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Research Paper

CEO Overconfidence and Overinvestment: Role of Exchange Rate

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ABSTRACT

The existence of financial anomalies, which challenge the efficient-market hypothesis, provides substantial experimental evidence of market deviations from rationality. According to the efficient-market hypothesis, investors incorporate all available market information and diligently interpret it. However, empirical evidence demonstrates that most investors fail to engage in rigorous information processing, leading to various behavioral theories highlighting market inefficiency and biased information processing. This research aims to identify and examine the impact of CEO perceptual biases on judgment and economic decision-making, specifically focusing on the reporting quality of firms listed on the Tehran Stock Exchange. The study investigates the relationship between CEO Overconfidence and Overinvestment with the role of economic moderators on the Tehran Stock Exchange (TSE). A sample size of one hundred and five companies was selected using systematic removal sampling, covering the period from 2012 to 2019. Given the dichotomous dependent variable, this study employs probit regression to test the research hypotheses. The results indicate a significant positive effect of CEO overconfidence on overinvestment. Additionally, it is observed that the exchange rate strengthens the positive effect of CEO overconfidence on overinvestment. Based on these findings, the CEO's decisions as the primary decision-maker within a company, particularly in inflationary conditions, can significantly impact future corporate investment levels. The findings further reveal that the indices of CEO perceptual biases in judgment and economic decision-making have a significantly negative effect on the reliability and competitiveness of financial reporting.

1 Introduction

Corporate financial performance reflects the extent to which firms can achieve their financial objectives. In today's competitive world, retaining and enhancing financial performance is crucial to meet shareholders' expectations and attract new investors. Investors, creditors, directors, and governments are considered the main stakeholders interested in corporate financial performance [1]. In recent years, information quality has emerged as a major concern for organizations and a vital aspect of managerial information systems. The availability of improved data resources and increased access to information resources for CEOs and users has highlighted the importance of understanding information quality [2].

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Financial statements aim to provide investors and stakeholders with clear information about the financial condition, performance, and flexibility of the corporation, enabling them to make informed decisions [3]. To ensure high-quality financial reporting and mitigate agency costs, CEOs are determined to guarantee the quality of financial reporting by leveraging their technical and perceptual (psychological) abilities [4]. Perceptually and technically competent CEOs can make informed decisions and enhance corporate performance in a competitive market. Extensive literature has focused on the role of individual characteristics and managerial tendencies in explaining important corporate variables such as investment, mergers, and financing. These managerial specifications include risk aversion, education, and perceptual and behavioral tendencies like overconfidence. Given their role as senior decision-makers and the information available to investors and shareholders, the literature has primarily focused on the psychological characteristics of CEOs. Overconfidence is one such perceptual error or behavioral bias. An overconfident manager makes decisions based on their mental inclinations and motivations, deviating from reality and incorporating personal tastes, feelings, and beliefs into corporate decision-making [5]. Consequently, when confronted with reality, they act inefficiently as they are unprepared to face the status quo [5]. Decisions made by overconfident managers based on personal desires that are detached from reality always pose a risk to the company's future.

Furthermore, overconfidence leads managers to be overly optimistic about the expected future income, cash flows, and the risk and return outlook of the company [6]. Due to their optimistic expectations, overconfident managers are more prone to forecasting errors [7]. Given the role of price volatility in corporate investment behavior and its influence on managerial decisions, managers can play a significant and decisive role in the relationship between investment decisions and inflation [3]. Therefore, an increase in overconfidence during inflationary fluctuations is expected to make managers more productive due to rising prices while also increasing their willingness to invest in various dimensions, potentially affecting the company's risk and return [8]. Experimental research results indicate a positive relationship between managerial overconfidence and overinvestment during inflationary conditions [9]. Consequently, addressing CEO overconfidence becomes a theoretical and practical necessity due to its impact on inflation and overinvestment in companies. This need arises for two reasons. Firstly, further study and analysis are required to examine the relationships between these variables in theoretical and conceptual domains. Secondly, although the existence of a relationship between the research variables has been hypothesized and conceptually supported, its practical applications have not been extensively studied. Thus, there is a growing need to study and interpret the relationship between CEO overconfidence in Iran, Exchange Rate, and overinvestment, considering their effects on corporate risk-taking and capital productivity. Accordingly, this study aims to examine the mediating role of the Exchange Rate in the impact of managerial overconfidence on overinvestment.

