that it has some neuropsychological implications, which will be discussed further in this section.

However when Johnson and Gleason (2009) study the behaviors of US males and females in a contest to analyze their risk attitudes, in contrast to intuition and other studies males are found to be more cautious than females. They attribute the result to the self-selection bias of female contestants and differing goals between sexes. They conclude that females as they opt for the contest can be more motivated by the experience itself than the money to be won (p. 243). It looks plausible to assume that the risk attitudes of males and females can be context and perception driven and may not be as simple to be determined by gender.

In yet another fruitful study Meimer-Pesti and Penz (2008) distinguishes between gender and sex of their influence on risk attitudes. While gender simply represents being a male or female, they propose to differentiate individuals with respect to their male and female sex role stereotypes. They point to the fact that in many gender vise studies females have been found to be more risk averse than males and risk taking has been interpreted as a masculine attribute. They challenge this finding and hypothesize that the financial risk taking increases as an individual from either gender identifies himself with masculine characteristics. The findings support their hypothesis. They conclude that masculinity score being constant, the difference between risk attitudes of individuals from either gender decreases and the masculinity score is significantly associated with higher financial risk taking while femininity score is not correlated with risk taking (pp. 191-193). It simply means that masculine attributes support financial risk taking however feminine attributes do not mean either risk aversion or risk taking. The study also asserts that gender priming on femininity and masculinity influences only the males in the direction of risk taking. It is apparent that something much deeper than gender lies beneath the risk attitudes of individuals.

There are also studies that focus on the relationship between age and risk attitude. Erb et al. (1997) examines the relationship between country demographics and the risk measures of countries. They conclude that there is a significant negative relationship between average age and the country risk measures, which implies that countries with higher perceived risk are younger (p. 27). The finding is in line with the results of Bakshi and Chen (1994) supporting a positive relationship between aging and risk aversion.

Riley and Chow (1992) studies a random sample of US population to understand the relationship between risk aversion and demographic and socio-economic variables. They find that there is a negative relationship between age and risk aversion especially after the age of 65 (p. 32). They also conclude that risk aversion decreases as one goes above the level of poverty and decreases significantly with increasing wealth. This is in contrast to the finding by Hartog, et al. (2002: 23)

Reyna and Farley (2006) take a life cycle approach and examine risk attitudes and decision making among adolescents in US. They conclude that adolescents make risky decisions although they are aware that those decisions can lead to undesirable consequences and that risk appetite decreases with age. The most interesting finding is that analytical reasoning in decision making is stronger among children than adolescents (p. 36). In yet another study in US, Rivers et al (2008: 131-137) show the substantial influence of emotions on shaping adolescent's risk attitude. It can be hypothesized that excessive risk appetite in post adolescence and seniority may be related to a psychological trapping in adolescence or excessive emotionality.

There are also a group of studies that attempt to associate some individual characteristics and personality to risk attitude. Falk and Matulich (1976) investigate the relationship between a set of individual characteristics and risk attitude in US. They conclude that the only variable showing a significant relationship with risk attitude is concern for others. They assert that there is a significantly positive relationship between concern for others and risk aversion (p.215).

Campbell et al. (2004) investigate the relationship between narcissism, over confidence and risk attitude in US. They show that there is a positive relationship between narcissism and overconfidence and that narcissists have higher risk appetites. They also conclude that narcissists place more emphasis on their expectations of future performance rather than how they have actually performed as they make financial decisions.

Kerr et al. (2019) examines the results of a multinational/multicompany survey to distinguish the characteristics of entrepreneurs, nonfounder CEOs/leaders and inventor employees. They find that entrepreneurs have the highest risk tolerance even in the smaller gambles, the strongest self-efficacy, greater need for achievement and more internal locus of control (p. 297). Nonfounder CEOs are between the entrepreneurs and innovative employees. All of the three groups score higher on the innovative characteristics than lay employees.

Nandan and Saurabh (2016) investigate the relationship between personality dimensions and short term investment intentions among the students of Generation Y in India. They find that there is a significantly positive relationship between openness to experience, neuroticism, and extraversion and short term intentions to invest in the mediation of financial risk attitude. Nicholson et al (2005) develop a new scale to measure a total risk propensity resulting from 6 domains as recreation, career, finance, health, safety and social. They conclude that risk attitude is deeply rooted in personality. Risk propensity is significantly and positively correlated with high scores of extraversion and openness to experience and low scores of neuroticism, agreeableness and conscientiousness (pp. 169-171). They also argue for three nonexclusive types of risk takers as stimulation seekers, risk adapters and goal achievers, only the first of which is interpreted as true risk seekers while the other two are only risk bearers.

Financial literacy has also been interpreted as an individual characteristic associated with financial risk taking. Nicolini et al (2017) study individuals from Italy, Spain and Sweden to test how the level of financial literacy impacts financial risk attitude. They find that there is a negative relationship between financial literacy and risk aversion (pp. 317-318). As people know more about the financial markets and instruments they are inclined to get involved in more risky investments. They argue that excessive risk aversion keeps the investors from establishing optimum portfolios and also leads to less efficient financial markets.

There are also some critical studies regarding financial risk taking Shin et al. (2015). Some researchers have treated financial risk taking as an addiction and compared it to a gambling addiction. They compare the financial market gamblers to horse race gamblers in Korea and conclude that the severity of the pathological gambling is similar in both while the financial market gamblers differed socioeconomically, having a better education, full time jobs and living with their spouses (pp.247-248). Jones (2014) prepare an experimental design to test the impact of Dark Triad features (narcissism, Machiavellianism, and psychopathy) of the participants on their financial risk taking regarding both self and other participants' gains through MTurk, a crowdsourcing platform. They find that all three of the features correlate highly with only one round of excessive risk taking however participants with high psychopathy scores continue to take excessive risks (p. 112). These findings are in line with the results of Falk and Matulich (1976), Campbell et al. (2004), Sasaki and Kanachi (2005), and Nandan and Saurabh (2016). On the other hand Arthur et al. (2016) makes a conceptual literature review of the issue in an attempt to distinguish investment, speculation and gambling. They find empirically that the personality, cognitive and motivational attributes of the three groups as investors, gamblers and speculators are similar whereas the correlation is especially significant between gamblers and speculators (pp. 586-587). They argue that the level of gambling activity in populations has a tendency to correlate with speculative financial activity and investors differ from gamblers and speculators, in terms of conceptualized problematic gambling.

Chan (2015) shows how emotions and evolutionary factors influence financial risk taking by an experimental design study in Australia. The findings of the study discern that average heterosexual males take higher financial risks when they are in the same environment with males who are physically more attractive. He attributes this to evolutionary theory such as males' trying to increase their desirability as a mating strategy by accruing money. He also draws attention to the fact that men are bombarded by both attractive opposite sex and same sex figures in advertisements. The findings are in parallel with results of the gender priming effect on males (Meimer-Pesti and Penz, 2008) rather than females. Baker and

Maner (2008) has already shown that males take higher financial risks when they encounter attractive female faces (p. 391).

From what has been reviewed so far it is obvious that the formation of these thoughts and emotions, which in turn will lead to risk attitudes, logically should have some endocrinological and neuropsychological antecedents. For this end, Coates et al. (2010) examines the relationship of endocrine system with financial decision making. They review the literature to find a meaningful relationship and argue that the preliminary findings point to the role of cortisol for risk and testosterone for reward mechanisms. So an imbalance in the favor of cortisol calls for a dominant risk aversion whereas an imbalance in the favor of testosterone calls for reward seeking and risk tolerant behavior. They associate the bubbles and crashes in the markets to the imbalances in steroid hormones (pp. 339-340). Mehta et al. (2015) focus on the relationship of hormones with risk attitudes and conclude that regardless of gender higher basal testosterone predicts risk preference whereas higher basal cortisol predicts risk aversion, pointing to a joint modulation of the two hormones in risk attitude (pp. 96-96). Pfattheicher (2016) attempts to find a relationship between the Dark Triad and endocrinology. He shows that narcissism is significantly positively correlated with basal testosterone and cortisol levels. He associates the high testosterone with the propensity to dominate others and high cortisol with the high vigilance and social esteem sensitivity of the narcissists (pp. 117-118). The results of the study are meaningful and supportive of the role of hormones in financial risk taking and psychological traits especially when evaluated with the results of Campbell et al. (2004) which argue for an increased risk appetite of narcissists.

In a similar vein with the neurobiological influences, Christopoulos et al. (2009) assert that the activity in a specific brain area called right inferior frontal gyrus is correlated with risk aversion. The findings in this study are in parallel to other studies in the field (Knoch et al., 2006; Fecteau et al., 2007), which all argue that neuromodulation of right inferior frontal gyrus changes the risk attitude of participants. Kuhnen & Knutson (2005:763) and Knutson & Bossaerts (2007: 8174) show that right anterior insula is involved in risk attitudes of individuals. Both right inferior frontal gyrus and right anterior insula are implicated in inhibitory control systems consistently in medical studies (Cai et al., 2014: 14652). It can be hypothesized that excessive risk taking be it financial, physical or psychological is associated with the malfunctioning of these inhibitory mechanisms in brain.

As does the literature cited so far reveal the individual decision making under uncertainty as it relates to financial risk attitude towards investments is more of an individualistic, cognitive, emotional, behavioral and neuropsychological phenomenon than a mere rational processing. It can be concluded that something deep in the endocrinological and neuropsychiatric mechanisms run beneath and they manifest themselves in financial risk attitudes. It can even be speculated that adding a new dimension to personality scales as risk attitude can have high explanatory power.

A snapshot of behavioral economic literature on an individual level is given in Table 3 on a timeline basis. The classification has been made with respective to cognitive biases and risk attitudes of individuals. The accumulation of studies regarding risk attitude clearly shows that risk attitude is a valuable determinant in investment decisions.

Table 3 : Behavioral Determinants of CIB on an Individual Level

Cognitive Biases	
Herding	Farrell & Saloner, 1985; Morck et al., 1989; Bikhchandani et al., 1992; Devenow & Welch, 1996; Bikhchandani & Sharma, 2000; Garber, 2000; Hanazaki & Takeuchi, 2001; Bo et al., 2013; Scharfstein & Stein, 2013; Alabass, 2019;
Overconfidence	Campbell et al., 2004
Home bias	D'Souza & Peretiatko, 2005; Anderson et al., 2011;
Risk Attitude (Individual)	
Concern for others	Falk & Matulich, 1976;
Age	Riley & Chow, 1992; Bakshi & Chen, 1994; Erb et al., 1997; Reyna & Farley, 2006; Rivers et al, 2008
Retirement	Riley & Chow, 1992
Affluence/wealth	Riley & Chow, 1992; Hartog, et al., 2002;
Gender	Hartog, et al., 2002; Sasaki & Kanachi, 2005; Johnson & Gleason, 2009;
Level of education	Hartog, et al., 2002;
Self-employment	Hartog, et al., 2002;
Civil service occupation	Hartog, et al., 2002;
Narcissism	Campbell et al., 2004
Emphasis on expectations rather than past performance	Campbell et al., 2004
Openness to experience	Nicholson et al., 2005; Nandan & Saurabh, 2016
Neuroticism	Nicholson et al., 2005; Nandan & Saurabh, 2016
Extraversion	Nicholson et al., 2005; Nandan & Saurabh, 2016
Agreeableness	Nicholson et al., 2005
Conscientiousness	Nicholson et al., 2005
Risk taking vs. risk bearing	Nicholson et al., 2005
Impulsivity	Sasaki & Kanachi, 2005;
Neuropsychological factors	Kuhnen & Knutson, 2005; Knoch et al., 2006; Knutson & Bossaerts, 2007; Fecteau et al., 2007;

	Christopoulos et al., 2009; Cai et al., 2014
Individual's life-cycle stage	Reyna & Farley, 2006;
Evolutionary factors, males (opposite sex and same sex)	Baker & Maner, 2008; Chan, 2015
Sex role stereotypes (masculinity vs femininity)	Meimer-Pesti & Penz, 2008
Gender priming	Meimer-Pesti & Penz, 2008
Emotions	Rivers et al, 2008
Context and perception	Johnson & Gleason, 2009;
Endocrinological factors (testosterone vs. cortisol)	Coates et al., 2010; Mehta et al., 2015
Dark triad (narcissism, Machiavellianism, and psychopathy)	Jones, 2014; Pfattheicher, 2016
Addictive behavior	Shin et al. 2015
Gambling, speculating vs. investing	Arthur et al., 2016
Financial literacy	Nicolini et al. 2017
Self-efficacy	Kerr et al., 2019
Need for achievement	Kerr et al., 2019
Internal locus of control	Kerr et al., 2019

2.4. Behavioral Determinants of CIB on an Organizational Level

Apart from systematic cognitive biases detailed so far that can be generalized for individuals of a population to influence investment decisions and CIB in general, there are also characteristics that apply to specific firms or the owners and managers of firms, which are influential on CIB. These individual characteristics will be discussed separately in the sub-sections of owner-manager related, firm specific, and risk attitude. The risk attitude of organizations, and owners' and managers' as in other sections are discussed separately because it has a substantial influence on investment behavior.

2.4.1. Owner, Manager, and Top Management Team/Board Specific

The number of studies is limited and the extant literature approaches the subject from the perspective of either manager/owner or top management team/board's characteristics.

Malmendier and Tate (2005) investigate the relationship between the overconfidence of US CEOs and corporate investment decisions. They conclude that overconfident CEOs show higher investment-cash flow sensitivity especially when internal financial resources are weak and the overconfidence leads to risky overinvestment. They argue that management incentives further raise the risk appetites of CEOs to make new acquisitions. They assert that a professional boards with high-caliber professionals who would give approval to new investments can counterbalance the overconfidence of CEOs to make more rational investment decisions (p. 655). Nonetheless they also propose a method to measure the overconfidence of CEOs by using CEOs' portrayals in the media.

Lin et al. (2005) investigates firms in Taiwan to understand the relationship between the optimism of management and capital investment decisions. They conclude that optimistic managers in firms with lower ease of access to external funds have higher sensitivity of investment-cash flow, which leads to overinvestment when external funds are obtained (p. 543).

Malmendier et al (2011) study the impact of the characteristics of US managers on financial decisions. They conclude that managers who believe their companies are undervalued also see external financing mainly in the form of equity financing overpriced, which is in support of endowment bias. The study also shows that CEOs who grew in the period of the Great Depression have a negative attitude towards leverage and are inclined to use internal finance. On the other hand CEOs with a military background are inclined more to leverage and they follow more aggressive financial strategies (p. 1687).

Jian and Lee (2011) study the publicly traded US firms to understand the relationship between CEO reputation and capital investments. The findings show that there is a positive relationship between CEO reputation and how financial markets perceive the announcement of corporate capital investments. CEO reputations decrease the negative stock price impact of capital investment announcement of firms with high cash reserves but low growth prospects (p. 945). They also argue that operating performance improves in the post-investment period in firms with more reputable CEOs.

Graham et al. (2013) study US CEOs in terms of their attitudes and psychological traits and compare them with their non-US counterparts, CFOs and lay people. US CEOs are more optimistic and less risk averse compared to both non-US counterparts, CFOs, and lay people regarding the financial policies of company (p. 119). In-group analysis of the CEOs show that those with higher risk tolerance have a tendency for more acquisitions and those with higher optimism have a tendency for more short term leverage.

Koo and Yang (2018) examines Korean firms to see whether investment behaves asymmetrically in response to variations in cash flow in the moderation of managerial overconfidence and self-attribution bias. They show that firms that have easier access to external funds had more downwardly sticky investment cash flow sensitivity, which means that when cash flow decreased the investment decreased to a smaller extent. This sticky behavior is accentuated when the companies have overconfident managers and got even stronger when overconfidence is coupled with self-attribution bias, which causes higher than rational investment levels (p. 144).

Sharma and Tarp (2018) investigate the Vietnamese owners and managers to clarify the relationship between managerial characteristics and corporate decisions and contribute to the growing literature of managerial capital. They approach the managerial capital from a perspective of risk attitude, innovativeness, and locus of control and show that there is a positive relationship between the internal locus of control, innovativeness and business revenues whereas risk aversion is negatively related to revenue (p. 280). In addition the relationship between the internal locus of control and corporate investment was positive.

The studies encompassing a group of top directors or boards dwell on the characteristics of the boards and top management teams. Usdiken (1992) investigates the changes in the characteristics of top management teams during the transition period when uncertainty is high by studying the banking sector in Turkey from 1975 to 1986. The results show the evolution of top management during transition is not a random process but in line with the requirements of environment. The formal education level of the teams is the variable that shows the first immediate response to increase while average age the second to decrease during the transition period (p. 216). The associated changes in the top management structure are slower in larger banks. It can be hypothesized that the decreasing average age of the top management teams also paves the way for the higher risk appetite of banks and more pro-change attitudes of younger managers during a liberalization type of semi-structured uncertainty. In a similar vein Yamak and Üsdiken (2006) investigate the 71 largest industrial firms in Turkey to understand how the characteristics of top management teams change during the early and late stages of the liberalization period. The study shows that the average age and organizational tenure of management teams are lower in the first phase with increased export orientation while the relationship between age, tenure and export orientation becomes vague in the late phase (p. 189-190).

Lai and Lui (2016) examines the relationship between top management characteristics and capital investment efficiency. They conclude that there is a negative relationship between more reputable board members and investment inefficiencies. They measure the reputation of boards by their tenure of executive experience, higher formal background, multiple company appointments of board members, and board size. They argue that the characteristics of boards determine the capital investment efficiencies of firms, more reputable boards leading to fewer over-or-under-investments (p. 16). They also remark that improved financial reporting standards as dictated by the qualification of boards, which forms a governance and control structure on the investment decisions of the firm, lead to lower distortions in investment behavior.

Shin et al. (2019) study the relationship between female board members and corporate investment efficiency in publicly traded Korean firms. They show that there is a positive relationship between females in boards and capital investment efficiency. They argue that the curbing effect of females on over-investment stems from the female directors' conservatism, risk aversion and prudence. The efficiency influence of female board members is to curb over-investment rather than to decrease under-investment (p. 1).

2.4.2. Firm Specific Characteristics

There are also studies that associate firm characteristics with CIB on a behavioral level. DeCanio (2001) assert that the theory and empirical evidence show firms are not likely to be fully optimized and that there are organizational factors that influence the corporate investment behavior of companies. As a result companies construct their own realities and aim for an equilibrium point of their own rather not a full rational maximization (pp. 507-510).

Kuzmicheva (2014) argues for a combined influence of financial constraints and risk attitudes on capital investment for public firms in developed countries. She shows that when there is demand uncertainty at a specified level of financial constraints, firms with a higher risk appetite are inclined to decrease the level of capital investment less as compared to more risk averse companies (p. 25). She associates the risk attitude of managers with those of their companies and proposes that the attitudes of managers must be evaluated by a combination of qualitative and quantitative approaches to determine the CIB of the firms.

The subject studied in most detail as a firm level characteristic in relation with CIB and growth is corporate governance through the mediation of corporate risk attitude. John et al. (2008) analyzes the relationship between investor protection and risky but value generating investments fostering growth. They find that there is a positive relationship between the quality of investor protection and both the level of corporate investments and growth (pp. 1725-1726). The relationship holds true for both the cross country panel and the US only sample.

