Interactions of Financial Risk Tolerance, Internal Fit, External Fit and Personality Traits on Corporate Investment Behaviour [1] [2]

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Abstract

Explaining corporate investment behaviour (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 behaviour 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 personality traits of owners/top management, such as openness, conscientiousness, extroversion, agreeableness, neuroticism, which is another area of interest in investment theory, is also included in the study. The models to test the hypotheses are proposed by using CFRT and Big 5 as independent variables to explain corporate investment behaviour (CIB). The results of this study 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, Corporate Financial Risk Tolerance, External Fit For Investment, Internal Fit For Investment, Personality Traits of Top Management*

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[1] This study does not require ethics committee permission.

[2] This article was derived from Cem Ünlüakın's PhD thesis at Istanbul University, Institute of Social Sciences, Department of Business Administration

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Kurumsal Yatırım Sürecinde Finansal Risk Toleransı, Dahili ve Harici Uygunluk ile Kişilik Etkileşimi

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Öz

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 edilmiştir. Hipotezleri test edecek modeller, kurumsal yatırım davranışını (KYD) bağımlı, KFRT ve beş faktör kişilik modeli özelliklerini bağımsız değişkenler olarak kullanarak önerilmiştir. Sonuçlarımız, üst yönetimin beş faktör kişilik modeli özelliklerinin KYD ile anlamlı bir ilişki içinde olmadığını, ancak KFRT'nin anlamlı bir şekilde KYD'yi açıkladığını göstermektedir. Takiben, şirketler için KYD'yi ve finansal risk tutumunu etkileyen öğeler dahili ve harici yatırıma uygunluk (YİDU, YİHU) olarak literatür üzerinden sınıflandırılmış ve iki kompozit düzenleyici değişken olarak modele eklenmiştir. Neticede, KFRT için hem YİDU hem de YİHU'nun eklenmesiyle model uyumluluğu artarken, beş faktör kişilik özellikleri için, YİHU'nun moderasyonunda sadece sorumluluk özelliği anlamlı hale gelmiştir.

Anahtar Kelimeler: *Kurumsal Yatırım Davranışı, Kurumsal Finansal Risk Toleransı, Yatırım İçin Dahili Uygunluk, Yatırım İçin Harici Uygunluk, Üst Yönetimin Kişilik Özellikleri*

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Introduction

Corporate 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 determinants of corporate 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; Hubbard, 1998; Stein 2003). Apart from the discrepancies within the mainstream economics, another important reason for the dicrepancies between the mainstream and behavioral research stems from the differences in the assumptions between the mainstream and behavioral economic theory. In contrast to the assumptions of mainstream 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, behavioral economics calls for a satisficing "normal" man prone to cognitive biases and processing errors, with limited self control. These humanly attributes might dominate to disrupt the equations of mainstream economic theory. Behavioral economics encompasses a broad area including psychology, sociology and mainstream economic theory. This paper gives a snapshot of the evolution of theory for corporate investment behavior from pure mathematical capital investment models to behavioral ones. It focuses on variables such as corporate financial risk tolerance, the personality traits of top management, a company's suitability assessment of its internal and external environment for investment, and aims to explain corporate investment behavior by these variables. It tests its own hypotheses derived from extant literature to distinguish some valid determinants of corporate investment behavior for production companies.

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. 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 relavent 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.

Theoretical Framework and Hypothesis Development

Clark (1917) in his model 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. 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). Another common theme in explaining capital investment behavior is the profits (Tinbergen, 1938; Shapiro, 1955; Modigliani and Miller, 1958, 1963). Duesenbery (1959) builds upon the previous theories cited above and proposes the financial theory of investment model which takes into account the cost of capital in investment decisions, so it is also called the cost of capital theory of investment. Jorgenson (1963) and Jorgenson et al. (1968, 1969) devise a Neoclassical Model of Investment that assumes capital investment behavior is based on determining the optimum capital stock and it depends in succession on the profit maximization theory of a firm. However, in an unexpectable world, the model has very unrealistic assumptions like no uncertainty, no adjustment costs, the perfect competition of firms, full employment in the economy and more.