2 Literature Review

2.1 Behavioral Finance Approaches in Iran

The history of behavioral finance dates back to the early 70s. This mixed branch of financial sciences in which psychological and sometimes sociological issues are employed to run a more thorough analysis of financial market problems mostly focus on investors' decision-making process and their reaction to various conditions of financial markets, and particularly accentuates the effect of investors' personality, culture, and judgment on their investment decisions. In actual fact if biased approaches are built upon the CEOs' psychological attributes, then socio-cultural characteristics need to be taken into account as

important factors contributing to the CEOs' perceptual formations, which are included within the intermittent matrices of unbalanced economic infrastructures, and resulting in heterogeneity contradictions during the process of managing organizations and in the form of agency costs between CEOs and shareholders. Most of the behavioral characteristics including theatricality of behaviors, exaggerated expression of performance and reputation (management in favor of shareholders' interest and desires) have been notoriously salient in recent years, and not only have they scarcely been under transparent surveillance, but they have also gained more strength and consequently, have promoted biased behaviors [9]. Accordingly, directors believe that ensuring shareholders and investors in capital market is the only way to escape the difficulties unscathed.

Lack of transparent regulations and guidelines for the evaluation and determination of CEOs' tenure is another factor which signals the increasing behavioral biases in their performance. Moreover, lack of alignment of psychology with economic issues, along with the political connections within financial markets and stock exchanges, has rendered the problem of CEOs' perceptual biases unsolved in the developing countries like Iran [8]. In fact, in the sovereignty structure of Iran, CEOs are hired to retain the minority interests at the expense of majority interests, which can exacerbate CEOs' perceptual biases. The idiosyncratically cultural, political, economic and social structure of Iran and its effect on individual and group behaviors, especially in the capital market thus urges the recognition of theories as well as the analytical and cognitive models of behavioral finance.

2.2 Behavioral Finance Theories

The school of behavioral finance, as a result of the combination of psychology and finance, is founded on the view that psychology plays an essential role in financial decision-making. As cognitive errors and deviations affect investment theories, they also exert the same effect on financial alternatives [10]. Behavioral finance is the science of studying how individuals analyze and interpret information to make informed investment decisions. To put it another way, behavioral finance seeks to examine the effect of psychological processes on decision-making. Nowadays, the perception of investors' fully rational behavior in pursuit of maximizing their benefits proves insufficient to justify market reaction and behavior. Therefore, behavioral finance is counted as a paradigm according to which financial markets are studied given certain models which, in turn, refute two fundamental and circumscribing assumptions of the traditional paradigms, namely maximization of the expected tendencies and full rationality. The theoretical underpinnings of behavioral finance lend support to the claim that experimental puzzles in the domain of finance are sometimes hard to solve as certain economic factors are likely to demonstrate less rational behavior [11].

However, Robert Olsen is inclined to believe that behavioral finance does not aim at propagating the idea of the inaccuracy of rational behavior, but tries to encourage discussions on the role of psychological decision-making processes in recognizing and predicting financial markets. The proponents of behavioral finance develop the claim that the subject of psychological tendencies within the realm of investment requires extensive research. Taking psychology into consideration as a fundamental factor influencing the financial knowledge of investors in stock exchanges makes it difficult to accept the presence of uncertainty towards the behavioral finance creditability [12; 13].