Nguyen (2011) investigates the impact of governance policies of Japanese firms on their corporate risk attitudes. They show that family companies and those with higher ownership concentration are inclined to take higher idiosyncratic risks, while bank affiliation or control decreases it. This in turn results in higher investment and growth for family and ownership concentrated companies as compared to bank controlled ones. The study attributes the high performance to the fact that corporate governance structures of the family or owner concentrated firms frame and balance the risky investment decisions and give them a competitive advantage (pp. 294-295).

Selto and Cussatt (2013) investigate the impact of Sarbanese-Oxley corporate governance reforms after the Enron case in US. They find that both the CEOs incentive pays and the association of their pays with stockholders' returns decreased after the enactment of reforms (p. 1341). In the meanwhile risky investments decreased and CEOs investment decisions became less sensitive to the incentives they received after corporate governance was increased.

Ayadi et al. (2014) study the relationship between corporate social responsibility and corporate risk taking and the moderating effect of corporate governance structure on this relationship for US firms. They argue that firms with higher corporate social responsibility have stronger risk appetites. The relationship is stronger in the moderation of improved corporate governance structures (p. 44-46). They conclude that corporate social responsibility activities are not just a waste of corporate resources but on the contrary support risky but value generating corporate investment decisions to increase firm value.

Jiang et al. (2016) investigate the relationship between corporate culture and the sensitivity of investment to cash flow in China. They attempt to distinguish whether a culture of high integrity would help firms weather credit problems. They analyze the firms' cultures from public documents and the statements in firms' corporate culture documents. They find that firms accentuating a focus on high integrity in their corporate cultures are inclined to lower sensitivity to cash reserves for investments because they have easier access to external capital (p. 437).

Tran (2019) studies the relationship between the presence of independent directors and corporate investment efficiency in Vietnamese firms. He concludes that as the ratio of independent directors increases the overinvestment decreases, which implies a higher corporate efficiency especially for firms with financial constraints.

Laksmana and Yang (2015) investigate the relationship between firm/industry competitiveness and CIB in US. They show that when firms operate in more competitive industries they are inclined to take higher risks, making more capital and R&D investments. They conclude that firms operating in competitive markets have a tendency to use resources more efficiently, as the relationship between excess cash reserves and overinvestment is moderated by competition working as a governance mechanism (pp. 21-22). The relationship between herding and CIB has already been discussed in their relation to overinvestment under herding bias. The relationship between competition and herding and its relationship with informational asymmetries influencing CIB seems not to have been much touched in literature so far and deserves further investigation.

The preference of a firm about debt versus equity financing also arises as a firm specific characteristic influencing CIB. Since this subject is closely related to the concept of informational asymmetry it will be discussed under the associated section.

2.4.3. Ownership Status Specific

La Porta et al. (1999: 511-512) showed that the type of most common ownership across countries is family companies or controlling stockholder-type of businesses. The concepts of family ownership, ownership concentration & dispersion, and professionalization have been studied in terms of their relationships with CIB. Yıldırım-Öktem and Üsdiken (2009) investigate the evolution of board professionalization in Turkish family companies, which are the representatives of late-industrialization. The measures of board professionalism are assumed to be the size, the proportion of paid members, and the presence of outsiders in the board. They use power, contingency, and institutional perspectives to estimate board structure. They conclude that power and institutional perspectives are more influential in shaping the professionalization of boards rather than contingency issues of external and internal complexities (pp. 126-128) and family firms in a joint venture are inclined to have more professional boards. However the study does not relate the ownership structure or board professionalism with CIB while it pinpoints that FDI may not always mean more board professionalism in the Turkish context.

An important implication for the CIB of companies is the attitude of the decision makers whether they are the owners or the non-owners. In a study by Canton et al (2002) in the Netherlands, the attitude of non-owners versus the company owners towards technological capital investment is evaluated to conclude that that non-owners might show resistance to new investments since profits from the change would accrue to the owners, whereas the non-owners bear the brunt of extra work such as working longer hours, learning about the new operation and the maintenance of new system.

Caprio et al. (2011) study the large companies in Continental Europe to understand how the family control and ownership structure influenced M&A decisions both on the acquiring and the to-be-acquired side of the deal. They find that there is a negative relationship between likelihood of placing an acquisition bid and concentrated ownership structure as family companies. The relationship is stronger when the family expects to lose controlling share as a result of the acquisition. On the other side of the deal as being taken over by another company, if the major shareholder would lose the majority of voting rights then the company is not likely to accept being acquired by an unrelated party. The same tendency applies to family firms (pp. 1655-1656). However when family firms acquire new firms there is no evidence that supports a deterioration of firm value.

Nguyen (2011) investigates the family companies in Japan regarding their corporate governance structures and risk attitudes. They show that family companies and those with higher ownership concentration are inclined to take higher idiosyncratic risks, while bank affiliation or control decreases it. This in turn results in higher investment and growth for family and ownership concentrated companies as compared to bank controlled ones. The study attributes the high performance to the fact that corporate governance structures of the family or owner concentrated firms frame and balance the risky investment decisions and give them a competitive advantage (pp. 294-295).

Croci et al (2011) makes a comprehensive analysis of European firms to understand the role of family control over financial decisions. They show that there is a positive relationship between family control and propensity to debt financing rather than equity-based fund raising. Meanwhile the credit markets are more willing to supply long term leverage to family firms which is an indication that they see lower risk in family businesses. On the other hand, family firms invested less in higher risk R&D but not so in low risk fixed assets as compared to non-family firms. They conclude that the interests of family firms about external financing issues are in higher disagreement with the interests of minority shareholders, whereas the interests of family firms about investment decisions are in lower disagreement with the interests of bondholders (pp. 893-894) and attribute these findings to the fear of loss of control in family firms.

Ku and Hung (2012) investigate the relationship between family control and sensitivity of investment to cash flow in an attempt to understand the agency issues arising from excess cash reserves and asymmetrical information in the moderation of excessive control rights and the independence of board members by changing agency costs in Taiwanese firms. The findings show that by decreasing the impact of asymmetrical information, family control decreases the sensitivity of investment to cash flow, which means family firms have a tendency to obtain external funds for new investments in absence of cash reserves. However if the family has excessive control rights then the sensitivity of investment to cash flow increases due to the conflict of interests between the minority shareholders and the family. The presence of an independent board mitigates the impact of this excessive control as does another block holder of investors by increasing corporate governance (pp. 263-264).

Jiang et al. (2020) studies the relationship between board chairs for family members in family firms and R&D investments in China. They find that when families have more members in the board they are inclined to make higher R&D

investments. They attribute this finding to the fact that family members in the boards increase the sentiment of direct controlling of family over investment decisions and decreases the family's risk aversion against a possible "socioemotional" loss (pp. 116-117). They pinpoint two boundary conditions moderating the relationship between the impact of family chairs and the level of R&D investments, the first is the public visibility of family owners and the second is the sales growth of firm relative to the social aspiration level of family.

There are also studies that examine the CIB of firms with respect to their private or public orientation, as a representation of ownership structure. Short term orientation of public firms was a major concern for the researchers. In the early studies by Narayanan (1985: 1482-83) and Stein (2001, 2003), the findings stress that there is a tendency among public managers to make short term investment decisions and to forsake the long-term interests of shareholders. Asker et al. (2014) argue that agency costs give rise to short-term submission among U.S. public firms, which in return induce them to invest less and have lower sensitivity to investment possibilities.

Hjelmeland and Moldvaer (2015) study the impact of short term orientation on the investment behavior of Norwegian public firms. They identify private and public firms of similar dimensions to investigate their investment behavior. They discern that public firms have a tendency to invest less than their private counterparts and that they are less responsive to alterations in investment possibilities. They conclude the short term orientation influenced the corporate investment behavior of Norwegian public firms, and make them more reluctant to invest. The results are in congruence with Asker et al. (2014) who argue for a similar tendency of reluctance for US public firms.

2.4.4. Informational Asymmetries and CIB

Informational asymmetry can be between owner vs. manager, company vs. external fund raisers, company vs. company, managers vs. employees, company vs. governments, and company vs. population from a stakeholder perspective. The Sarbanes-Oxley laws were enacted in an attempt to decrease the vulnerability of external fund raisers and public by increasing transparency and decreasing the informational asymmetries and agency costs in publicly traded firms in US after the Enron scandal. New rules in International Accounting Standards were also introduced to increase the transparency of firms and to decrease the informational asymmetries that arise between the company and external fund raisers be it institutional or individual. One of the first studies that emphasizes the impact of informational asymmetries in behavioral economics is by Akerlof (1970). The informational asymmetricity between owners vs. managers, company vs. company, and company vs. external fund raisers have been the issue of CIB in literature so far, the issue of leverage, its disciplinary role and over/under-investment, management entrenchment and empire building, corporate governance, being the most studied concepts.

Starting from the late studies of mainstream economics, the level and duration term of leverage have attracted attention as a source of informational asymmetries influencing CIB. The details as interpreted in the mainstream economics have already been discussed in previous chapters. For firms with low growth potentials, leverage can be used as a governance tool for increased discipline to deter managers from taking high risks and overinvestment but instead induce them to make more moderate-risk investments (Jensen, 1986; Stulz, 1990). In this end, it decreases potential agency costs. Also Dang (2011: 250-251) shows for UK firms that there is a negative relationship between leverage and capital investment for firms with low growth potentials and argues for the disciplinary role of leverage, in parallel to the overinvestment hypothesis. This hypothesis assumes a conflict between shareholders and managers in that managers can make use of informational asymmetries and induce overinvestment in an attempt to increase the firm's scale to the disadvantage of shareholders. According to this theory since managers are obliged to pay interest on leverage it deters them from making risky investments. This issue is related to both the informational asymmetries between shareholders and managers and the empire building whims of managers and it will be discussed under empire building separately. On the other hand underinvestment arises when firms with high growth prospects make lower than optimum levels of capital investment, which might result from agency conflicts between managers and shareholders due to informational asymmetries, where managers turn down rationally risky positive NPV investments, to the disadvantage of shareholders, for their own safety. It can also be hypothesized that the informational asymmetries between companies also lead to under-and-over investments due to the lack of information about the level of capital investment competitive firms undertake.

Myers and Majluf (1984: 219-220) shows that firms should prefer internal cash flow to debt financing and debt financing to equity financing by a mathematical model. It can be argued that there is sensitive information for firms, which they do not want to share with the market. Since raising equity means sharing ownership with a third party and thus publicizing more information due to the obligations of standardized public reporting, it can be hypothesized that firms prefer internal cash flow to debt and debt to equity in an attempt to keep this sensitive information to themselves as much as possible. Empirical studies testing this argument and the mathematical findings of Myers and Majluf (1984) would contribute to literature. The informational asymmetry between external fund raisers and companies emerge as another factor influencing CIB.

Griffith (2001) study the UK firms to examine the relationship between productivity and product market competition. He shows that there is a positive relationship between competition and efficiency in firms where ownership and control are saliently separated but not in those where they are closely related. He argues that competition decreases agency costs and contributes to the better performance of UK firms as compared to their European counterparts (p.25). Competition in terms of managerial incentives arises as another determinant influencing CIB. It can be hypothesized that it has an impact on CIB, directly decreasing the informational asymmetry between shareholders and managers, by motivating the managers to share more information with the shareholders and influence the efficiency of CIB. On the other hand it can also encourage the managers to behave like a shareholder in their risk attitudes, which will be discussed separately under the next section.

Entrenchment and empire building are other results of information asymmetries between shareholders and managers, which have an impact on CIB. Management entrenchment can be defined as the top managers'' attempts to increase their power bases to the disadvantage of shareholders, so as to make themselves indispensable. It generally occurs when shareholder structure is too dispersed to take action to prevent this idiosyncratic behavior which does not create value. Empire building in a similar vein, is an attempt to increase both the scale and scope of a top manager's circle of influence to the disadvantage of shareholders. It may arise from the top managers' whims to dominate more or making their seats steadier and long lasting.

Ji et al. (2019) investigate the relationship between management entrenchment and capital structure for US firms. They show that there is a positive relationship between leverage and management entrenchment in more diversified firms whereas the relationship is negative in more focused firms. Since there is a negative relationship between management entrenchment and corporate governance this implies that increased corporate governance increases/ decreases leverage depending on whether the firm is focused/diversified. As a result they conclude that entrenched managers are inclined to more debt financing in diversified firms since they have more creditor-aligned interests while entrenched managers in focused firms are inclined to undertake lower debt so that they would not run the performance pressure of meeting the debt obligation and ensure that they would not lose control as a result of bankruptcy (pp.32-33). They argue that making this classification of focused vs diversified firms also clarifies the conflicting results in literature regarding the relationship between corporate governance and capital structure.

In an attempt to ensure corporate control, the theory assumes corporate governance tools, mainly the board of directors and a high caliber reporting system as vital mechanisms to monitor the operations and decrease information asymmetries between shareholders, managers and external fund raisers. The relationship between corporate governance, board of directors and CIB has already been detailed in previous sections. It seems plausible to assume that it works as a mechanism to mitigate informational asymmetries and influence CIB.

2.4.5. Risk Attitudes and CIB

Having implications on the ownership perspective, a similar argument holds for individual behavioral differences and attitudes such as risk-aversion of the corporate investment maker. Evidently, if the risk-aversion of an investor is higher, he will be less willing to invest in uncertain circumstances. Since risk-aversion is a highly personality-oriented, behavioral, and individual phenomenon, it is another important element of uncertainty that must be incorporated into investment decision making. As can be seen apart from economic variables of uncertainty, human element itself can be another important source of uncertainty.

Batteux et al. (2019) investigate whether there is a change in an individual's risk preferences as he decides on behalf of others. They attempt to make a meaningful contribution to literature by making a meta analysis and reach a conclusion about a phenomenon about which studies have produced conflicting findings. They conclude that there is no self vs. others difference as people make decisions for others in the financial domain however when in a loss frame they are more risk-taking for self as compared to others (p. 1). The differential analysis of the impact of risk taking attitude on CIB between owners and managers in the light of endowment bias can contribute to literature.

However when Schmielewski and Wein (2013: 13) study the German banks to understand the risk attitudes of agents and principals, they find that when banks have a dispersed shareholder structure they encounter higher agency costs due to the insufficiently monitored bank managers, which they attribute to the managers' freedom to take risky decisions. They conclude that bank ownership structure has a significant influence on the risk attitudes of banks and private banks are more risk averse. In a similar vein, Fayed and Ezzat (2017: 20-21) show empirically for conventional and Islamic banks across 8 Arab countries that there is a significant inverse relationship between shareholder rights and risk taking behavior, which means that when shareholder structure is concentrated with accumulated voting rights the propensity of banks to take risks decreases. No studies regarding the risk attitudes of owners versus managers in corporations other than banks have been encountered in literature.

As for the differences between risk attitudes, short term orientation of public firms has been of concern for the researchers. Narayanan (1985: 1482-83), Stein (2001, 2003), Asker et al. (2014), Hjelmeland and Moldvaer (2015) show that there is a tendency among public managers to make short term investment decisions and to forsake the long-term interests of shareholders and argue that agency costs give rise to short-term submission.

Loughran and Ritter (1997: 1823) show that US firms demonstrate extraordinarily better performance one year prior to an initial public offering as compared to the five years post IPO, which evidences the short termism of public companies in general and that this little game of hiding or sparing information runs not only within the company but also between the company and external fund raisers, depending on the position and interests of associated parties.

Dill et al. (2014) investigate the foreign versus domestic-owned companies in Germany. They show that firms with foreign owners were inclined to short-termism. This relationship is even stronger when managers of the German subsidiary are not assigned by the foreign parent firm. Besides when the physical distance between the German subsidiary and foreign parent increases so does the short-termism. They attribute this to the fact that since there is information asymmetry between parent firm and subsidiary, the parent firm is inclined to favor short-termism (pp.20-22).

Liljeblom and Vaihekoski (2008) study the biggest 500 Finnish firms to understand whether short term pressure imposed on firms pushes them to take actions that are not favorable in the long run. They distinguish the firms in terms of their owners' short versus long term orientations. There is a tendency in general for firms to feel short term pressure imposed on them. The felt pressure is related to the short vs long-term orientation of owners, the pressure being higher with short-term oriented owners. CIB is also related with the term orientation of owners. When owners are short-term oriented the firms are more reluctant to make long-term investments (p.437).

Narayanan (1985) study the assumptional concern that US managers are inclined to take short term actions to favor self-returns to the disadvantage of shareholders and tries to distinguish the possible incentives to do so. He concludes that the short-termism of managers stem from urges to build reputation as early as possible and increase compensations and the short term orientation is inversely related to his duration of contract, experience and the risk of company (pp. 1482-1483). Hirshleifer (1993) comments on the relationship between management reputation and CIB and concludes that reputational concerns have a positive impact on alleviating the underinvestment bias in R&D. He emphasizes that there are very few empirical studies in this venue although reputational concerns are very influential in the formation of risk attitudes, nonconformity and overinvestment (p. 157-159).

The best examples that reflect short termism attitude of managers regarding CIB are found in studies that examine the CEO incentive plans. Kang et al. (2006: 1144), Ahmed and Ndayisaba (2016: 324-327), and Ladika and Sutner (2018: 30-31) investigate the relationship between CEOs' incentive plans and CIB and conclude that CEOs' risk seeking decreases as incentive plans become more long term, long term investment increases as incentive plans include more long term items in the form of firm equities, CEO compensation package is shaped by the strength of corporate governance mechanisms in the firm, and short term incentive plans decreases the tendency of managers to make long term investments.

Croci and Petmezas (2015) investigate the relationship between the compensation contracts of CEOs and their inclinations to acquisitions. The study shows that when CEOs are stimulated by compensation packages they are more inclined to make acquisitions which is an indication of higher risk taking (p. 1).

A snapshot of behavioral economic literature on an organizational level is given in Table 4 on a timeline basis. The classification has been made with respective to owner/manager/board, firm specific, ownership status, informational asymmetries and risk attitudes specific. The accumulation of studies regarding risk attitude again clearly shows that risk attitude is a valuable determinant in investment decisions on an organizational level too.