Not until 1970s, the uncertainty concept is incorporated firmly into economic models of capital investment. Early econometric models have not included the concept of uncertainty and produced unsatisfactory results for the explanation of capital investment behavior. These models have a narrow explanation of the variations in capital investment and do not reflect the results of what really happen in practice (Dixit and Pindyck, 1994). Tobin (1969)'s Q model of investment can be interpreted as the pioneer to incorporate firmly the concept of uncertainty in capital investment. The model states that the share prices during issuance reflect the investment behavior of the firm and 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. Hartman (1972) emphasizes the importance of capital productivity for the uncertainty effect on capital investment in the early models for the uncertainty-capital investment relationship. Bernanke (1983) studies the optimum timing of capital investment under uncertainty given that investment is irreversible and the information on returns is obtained over time. He argues that uncertainty delays new investments by increasing the value of waiting which in turn translates into the instability of aggregate investment. Ghosal and Loungani (1996), 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) argue for a more significant negative relationship even in markets with low degrees of competition. 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.

Contemporary to the introduction of uncertainty into mainstream models another echole by behavioral economists appear who incorporate the human factor with his cognitive biases into economic theory. 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.

A prominent proponent of incorporating psychology into economics and one of founders of behavioral economics is Katona (1951, 1953), with his concentrated early emphasis on the role of psychology in economics and business decisions. Katona emphasizes the necessity of emprical observations on behavior rather than theory by using questionnaires and interviews to obtain information about subjective intervening variables. This technique allows one to reach deeper knowledge about attitudes, expectations, aspirations and habituations. He, unlike pure theorists, does not assume rational behavior in the beginning but instead attempts to find out conditions where near-rational behavior existed. Simon is another prominent name in behavioral economics. The concept of bounded rationality, is coined by Simon (1972) then by March (1978). Simon mentions the limits of human rationality in decisions as early as almost eight decades ago (Simon, 1944, 1955). Simon is special in that he is the vanguard daring to challenge the basic assumptions of neoclassical economic theory by taking an interdisciplinary stance. He is among the few who first realizes the importance of analyzing the architecture of complexity and posits a method to explicate power law distributions by preferential attachment (Mandelbrot, 1959). Kahneman, Tversky, Rabin, Thaler, Camerer, Fehr, Laibson and Loewenstein are leading members of this echole (Tomer, 2007). 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). They mainly challenge the assumptions of rationality, self control and self interest for human decision makers as assumed by mainstream economists.

The literature cited so far indicates the importance of uncertainty in explaining corporate investment behavior. Risks can be interpreted as translations of uncertainty into more conrollable components therefore uncertainty handling is closely related to risk taking behavior. It is not surprising that risk taking behavior, which this study concentrates on, is another variable of interest in literature in relation to corporate investment behavior.

This paper 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 appetitite 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. Assesment 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 wheras 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 appetitite 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 relationhip 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 fit for investment

> H_3: Corporate financial risk tolerance influences corporate investment behavior in the moderation of company's internal fit for investment

Farrell and Saloner (1985) develops a model in which they argue that firms follow each other in technological investments in a bandwaggon 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 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 mimick 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 assymetries 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 assymetries 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: Personality traits of top management have influence on corporate investment behavior in the moderation of company's external fit for investment

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

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

Research Design

Item generation, content and face validity

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) develop 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.

Sampling and data collection

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 informed about the details of study via e mail and invited to participate on a web based platform. There are 312 responding companies nationally representative of production companies across the country, complying with targetted 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 1.

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 (Gençöz and Öncül, 2012) and the fourth included the questions about corporate investment level (CIL). The Likert items are from 1 (strongly disagree) to 5 (strongly agree).

Exploratory factor analysis

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 componenet analysis (PCA) and varimax orthogonal rotation. Cronbach's alphas for each dimension and the overall scale are calculated for a reliability analysis.

Construct validation

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.

Hypothesis Testing

Multiple regression models to test the hypotheses derived from literature have 7 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.

Results

Exploratory factor analysis (EFA)

The term financial risk tolerance is defined by Grable (2000) and Cordell (2001) identifies 4 dimensions as risk propensity, risk attitude, risk knowledge, and risk capacity as dimensions 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 current 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. After content and face validation of items with eight panelists and a pilot study, the detail of which was given in research design, the questionaire for CFRT was shared with companies. The company target pool was chosen in line with the distribution of companies across the country with respect to the official data from the Turkish Ministry of Industry and Technology. The company addresses were obtained from the İstanbul Chamber of Industry and the General Directoriate of Turkish Ministry of Industry and Technology. Regions 1 through 7 represent Marmara, Aegean, Mediterrenean, Central Anatolia, Black Sea, Eastern and Southeastern Anatolia, respectively. The obtained data represents a fair distribution of production companies across the country, encompassing 23 industries. The demographic profile of companies is given in Table 1.