2.3 Overconfidence

Overconfidence is one of the essential findings of psychology in judgment and decision-making. It is a

personality trait that can be defined as behavioral personality traits and unrealistic (positive) beliefs about various aspects of a consequence under uncertainty conditions. In this sense, the average estimate will be exaggerated [14]. Managers are among the top-ranking individuals in organizations with more authority and decision-making power, whose personal desires can affect the organization's selected policies and procedures. Hence, managers' perspectives affect the organization, procedures, and policies, as well as employees and related issues. One of the primary applications of the concept of overconfidence in financial literature was made by Ray [15]. He argues that management overconfidence is one of the factors that cause managers to involve in the appropriate acquisition processes and overpayments for target companies. The majority of managers believe that their company is more likely to succeed than other companies [16]. Such managers are called overconfident managers.'

2.4 Optimism

Optimism is regarded to be one of the significant findings of psychology in judgment and decision-making. Overconfident individuals believe that they have more capabilities than others, can control risks beyond their reach, and have much more precise predictive power than expected. Two behavioral factors linked to managerial overconfidence result in increased expectations of future demand:

- **Incorrect Grading (Lower-Variance Effect):** It indicates very low confidence in the expected results. The most common type of overconfidence is mentioned in the financial literature, sometimes referred to as overconfidence in forecasting. Here, people usually overestimate their knowledge accuracy and underestimate the risk and variance of random variables, with very narrow confidence intervals in their forecasting [17]. For example, when estimating the value of a share, they consider a very low deviation for the expected yield spectrum.
- **B) Extreme or Unrealistic Optimism (Above-Average Effect):** This concept is adapted from the financial literature derived from the concepts of psychology and delusional optimism. In this type of overconfidence, people overestimate their skills [18]. Extreme optimism leads to the expected future income leading managers to make decisions based on their predictions [19]. According to psychological research, people generally tend to have an unrealistic positive view of themselves and their skills. When compared to a group (e.g., colleagues), many people overestimate their capabilities and skills above the average capabilities and skills of other members.

The explanation provided for managerial overconfidence is distinct from the economic explanations presented in previous studies. From an economic point of view, it is assumed that managers are reluctant to meet future expectations, while overconfidence implies that managers have positive attitudes toward future expectations. Moreover, overconfidence is distinct from the explanations given for the agency theory mentioned in the previous literature [20]. According to Gervais et al [21], overconfident managers tend to operate in companies with risky growth. Accordingly, relying on the theoretical and experimental support of the mentioned research, H1 is presented as follows: Exchange rate exacerbates the impact of CEO overconfidence on overinvestment.

2.5 Research Background

Experimentally, the relationship between individual behavioral biases and perceptual errors has a long history in psychological literature. However, it has become more consistent in financial discussions since the beginning of the present century through the fusion of behavioral and financial theories. The upward trend of research in this regard shows its importance in the performance of companies and even

the capital market. On the other hand, as an elected representative of shareholders, the CEO should strive to improve the quality of financial reporting because it is crucial for decision-making by shareholders and investors. If behavioral biases are combined with the quality of financial reporting, shareholder decision-making will be disrupted, and the capital market will lose its functionality. In this regard, Sauerwald& Su [22] conducted a study entitled "CEO overconfidence on the degeneration of social responsibility disclosure." This study examined 500 companies in the period 2066-2014. The results showed declining social responsibility disclosure reports as a result of CEO overconfidence and the company's exposure to uncertainty by shareholders, investors, and analysts in a competitive market. On the other hand, in their study, Ma et al [23] introduced the CEO's behavioral biases as one of the reasons for the disproportionate specialized knowledge of managerial position with a negative impact on the quality of financial reporting. Ulupinar [24] examined the effect of managerial stability on the CEO's behavioral biases. This study was conducted in the period 1994-2006, in which managerial stability was measured using three criteria: CEO tenure, managerial ownership, and CEO duality, as well as perceptual biases based on overconfidence and optimism. The results showed a positive effect of all three of the above criteria on the CEO's perceptual biases, which led to biased CEO behavior more as a stable management position at the top of companies.