Table 4 : Behavioral Determinants of CIB on an Organizational Level

Owner, Manager, Board Characteristics	
Overconfidence(CEO)	Malmendier & Tate, 2005; Koo & Yang, 2018
Optimism(CEO)	Lin et al., 2005; Graham et al., 2013
High caliberness (boards)	Malmendier & Tate, 2005
Long-term vs. short-term orientation (owners)	Liljeblom & Vaihekoski, 2008
Period of early life (CEO)	Malmendier et al., 2011
Military experience (CEO)	Malmendier et al., 2011
Reputation (CEO)	Jian & Lee, 2011; Scharfstein & Stein, 2013
Independence (boards)	Ku & Hung, 2012
Is CEO and the chair same person? (board and CEO)	Bo et al., 2013
Professionalism (boards)	Lai & Lui, 2016
Reputation (boards)	Lai & Lui, 2016
Self-attribution bias (CEO)	Koo & Yang, 2018
Internal locus of control (CEO, owners)	Sharma & Tarp, 2018
Innovativeness (CEO)	Sharma & Tarp, 2018
Gender (board)	Shin et al., 2019
Family members in board (board)	Jiang et al., 2020
Firm Specific	
Growth potential	Jensen, 1986; Stulz, 1990; Dang, 2011
Not full optimization (satisfication)	DeCanio, 2001

Investor protection	John et al., 2008
Short-term pressure on the firm	Liljeblom & Vaihekoski, 2008
Family company, high ownership concentration	Nguyen, 2011
Bank affiliation	Nguyen, 2011
Idiosyncratic risks	Nguyen, 2011; Caprio et al., 2011
Corporate governance and control	Nguyen, 2011; Selto & Cussatt, 2013; Ayadi et al., 2014; Lai & Lui, 2016
Being cash poor, financially constrained	Kuzmicheva, 2014
Demand uncertainty	Kuzmicheva, 2014
Manager-to-firm risk attitude transmission	Kuzmicheva, 2014
Corporate social responsibility	Ayadi et al., 2014
Physical distance from parent company	Dill et al., 2014
Industry competition	Laksmana & Yang, 2015
Corporate culture emphasizing integrity	Jiang et al., 2016
Independent directors	Tran, 2019
Ownership Status	
Private vs. public	Narayanan, 1985; Stein, 2001, 2003; Asker et al., 2014; Hjelmeland & Moldvaer, 2015
Family	Caprio et al., 2011; Croci et al., 2011; Nguyen, 2011; Ku & Hung, 2012
Ownership concentration	Caprio et al., 2011; Nguyen, 2011
A second block holder of investors	Ku & Hung, 2012
Level of control rights	Ku & Hung, 2012
Foreign vs. domestic	Dill et al., 2014
Informational Asymmetries	
Shareholders vs. bondholders	Myers,1977

Company vs. external fund raisers, concept of sensitive information, debt financing vs. equity financing	Myers & Majluf, 1984; Loughran & Ritter, 1997
Leverage as a disciplinary tool	Jensen, 1986; Stulz, 1990; Dang, 2011
Over-investment	Jensen, 1986; Stulz, 1990; Hirshleifer, 1993; Dang, 2011; Shin et al., 2019
Under-investment	Hirshleifer, 1993; Shin et al., 2019
Competition	Griffith, 2001
Company vs. company	Griffith, 2001
Owner vs. manager	Canton et al., 2002
Family vs. minority shareholders	Ku & Hung, 2012
Empire building and managerial entrenchment	Ji et al., 2019
Corporate governance	Ku & Hung, 2012; Ji et al., 2019
Diversified vs. focused firms	Ji et al., 2019
Risk Attitude	
Duration of contract (agent)	Narayanan, 1985
Level of experience (agent)	Narayanan, 1985
Risk of company (agent)	Narayanan, 1985
Incentive plans: its relation with risk appetite and short term vs. long term contracts (agent)	Narayanan, 1985; Kang et al., 2006; Selto & Cussatt, 2013; Croci & Petmezas, 2015; Ahmed & Ndayisaba, 2016; Ladika & Sutner, 2018
Reputation (agents and principals)	Narayanan, 1985; Hirshleifer, 1993; Jiang et al., 2020
Short termism (agents and principals, public managers)	Narayanan, 1985; Loughran & Ritter, 1997, Stein, 2001, 2003; Asker et al., 2014; Dill et al., 2014; Hjelmeland & Moldvaer, 2015
Idiosyncratic risk (principal)	Caprio et al., 2011
Fear of loss of control	Caprio et al., 2011; Croci et al., 2011

(principal)	
Debt financing vs. equity financing (principal)	Croci et al., 2011
Being a family company (principal)	Caprio et al., 2011; Croci et al., 2011; Nguyen, 2011
Risk appetite (agents vs. principal)	Schmielewski & Wein, 2013; Fayed & Ezzat, 2017
Being a CEO (agent)	Graham et al., 2013
Being from U.S.(agent)	Graham et al., 2013
Business revenues (agent and principal)	Sharma & Tarp, 2018
Socioemotional loss (principals)	Jiang et al., 2020
Social aspiration level (principals)	Jiang et al., 2020
Public visibility of family members (principal)	Jiang et al., 2020

2.5. Behavioral Determinants of CIB on a National Level

2.5.1. National Culture & CIB

Culture is defined as a set of shared and generation-to-generation transferred assumptions among the members of a group, which have been attained through learning while solving problems with its environment and within the group itself (Schein, 2004: 17) whereas Hofstede (2010: 6) defines it as “the collective programming of the mind” distinguishing the group from others. Since cultures impact how people think and behave it is plausible to assume that they also influence business conducts by shaping the organizations’ cultures and the individuals within. In a similar vein Erkmen (2010: 23-30) discusses the relationship between national culture, organizational culture and environment. He discusses that organizations are influenced by the national cultures and the characteristics of their employees. However organizations also develop particular cultures of their own that can survive successfully but still are different from the host country cultures.

Since decisions about capital investments are very if not the most vital part of business conduct, the importance of understanding the relationship between these two prominent concepts looks apparent. However when economics literature is reviewed the scarcity of studies investigating the relationship between national culture and CIB attracts notice.

Only a few studies have been encountered in literature that investigate the relationship between national culture and CIB. Shao et al. (2013) investigate the relationship of individualism with types and horizons of capital investment to find that there was a tendency to invest in more long term or risky projects among firms of more individualistic cultures, which constituted mostly R&D projects but not physical assets. They argue that individualism is the driving force behind risk taking and it influences investment in the mediation of risk taking. Individualistic firms use their excess cash reserves to make R&D investments instead of paying dividends.

In another study, Zhang et al (2015) investigate the relationship between national culture and corporate investment efficiency of firms from 18 different countries. They find that there is a positive relationship between individualism and corporate investment whereas the relationship is negative for uncertainty avoidance and masculinity (p. 19). Interestingly, the relationships get stronger during periods of crisis, which points to the impact of national culture on firms' investment decisions getting more significant under uncertainty. It can be hypothesized that the organizations revert and stick more strongly to in-built national cultural dimensions when faced with uncertainty.

To elucidate the impact of individualism on the decisions of corporate finance Chui et al. (2002) study firms from 22 countries to conclude that the nationality of the company predicts the level of debt and as firms depend more on conservatism and mastery which is a more collectivistic leaning, they tend to have lower levels of debt (p. 99).

There are also some studies that investigate the relationship between national culture, host culture and home bias. It is worth discussing them here due to its close relation with the diversification and the M&A policies of firms which can be interpreted as a corporate investment strategy.

D'Souza and Peretiatko (2005) investigate the reason why US multinational companies prefer to make foreign direct investment in Australia as compared to Asian countries. The study emphasizes the similarities of the cultures of Australia and US as compared to Asian countries (p. 19) and concludes that the compatibility of national cultures is an important factor for the US firms' preference for Australia in FDI (p. 25).

Bhardwaj et al. (2007) studies 43 countries to investigate the relationship between host country culture and FDI. They show that countries that score lower on uncertainty avoidance attract more FDI. They also argue for an interaction effect of uncertainty avoidance and trust on FDI. They concluded that uncertainty avoidance acts as a moderator on the positive link between the level of trust in the country and the FDI attracted to the country after controlling for institutional, regulatory, human capital and economic factors (p. 44).

Anderson et al. (2011) studies the portfolios from over 60 countries, which were managed institutionally to find that portfolios from countries that score high on uncertainty avoidance had a tendency towards higher home risk and less diversified in foreign assets. However portfolios from countries that scored high on long term orientation and masculinity were inclined less to home bias whereas those that scored high on masculinity were inclined to hold more diversified foreign assets (p.931). They conclude that portfolios from culturally different countries have lower preference to invest in one another, which was comparable to the intimidating impact of geographical distance. This can be interpreted as a cognitive distance stemming from different values as dictated by different cultures.

Palamida et al. (2017) investigate the investment intentions of young individuals in relation to their human, social and financial capitals in Greece versus England. For the Greek sample they show that there is an indirect positive relationship between human capital and investment intention mediated by firstly subjective norms and secondly perceived behavioral control and personal attitudes, whereas the relationship between social capital and investment intentions is directly and indirectly related in the mediation of perceived behavioral control. However in the more individualistic English sample the relationship between human capital and investment intentions is directly positive and there is only an indirect relationship between social capital and investment intentions mediated by perceived behavioral control. Interestingly there is a negative relationship between financial capital and investment intentions in the total sample, whereas the relationship was ambiguous for the English and negative for the Greek sample (p. 403).

Most studies trying to investigate the impact of culture on corporate decision making focus on the relationship of culture with risk taking attitude. Risk attitudes on a national level have important implications for CIB too, so it will be discussed in the following section.

2.5.2. Risk Attitudes & CIB on a National Level

Individual characteristics have close relationship with financial and personal risk attitudes and in turn risk attitudes have close relationship with investment attitudes, the details of which have been discussed on a micro level under individualistic risk attitudes from an endocrinological, neuropsychological and behavioral perspective. However studies that link national culture on a macro level with CIB are scarce. The only study that relates macro cultural factor of individualism to CIB argues for the mediatory effect of risk taking (Shao et al., 2013). It is reasonable to assume that the inclination to risk taking stems from individualism and to discuss the relationship of this mediating variable of risk taking with cultural variables on a macro level here.

Li et al. (2013) study firms from 35 countries to investigate the influence of national culture on risk attitudes. They identify three cultural dimensions from two common scales to be influential on risk taking as harmony, uncertainty avoidance and individualism. The results call for a positive relationship between individualism and risk appetite whereas the relationship is negative for harmony and uncertainty avoidance. The relationship between corporate risk attitude and culture gets stronger with excess cash and weaker with firm size.

Gaganis et al. (2019) study insurance firms across 42 countries to find a relationship between culture and risk attitudes. They find evidence for the fact that national culture influenced the risk attitudes of insurance companies. In specific, they assert that there is a positive relationship between individualism and risk appetite whereas risk appetite decreases with increasing uncertainty avoidance and power distance. However Pan (2003) and Aggarwal et al. (2012) point to a positive impact of power distance on FDI. The authoritative inclination seems to be awkward and may act differently in emerging economies.

There is only one study that aims directly to clarify the relationship between a systematical factor applying to a population, the host culture, in the mediation of corporate risk taking and CIB. It investigates the relationship among risk appetite, creative culture in the firm’s territory, and corporate financial decisions for US firms (Ucar, 2017). The findings assert that creative cultures through the mediation of risk attitudes influences CIB. Firms established and operating in creative cultures have higher risk appetites, higher investment levels, and growth.

The behavioral determinants of corporate investment on a national level are summed up with respect to national culture and risk attitude in Table 5. However the number of studies is still no more than a few. It is interesting to note that studies trying to link national culture with investment behavior are more than studies that directly attempt to link risk attitudes of cultures with corporate investment. It is assumed that national culture is used as a vehicle to understand the relationship of risk attitudes of cultures with corporate investment. Since risk attitude arises as a very important determinant in investment decisions it might be worthwhile to incorporate a brand new variable that measures risk attitude as a personality trait and a dimension of national culture not only in the field of finance but also in other social disciplines.

Table 5 : Behavioral Determinants of CIB on a National Level

National Culture	
Collectivistic leaning-conservatism and mastery	Chui et al., 2002
Cultural compatibility	D'Souza & Peretiatko, 2005; Anderson et al., 2011
Trust	Bhardwaj et al., 2007
Uncertainty avoidance	Bhardwaj et al., 2007; Zhang et al., 2015
Cultural distance compared to geographical distance	Anderson et al., 2011
Individualism	Shao et al., 2013; Zhang et al., 2015; Palamida et al., 2017
Masculinity	Zhang et al., 2015
Uncertainty/crisis increasing the impact of culture	Zhang et al., 2015
Creative culture	Ucar, 2017
Human capital vs. social capital vs. financial capital	Palamida et al., 2017
Subjective norms	Palamida et al., 2017
Perceived behavioral control	Palamida et al., 2017
Risk Attitude (National Level)	
Individualism	Li et al., 2013; Gaganis et al., 2019
Uncertainty avoidance	Li et al., 2013; Gaganis et al., 2019
Harmony	Li et al., 2013
Creative culture	Ucar, 2017
Power distance	Gaganis et al., 2019

2.6. A Short Perspective of Management Theories and Behavioral Economics

Starting from the Industrial Revolution back in mainly 19th century there arose the need for a systematic approach to management to instill a smooth flow of business activity. Bureaucratic Model (Weber, 1905), Scientific Management Approach (Taylor, 1911), Administrative Process Theory (Fayol, 1917), focused on the mechanical side of management in the classical era.

However by the neoclassical era in 1930s, with the introduction of results of “Hawthorne Studies” the importance of human element was started to be reckoned with and be incorporated into the practice of management, which was followed by Maturity Theory (Argyris, 1957), Theory X and Theory Y (Mcgregor & Cutcher-Gershenfeld, 1960: 166-171), and System 4 Model (Likert, 1981).

Management Science Approach found grounds in the aftermath of the Great Depression and the approaching world war, which proposed the use of quantitative techniques to aid decision making. The approach gained impetus in World War II when interdisciplinary teams of scientists named operations researchers came together to find solutions to the multiplex issues of war by constructing mathematical simulation models of actual war related problems.

In the aftermath of war, having essence from application of General System Theory (Bertalanfy, 1967) to psychology, organizations were started to be modelled in a more holistic approach as entities that are intertwined with the external players and their organic relationships were interpreted in a system’s and a subsystem’s perspective. Different from the closed systems as defined in the classical and neoclassical eras, organizations were defined as open systems in a contingency perspective in close interaction with technology like in the studies of Thompson and Bates (1957), Woodward (1958), Rice (1963), Perrow (1967), and Hinings et al. (1974) and with environment as in the studies of Thompson and McEwen (1958), Burns and Stalker (1961), Emery and Trist (1965), Lawrence and Lorsch (1967), Lorsch (1970), and Duncan (1972)

In the postmodern era, organizations, as open systems discussed above, were interpreted in the light of their adaptations to the external variables, which gave rise to theories such as Organizational Configuration (Luthans, 1973; Arthur 1994; Delery and Doty, 1996), Resource Dependence Theory Thompson, 1967; Pfeffer and Salancik, 1978), Organizational Strategy Approach (Mintzberg, 1973; Miles and Snow, 1978; Porter, 1996), Information Processing Approach (Simon, 1972; March, 1978), Agency Theory (Berle and Means, 1932; Ruback and Jensen, 1983; Perrow, 1986; Einsenhardt, 1989), Transaction Cost Theory (Williamson, 1981), Institutionalization Theory (Dimaggio and Powell, 1983; Oliver, 1991; Scott and Meyer, 1994), and Population Ecology Approach (Hannan and Freeman, 1977).

And lately the concepts of complexity and chaos have been implemented in the theory of management, having essence from the studies of Holland (1992), Levin, 1998) organizations and social phenomena were interpreted as ever-evolving adaptive living-like organisms called complex adaptive systems in an ever-changing environment (Dooley, 1997; Garcia, 1999; Pascale et al., 1999; Foster, 2000)

As can be seen from the historic timeline there has been an evolution of interpreting the human element from a perspective of a rational economic man in the classical period, to a social man in the neoclassical, and then to a complex man in the modern period. Behavioral economics is one such approach to bring meaningful explanation to the relationship between the complex man and the organization in the modern period.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1. Aim and Objective

To investigate the driving forces for a company to take financial risk and make capital investment was the essence of this study. In order to answer this question, a thorough review of literature has been made encompassing a 150 year period. It was discovered that risk concept was essential in investment decision making and it was decided to create a scale to measure financial risk tolerance on an organizational level from a behavioral perspective. Besides the development of a scale, by investigating literature in detail, it was hoped that some other driving forces might be detected which could be operationalized as variables to explain corporate investment behavior.

3.2. Derivation and List of Hypotheses

This study concentrates mainly on behavioral studies to explain CIB and derive hypotheses from the studies that follow. Shao et al. (2013) model risk attitude as a mediatory variable between the cultural dimension of individualism and CIB. Graham et al. (2013) study US CEOs in terms of their attitudes and psychological traits and show that those with higher risk tolerance have a tendency for more acquisitions. Sharma and Tarp (2018) investigate the Vietnamese owners and managers to clarify the relationship between managerial characteristics and corporate decisions. They show risk aversion is negatively related to revenue. Kuzmicheva (2014) argues for a combined influence of financial constraints and risk attitudes on capital investment for public firms in developed countries. She shows that when there is demand uncertainty at a specified level of financial constraints, firms with a higher risk appetite are inclined to decrease the level of capital investment less as compared to more risk averse companies. She associates the risk attitude of managers with those of their companies and proposes that the attitudes of managers must be evaluated by a combination of qualitative and quantitative approaches to determine the CIB of firms.

Grable (2000) defines financial risk tolerance as the maximum level of uncertainty one can take as s/he makes a financial decision. Cordell (2001) identifies 4 dimensions as risk propensity, risk attitude, risk knowledge, and risk capacity as components of financial risk tolerance. Risk propensity or practice is how one behaves and manages financial risk actually; risk attitude is one’s inclination to take financial risk; risk capacity is one’s potential to bear financial risk; and risk knowledge is one's proficiency in evaluating financial risk. Assessment of risk tolerance is a challenge because it is a psychological trait that cannot be directly observed (Yao and Curl, 2011). Wahl and Kirchler (2020) develops a scale, in line with the dimensions of Cordell's study to measure financial risk tolerance on an individual level.

Consequently, the following research hypothesis is proposed:

H_1 : Corporate financial risk tolerance and personality traits of top management influence corporate investment behavior

Shao et al. (2013) investigate the relationship of individualism with types and horizons of capital investment to find that there is a tendency to invest in more long term or risky projects among firms of more individualistic cultures. They argue that individualism is the driving force behind risk taking and it influences investment in the mediation of risk taking. In another study, Zhang et al. (2016) investigate the relationship between national culture and corporate investment efficiency of firms from 18 different countries. They find that there is a positive relationship between individualism and corporate investment whereas the relationship is negative for uncertainty avoidance and masculinity. Interestingly, the relationships get stronger during periods of crisis, which points to the impact of national culture on firms' investment decisions getting more significant under uncertainty. John et al. (2008) analyzes the relationship between investor protection and risky but value generating investments fostering growth. They find that there is a positive relationship between the quality of investor protection and both the level of corporate investments and growth. The relationship holds true for both the cross country panel and the US only sample. Ayadi et al. (2015) study the relationship between corporate social responsibility and corporate risk taking and the moderating effect of corporate governance structure on this relationship for US firms. They argue that firms with higher corporate social responsibility have stronger risk appetites. The relationship is stronger in the moderation of improved corporate governance structures. Hirshleifer (1993) examines the relationship between management reputation and CIB and concludes that reputational concerns have a positive impact on alleviating the underinvestment bias in R&D. He emphasizes that there are very few empirical studies in this venue although reputational concerns are very influential in the formation of risk attitudes, nonconformity and overinvestment. Bhardwaj et al. (2007) examines 43 countries to investigate the relationship between host country culture and foreign direct investment (FDI). They show that countries that score lower on uncertainty avoidance attract more FDI. They also argue for an interaction effect of uncertainty avoidance and trust on FDI. They assert that uncertainty avoidance acts as a moderator on the positive link between the level of trust in the country and the FDI attracted to the country after controlling for institutional, regulatory, human capital and economic factors. Gaganis et al. (2019) study insurance firms across countries to find a relationship between culture and risk attitudes. They find evidence for the fact that national culture influenced the risk attitudes of insurance companies. In specific, they assert that there is a positive relationship between individualism and risk appetite whereas risk appetite decreases with increasing uncertainty avoidance and power distance. However Pan (2003) and Aggarwal et al. (2012) point to a positive impact of power distance on FDI. On a national level, Jones and Olken (2008) suggest that authoritative inclination of leaders might force economic growth. Authoritative tendencies seem to be equivocal and may act differently in emerging economies. Ghosal and Loungani (2000) conclude that closer relationship of companies with financial institutions improve their access to funds for investment. Hoshi et al. (1990) show that companies having better communication with banks have easier access to liquidity which positively impact their investments.