Fabrigar and Wegener (2012) state that there is a need of at least three or more measured variables of a factor for improved statistical identification. The 4 dimensions as risk propensity, risk attitude, risk capacity and risk knowledge originally contained 9, 9, 9, 10 items respectively. A total of 312 responses were received, 5 of which were omitted from study due to observed problems in the data set. Comrey and Lee (1992) suggest sample sizes of 100 as poor, 200 as fair, 300 as good, 500 as very good, and 1,000 or more as excellent. Cattell (1978) suggests a ratio between 3 to 6 times the number of variables as observations with an absolute minimum of 250 observations. However, Mundfrom and Shaw (2005) show that when items to factors ratio is at least 7, even if the communalities are low, 180 participants are sufficient to give excellent results. Data used in this study satisfy all conditions.

Table 1.
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

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 ($\chi2(666)$, N(307) = 8746.45, p = .00), indicating that it is appropriate for EFA.

EFA was conducted with principal componenet 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 2

Rotated Factor Structure (N =307)

	CFRA	CFRK	CFRP	CFRC
CFRA1	.779			
CFRA2	.740			
CFRA3	.728			
CFRA4	.715			
CFRA5	.679			
CFRA6	.664			
CFRA7	.558			
CFRK1		.827		
CFRK2		.812		
CFRK3		.781		
CFRK4		.677		
CFRP1			.846	
CFRP2			.844	
CFRP3			.841	
CFRC1				.756
CRFC2				.691
CFRC3				.642
CFRC4				.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 2. 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 could be found in Appendix A.

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.

Analysis of construct validity

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 3
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 3. The results obtained are an indication of a good construct validity. The analyses of content and face validity are discussed in the research design.

Hypothesis testing

Decsriptively 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 invetment 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 4.

Table 4
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

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 5
Regression results for H_1

Independent Variables	β	t	p
CFRT	.41	5.73	.00
Openness	.03	.41	.68
Extroversion	.02	.21	.83
Neuroticism	-.00	-.03	.97
Conscientiousness	.11	1.40	.16
Agreeableness	.40	5.72	.50

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 5.

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

Openness, extroversion, neuroticism, conscientiousness, and aggreeableness do not significantly explain CIL in the moderation of IFFI as shown in Table 6 to 10.

Table 6

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 7

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 8

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 9

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

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

Table 10
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

H_3: CFRT influences CIB in the moderation of IFFI

The results of multiple 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 11.

Table 11
Regression results for H3

Independent Variables	β	t	p
CFRT	.43	8.60	.00
IFFI	.20	3.96	.00
Interaction	.11	2.12	.04

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 agreeeableness do not significantly explain CIL in the moderation of EFFI as in Table 12, 13, 14, 16 respectively.

Table 12
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 13

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 14

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 15. The results of multiple 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 15

Regression results for H_{4d} (conscientiousness)

Independent Variable	β	t	p
Conscientiousness	.15	2.18	.03
EFFI	.45	6.74	.00
Interaction effect	.18	2.51	.01

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

Table 16

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 multiple 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 17.

Table 17

Regression results for H$_5$

Independent Variables	β	t	p
CFRT	.41	8.94	.00
EFFI	.40	8.64	.00
Interaction	.14	3.08	.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 18

Regression results for H$_6$

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

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

The results of multiple 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 18.

Discussion

Unlike studies indicating a relationship between personality traits of individuals and investment decisions (Chitra and Sreedevi, 2011; Gambetti and Giusberti, 2019; Mayfield et al., 2008; Oehler et al., 2018), the relationship becomes insignificant on a corporate level when personality traits of top management are involved. This is also contrary to the suggestion that managers' attitudes are associated with those of their companies in investment decisions (Graham et al., 2013; Kuzmicheva, 2014). However, there seems to be an interaction between conscientiousness trait and environment. Conscientiousness becomes significant in the moderation of external fit for investment to explain corporate investment behavior. Unlike on an individual level, the dynamics that cause 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.

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. These results are in line with Shao et al. (2013)

showing a relationship between risk attitude and corporate investment behavior. In the broadest terms it can be concluded that corporate financial risk tolernce 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.