Wang et al [25] conducted a study entitled "Overinvestment, Exchange Rate, and managerial overconfidence: A firm-level analysis of Chinese companies. The study was conducted in the period 2003-2012, during which 113 companies active in the Chinese capital market were examined. The results showed an increased overinvestment as a result of lower Exchange Rate, exacerbated by managerial overconfidence. Analysis of overinvestment was primarily driven by managerial overconfidence in state-owned enterprises, as well as a negative correlation between Exchange Rate and managerial overconfidence overinvestment. Managerial overconfidence is mute in non-state-owned enterprises. Koga and Kato [26] examined 1000 firm-year observations from a sample of Japanese listed firms during the years 1989-2015. They document that optimistic and pessimistic biases are significantly influenced by financial market conditions and firm-specific characteristics like corporate history. Their findings also suggest that biases and partiality significantly affect corporate business decisions. Corporate fixed investment together with its research and development expenditures may exhibit kind of fluctuation given optimism and pessimism. The discussed findings imply that corporate perceptual biases prove to be an alternative mechanism to traditional optimization mechanism given the impact of financial position and macroeconomic on corporate investment behaviors. MohammadAli and Anis [7] examine the impact of emotional biases including CEO’s overconfidence on corporate dividend policies using Bayesian network method. The emotional bias is measured using a questionnaire with multiple items. The statistical population consists of 100 CEOs in Tunisia. The study reports that CEOs are influenced by certain perceptual biases including optimism, loss aversion and overconfidence.

It also reveals that CEOs’ perceptual biases affect the dividend policies and value creation. Additionally, they are witnessing an asymmetric impact of Exchange Rate on corporate overinvestment during various economic cycles. Shamsi et al [5] conducted a study entitled "The impact of managerial overconfidence based on investment and capital expenditures on risk and capital productivity indicators." In this study, 132 companies were examined in the period 2011-2016. The panel regression model was used to test the hypotheses. The findings indicate the notorious effect of managerial overconfidence based on capital expenditures on the deviation of stock returns and, at the same time, the significant positive effect of managerial overconfidence based on investment on the latter. This means that companies with overconfident investment-based managers are exposed to significant risk and invest more in high-risk

projects. Furthermore, managerial overconfidence has no significant effect on the deviation of operating cash flow and capital productivity. AlinejadSarokolaei et al [3] conducted a study entitled "inflation volatility and overinvestment test with an emphasis on managerial overconfidence." The study looked at investing in companies by considering inflation volatility as well as the effect of managerial overconfidence on the intensity or weakness of this relationship in companies listed on the TSE. The statistical population consists of 193 companies in the period 2011-2015. In this study, the model by Biddle et al [27] was used to test overinvestment. The results indicate the lack of effect of inflation volatility on overinvestment and the direct and significant effect of managerial overconfidence on overinvestment. On the other hand, managerial overconfidence affects the relationship between inflation volatility and overinvestment.

3 Methodology

This is an applied research project in the objective and retrospective quasi-experimental method of data collection in positive accounting research, performed using the probit regression method and econometric models. The statistical population consists of companies listed on TSE for the period 2012-2019. The sample of choice is the companies that meet the following conditions:

1) The company must be listed on the stock exchange before 2012 and be listed on the stock exchange companies until the end of March 2019.
2) The company's fiscal year ends on March 20.
3) The activity or fiscal year has not changed during the mentioned years.
4) Not be part of the investment and financial intermediation companies (investment companies were not included in the statistical population because they are different from other companies in terms of the nature of their activity).
5) The duration of the transaction during the mentioned period should not be more than six months.

Following the above restrictions, 99 companies were selected as examples. The data were extracted from the compressed tablets of the TSE statistical and video archive, the TSE website, and other related databases, as well as the RahavardNovin software. The final analysis of the collected data was performed using Eviews 9 econometric software.