These studies guide us to identify a moderating variable called internal fit for investment, which consists of 10 company specific items such as competition among company managers, concern for social responsibility, refraining from uncertain situations, adherence to corporate governance, concern for company reputation, conduct of trust, male dominance of board, concern for consistent risk handling behavior, communication capability with financial institutions and authoritative inclination. Male dominance of board and refraining from uncertain situations are proposed to have a negative polarization in IFFI as inferred from citations. This variable defines the suitability of a company's internal environment for investment with respect to company specific items.

Consequently, the following research hypotheses are proposed:

H_2 : Personality traits of top management have influence on corporate investment behavior in the moderation of company's internal fitness for investment

H_3 : Personality traits of top management have influence on corporate investment behavior in the moderation of company's environmental fitness for investment

Farrell and Saloner (1985) develops a model in which they argue that firms follow each other in technological investments in a bandwagon fashion. Scharfstein and Stein (1990) build a theoretical model and make some inferences about the reasons of herding behavior in corporate investment. They claim that corporate managers follow other managers' investment decisions by the fear of ruining their reputations in the labor market by diverging from the multitudes or to gain reputation in the labor market by making the same decision with the winners. They call this the "sharing-the-blame" effect. Scharfstein and Stein also mention an interesting finding that even banks follow each other in lending to the less developed and developing countries in a herding bias. Bikhchandani et al. (1992) find that corporate managers have a tendency to follow financial experts in investment behavior rather than relying on their own expertise. It is plausible to assume that this would induce a compounding herding behavior on the overall market participants too. Devenow and Welch (1996) discern that career reputation concerns are the main point of motivation for corporate managers as they mimic investment behavior of their peers. They point out that the current challenge of the literature is the lack of empirical studies. They criticize that the scarce existing literature heavily depends on price or investment patterns due to easier access to data. They recommend that methods to measure the traffic in communication channels must be devised and the relation as to who follows who must be discovered. In a similar vein, Garber (2001) imply that the most common bias of corporate managers is their tendency to follow peers in other companies. Bikhchandani and Sharma (2000) argue that reputational herding might be another reason. Laksmana and Yang (2015) investigate the relationship between firm/industry competitiveness and CIB in US. They show that when firms operate in more competitive industries they are inclined to take higher risks, making more capital and R&D investments. Xu et al. (2010) analyze the Chinese companies to examine the relationship between uncertainty and capital investment and the impact of government intervention on investment and uncertainty nexus. They conclude that state interference induces weaker corporate governance and disrupts investment behavior. Gilchrist et al. (2014) show that individual firms adapt a classical wait-and-see approach due to the information asymmetries and irreversibility of capital and this in turn influenced aggregate investment during uncertainty. Bernanke (1983) argues that uncertainty delays new investments by increasing the value of waiting which in turn translates into the instability of aggregate investment. An increase in communication among industry players can be assumed to decrease the informational asymmetries and uncertainties. Tosun et al. (2008) find an inverse relationship between political risk and macroeconomic performance in Middle East and North Africa region.

These studies guide us to identify a moderating variable called external fit for investment, which consists of 5 environment specific items such as competition among companies, communication among companies, government intervention, herding behavior and political instability. Government intervention and political instability are proposed to have a negative polarization in EFFI as inferred from citations. This variable defines the suitability of a company's external environment for investment with respect to environment specific items.

Consequently, the following research hypotheses are proposed:

H_4 : Corporate financial risk tolerance influences corporate investment behavior in the moderation of company's internal fitness for investment

H_5 : Corporate financial risk tolerance influences corporate investment behavior in the moderation of company's environmental fitness for investment

H_6 : Corporate financial risk tolerance influences corporate investment behavior in the moderation of both company's environmental and internal fitness for investment

2.3. Research Models

The following models are figurative representations of the hypotheses delineated in the section above. Capital investment which represents the capital investment level of the company as a percentage of total assets is operationalized to represent the corporate investment behavior. The capital investment levels are proportioned to total assets to avoid any bias that could arise due to differences in the size of companies. Capital investment is the dependent variable in all models. CFRT, corporate financial risk tolerance, is a new scale derived in the study to measure financial risk handling attitude of a company. It has 4 factors such as corporate financial risk attitude, corporate financial risk propensity, corporate financial risk knowledge and corporate financial risk capacity. Corporate financial risk attitude has 7 items, corporate financial risk propensity has 3 items, corporate financial risk capacity has 4 items and corporate financial risk attitude has 4 items. Personality traits of top management having the authority to make capital investment decisions alone or with only two signatures (has a direct say on the investment to be made with at least 50% influence) are assessed by Big 5 scale developed by Gencoz & Oncul (2012) in line with Turkish national culture.

Internal fit for investment has 10 company specific dimensions as derived from literature (Table 6). This variable defines the suitability of a company's internal environment for investment with respect to company specific items.

Table 6: Items for Internal Fit for Investment (IFFI)

Competition among company managers
Concern for social responsibility
Refraining from uncertain situations
Adherence to corporate governance
Concern for company reputation
Conduct of trust
Male dominance of board
Concern for consistent risk handling behavior
Communication capability with financial institutions
Authoritative inclination.

External fit for investment has 5 environment specific dimensions as derived from literature. This variable defines the suitability of a company's external environment for investment with respect to environment specific items (Table 7).

Table 7: Items for External Fit for Investment (EFFI)

Competition among companies
Communication among companies
Government intervention
Herding behavior
Political/financial instability.

Personality traits of individuals have been of focus of attention in the literature of finance as it relates to investment decisions. However the number of studies that investigate relationship between the personality traits of top management and their companies' inclinations to make capital investment are few. The relationship between risk attitudes of individuals and their investment decisions have also been investigated. In this model it is proposed that personality traits of top management and corporate financial risk tolerance of a company influence its capital investment behavior.

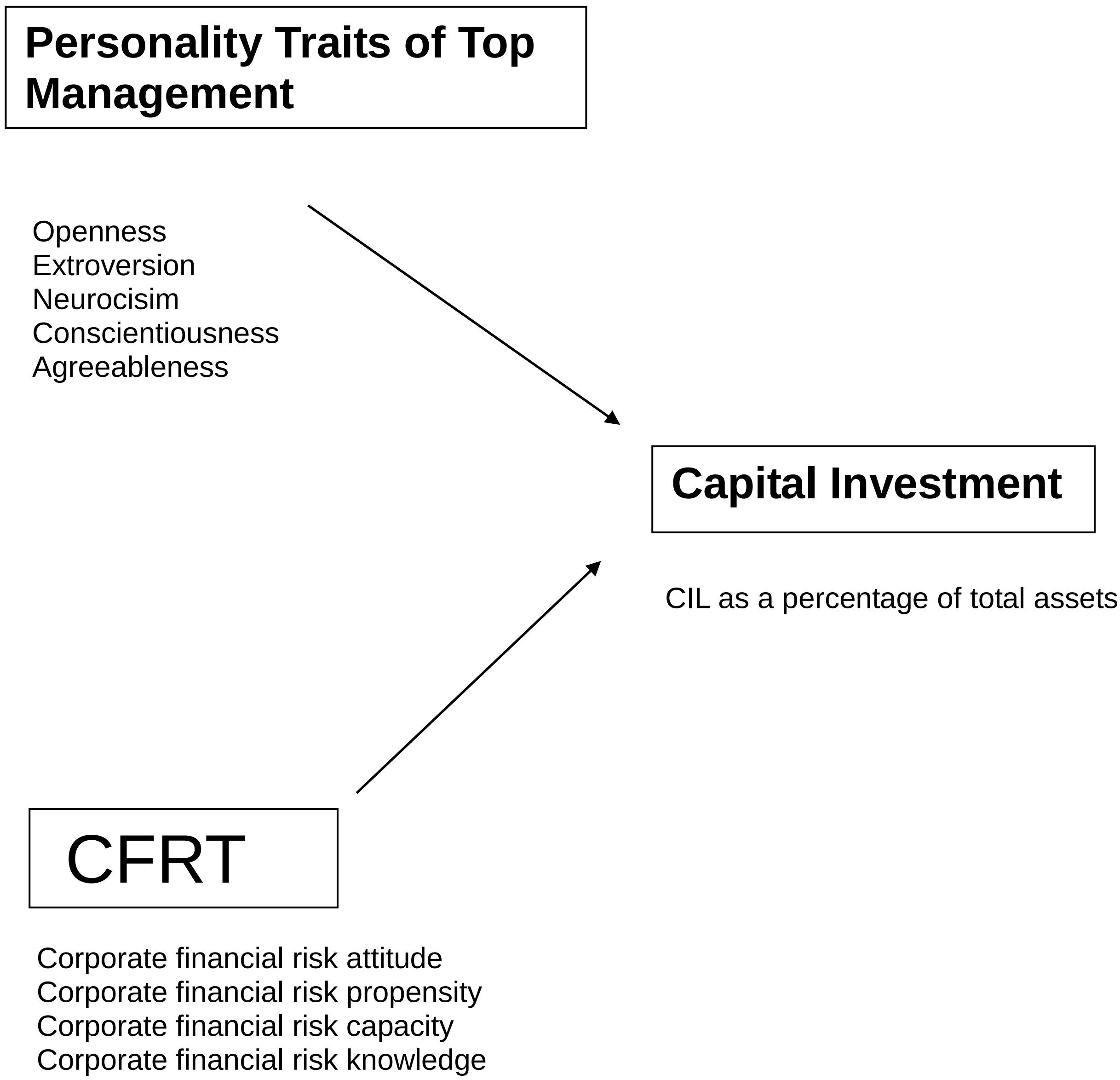


Figure 1 : Research Model 1 (Hypothesis 1)

Personality traits of individuals have been of focus of attention in the literature of finance as it relates to investment decisions. However the number of studies that investigate relationship between the personality traits of top management and their companies' inclinations to make capital investment are few. In this model it is proposed that the personality traits of top management as assessed by Big Five influence capital investment behavior of a company in the moderation of internal fit for investment which comprises 10 sub-items.

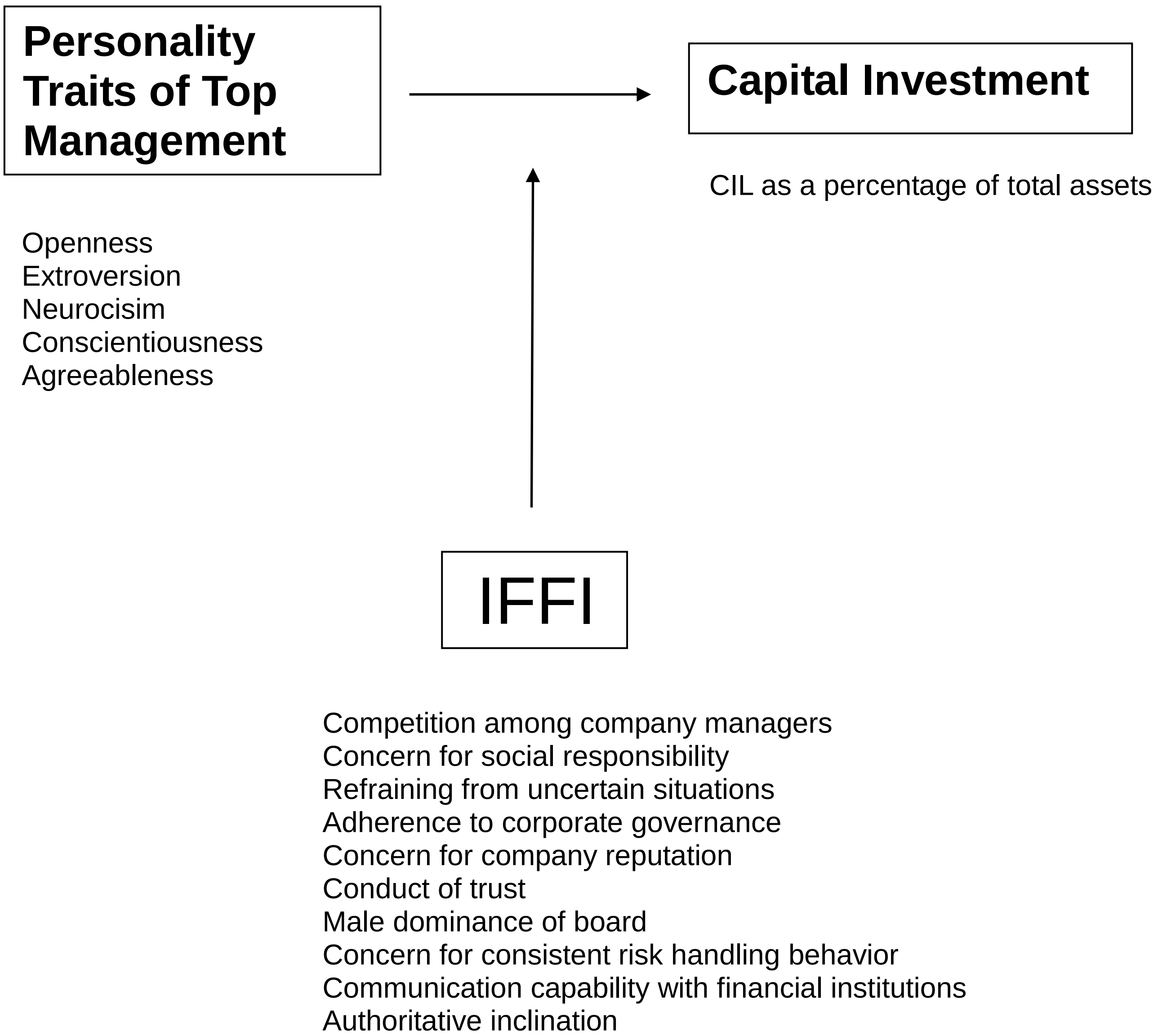


Figure 2 : Research Model 2 (Hypothesis 2)

In this model a relationship is proposed in which personality traits of top management influence the capital investment behavior of a company in the moderation of external fit for environment. External fit for investment is another important variable derived from literature. It consists of 5 sub-items. It shows how suitable the environment is for a company to make investment.

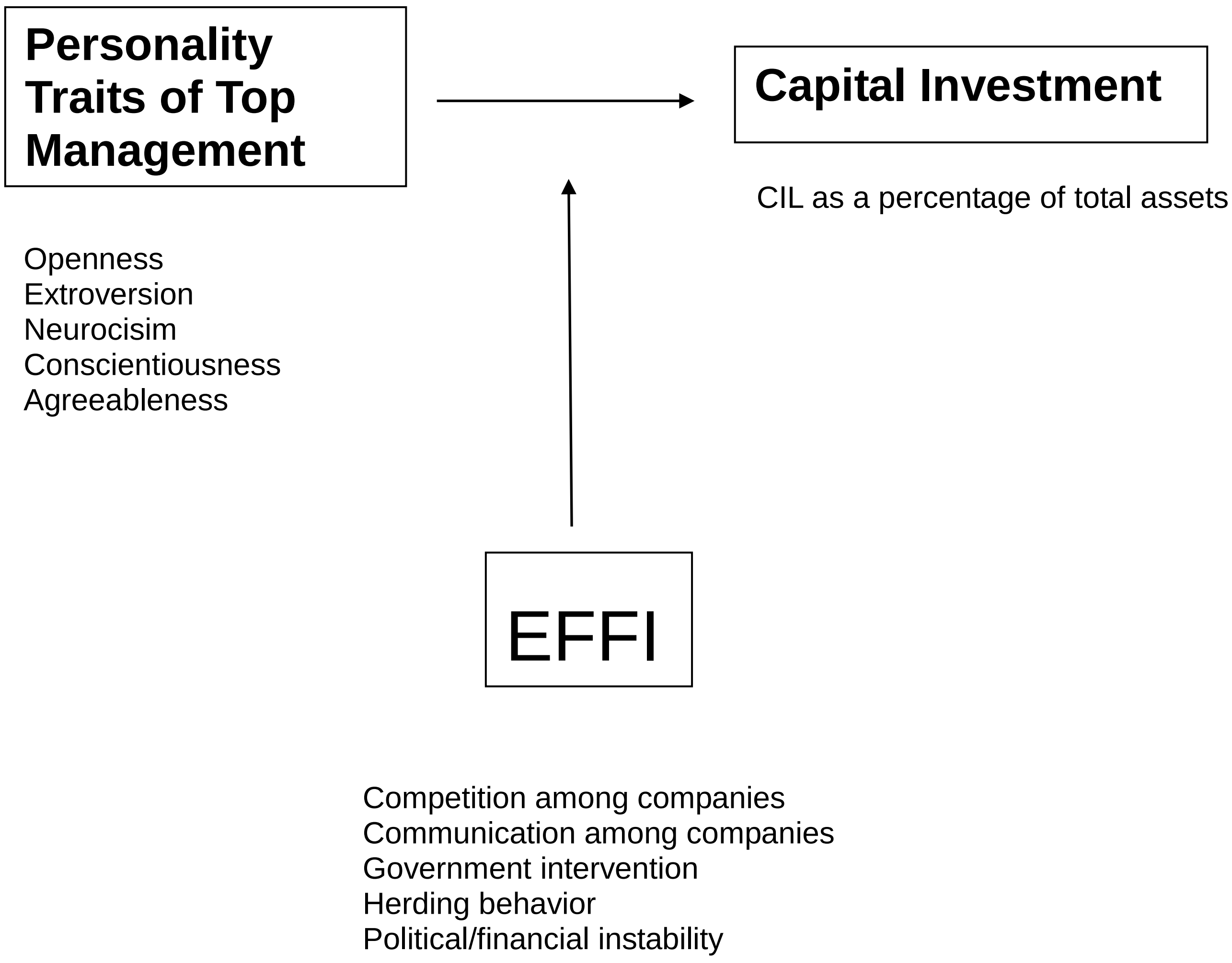


Figure 3 : Research Model 3 (Hypothesis 3)

In this model it is proposed that corporate financial risk tolerance, with a 4 factor structure, such as risk attitude, risk propensity, risk capacity and risk knowledge influences capital investment behavior of a company in the moderation of a company's internal fit for investment, which shows how suitable the internal dynamics of a company is to make investment.