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Appendix A

CFRT Items

Dimensions	Items		
CFRA		English Version	Turkish Version
	CFRA 1	Our company always deems uncertainty in investment plans as an opportunity to take.	Şirketimiz yatırım planlarındaki her türlü belirsizliği değerlendirilebilecek bir fırsat olarak görür.
	CFRA 2	Our company believes that it has to take financial risks to increase revenues.	Şirketimiz kazancı arttırmak için finansal risk alması gerektiğine inanır.
	CFRA 3	Our company focuses more on probable gains than probable losses.	Şirketimiz yatırımlarında olası risklerden çok, olası kazançlara odaklanır.
	CFRA 4	Our company concentrates more on expectations than past performance while making investment decisions.	Şirketimizin yatırım kararlarını alırken geçmiş performans verilerinden ziyade beklentiler üzerine odaklanırız.
	CFRA 5	Our company is always ready for investment opportunities that might arise anytime.	Şirketimiz beklenmedik bir anda ortaya çıkabilecek yatırım fırsatlarına her zaman açıktır.
	CFRA 6	Our company prefers to make investment decisons with respect to the optimistic scenario	Şirketimiz yatırım kararlarında iyimser senaryoya göre karar vermeyi tercih eder.
	CFRA 7	Our company prefers debt finance to equity finance.	Şirket olarak kredi finansmanını sermaye artırımına tercih ederiz.
CFRK			
	CFRK 1	Our company can make financial decisions without external consultancy	Şirket olarak finansman ile ilgili konularda hiçbir danışmanlık almadan kendimiz karar verebiliriz
	CFRK 2	As a company we have full understanding of risks that any kind of financial instrument bears.	Şirket olarak kullandığımız her türlü finansman aracının taşıdığı risklerin neler olduğuna tamamıyla vakıfız.
	CFRK 3	We can easily understand how any financial instrument (forwards, swaps, options) to be used by our company works.	Şirket için kullanılabilecek finansal enstrümanların (forward, swap, opsiyon vb.) işleyişini kolaylıkla anlarız.
	CFRK 4	We have the standards to report the financial risks the company has undertaken (collections, foreign currency, interest rate etc.) and the associated losses.	Şirketin aldığı finansal riskleri (tahsilat, kur, faiz dalgalanma riskleri vb) ve bunların sebep olabileceği olası kayıpları raporlama standartlarına sahibiz.
CFRP			
	CFRP 1	We closely monitor our daily cash flow based on current reconciliations.	Güncel mutabakatlara dayalı nakit akışımızı günlük bazda takip ederiz.
	CFRP 2	Insurance for any kind of financial risk that would hinder our operations is done with full coverage.	Operasyonlarımızı aksatabilecek her türlü mali riske karşı sigortamız tam kapsamlı olarak yapılmıştır.
	CFRP 3	We prepare risk reports for our receivables on a monthly basis (aging tables etc.)	Ticari alacaklarımız için her ay fatura bazında risk raporlaması yaparız. (yaşlandırma tabloları vb. yöntemlerle)
CFRC			
	CFRC 1	Our company has a stable cash flow profile that can satisfy its financial needs	Şirketimiz finansal ihtiyaçlarını karşılayacak düzenli bir nakit akışına sahiptir.
	CFRC 2	Our company can get access to sources of credit easily on an as-needed basis	Şirketimiz ihtiyaç duyduğunda kredi kaynaklarına kolaylıkla ulaşır.
	CFRC 3	Our company has a strong ownership structure to meet its financial needs for investment	Yatırımlar için şirketimizin nakdi ihtiyaçlarını karşılayan güçlü bir ortaklık yapısı vardır.
	CFRC 4	Our company can easily weather periods of economic instability	Ekonomik konjonktür kötü olsa da şirketimiz bu dönemleri kolaylıkla atlatabilir.

Note: CFRP: Corporate financial risk popensity; CFRA: Corporate financial risk attitude; CFRC: Corporate financial risk capacity; CFRK: Corporate financial risk knowledge

Genişletilmiş Özet

Amaç

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.

Tasarım ve yöntem

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 yatırım 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.

Bulgular

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.

Sınırlılıklar

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

Öneriler

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 sebepleri, 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.

Özgün değer
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.

Araştırmacı Katkısı: Cem ÜNLÜAKIN (%70), Hakkı AKTAŞ (%30).