Introducing variables and patterns

To analyze the hypotheses proposed, based on the research conducted by Guo et al [6] and Wang et al [36] the following probit models were designed:

- Nonlinear probit model for H1:

$$\text{Overinvestment}(Y_{it}=1|X'_{it})=\Pr(Y_{it}=1|Y^{*}_{it}>0)=\Phi \quad (1)$$
$$\Big(\delta_0+\delta_1\text{Over\_Confidence}_{it}+\delta_2\text{Sales}_{it}+\delta_3\text{Cash}_{it}+\delta_5\text{Lev}_{it}+\delta_6\text{BM}_{it}+\delta_7\text{ROA}_{it}+$$
$$\delta_8\text{Agency Cost}_{it}+\delta_9\text{Tangibility}_{it}+\delta_{10}\text{Invest\_Oppertunity}_{it}+$$
$$\delta_{11}\text{Own\_Concenteration}_{it}+\int_{-\infty}^{X'_{it}\infty}\left[\frac{1}{\sqrt{2\Pi\Pi}}\right]\text{Exp}\left[\frac{1}{2}\left(\frac{s-\mu}{\sigma}\right)^2\right]\Big)\,ds$$

In Model 1, if the coefficient δ_1 is detected as significant, H1 will be confirmed.

- Nonlinear probit model for H2:

$$\text{Overinvestment}(Y_{it}=1|X'_{it})=\Pr(Y_{it}=1|Y^{*}_{it}>0)=\Phi \quad (2)$$
$$\Big(\delta_0+\delta_1\text{Over\_Confidence}_{it}+\delta_2\text{Over\_Confidence}_{it}\times\text{Exchange Rate}_{it}+\delta_3\text{Sales}_{it}+\delta_4\text{Cash}_{it}+$$
$$\delta_6\text{Lev}_{it}+\delta_7\text{BM}_{it}+\delta_8\text{ROA}_{it}+\delta_9\text{Agency Cost}_{it}+\delta_{10}\text{Tangibility}_{it}+\delta_{11}\text{Invest\_Oppertunity}_{it}+$$

$$\delta_{12}\text{Own\_Concenteration}_{it} + \int_{-\infty}^{x'_{it}\infty}\left[\frac{1}{\sqrt{2\Pi\Pi}}\right]\text{Exp}\left[\frac{1}{2}\left(\frac{s-\mu}{\sigma}\right)^2\right]\Big)\,ds$$

In Model 2, if the coefficient $\delta_1$is detected as significant, H2 will be confirmed.

Table 1: Definition of variables

Variable	Definition
Dependent Variable	
Overinvestment or Underinvestment	Overinvestment or underinvestment is calculated by the absolute value of the negative residuals $-\lvert\varepsilon_{it}\rvert > 0, -\lvert\varepsilon_{it}\rvert < 0$ of the difference between the total investment in financial and capital assets [4].
Independent Variables	
Exchange Rate	Definition: The exchange rate is the value of one country's currency against another country's currency. How to measure: Exchange rate changes (country variables) are extracted through the website of the Statistics Center of Iran. And the process of measuring exchange rate fluctuations is as follows: $\mathbf{Forex\_Rate_{it}} \equiv \left(\frac{\mathbf{Consumer-Price-Index\{USA\}_t}}{\mathbf{Consumer-Price-Index\{I.R.Iran\}}}\right)\otimes\left(\frac{\mathbf{E.IRR_t}}{\mathbf{E.USA_t}}\right)$ The second coefficient indicates the exchange rate of the rial against the US dollar. The exchange rate of one US dollar against the rial of the Islamic Republic of Iran is extracted through the official rate of the Nima system.
$\text{Over\_Confidence}_{it}$	A variable is a function of the two-valued logic that takes 1 if the deviation between (PEPS_{it}) Predicated Earnings Per Shareand (REPS_{it}) Real Earnings Per Shareis positive; otherwise, $(\varepsilon_{it} < 0)$is zero [29]
Control Variables	
Sales	Sales divided by total assets or financial turnover ratio of assets as a measure of the efficiency of management performance in using resources to maximize revenue.
Opt(Cash)	Turnover of operating cash is divided by the total assets of the previous period
Leverage	Financial leverage: debt divided by total assets
BM	The ratio of book value to the market value of property rights
ROA	The return on assets equals the net profit of the company divided by the assets of the last period
Agency cost	Operating cost divided by the total assets of the last period
Tangibility	Fixed assets divided by the total assets of the last period
Investment opportunities	Future investment opportunities are measured by Tobin's Q ratio or the ratio of market value to book value of total assets. $q-\text{tobin} = \frac{(\text{Market Value of Equity})_{it} + (\text{Present Value of Debts})_{it}}{(\text{Book Value of Total Asstes})_{it}}$
Ownership concentration	The number of Single Owner Equity holders in a shareholding structure of the sample companies selected in the study, who own at least one share, or the sole proprietor of the unit alone own at least 5% of the shares.