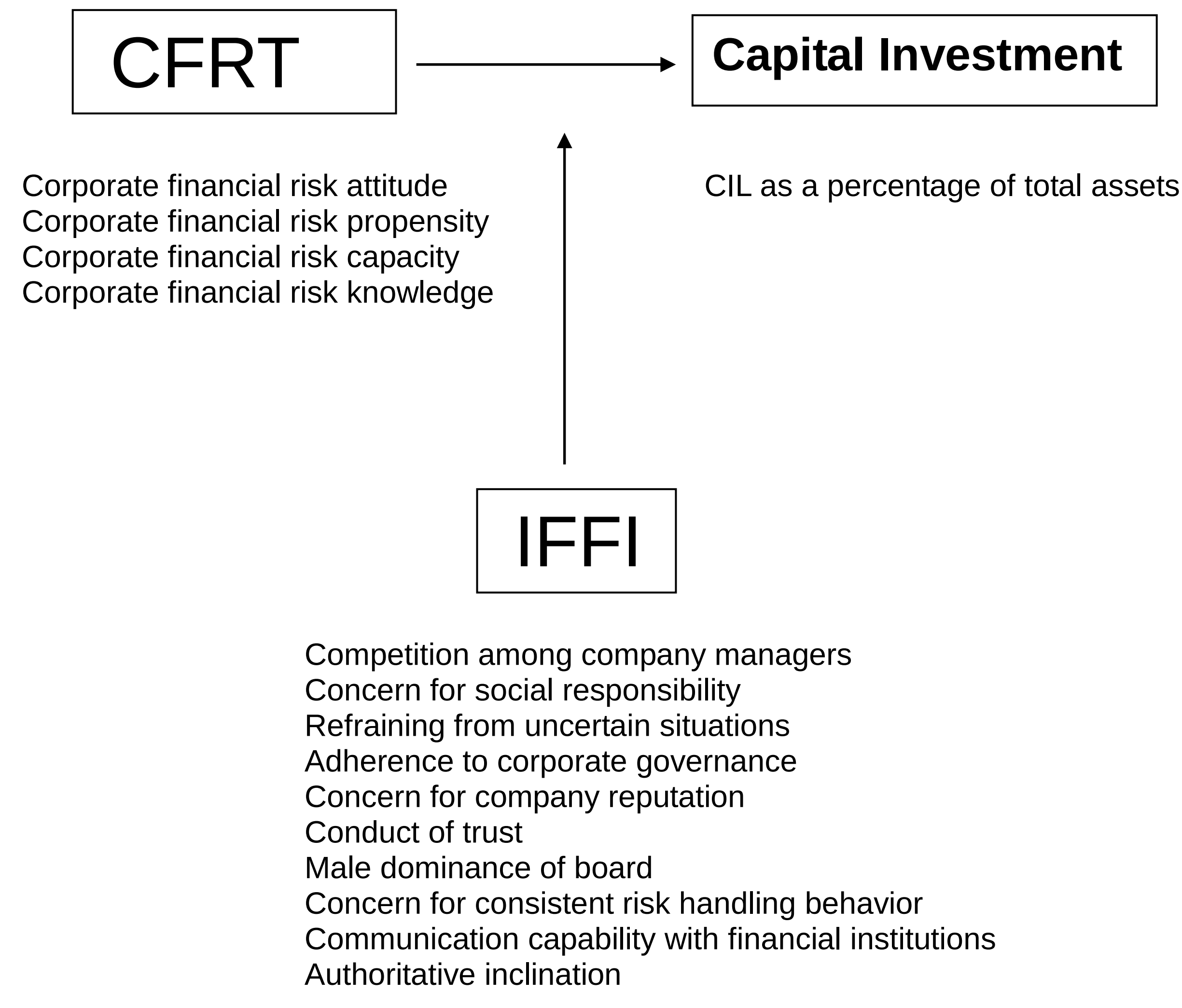


Figure 4 : Research Model 4 (Hypothesis 4)

In this model it is proposed that corporate financial risk tolerance, with a 4 factor structure, such as risk attitude, risk propensity, risk capacity and risk knowledge influences capital investment behavior of a company in the moderation of an external fit for investment, with 5 sub-items, which shows how suitable the external dynamics of a company is to make investment.

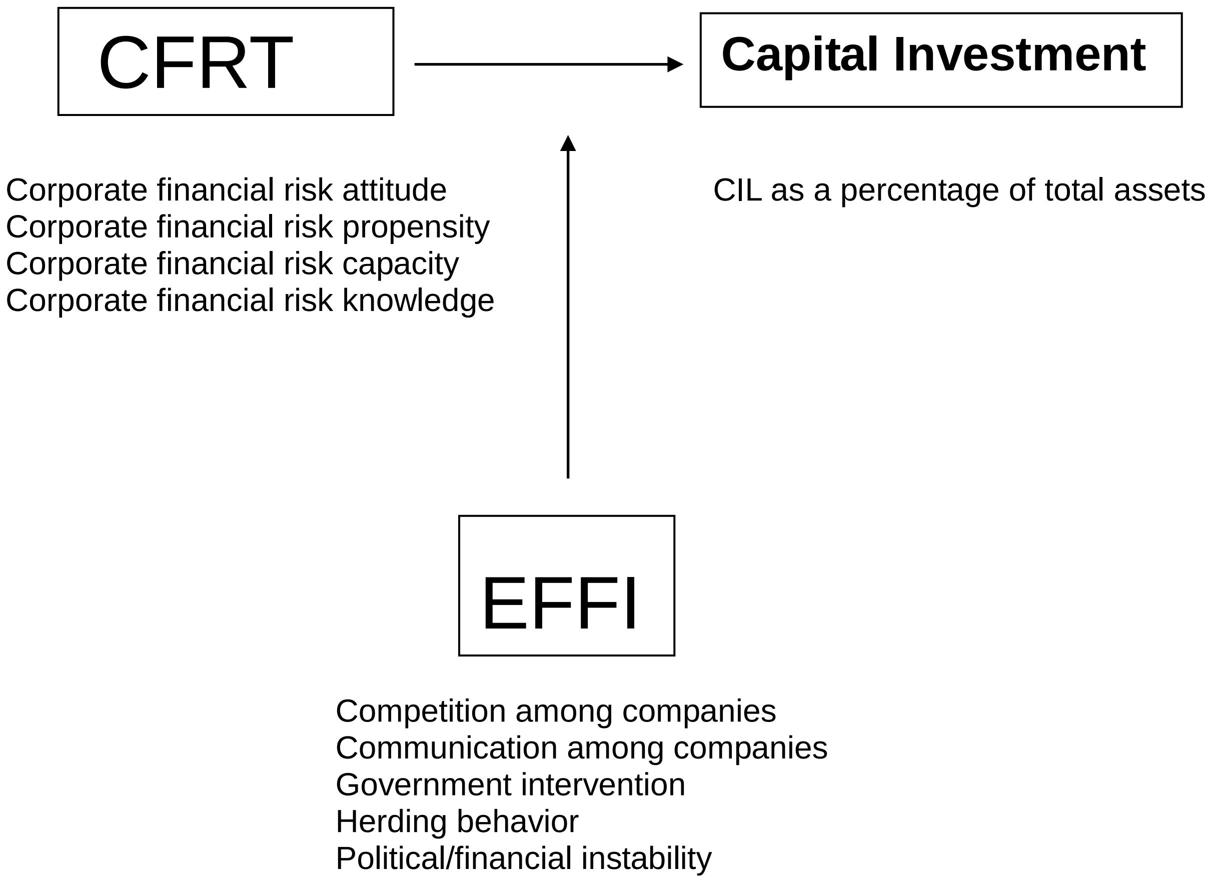
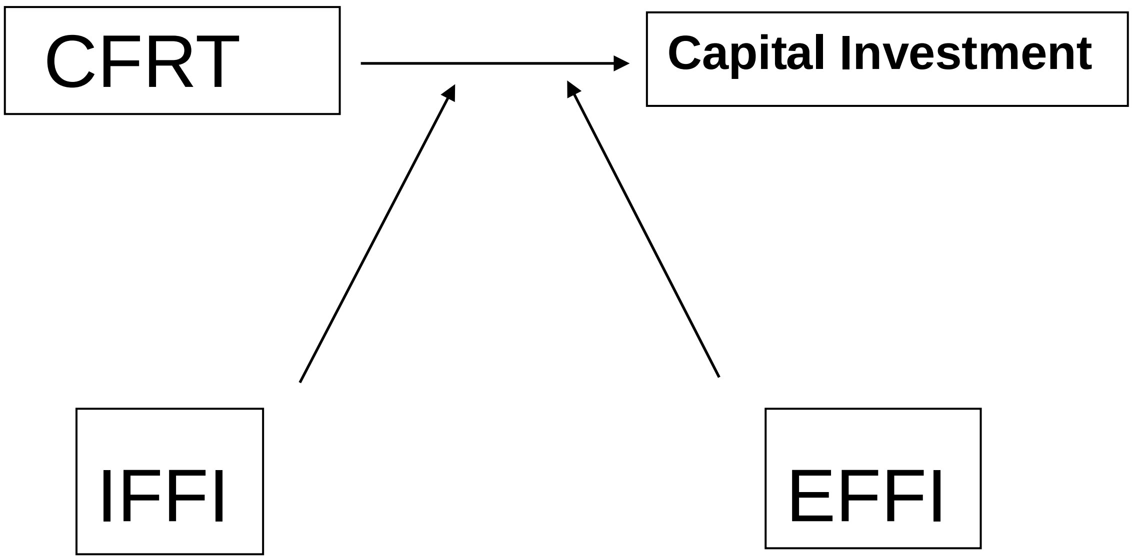


Figure 5 : Research Model 5 (Hypothesis 5)

In this model both external fit and internal for investment are employed as moderating variables. It is proposed that corporate financial risk tolerance, with a 4 factor structure, such as risk attitude, risk propensity, risk capacity and risk knowledge influence capital investment behavior of a company in the moderation of both external fit for investment and external fit for environment.



Competition among company managers
Concern for social responsibility
Refraining from uncertain situations
Adherence to corporate governance
Concern for company reputation
Conduct of trust
Male dominance of board
Concern for consistent risk handling behavior
Communication capability with financial institutions
Authoritative inclination

Competition among companies
Communication among companies
Government intervention
Herding behavior
Political/financial instability

Figure 6 : Research Model 6 (Hypothesis 6)

3.4. Operational Definitions of the Study Constructs

As a starting point, there are 3 main variables in the research model. The two independent variables are personality characteristics of corporate investment decision makers, as will be assessed by Big 5 scale developed by Gencoz & Oncul (2012) in line with Turkish national culture and corporate financial risk tolerance, as will be assessed by a new scale being developed by the current study. The dependent variable is capital investment levels of companies. There are also moderating variables in the model which stem from studies in literature. The theoretical background of each moderating item referred to as moderating variable can be found in the Appendix. Pertinent studies which form a basis for each item can be found in a chronological order in the associated table. The items from literature are classified as internal and external in the study to obtain a composite score for each moderating variable.

Grable (2000) defines financial risk tolerance as the maximum level of uncertainty one can take as s/he makes a financial decision. Financial decisions involve uncertainty and the human element. Since people distort reality due to emotions and other personal reasons, and deviate from the boundaries of a rational economic man as has been discussed in detail in previous chapters, the final decisions can be far from an absolute optimum and result in a local optimum which is just individually satisficing. Since humans are involved in corporate decision making processes, it looks plausible to assume that corporate decision making is also influenced by the human element, though to a lesser extent, due to collective decision making and more professional/technical approach in a company.

In this study, with an aim to better grasp the human perspective, the statements were prepared in such a way that they would account for gain & loss situations and risk & uncertainty dimensions. Items were also designed in a neutral formulation to avoid heuristics and emotional leading; attention was made for a theoretical reflection but also for a practical application.

The preliminary corporate risk tolerance scale was prepared by taking essence from Cordell (2001) study which defined 4 dimensions as risk propensity, risk attitude, risk knowledge, and risk capacity. Wahl & Kirchler (2020)'s scale, which had been constructed with respect to the dimensions of Cordell's study, was used a guide however since the original was prepared to assess an individual's financial risk tolerance, the items were modified, extended, or completely changed to reflect an organizational perspective. Also the first dimension, risk propensity, which is meant to measure the actual financial risk taking, was changed to a dimension as corporate financial risk management practice, which was interpreted to better represent actual financial risk taking behavior on a corporate level. In the preparation of the statements, theoretical studies cited in literature, financial risk management data from internet sources, peers', professional executives', financial consultants' contributions and the researcher's 20 years of professional financial experience were utilized.

A total of 44 items were prepared under 4 different dimensions for the corporate risk tolerance scale and 40 items for the demographic and moderating variables to cover literature in corporate investment and the research models' questions; consequently they were shared with 2 financial advisors for technical details and conceptual issues; 2 C-level executives for full coverage and understandability of items by target audience; 1 HR director for suitability of items with respect to organizational ethics; 1 lawyer for legal problems that may arise due to the content of items; 1 editor for grammar and semantic problems; 3 academics for overall scrutiny and suitability of items. Their feedbacks on the items prepared were collected and discussed and the necessary improvements and modifications were made to obtain the final preliminary questionnaire, which contained a total of 93 items. Big 5 scale developed by Gencoz & Oncul (2012) was used to assess the personality characteristics of the financial investment decision makers.

3.5 Sampling Plan

The company lists and contact information were obtained from Istanbul Chamber of Industry and Turkish Ministry of Industry and Technology. The lists consisted of companies that would represent the distribution of production companies in Turkey. The survey was conducted using an area based stratified random sample design with respect to the reports of Turkish Ministry of Industry and Technology regarding the regional distribution of production companies. 1500 companies were contacted about the details of study via e mail and invited to participate on a web based platform. There were 312 responding companies nationally representative of production companies across the country, complying with targeted stratification rates, 307 of which were eligible for evaluation, with 160 family and 147 nonfamily businesses. 192 of them are domestic and 115 are foreign. 75% of them have been in business for more than 10 years.

3.6. Data Collection and Study Design

Data was collected with 4 questionnaires. The first included the items to be used for exploratory factor analysis for CFRT in Likert scale, the second included demographic information and items for the moderating variables IFFI and EFFI, the third included a Big 5 questionnaire (Gencoz and Oncul, 2012) and the fourth included the questions about corporate investment level (CIL). The Likert items are from 1 (strongly disagree) to 5 (strongly agree).

It was decided to assess risk handling behavior of a company by risk tolerance. The term is defined by Grable (2000) and Cordell (2001) identifies 4 dimensions as risk propensity, risk attitude, risk knowledge, and risk capacity as components of financial risk tolerance. Wahl and Kirchler (2020) develops a scale, in line with the dimensions of Cordell's study to measure financial risk tolerance for an individual. In this study we adapted Wahl and Kirchler's scale for a company. The theoretical dimensions of construct and the scale were carefully studied to understand the scope and coverage. Consequently the items in the original scale were transformed to cover the full scope for a company and a draft was prepared with a group of 3 financial advisors.

In the next step the draft and the original scale were shared with eight financial & risk management professionals, corporate bankers, corporate finance executives and scholars. To ensure content validity, they reviewed the items to examine whether they represented the dimensions of financial risk tolerance for a company and to ensure face validity, they examined whether the scale as a whole appeared suitable to measure financial risk tolerance for a company. The improved draft as a result of the first round of evaluation by panelists was shared within a business network as a pilot study. 49 participants answered the items and gave feedback regarding the content and scope of items. As a final step feedback from pilot study was utilized to strengthen and clarify the items. Some items were rephrased or dropped and some new items were included. The iterative process with the panelists was ended when the panelists concluded that the scale was suitable to measure risk tolerance and the items in each dimension were appropriate to cover the scope of dimensions.

The initial assessment of collected data is made by checking Kaiser-Meyer-Okin (KMO) and Bartlett's test of sphericity. EFA is conducted on SPSS v. 26, with principal component analysis (PCA) and varimax orthogonal rotation. Cronbach's alphas for each dimension and the overall scale are calculated for a reliability analysis.

Construct validity is assessed by employing convergent and discriminant validity by showing the correlation of CFRT with items that it has to converge and those that it has to diverge, respectively. Also the intercorrelations of dimensions of CFRT scale, the correlations of dimensions with the overall scale for CFRT and the dependent variable, CIL, were analyzed.

Multiple regression models to test the hypotheses derived from literature have 6 independent variables CFRT, Big 5 traits of top management having a signatory right to make capital investment decision and a dependent variable, corporate investment level, CIL, which is used to operationalize the construct, CIB. It is calculated as a percentage of tangible and nontangible asset investment over total assets. A ratio of investment level to total assets is used to eliminate any bias that would arise due to the different company sizes. As a result of literature review, two moderating variables such as internal and external fit of environment for investment have been identified to test alternative hypotheses to explain corporate investment. 6 hypotheses are tested by using CFRT and Big 5 as independent, IFFI and EFFI as moderating and corporate investment level as dependent variable.

3.7. Demographics of Survey Respondents

There are 312 responding companies nationally representative of production companies across the country, complying with targeted stratification rates, 307 of which are eligible for evaluation, with 160 family and 147 nonfamily businesses. 192 of them are domestic and 115 are foreign. 75% of them have been in business for more than 10 years. The details are presented in Table 8.

Table 8 Demographic Profile of Responding Companies (n = 307)

	Frequency	**Percent (%)**
Age (yr.)		
< 4	5	1.6
4-10	71	23.1
10-20	119	38.8
> 20	112	36.5
Ownership		
Family	160	52.1
Nonfamily	147	47.9

Origin		
Local	192	62.5
Foreign	115	37.5
Distribution		
Region 1	150	48.9
Region 2	63	2.5
Region 3	41	13.4
Region 4	25	8.1
Region 5	5	1.6
Region 6	10	3.3
Region 7	13	4.2
Size (Assets – mio USD)		
< 5	10	3.3
5-12.5	44	14.3
12.5-50	158	51.5
50-100	90	29.3
> 100	5	1.6

CHAPTER FOUR

DATA ANALYSIS AND RESEARCH FINDINGS

In this chapter, a scale is developed by using exploratory factor analysis. The details of the analysis for item generation, face and content analyses of items have already been discussed in the methodology. Post EFA analysis, a construct validation of scale is made by showing discriminant and convergent validities with associated items. The chapter is closed by testing six hypotheses as confirmatory models.

4.1. Reliability Analysis

The initial assessment of collected data was made by checking Kaiser-Meyer-Okin (KMO) and Bartlett's test of sphericity. KMO values between .8 and 1 show sampling adequacy to extract factors (Field, 2009) and a statistically significant chi-square value for Barlett's (1954) sphericity test indicates random data. The data has appropriate sampling adequacy (KMO = .93) and statistically significant Barlett's test of sphericity ($\chi 2$ (666), N (307) = 8746.45, p = .00), indicating that it is appropriate for EFA.

EFA was conducted with principal component analysis (PCA) and varimax (Kaiser, 1958) orthogonal rotation. PCA was preferred for data reduction to preserve as much as possible from the original data (Norris and Lecavalier, 2010). Cut off level for factor loadings was set at .4 as suggested by Stevens (1992) regardless of sample size. Items were deleted iteratively by analyzing the double loadings, communalities and the antiimage matrices.

4.2. Descriptive Statistics

Descriptively the independent variables are CFRT (*M* = 3.25, *SD* = .77); openness (*M* = 3.35, *SD* = .34); extroversion (*M* = 3.96, *SD* = .54); neuroticism (*M* = 1.99, *SD* = .49); conscientiousness (*M* = 4.33, *SD* = .40); agreeableness (*M* = 3.45, *SD* = .50), the moderating variables are IFFI (*M* = 2.31, *SD* = .28); EFFI (*M* = .88, *SD* = .43), the dependent variable is corporate investment level, CIL (*M* = .05, *SD* = .02). The interaction terms are created by multiplying standardized scores of independent and moderating variables as suggested by Cohen et al. (2003) and West et al. (1996). The summary is in Table 9.

Table 9: Descriptive Statistics of Variables

Variables	Mean	Standard Dev.
CFRT	3.25	0.77
Extroversion	3.96	0.54
Openness	3.35	0.34
Neuroticism	1.99	0.49
Conscientiousness	4.33	0.39
Agreeableness	3.45	0.50
Internal Fit for Investment	2.31	0.28
External Fit for Investment	0.87	0.43
Capital Investment	0.045	0.027

4.3. Exploratory Factor Analysis

EFA was conducted with principal component analysis (PCA) and varimax (Kaiser, 1958) orthogonal rotation. PCA was preferred for data reduction to preserve as much as possible from the original data (Norris and Lecavalier, 2010). Cut off level for factor loadings was set at .4 as suggested by Stevens (1992) regardless of sample size. Items were deleted iteratively by analyzing the double loadings, communalities and the antiimage matrices.

Table 10 Rotated Factor Structure (N =307)

	CFRA	**CFRK**	**CFRP**	**CFRC**
Our company always deems uncertainty in investment plans as an opportunity to take	.779			
Our company believes that it has to take financial risks to increase revenues.	.740			

Our company focuses more on probable gains than probable losses.	.728		
Our company concentrates more on expectations than past performance while making investment decisions	.715		
Our company is always ready for investment opportunities that might arise anytime	.679		
Our company acts on the optimistic scenario for investment decisions.	.664		
Our company prefers debt finance to equity finance.	.558		
Our company can make financial decisions without external consultancy		.827	
As a company we have full understanding of risks that any kind of financial instrument bears.		.812	
We can easily understand how any financial instrument (forwards, swaps, options) to be used by our company works.		.781	
We have the standards to report the financial risks the company has undertaken (collections, foreign currency, interest rate etc.) and the associated losses.		.677	
We closely monitor our daily cash flow based on current reconciliations.			.846
Insurance for any kind of financial risk that would			.844

hinder our operations is done with full coverage.				
We prepare risk reports for our receivables on an invoice basis monthly (aging tables etc.)			.841	
Our company has a steady cash flow profile to meet its financial needs				.756
Our company has easy access to credit sources whenever in need.				.691
Our company has a strong ownership structure to meet its investment needs.				.642
Our company can easily weather dire economic periods.				.598
Eigenvalues	7.02	2.16	1.32	1.18
% of variance explained by factor	21.60	15.40	15.18	12.71

Note. Extraction method: Principal component; Rotation method: Varimax; suppressed at .40

The resulting factor structure is given in Table 10. Factor structure of financial risk tolerance for a company (CFRT) is compatible with the 4 dimensional model of Cordell (2001) and also in accordance with the 4 dimensional scale as suggested by Wahl and Kirchler (2020) on an individual level. The details of items can be found in Appendix.

Nunnally and Bernstein (1994) state Cronbach's alpha (α) from .70 to .95 indicate acceptable reliability results. In our study, CFRA dimension consists of 7 items (α= .86); CFRK dimension consists of 4 items (α= .81); CFRP dimension consists of 3 items (α= .93); CFRC dimension consists of 4 items (α= .76); overall CFRT scale consists of 18 items (α= .90). These results show that the overall scale and its 4 dimensions are reliable Table 11.

Table 11 Reliability Measures for Scales

	Cronbach Alpha
Corporate Financial Risk Tolerance (18 items)	.90
Factors	
Corporate Financial Risk Attitude (7 items)	.86
Corporate Financial Risk Propensity (3 items)	.93
Corporate Financial Risk Capacity (4 items)	.76
Corporate Financial Risk Knowledge (4 items)	.81

4.4. Construct Validity Analysis

In order to assess construct validity it is necessary to demonstrate CFRT measures what it claims to measure (Cohen and Swerklik, 1999). Convergent and discriminant validity provide evidence of construct validity (Hubley and Zumbo, 1996). If convergent validity exists the tests or items having the same or theoretically related items should have a significant positive correlation. On the other hand if discriminant validity exists the tests or items having theoretically negative relationships should have a significantly negative correlation.

Laksmana and Yang (2015) show that industry competition positively influence risk tolerance. Shao et al. (2013) and Gaganis et al. (2019) find that individualism is positively related to risk tolerance. Graham et al. (2013) and Kuzmicheva (2014) show that risk tolerance positively influences corporate investment. Therefore CFRT should have a significantly positive correlation with the items, internal competition among managers, external competition among companies and corporate investment level to demonstrate convergent validity. CFRT is found to be significantly correlated with internal and external competition ($r = .13$, $p < .05$ and $r =.21$, $p < .01$, respectively). It also has a significant correlation with corporate investment level in line with theory ($r = .46$, $p < .01$).

Nakamura (1999) and Gaganis et al. (2019) find that there is a negative relationship between uncertainty avoidance and risk tolerance. Therefore CFRT should have a significantly negative correlation with the item, refraining from uncertain situations, to demonstrate discriminant validity. A significantly negative correlation with CFRT and refraining from uncertain situations is found ($r = -.14$, $p < .05$)

Table 12 Correlations between risk dimensions, CFRT and CIL

	propensity	Attitude	capacity	knowledge	CFRT	CIL
Propensity	-					
Attitude	.52**	-				
Capacity	.53**	.56**	-			
knowledge	.44**	.29**	.41**	-		
CFRT	.85**	-.70**	.80**	.72**	-	
CIL	.39**	.39**	.33**	.32**	.46**	-

Note. * p < .05, ** p < .01

Cordell (2001) states that the dimensions of risk tolerance are interrelated and Dohmen et al. (2011) conclude that risk tolerance in general has relationship with more specific dimensions of risk tolerance. The intercorrelations of CFRT dimensions are analyzed and furthermore the interrelations of CFRT dimensions with corporate investment level are also assessed. It is found that the dimensions risk propensity, risk attitude, risk capacity and risk knowledge are significantly positively intercorrelated and also significantly positively correlated with CIL and CFRT. The results are given in Table 12. The results obtained are an indication of a good construct validity. The analyses of content and face validity are discussed in the research design.

4.5. Correlation Analysis of the Research Variables

Descriptively the independent variables are CFRT (*M* = 3.25, *SD* = .77); openness (*M* = 3.35, *SD* = .34); extroversion (*M* = 3.96, *SD* = .54); neuroticism (*M* = 1.99, *SD* = .49); conscientiousness (*M* = 4.33, *SD* = .40); agreeableness (*M* = 3.45, *SD* = .50), the moderating variables are IFFI (*M* = 2.31, *SD* = .28); EFFI (*M* = .88, *SD* = .43), the dependent variable is corporate investment level, CIL (*M* = .05, *SD* = .02). The interaction terms are created by multiplying standardized scores of independent and moderating variables as suggested by Cohen et al. (2003) and West et al. (1996). The correlation scores for the variables used in the study are given in Table 13.

Table 13 Correlation data for variables

	1	2	3	4	5	6	7	8	9
1. Openness	-								
2. Extroversion	.36**	-							
3. Neuroticism	.04	-.16*	-						
4. Conscientiousness	.22**	.15	-.28**	-					
5. Agreeableness	-.09	.19*	-.30**	.16*	-				
6. IFFI	.05	.09	.02	.02	-.02	-			
7. EFFI	.12	.25**	-.02	.09	.10	.05	-		
8. CFRT	.11	.20*	-.05	.09	-.02	.15**	.13*	-	
9. CIL	.17	.11	-.04	.15	-.04	.26**	.44**	.46**	-

Note. * $p < .05$, ** $p < .01$

4.6. Hypotheses Testing

There are a total of 6 hypotheses to be tested derived from literature as previously explained in detail. The alternative hypotheses are given and ordinary least square regression models (OLS) are used to check whether null hypotheses can be rejected.

H_1: CFRT and personality traits of top management influence CIB

Table 14 Regression results for H_1

Independent Variables	β	t	p	VIF
CFRT	.41	5.73	.00	1.05

Openness	.03	.41	.68	1.25
Extroversion	.02	.21	.83	1.27
Neuroticism	-.00	-.03	.97	1.19
Conscientiousness	.11	1.40	.16	1.17
Agreeableness	.40	5.72	.50	1.17

Note. Dependent variable is CIL. R = .45, Adj R^2 = .17, F = 6.80, p = .00

The results of multiple regression analysis show that CFRT explains 17% of the variance (Adj R^2 = .17, F = 6.80, p = .00). CFRT significantly explains CIL (β = .41, p = .00). However, none of the personality traits of top management significantly explains CIL as shown in Table 14.

H_2: Personality traits of top management influence CIB in the moderation of IFFI

Openness, extroversion, neuroticism, conscientiousness, and agreeableness do not significantly explain CIL in the moderation of IFFI as shown in Table 15 to 19.

Table 15 Regression results for H_{2a} (openness)

Independent Variables	β	t	p
Openness	.10	1.34	.18
IFFI	.26	3.46	.00
Interaction	.09	1.17	.24

Note. Dependent variable is CIL. R= .29; Adj R^2= .07; F= 5.02; p < .01

Table 16 Regression results for H2b (extroversion)

Independent Variables	β	t	p

Extroversion	.09	1.22	.22
IFFI	.24	3.21	.00
Interaction	-.02	-.23	.82

Note. Dependent variable is CIL. R= .27*;* Adj R^2= .06; F= 4.40; p < .01

Table 17 Regression results for H2c (neuroticism)

Independent Variables	**β**	**t**	**p**
Neuroticism	-.07	-.88	.38
IFFI	.24	3.20	.00
Interaction	-.07	-.90	.37

Note. Dependent variable is CIL. R= .27; Adj R^2= .05; F= 4.23; p < .01

Table 18 Regression results for H2d (conscientiousness)

Independent Variable	**β**	**t**	**p**
Conscientiousness	.19	2.34	.02
IFFI	.26	3.57	.00
Interaction	.12	1.46	.15

Note. Dependent variable is CIL. R= .31; Adj R^2= .08; F= 5.91; p < .01

Table 19 Regression results for H2e (agreeableness)

Independent Variables	**β**	**t**	**p**
Agreeableness	-.04	-.46	.64
IFFI	.25	3.38	.00

Interaction	.02	.20	.85

Note. Dependent variable is CIL. R= .26; Adj R^2= .05; F= 3.91; p < .01

=

Overall when IFFI is added as a moderating variable in the model, still no personality trait significantly explains CIL.

H_3: CFRT influences CIB in the moderation of IFFI

The results of regression analysis show that CFRT in the moderation of IFFI explains 25 % of the variance, as compared to 17 % without IFFI (Adj R^2= .25; F=34.44; p= .00). CFRT in the moderation of IFFI significantly explains CIL (β = .43, p = 00). The interaction term is significant (β = .11, p < 05) as is IFFI (β = .20, p = 00) as in Table 20.

Table 20 Regression results for H3

Independent Variables	B	t	P	VIF
CFRT	.43	8.60	.00	1.02
IFFI	.20	3.96	.00	1.03
Interaction	.11	2.12	.04	1.01

Note. Dependent variable is CIL. R=.50; Adj R^2= .25; F=34.44; p= .00

H_4: Personality traits of top management influence CIB in the moderation of EFFI

Openness, extroversion, neuroticism and agreeableness do not significantly explain CIL in the moderation of EFFI as in Table 21, 22, 23, 25 respectively.

Table 21 Regression results for H4a (openness)

Independent Variables	β	t	p
Openness	.07	.93	.35

EFFI	.45	6.54	.00
Interaction	-.02	-.26	.80

Note. Dependent variable is CIL. R= .46; Adj R^2= .20; F= 15.24; p= .00

Table 22 Regression results for H4b (extroversion)

Independent Variables	**β**	**T**	**p**
Extroversion	-.00	-.05	.96
EFFI	.46	6.38	.00
Interaction	-.01	-.18	.85

Note. Dependent variable is CIL. R= .46; Adj R^2= .20; F= 14.88; p= .00

Table 23 Regression results for H_{4c} (neuroticism)

Independent Variables	**β**	**t**	**p**
Neuroticism	-.03	-.49	.62
EFFI	.46	6.77	.000
Interaction effect	-.1	-1.46	.15

Note. Dependent variable is CIL. R= .47; Adj R^2= .21; F= 15.85; p= .00

Only conscientiousness becomes significant as shown in Table 24. The results of regression analysis show that conscientiousness in the moderation of EFFI explains 24 % of the variance, as compared no significance without EFFI (Adj R^2= .24; F=18.55; p= .00). CFRT in the moderation of EFFI significantly explains CIL (β = .15, p <05). The interaction term is significant (β = .18, p = .01) as is EFFI (β = .45, p = 00).

Table 24 Regression results for H_{4d} (conscientiousness)

Independent Variable	**B**	**t**	**p**	**VIF**
Conscientiousness	.15	2.18	.03	1.09

EFFI	.45	6.74	.00	1.01
Interaction effect	.18	2.51	.01	1.08

Note. Dependent variable is CIL. R= .50; Adj R^2= .24; F= 18.55; p= .00

Table 25 Regression results for H_{4e} (agreeableness)

Independent Variables	**β**	**T**	**p**
Agreeableness	-.09	-1.28	.20
EFFI	.47	6.81	.00
Interaction effect	-.01	-.11	.91

Note. Dependent variable is CIL. R= .47; Adj R^2= .20; F= 15.58; p= .00

H_5: CFRT influences CIB in the moderation of EFFI

The results of regression analysis show that CFRT in the moderation of EFFI explains 37 % of the variance (Adj R^2= .37; F=6.76; p= .00). CFRT in the moderation of EFFI significantly explains CIL (β = .41, p = .00). The interaction term is significant (β = .14, p = .00) as is EFFI (β = .40, p = .00) in Table 26.

Table 26 Regression results for H_5

Independent Variables	**β**	**t**	**p**	**VIF**
CFRT	.41	8.94	.00	1.01
EFFI	.40	8.64	.00	1.02
Interaction	.14	3.08	.00	1.00

Note. Dependent variable is CIL. R= .61; Adj R^2= .37; F= 6.76; p= .00

H_6: CFRT influences CIB in the moderation of both IFFI and EFFI

Table 27 Regression results for H_6

Independent Variables	**β**	**t**	**p**	**VIF**
CFRT	.39	8.65	.00	1.04
IFFI	.19	4.37	.00	1.03
EFFI	.40	8.91	.00	1.02
Interaction 1	.11	2.37	.02	1.02
Interaction 2	.14	3.07	.00	1.01

Note. Dependent variable is CIL. R= .65; Adj R^2 = .41; F= 43.75; p= .00

The results of regression analysis show that CFRT in the moderation of both IFFI and EFFI explains 41 % of the variance, as compared to 37 % with only IFFI (Adj R^2= .41; F=43.75; p= .00). CFRT in the moderation of EFFI significantly explains CIL (β = .39, p = .00). The interaction term between CFRT and IFFI is significant (β = .11, p < 0.05), the interaction term between CFRT and EFFI is significant (β = .14, p = .00) as is EFFI (β = .40, p = .00) in Table 27.

CONCLUSIONS

What are the driving forces for a company to take financial risk and make capital investment? This question gave the start of the study. In order to answer this question well, it was mandatory to understand and explain the corporate investment behavior in as much detail as possible. So the corporate investment behavior was chosen as the dependent variable and the quest for deriving new independent variables from literature to explain corporate investment started.

A thorough search of literature encompassing almost 150 years was made. The review of literature started from early models in mainstream economic theory. The models tried to explain mathematically the determinants of capital investment. However, mathematical models not incorporating uncertainty fell short of explaining what was happening in the real world. The models were deterministic in that there was no place for uncertainty in them. Not until 1970s, the element of uncertainty was incorporated into economic models of capital investment. The inclusion of uncertainty brought with itself the uncertainties regarding the behavioral side of decision making besides the economic variables. Following the economic crash of 1987, economists began to question whether capital markets provided the best estimate for the long term fundamental and market value of economic entities. The number of studies that pointed at the poorly informed traders, bounded rationality related poor decision and bubbles started to increase besides those attempting those to test the theory by empirical country specific studies regarding the determinants of capital investment behavior. These studies mainly focused on the relationship between uncertainty, cash flow profiles, leverage level, ease of access to external capital, corporate taxes, cost of capital, the predictive value of stock price and capital investment.

An important reason for the discrepancy between the theory and empirical research and between empirical studies themselves might stem from the differences in the assumptions between the classical and behavioral economic theory. In contrast to the assumptions of classical theory which assumed the absolute rationality and optimization capability of market participants, utilitarian characteristics and the complete self-control of corporate investors who were free of cognitive/processing errors and biases, it was highly probable that the assumptions of behavioral economics such as a satisficing “normal” man prone to cognitive biases and processing errors, with limited self-control dominate to disrupt the eloquent equations of mainstream economic theory.

After the literature search was completed the picture became clearer as to what was needed to dwell upon to explain corporate investment behavior. It was risk. Why were some companies more inclined to take financial risks while others were hesitant? A triad of studies formed the basis of progress. Grable (2000) defined financial risk tolerance as the maximum level of uncertainty one can take as s/he makes a financial decision. Cordell (2001) identified 4 dimensions as risk propensity, risk attitude, risk knowledge, and risk capacity as components of financial risk tolerance. Risk propensity or practice was how one behaved and managed financial risk actually, risk attitude was one's inclination to take financial risk, risk capacity was one's potential to bear financial risk and risk knowledge was one's proficiency in evaluating financial risk. In search of a tool to measure financial risk tolerance a third study by Wahl and Kirschler (2020) was come across which measured financial risk tolerance on an individual level. It was decided to develop a similar scale but on an organizational level.

A total of 44 items were prepared under 4 different dimensions for the corporate risk tolerance scale and 40 items for the demographic and other derived variables to cover in corporate investment literature and the research models' questions; consequently they were shared with 2 financial advisors for technical details and conceptual evaluation; 2 C-level executives for full coverage and understandability of items by target audience; 1 HR director for suitability of items with respect to organizational ethics; 1 lawyer for legal problems that may arise due to the content of items; 1 editor for grammar and semantic problems; 3 academics for overall scrutiny and suitability of items. Their feedbacks on the items prepared were collected and discussed and the necessary improvements and modifications were made to obtain the final preliminary questionnaire, which contained a total of 37 items for the scale. To ensure content validity, they reviewed the items to examine whether they represented the dimensions of financial risk tolerance for a company and to ensure face validity, they examined whether the scale as a whole appeared suitable to measure financial risk tolerance for a company. The improved draft as a result of the first round of evaluation by panelists was shared within a business network as a pilot study. 49 participants answered the items and gave feedback regarding the content and scope of items. As a final step feedback from pilot study was utilized to strengthen and clarify the items. Some items were rephrased or dropped and some new items were included. The iterative process with the panelists was ended when the panelists concluded that the scale was suitable to measure risk tolerance and the remaining 37 items in 4 dimensions were appropriate to cover the scope.