4 Empirical Results

4.1 Descriptive Statistics

To examine the general characteristics of the variables, to estimate the model, and to analyze them accurately, it is necessary to get acquainted with the descriptive statistics of the variables. Table 2 presents the descriptive statistics of the variables being tested, including some central and scatter indices for a sample of 793 observational companies in the period 2012-2019.

Table 2: Descriptive statistics of research variables

Variable	Mean	Median	Max	Min	SD	Skewness	Kurtosis
OVER_INVESTMENT	0.127475	0	1	0	0.333608	2.234001	5.990759
$\text{Over\_Confidence}_{it}$	0.294554	0	1	0	0.455983	0.901389	1.812502
Exchange	40206.78	32800	107832	12047	26743.95	1.841411	5.260349
SALE	0.524166	0.483927	6.32997	-0.00382	0.61928	6.37626	49.2187
CASH	0.134156	0.109133	0.599432	-0.49012	0.141745	0.521376	4.153894
LEVERAGE	0.569026	0.583429	0.997751	0.012734	0.225688	0.288575	4.943143
BM	1.468015	1.019442	22.60137	0.050937	1.526885	4.546362	42.17867
ROA	0.072896	0.049073	0.67914	-0.40446	0.107817	1.492602	7.836729
AGENCYCOST	0.386327	0.265431	7.105432	0	0.496113	5.983727	61.30699
TANGIBILITY	0.262816	0.222565	0.932981	0	0.189368	0.784977	2.940814
INV_OPPORTUNITIS	1.311231	0.98093	19.632	0.044245	1.269618	4.64978	46.09687
OWNERSHIP_CONSTRANTION	3.529703	3	8	1	1.837109	0.318901	2.155384

The mean, standard deviation, skewness, kurtosis, and Jarque-Bera test statistic are shown in Table 2. Among the research data, the highest mean and standard deviation is related to the exchange rate with 40206.78. The lowest standard deviation is related to return on assets with 95.26743. The highest skewness is related to operating costs with +98.5. Finally, most kurtosis is related to operating costs, clearly indicating its very scattered distribution. The rest of the variables have concentrated distribution with low skewness and kurtosis. The growth in sales of companies funded by investment funds with kurtosis and skewness is roughly scattered and noticeable. The reliability test of the variables was performed before using the regression method, with the results presented in Table 3.