The initial assessment of collected data was made by checking Kaiser-Meyer-Okin and Bartlett's test of sphericity. EFA was conducted with principal component analysis and varimax orthogonal rotation. Cronbach's alphas for each dimension and the overall scale were calculated for reliability analysis.

Construct validity was assessed by employing convergent and discriminant validity by showing the correlation of CFRT with items that it had to converge and those that it had to diverge, respectively. Also the intercorrelations of dimensions of CFRT scale, the correlations of dimensions with the overall scale for CFRT and the dependent variable, CIL, were analyzed. The results for reliability, content, face analyses and construct validation showed the robustness of scale to measure corporate financial risk tolerance.

As a starting point for research models, there were 3 main variables. The two independent variables personality characteristics of corporate investment decision makers, as were assessed by Big Five scale developed by Gencoz & Oncul (2012) in line with Turkish national culture and corporate financial risk tolerance, as was assessed by a new scale being developed by the current study. The dependent variable was capital investment levels of companies, which operationalized the construct corporate investment behavior. Subsequently, 2 moderating variables in the models which stemmed from studies in literature were incorporated. The statistically significant items from literature were classified as internal and external fit for investment to obtain the moderating variables.

Six hypotheses were formed by using the above mentioned 5 different variables. The results of the hypothesis tests were as follow:

H_1: CFRT and personality traits of top management influence CIB

Personality traits of top management were expected to influence corporate investment behavior at least for one of its dimensions. However when corporate investment level was regressed on five dimensions of personality traits and the corporate financial risk tolerance, none of the personality traits of top management were significant. Only corporate financial risk tolerance was significantly related to corporate investment behavior.

H_2: Personality traits of top management influence CIB in the moderation of IFFI

It was tested whether the inclusion of a moderating variable, internal fit for investment, which represented the suitability of internal dynamics of a company to make investment, would make the relationship between personality traits and corporate investment significant. However even after the inclusion of IFFI still no personality trait of top management significantly explained corporate investment behavior.

H_3: CFRT influences CIB in the moderation of IFFI

Since risk was a prominent variable that explained the investment behavior on individual, organizational and national level, it was expected that the CFRT would explain corporate investment behavior with improved model fit results when a moderating variable that represented the internal suitability of a company for investment was added. CFRT significantly explained corporate investment behavior in the moderation of internal fit for investment with improved model fit results. In other words as corporate financial risk tolerance increased so did corporate investment level and the capital investment increased more in case the conditions within the company were more favorable for investment.

H_4: Personality traits of top management influence CIB in the moderation of EFFI

It was tested whether the inclusion of a moderating variable, external fit for investment, which represented the suitability of external dynamics of a company to make investment, would make the relationship between personality traits and corporate investment significant. As a result of the inclusion of EFFI conscientiousness trait of top management became significant to explain corporate investment behavior. In other words as conscientiousness trait of top management increased so did corporate investment level and the capital investment level increased more in case the conditions in the company's environment were more favorable for investment.

H_5: CFRT influences CIB in the moderation of EFFI

In this hypothesis corporate financial risk tolerance was tested in the moderation of external fit for investment, which represented the suitability of company's environment to make corporate investment. It was expected that the CFRT would explain corporate investment behavior with improved results when a moderating variable that represented the external suitability of a company for investment was added. CFRT significantly explained corporate investment behavior in the moderation of external fit for investment with improved model fit results. In other words as corporate financial risk tolerance increased so did corporate investment level and the capital investment level increased more in case the conditions in the company's environment were more favorable for investment.

H_6: CFRT influences CIB in the moderation of both IFFI and EFFI

The last model was proposed as a complete model to explain corporate investment behavior. It would also enable one to see the overall explanation power of the prominent variables. The model fit was highest in the results of this hypothesis. Corporate financial risk tolerance explained corporate investment behavior in the moderation of both internal and external fit for investment. In other words as corporate financial risk tolerance increased so did corporate investment level and the capital investment increased more in case the conditions both within and outside the company were more favorable for investment.

The discussion of results and comparisons with extant literature are made in the following section.

DISCUSSION AND RECOMMENDATIONS

The results of this study show that the personality traits of top management do not have a significant relationship with corporate investment behavior. The results are contrary to the findings of Chitra and Sreedevi (2011), Gambetti and Giusberti (2019), Mayfield et al. (2008) and Oehler et al. (2018) which find a significant relationship between personality traits of decision makers and investment. These studies focus on individual level decision making process. However on an organizational level the significance of personality traits of decision makers, who were top managers in this study, seems to disappear. The reasons why for personality traits to become insignificant to explain investment behavior at an organizational setting look interesting and deserve attention in future studies. The collective decision making process, rules, regulations, financial policies and risk procedures of a company can be some of the reasons why this discrepancy occurs. The interactions of personality traits of managers and the aforementioned variables can be good points to discover to better understand corporate decision making process.

Graham et al. (2013) study US CEOs in terms of their attitudes and psychological traits and compare them with their non-US counterparts, CFOs and lay people. In-group analysis of the CEOs they show that those with higher risk tolerance have a tendency for more acquisitions and those with higher optimism have a tendency for more short term leverage. On the other hand Kuzmicheva (2014) associates the risk attitude of managers with those of their companies and proposes that the attitudes of managers must be evaluated by a combination of qualitative and quantitative approaches to determine the CIB of firms. The two studies conclude that a significant relationship exists between personality traits of top management and corporate investment behavior. However our results also contradict with these findings on an organizational level. Personality traits of top management alone do not significantly explain corporate investment behavior in our study. In an attempt to explain corporate investment behavior, when corporate investment level is regressed on conscientiousness trait in the moderation of external fit for investment the relationship becomes significant. This is the only personality trait this study has inferred to explain corporate investment behavior in the moderation of external fit for investment. The conscientiousness trait is still insignificant without the moderation of EFFI. This is another interesting point to be made that needs further investigation. The interactions between herding, external fit for environment and personality traits of top management in particular conscientiousness can be studied further to explain corporate investment behavior. Unlike on an individual level, the dynamics that causes the relationship between personality traits and investment behavior to be insignificant on a corporate level and the reason why only conscientiousness trait becomes significant in the moderation of environmental fitness for investment are interesting points for further research.

Shao et al. (2013) investigate the relationship of individualism with types and horizons of capital investment to find that there is a tendency to invest in more long term or risky projects among firms of more individualistic cultures. They argue that individualism is the driving force behind risk taking and it influences investment in the mediation of risk taking. The results of our study are in line with Shao et al. showing a relationship between risk attitude and corporate investment behavior. The scale for corporate financial risk tolerance as developed based on the triad of Grable (2000), Cordell (2001), Wahl and Kirschler (2020) gives us the foundation to measure financial risk tolerance on an organizational level. This is a contribution to literature as a new scale with good reliability and validity results. Beside CFRT, two new variables have been introduced such as internal and external fit for investment. The two variables are used as moderating variables in our study to explain corporate investment behavior with improved model fit results. CFRT can significantly explain corporate investment behavior alone and in the moderation of either IFFI or EFFI with improved results.

Corporate financial risk tolerance, company's internal and external fit for investment are proposed as new variables to explain corporate investment behavior. CFRT can significantly explain corporate investment behavior alone and in the moderation of either IFFI or EFFI. In the broadest terms it can be concluded that corporate financial risk tolerance significantly explains corporate investment behavior in the moderation of both company's internal and external fit for investment. The interaction of the newly proposed variables CFRT, EFFI and IFFI with other corporate and national level constructs and corporate investment related variables can be a new venue for further research to understand corporate decision making.

Apart from the results of research models it is worthwhile to discuss the detailed literature review. Since the review encompasses a period of 150 years in capital investment literature on a timeline basis, it also hints at some important points and gaps. When studies in mainstream economics and empirical studies are examined it becomes evident that firm specific studies hold the majority. Besides the studies have evolved from simple deterministic mathematical models to more complex ones incorporating elements of uncertainty to explain capital investment behavior.

In this study, it is proposed that corporate investment literature in behavioral perspective could be classified in three main captions such as individual, organizational and national level. This approach enables one to see the specific focus of attention in corporate investment behavior. When all studies are tabulated on a topic basis in a timeline, it becomes even clearer where the focus is shifting and the current gaps in literature. Seeing and analyzing the studies in a snapshot also allow one to see the interrelations among variables more clearly and inspire new studies. When this classification is made, it becomes evident that studies on organizational level hold the majority in behavioral perspective. Another important issue arising from literature review is that there are only a few studies in literature to explain corporate investment behavior on a national level, which indicates a gap in extant literature.

This study is salient in that it is the first study in the literature to measure financial risk tolerance on organizational level with its behavioral dimensions, it adds two new composite variables to the corporate investment literature such as internal and external fit for investment, and suggests meaningful models to explain corporate investment behavior.

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APPENDICES

Appendix 1: Corporate Financial Risk Tolerance Questionnaire

Items used in the preliminary Corporate Financial Risk Tolerance Scale development

(Items in the final questionnaire will be marked with an asterisk in the first column)

CFRP: Corporate financial risk propensity.

CFRA: Corporate financial risk attitude.

CFRC: Corporate financial risk capacity

CFRK: Corporate financial risk knowledge

		Dimensional Questions	Items
		Corporate financial risk management practice (actual)	
Q1		CFRMP01	Stok yönetimini iyi yaptığımızdan müşteri taleplerini sıkıntı yaşamadan karşılarız.
Q2		CFRMP02	Şirketimizin varlık ve yükümlülük tarafındaki faiz riskleri olası dalgalanmalara karşı dengelenmiştir.
Q3		CFRMP03	Yabancı para risklerimiz forward, swap ve diğer finansal araçlarla tam kapsamlı koruma altına alınmıştır. (hedge edilmiştir)
*Q4	Insurance for any kind of financial risk that would hinder our operations is done with full coverage.	CFRMP04	Operasyonlarımızı aksatabilecek her türlü mali riske karşı sigortamız tam kapsamlı olarak yapılmıştır.
*Q5	We prepare risk reports for our receivables on an invoice basis monthly (aging tables etc.)	CFRMP05	Ticari alacaklarımız için her ay fatura bazında risk raporlaması yaparız. (yaşlandırma tabloları vb. yöntemlerle)
Q6		CFRMP06	Satıştan gelecek

			tahsilatlarımız müşterinin risk kategorisine göre çeşitli araçlarla güvence altındadır. (Coface, Hermes sigortası, müşteri çek veya senedi vb.)
Q7		CFRMP07	Şirketimiz vadesi gecen alacakları için gecikme faizlerini faturalar.
*Q8	We closely monitor our daily cash flow based on current reconciliations.	CFRMP08	Güncel mutabakatlara dayalı nakit akışımızı günlük bazda takip ederiz.
Q9		CFRMP09	Risk kategorisine göre sınıflandırılmış alıcılarımıza farklı koşullarda satış yapmak üzere prosedürlerimiz vardır. (maksimum satış limiti, vade , ödeme şekli , teminat mektubu ve senet karşılığı satış vb.)
		Corporate financial risk attitude	
Q10		CFRA01	Şirket olarak kullanım süresi on yıl ve üstü yatırımları kısa veya orta vadeli yatırımlara, tercih ederiz
*Q11	Our company prefers debt finance to equity finance.	CFRA02	Şirket olarak kredi finansmanını sermaye artırımına tercih ederiz.
*Q12	Our company concentrates more on expectations than past performance while making investment decisions.	CFRA03	Şirketimizin yatırım kararlarını alırken geçmiş performans verilerinden ziyade beklentiler üzerine odaklanırız.
*Q13	Our company always deems uncertainty in investment plans as an opportunity to take.	CFRA04	Şirketimiz yatırım planlarındaki her türlü belirsizliği değerlendirilebilecek bir fırsat olarak görür.
*Q14	Our company believes that it has to take	CFRA05	Şirketimiz kazancı arttırmak için finansal risk alması

	financial risks to increase revenues.		gerektiğine inanır.
*Q15	Our company focuses more on probable gains than probable losses.	CFRA06	Şirketimiz yatırımlarında olası risklerden çok, olası kazançlara odaklanır.
Q16		CFRA07	Şirketimiz ortaya çıkabilecek yatırım fırsatları veya beklenmedik ihtiyaçları için hazırlıklıdır.
*Q17	Our company acts on the optimistic scenario for investment decisions.	CFRA08	Şirketimiz yatırım kararlarında iyimser senaryoya göre karar vermeyi tercih eder.
*Q18	Our company is always ready for investment opportunities that might arise anytime.	CFRA09	Şirketimiz beklenmedik bir anda ortaya çıkabilecek yatırım fırsatlarına her zaman açıktır.
		Corporate financial risk capacity	
Q19		CFRC01	Yatırımlarımız bir iki yıl umduğumuzun altında performans gösterse bile bunu kolaylıkla atlatabiliriz.
Q20		CFRC02	Şirketimiz işin doğası gereği bazı yatırımlardan zarar etse bile bunu zorlanmadan telafi edebilir.
Q21		CFRC03	Mevcut yarımlarımızın performansı kötü gitse de yeni yatırım fırsatları peşinde koşarız.
Q22		CFRC04	Şirketimiz sektör bazındaki dalgalanmalardan en az etkilenen firmalardan biridir.
*Q23	Our company can easily weather dire economic periods.	CFRC05	Ekonomik konjonktür kötü olsa da şirketimiz bu dönemleri kolaylıkla atlatabilir.
*Q24	Our company has a steady cash flow profile to meet its	CFRC06	Şirketimiz finansal ihtiyaçlarını karşılayacak düzenli bir nakit akışına

	financial needs		sahiptir.
*Q25	Our company has easy access to credit sources whenever in need.	CFRC07	Şirketimiz ihtiyaç duyduğunda kredi kaynaklarına kolaylıkla ulaşır.
*Q26	Our company has a strong ownership structure to meet its investment needs.	CFRC08	Yatırımlar için şirketimizin nakdi ihtiyaçlarını karşılayan güçlü bir ortaklık yapısı vardır.
Q27		CFRC09	Mevcut yatırımlarımız kâra geçmese bile şirketimiz kendini döndürecek nakit akışına sahiptir.
		Corporate financial risk knowledge	
Q28		CFRK01	Şirket olarak, sermaye ve finansal piyasaları yakından takip ederek, olası gelişmelerin şirketin finansal yapısına etkisini analiz edecek bilgi birikimine sahibiz.
Q29		CFRK02	Şirketimiz, yatırım kararlarını almadan önce fizibilite raporlarını detaylı bir şekilde hazırlayıp, tüm alternatif yatırım senaryolarını inceleyecek bilgi birikimine sahiptir.
*Q30	We have the standards to report the financial risks the company has undertaken (collections, foreign currency, interest rate etc.) and the associated losses.	CFRK03	Şirketin aldığı finansal riskleri (tahsilat, kur , faiz dalgalanma riskleri vb) ve bunların sebep olabileceği olası kayıpları raporlama standartlarına sahibiz.
Q31		CFRK04	Şirket olarak işimize yarayacak her türlü finansman aracını nasıl kullanabileceğimiz konusunda bilgi sahibiyiz.

*Q32	As a company we have full understanding of risks that any kind of financial instrument bears.	CFRK05	Şirket olarak kullandığımız her türlü finansman aracının taşıdığı risklerin neler olduğuna tamamıyla vakıfız.
*Q33	We can easily understand how any financial instrument (forwards, swaps, options) to be used by our company works.	CFRK06	Şirket için kullanılabilecek finansal enstrümanların (forward, swap, opsiyon vb.) işleyişini kolaylıkla anlarız.
*Q34	Our company can make financial decisions without external consultancy.	CFRK07	Şirket olarak finansman ile ilgili konularda hiçbir danışmanlık almadan kendimiz karar verebiliriz.
Q35		CFRK08	Şirket olarak farklı finansal ürünleri inceleyip hangisinin şirketimizin işine en çok yarayacağına kolaylıkla karar verebiliriz.
Q36		CFRK09	Net bugünkü değer, içsel getiri oranı, finansal rasyolar, yaşlandırma tabloları vb. finansal yöntem ve kavramların nasıl kullanılacağını biliriz.
Q37		CFRK10	Şirketimiz olası kur ve faiz dalgalanmaları ile alıcılardan kaynaklı temerrüt risklerine karşı koruma amaçlı finansal ürünlerin detayına hakimdir.

Appendix 2: Key Items from Literature in Survey

Items used in the preliminary study for moderating and control variables. Items in italics will be placed at the end of the survey and be answered by only the stockowners and professionals who make the final decisions in corporate investments with single or double signatures. Those who answer this part will also be requested to fill in the Big 5.

Items designated with (L) are Likert questions, the remaining will be in multiple choices.