Table 3: Variable reliability test results

Variable	Unit Root Test	$\chi 2$ statistic	P – Value	Result
$\text{Over\_Confidence}_{it}$	Augmented Dickey-Fuller	1009.4	0.0000	static– I(1)
Exchange	Augmented Dickey-Fuller	1155.01	0.004	static– I(0)
SALE	Augmented Dickey-Fuller	1128.13	0.0000	static– I(1)
CASH	Augmented Dickey-Fuller	2019.43	0.0000	static– I(1)
CONSTRIANT	Augmented Dickey-Fuller	1663.74	0.0000	static– I(1)
LEVERAGE	Augmented Dickey-Fuller	1826.32	0.0000	static– I(1)
BM	Augmented Dickey-Fuller	8201.38	0.0000	static– I(1)
AGENCYCOST	Augmented Dickey-Fuller	1329.49	0.0004	static– I(0)
ROA	Augmented Dickey-Fuller	1318.87	0.0000	static– I(1)
TANGIBILITY	Augmented Dickey-Fuller	37.1527	0.0000	static– I(1)
INV_OPPORTUNITIS	Augmented Dickey-Fuller	335.331	0.0000	static– I(1)
Over_Investment	Augmented Dickey-Fuller	1092.51	0.0000	static– I(1)

can be seen, all variables are stable either at the surface or with a single differentiation. Therefore, it can be concluded that the use of the regression method is unrestricted. According to the methodology, according to the procedure of calculation and classification of companies into two types, companies with overinvestment (1) and companies without overinvestment (0), probit regression has been used. Based on the results, the research hypotheses were tested.

First Hypothesis

H1: CEO overconfidence has a significant impact on investment bias in companies listed on

TSE. The following model is used to measure it:

$$\text{Overinvestment}(Y_{it}=1|X'_{it}) = \Pr(Y_{it}=1|Y^{*}_{it}>0)$$
$$= \Phi\Bigg(\delta_0 + \delta_1 \text{Over\_Confidence}_{it} + \delta_2 \text{Sales}_{it} + \delta_3 \text{Cash}_{it} + \delta_5 \text{Lev}_{it} + \delta_6 \text{BM}_{it} + \delta_7 \text{ROA}_{it}$$
$$+ \delta_8 \text{Agency Cost}_{it} + \delta_9 \text{Tangibility}_{it} + \delta_{10} \text{Invest\_Oppertunity}_{it} + \delta_{11} \text{Own\_Concenteration}_{it}$$
$$+ \int_{-\infty}^{X'_{it}\infty} \left[\frac{1}{\sqrt{2\Pi\Pi}}\right] \text{Exp}\left[\frac{1}{2}\left(\frac{s-\mu}{\sigma}\right)^2\right]\Bigg) ds$$

Table 4: Estimation results by probit method (dependent variable: corporate overinvestment)

Variable	Coefficient	z-statistic	Probability of Rejecting Significance
Over_Confidence	1.552618	11.78586	0.0000
SALE	-3.88786	-2.23859	0.0166
CASH	-0.43221	-0.54381	0.6908
LEVERAGE	-1.78762	-3.32336	0.0000
BM	-0.35523	-3.81327	0.0001
ROA	2.812456	1.606298	0.1082
AGENCYCOST	2.457539	2.066475	0.0388
TANGIBILITY	-0.65499	-2.87532	0.0074
INV_OPPORTUNITIS	-0.8786	-3.4675	0.0000
OWNERSHIP_CONSTRANTION	-0.3435	-2.87438	0.0001
Hosmer-Lemeshow test statistic(H − L) (P − VALUE)	Chi-Sq(8)=13.0646 (0.1096)		

According to the results of estimating the H1 test model with overinvestment as a dependent variable, in the goodness of fit test of the model, i.e., Hosmer-Lemeshow, H0 of no significant difference between the estimation and experimental values of the variable has a two-sentence distribution. The goodness of fit of the model is confirmed if the H0 of these tests is not rejected. According to the table, the probability of this test is above 5%, indicating the goodness of fit of the above probit model. Furthermore, the managerial overconfidence coefficient (MANEGERAL_OVER) indicates a significant positive relationship between this coefficient and overinvestment.