Study reference	Levels	Items
	Level1	
	Individual decision maker level	
Canton et al., 2002; Ku & Hung, 2012	*IDML1*	*Şirket sahibi misiniz yoksa profesyonel yönetici mi?*
Hartog, et al., 2002; Sasaki & Kanachi, 2005; Baker & Maner, 2008; Meimer-Pesti & Penz, 2008; Johnson & Gleason, 2009; Chan, 2015; Shin et al., 2019	*IDML2*	*Cinsiyetiniz?*
Riley & Chow, 1992; Bakshi & Chen, 1994; Erb et al., 1997; Reyna & Farley, 2006; Rivers et al, 2008	*IDML3*	*Yaşınız?*
Narayanan, 1985; Riley & Chow, 1992	*IDML4*	*İş hayatındaki toplam tecrübeniz?*
Narayanan, 1985; Reyna & Farley, 2006	*IDML5*	*Mevcut şirketinizdeki kıdeminiz?*
Hartog, et al., 2002; Malmendier & Tate, 2005	*IDML6*	*Eğitim seviyeniz?*
	Company level	
Caprio et al., 2011; Croci et al., 2011; Nguyen, 2011; Ku & Hung, 2012; Ku & Hung, 2012	CL1	Şirketinizin • %50'den fazlası tek bir şahıs veya ailenin kontrolü altındadır. • %50'den fazlası birden fazla şahıs veya ailenin konrolü altındadır. • Şahıs ve aile kontrolü

		%50'nin altındadır.
Dill et al., 2014	CL2	Şirketinizin çoğunluk hissesi yurtdışı mı yoksa yerli yatırımcılarda mıdır?
Ghosal & Loungani, 2000	CL3	Şirketinizin yıllık net cirosu veya bilanço büyüklüğünden biri 125 milyon TL 'den büyük müdür ?
Ku & Hung, 2012; Lai & Lui, 2016; Tran, 2019; Jiang et al., 2020	CL4	Şirketinizin yönetim kurulunun yarıdan fazlası profesyonel yöneticilerden mi yoksa ortaklardan mı oluşuyor?
Narayanan, 1985; Stein, 2001, 2003; Xu et al, 2010; Asker et al., 2014; Hjelmeland & Moldvaer, 2015; Xie et al., 2019	CL5	Şirketiniz kamu kuruluşu mu özel teşebbüs mü?
	CL6	Şirketiniz borsaya kote mi?
Bo et al., 2013; Graham et al., 2013	CL7	Şirketinizin yönetim kurulu başkanı ile genel müdür aynı kişi mi?
Narayanan, 1985; Kang et al., 2006; Selto & Cussatt, 2013; Croci & Petmezas, 2015; Ahmed & Ndayisaba, 2016; Ladika & Sutner, 2018	CL8	Şirketinizdeki yöneticiler performans odaklı prim sistemiyle mi çalışır?
Ji et al., 2019	CL9	Şirketinizin herhangi bir holding veya şirketler grubu içinde mi yer alıyor?
	CL10	Şirketiniz kaç senedir faaliyette?
Lang et al.,1996	CL11	Satışlarınızda ihracatın payı yarıdan fazla mı?
Hartman, 1972	CL12	Satışını yapacağımız ürün için maliyet yaparken ilgili ürünün satış fiyatı önceden belli değildir, nihai olarak piyasada belirlenir. (L)

Fazzari et al.,1988; Hoshi et al., 1990; Dailami & Kim, 1991; Lang et al.,1996; Kumar et al., 2001, 2002; Nuguyen & Dong, 2013	CL13	Şirketimiz dış finansmana (banka kredisi vb.) her zaman kolaylıkla ulaşabilir. (L)
Fazzari et al.,1988; Ajide, 2017; Hanazaki & Hada, 2018	CL14	Şirketimiz dış finansmana (banka kredisi vb.) her zaman düşük maliyetle kolaylıkla ulaşabilir. (L)
Shapiro, 1955; Meyer & Kuh, 1955, 1957; Duesenberry, 1959; Fazzari et al.,1988; Barro, 1990; Athey & Laumas, 1994; Barran & Peeters,1996; Kumar et al., 2001, 2002; Scandizzo, 2005; Surajit, 2008; Chen et al., 2009; Nuguyen & Dong, 2013; Kuzmicheva, 2014; Federici & Prisi, 2015; Kothari et al., 2017; Ajide, 2017; Hanazaki & Hada, 2018	CL15	Şirketimiz her zaman nakit fazlasına sahiptir. (L)
Tinberger, 1938; Shapiro, 1955; Modigliani-Miller, 1958, 1963; Duesenberry, 1959; Surajit, 2008; Federici & Prisi, 2015; Kothari et al., 2017	CL16	Şirketimiz karlılık oranlarında her zaman sektörde başa oynar. (L)
Jensen, 1986; Fazzari et al.,1988; Stulz, 1990; Lang et al.,1996; Aivizian et al., 2005; Dang, 2011; Federici & Prisi, 2015; Danso et al., 2019	CL17	Şirketimizin pazar potansiyeli yıldan yıla çok değişmeyen stabil bir noktaya erişmiştir. (L)
Lang et al., 1996; Surajit, 2008	CL18	Şirketimiz bankalar ve finansal aracı kurumlarla yalnızca ihtiyaç duyduğunda iletişime geçer. (L)

Dailami & Kim, 1991	CL19	Şirketimiz yatırım teşviği vb. devlet desteklerinden yararlanır. (L)
Jorgenson, 1963, 1968, 1969; Hartman, 1972; Bernanke, 1980; Abel, 1983; Pindyck, 1982, 1988; Abel & Eberly,1999; Perotti & Kulatilika, 1999; Leahy & Whited, 1996; Abel & Eberly,1999; Nuguyen & Dong, 2013	CL20	Makine gücünden çok insan gücü yoğun bir şirketiz. (L)
Clark, 1917; Goodwin, 1951; Chenery, 1952; Koyck, 1954; Junankar,1970; Kuzmicheva, 2014	CL21	Şirketimizin satış hacmi dönemler bazında kolaylıkla tahmin edilebilir. (L)
Xu et al, 2010; Ajide, 2017	CL22	Şirketimizin risk politikası yönetim kurulu tarafından detaylı bir şekilde yazılı olarak belirlenmiştir. (L)
Myers,1977; Myers & Majluf, 1984; Jensen, 1986; Stulz, 1990; Loughran & Ritter, 1997; Dang, 2011; Croci et al., 2011	CL23	Şirketimizin dış finansman kaynağı (banka kredileri vb.) öz sermayesinden daima fazladır. (L)
Federici & Prisi, 2015	CL24	Şirketimizin bir yıldan kısa süreli kredileri daha uzun dönemli kredilerinden fazladır. (L)
Narayanan, 1985; Hirshleifer, 1993; Jian & Lee, 2011; Scharfstein & Stein, 2013; Lai & Lui, 2016; Jiang et al., 2020	CL25	Yönetim, şirket itibarının önemini her türlü iç ve dış iletişiminde öne çıkarır. (L)
Bhardwaj et al., 2007; Zhang et al., 2015	CL26	Şirketimizde belirsizlikten mümkün olduğunca kaçınılan bir kültür vardır. (L)
Xu et al, 2010; Nguyen, 2011; Ku & Hung, 2012; Selto & Cussatt, 2013; Ayadi et al., 2014; Lai & Lui,	CL27	Şirketimiz kurumsal sorumluluk, adalet, şeffaflık, hesap verebilirlik gibi kurumsal yönetişim ilkelerine sıkı sıkıya

2016; Ajide, 2017; Ji et al., 2019		bağlıdır. (L)
Bhardwaj et al., 2007	CL28	Şirketimizde tam bir karşılıklı güven havası hakimdir. (L)
Ayadi et al., 2014	CL29	Sosyal sorumluluk projeleri şirketimiz için vazgeçilmezdir. (L)
Zhang et al., 2015	CL30	Şirketimizin erkek egemen bir yönetim kurulu vardır. (L)
Chui et al., 2002; Shao et al., 2013; Zhang et al., 2015; Palamida et al., 2017; Kerr et al., 2019	CL31	Şirketimizde yöneticiler arasındaki rekabet yüksektir. (L)
Gaganis et al., 2019		Şirketimizde otoriter bir ortam vardır. (L)
	Level2	
	Environment Level	
Hartman, 1972; Abel, 1983; Caballero, 1991; Ghosal & Loungani, 1996; Nakamura, 1999; Perotti & Kulatilika, 1999; Guiso & Parigi,1999; Ghosal & Loungani, 2000; Griffith, 2001; Laksmana & Yang, 2015	EL1	Şirketimizin içinde bulunduğu sektör oyuncu sayısının çok olduğu rekabetçi bir sektördür. (L)
Griffith, 2001; Gilchrist et al., 2014; Danso et al., 2019	EL2	Şirketimizin içinde bulunduğu sektörde yasal rekabet kuralları çerçevesinde oyuncular arasındaki bilgi akışı ve paylaşımı yüksektir. (L)
Xu et al, 2010; Ku & Hung, 2012; Ajide, 2017; Ji et al., 2019	EL3	Sektörümüzde kurumsal sorumluluk, adalet, şeffaflık, hesap verebilirlik gibi kurumsal yönetişim ilkeleri genel kabul görür normlardır. (L)
Xie et al., 2019	EL4	Şirketimiz devlet müdahalesine (fiyat değişikliği, regülasyon ve standartlar vb.) açık bir sektörde faaliyet gösterir. (L)

Farrell & Saloner, 1985; Morck et al., 1989; Bikhchandani et al., 1992; Devenow & Welch, 1996; Bikhchandani & Sharma, 2000; Garber, 2000; Hanazaki & Takeuchi, 2001; Bo et al., 2013; Scharfstein & Stein, 2013; Arif & Lee, 2014; Hassan & Mertens, 2017; Alabass, 2019	EL5	Şirketimiz yatırım kararlarını alırken diğer firmaların yatırım kararlarını da yakından takip eder. (L)
Ajide, 2017	EL6	Siyasi belirsizlikler yatırım kararlarımızı etkiler.

Appendix 3: Items for the Determination of Corporate Investment Level

NEW INVERTMENT FOR 2020	TOTAL BALANCE SHEET AS AT 2020 CLOSURE	CUMULATIVE INVESTMENT BEFORE DEPRECIATION AS AT 2020 CLOSURE
New Tangible and Intangible Fixed Assets Investment for 2020 (New Land, Machinery&Equipment, Patents, Trademarks, Copyright for 2020 (in TRL)	Total Assets/Total Liabilities as at 2020 closure (Land, Machinery&Equipment, Patents, Trademarks, Copyright) (in TRL)	Balance Sheet Tangible Fixed Assets Plus Intangible Fixed Assets before depreciation as at 2020 closure (in TRL)
0 - 5 milyon O	0 - 25 milyon O	0 - 5 milyon O
5 - 10 milyon O	25 - 50 milyon O	5 - 10 milyon O
10 - 25 milyon O	50 - 75 milyon O	10 - 25 milyon O
25 - 50 milyon O	75 - 100 milyon O	25 - 50 milyon O
50 - 75 milyon O	100 - 125 milyon O	50 - 75 milyon O
75 – 125 milyon O	125 - 250 milyon O	75 – 100 milyon O
125- 250 milyon O	250 - 375 milyon O	100 - 150 milyon O
250 - 375 milyon O	375 - 500 milyon O	150 – 250 milyon O
375 - 500 milyon O	500 milyon – 1 milyar O	250 – 375 milyon O
500 - 750 milyon O	1 – 1,5 milyar O	375 - 500 milyon O
750 milyon - 1 milyar O	1,5 – 2,0 milyar O	500 – 750 milyon O
1 - 1,5 milyar O	2,0 – 2,5 milyar O	750 milyon - 1 milyar O
1,5 - 2,0 milyar O	2,5 – 3,0 milyar O	1 - 1,5 milyar O
2,0 - 2,5 milyar O	3,0 – 3,5 milyar O	1,5 - 2,0 milyar O
2,5 - 3,0 milyar O	3,5 – 5,0 milyar O	2,0 - 2,5 milyar O
3,0 - 4,0 milyar O	5,0 – 6,5 milyar O	2,5 - 3,0 milyar O
4,0 – 5,0 milyar O	6,5 – 8,0 milyar O	3,0 – 4,0 milyar O
> 5,0 milyar O	> 8,0 milyar O	> 4,0 milyar O

Appendix 4: Big 5 Questionnaire

TÜRK KÜLTÜRÜNDE GELİŞTİRİLMİŞ
TEMEL KİŞİLİK ÖZELLİKLERİ ÖLÇEĞİ

YÖNERGE:

Aşağıda size uyan ya da uymayan pek çok kişilik özelliği bulunmaktadır. Bu özelliklerden her birinin sizin için ne kadar uygun olduğunu ilgili rakamı daire içine alarak belirtiniz.

Örneğin;

Kendimi .... biri olarak görüyorum.

Hiç uygun değil	Uygun değil	Kararsızım	Uygun	Çok uygun
1	2	3	4	5

		Hiç uygun değil	Uygun değil	Kararsızım					Hiç uygun değil	Uygun değil	Kararsızım		
1	Aceleci	1	2	3	4	5	24	Pasif	1	2	3	4	5
2	Yapmacık	1	2	3	4	5	25	Disiplinli	1	2	3	4	5
3	Duyarlı	1	2	3	4	5	26	Açgözlü	1	2	3	4	5
4	Konuşkan	1	2	3	4	5	27	Sinirli	1	2	3	4	5
5	Kendine güvenen	1	2	3	4	5	28	Canayakın	1	2	3	4	5
6	Soğuk	1	2	3	4	5	29	Kızgın	1	2	3	4	5
7	Utangaç	1	2	3	4	5	30	Sabit fikirli	1	2	3	4	5
8	Paylaşımcı	1	2	3	4	5	31	Görgüsüz	1	2	3	4	5
9	Geniş / rahat	1	2	3	4	5	32	Durgun	1	2	3	4	5
10	Cesur	1	2	3	4	5	33	Kaygılı	1	2	3	4	5

11	Agresif(Saldırgan)	1	2	3	4	5		34	Terbiyesiz	1	2	3	4	5
12	Çalışkan	1	2	3	4	5		35	Sabırsız	1	2	3	4	5
13	İçten pazarlıklı	1	2	3	4	5		36	Yaratıcı (Üretken)	1	2	3	4	5
14	Girişken	1	2	3	4	5		37	Kaprisli	1	2	3	4	5
15	İyi niyetli	1	2	3	4	5		38	İçine kapanık	1	2	3	4	5
16	İçten	1	2	3	4	5		39	Çekingen	1	2	3	4	5
17	Kendinden emin	1	2	3	4	5		40	Alıngan	1	2	3	4	5
18	Huysuz	1	2	3	4	5		41	Hoşgörülü	1	2	3	4	5
19	Yardımsever	1	2	3	4	5		42	Düzenli	1	2	3	4	5
20	Kabiliyetli	1	2	3	4	5		43	Titiz	1	2	3	4	5
21	Üşengeç	1	2	3	4	5		44	Tedbirli	1	2	3	4	5
22	Sorumsuz	1	2	3	4	5		45	Azimli	1	2	3	4	5
23	Sevecen	1	2	3	4	5								

CV

CEM ÜNLÜAKIN

EXECUTIVE SUMMARY&CORE COMPETENCIES

Senior level executive with extensive hands-on experiences in ERP implementations, process analysis, people management, business leadership and working with Board of Directors, Banks and Attorneys. MBA with an established record of success in significant growing enterprise value. Proven ability to improve operations, impact business growth and maximize profits through achievements in financial management, cost reductions and internal controls. Strong in business valuations, annual and business plans and budgets, cost accounting, cash forecasts, working capital management and audits.

EXPERIENCE&ACHIEVEMENTS*

Freelance Consultancy and University Teaching **Multiple Locations**
2016/1 -

- Teaching courses in Industrial Engineering and Business Administration
- Consultancy about ERP implementations and business restructuring

TOYOTA TSUSHO **Kocaeli, Finance and Accounting**
Corporate Senior Manager **2012/4 - 2015/12**

- Managed corporate departments (Finance&Accounting, Administration, IT, HR)
- Coordinated preparation of income statement and balance sheet as well as other related legal, statutory reports and management reports
- Was responsible for ensuring compliance with both IFRS and local tax requirements for the company's accounting records
- Oversaw technical projects in alignment with organizational goals.
- Directed the effective delivery of networks, development, and disaster recovery systems and processes
- Developed and implemented HR policies to support organizational objectives
- Oversaw credit risk and J-SOX regulations
- Liaised with company lawyer for legal issues
- Managed relationships with financial institutions and directed strategic cash flow issues
- Reviewed management reports
- Participated in strategic planning and prepare annual budget of the company

* Took actions for improving business efficiency and profitability

PILS-CitiVentureCapital Group Companies, İstanbul, Private Equity

Chief Financial Officer 2006/12 - 2011/11

- Managed financial reporting (local&IFRS), treasury management, cost accounting, tax, purchasing, logistics, and IT issues for 3 companies
- Supported sales and strategic decision making process for all functions
- Directed annual plan review process and strengthened accountability by partnering other senior level management
- Prepared investment plans for possible acquisitions
- Implemented precise costing strategies and initiated strategies to redeploy company resources to increase gross margin by shifting focus on more profitable items
- Restructured processes and implemented ERP system at 3 companies
- Designed executive and management reporting system, tailored financial and operating reporting systems to meet requirements of an expanding business from 15 mio TL to 100 mio TL in revenues

MED-TEVA (Teva Pharmaceuticals) İstanbul, Finance and Accounting

Manager of Finance and Accounting 2003/6 - 2006/12

- Managed financial reporting (USgaap and TRgaap), accounting&tax issues, treasury, warehousing and IT issues
- Coordinated budget preparations, updates and follow-ups between business functions
- Managed financial market risks of FX, interest and liquidity
- Evaluated profitability to alternative investment projects
- Set up internal control procedures engaged with Sarbanese/Oxley
- Successfully managed assets and liabilities, decreasing receivables by 5 mio TL by structuring a collection strategy from SGK and renegotiating payment terms with suppliers
- Redesigned accounting and reporting system and financial procedures
- Successfully carried out and finalized financial due diligence with Teva
- Carried out relationships with financial institutions and negotiated with banks to manage cash flow and capital needs, supporting a growth from 13 mio to 35 mio USD in revenues

SIEMENS İstanbul, Corporate Treasury and Project Finance

Currency Executive 2001/6 - 2003/6

- Carried out treasury activities
- Liaised with banks and other financial institutions to manage cash flow
- Consulted business units for hedging individual projects as per customer needs
- Hedged overall portfolio against FX risks
- Managed market risk and reporting (Value-at-risk and scenario analyses)
- Followed up long term contracts with financial institutions
- Performed trade finance, forfaiting, factoring activities as per customer needs

- ➢ Prepared reports about macroeconomic environment and financial results of business
- ➢ Worked in SAP implementation of cash management module
- * Prepared the currency guideline for Siemens Turkey and implemented market risk reporting system
- * Designed and implemented currency risk management system

JP MORGAN CHASE **Istanbul, Financial Control**

Risk Analyst **2000/4 - 2001/6**

- ➢ Analyzed market risk (value-at-risk and gap analyses, stress tests)
- ➢ Analyzed treasury portfolio to substantiate daily/monthly profit-loss from fixed income, foreign exchange, money market, equities, synthetic securities and reported to local management and head office, in USgaap
- ➢ Made financial analysis and calculated risk reserve for treasury portfolio

DIŞBANK **İstanbul, Financial Control and Planning**
Assistant Manager **1997/9-1999/6**

- ➢ Was responsible for 11 corporate branches regarding financials
- ➢ Made financial analysis and prepared monthly management reports
- ➢ Ensured that the branches fully meet their financial&legal obligations
- ➢ Conducted variance analyses for expenses
- ➢ Coordinated budget preparations for branches and analyzed budget actualisations vs. planned
- ➢ Monitored conditions for loan and deposit agreements of branch customers
- ➢ Analyzed financial statements of branches for key performance indicators
- ➢ Prepared and reported financials of Malta Dışbank in line with IFRS

METU **Ankara, Dept. of Business Administration**
Research/teaching Assistant **1995/7-1997/6**

- ➢ Assisted administerial issues in department of management
- ➢ Assisted classes of business statistics and finance
- ➢ Was the advisor of 75 students

EDUCATION

Boğaziçi University (1991-1995), BS in Industrial Engineering

Middle East Technical University (1995-1997), MBA

Program Erasmus+ of the European Union (2019-2020), Micromaster in Entrepreneurship Ecosystem & Innovation Strategy

Program Erasmus+ of the European Union (2020-2021), Micromaster in Digital Communication & Marketing

İstanbul University (2018-2023), PhD in Business Administration and Policy

LANGUAGES, COMPUTER SKILLS AND PERSONAL

Languages: English- C2, German- B1, French-A2
Computer Skills: MS Office applications, Logo, SAP
Personal: Date of birth-1973, married, with one kid