First Hypothesis

H2: Exchange Rate exacerbates the impact of CEO overconfidence on corporate overinvestment in TSE. The following model is used to measure it:

$$\text{Overinvestment}(Y_{it}=1|X'_{it}) = \Pr(Y_{it}=1|Y^{*}_{it}>0)$$
$$= \Phi\Bigg(\delta_0 + \delta_1 \text{Over\_Confidence}_{it} + \delta_2 \text{Over\_Confidence}_{it} \times \text{Exchange Rate}_{it}$$
$$+ \delta_3 \text{Sales}_{it} + \delta_4 \text{Cash}_{it} + \delta_6 \text{Lev}_{it} + \delta_7 \text{BM}_{it} + \delta_8 \text{ROA}_{it} + \delta_9 \text{Agency Cost}_{it}$$
$$+ \delta_{10} \text{Tangibility}_{it} + \delta_{11} \text{Invest\_Oppertunity}_{it} + \delta_{12} \text{Own\_Concenteration}_{it}$$
$$+ \int_{-\infty}^{X'_{it}\infty} \left[\frac{1}{\sqrt{2\Pi\Pi}}\right] \text{Exp}\left[\frac{1}{2}\left(\frac{s-\mu}{\sigma}\right)^2\right]\Bigg) ds$$

Table 5: Estimation Results by Probit Method (Dependent Variable: Corporate Overinvestment)

Variable	Coefficient	z-statistic	Probability of Rejecting Significance
Over_Confidence × Exchange Rate	1.357695	12.196646	0000.0
SALE	-2.62177	-1.99109	0.0465
CONSTRIANT	0.204888	11.6757	0000.0
CASH	-0.32373	-0.60714	0.5438
LEVERAGE	-1.49377	-3.9996	0.0001
BM	-0.28208	-3.58403	0.0003
ROA	1.670985	1.392846	0.1637
AGENCYCOST	2.424927	1.824989	0.068
TANGIBILITY	-0.87468	-2.47301	0.0134
INV_OPPORTUNITIS	-0.41317	-4.33877	0000.0
OWNERSHIP_CONSTRANTION	-0.12521	-3.57227	0.0004
Hosmer-Lemeshow test statistic(H − L) (P − VALUE)	Chi − Sq(8)=12.7261 (0.1216)		

According to the results of estimating the H2 test model with overinvestment as a dependent variable, the probability values of the Hosmer-Lemeshow test are above 5%, indicating the goodness of the fir of the above probit model. Furthermore, the coefficient of managerial overconfidence's effect on Exchange Rate at a 95% confidence level has an error of less than 0.05%. Accordingly, H2 was confirmed, and it was found that Exchange Rate exacerbates the impact of CEO overconfidence on corporate overinvestment in TSE.

5 Conclusion

Individual performance is influenced by psychological characteristics, particularly perceptual ones, which may divert the process of decision-making from its rational foundations into a biased phase. Perceptual bias is an inner state accompanied by wild estimation and biased judgment. The present study aims at identifying the effect of CEO's perceptual biases in judgment and economic decision-making within a sample of firms listed on the Tehran Stock Exchange during the years 2012-2019. To recognize the various dimensions of CEO's perceptual biases, the study adopts a critical appraisal approach to detect the measures and indices of perceptual biases and qualitative specifications of financial reporting.The Purpose of this study CEO Overconfidence and Overinvestment by Role of Economic moderators Tehran Stock Exchange (TSE). CEO are incapable of predicting the price of their products and similar products, as well as choosing between producing more or postponing new investments. In other words, managerial overconfidence depends not only on the attributes of managers such as overconfidence but also on external environmental factors such as inflation volatility.

Exchange Rate is considered as one of the most important external factors in companies when making investment decisions. Uncertainty is seen as one of the economic dimensions, including primary monetary targets, in the form of a reserve fund that the central bank is trying to minimize. Increased inflation can sometimes lead to changed managers' expectations of future uncertainty inflation; consequently, such uncertainty affects managers' ability to predict price changes accurately. When product prices change, managers cannot predict the prices of their own products, complementary products, and competitive products. Therefore, they cannot decide whether or not to delay production, postpone investment, or sign short-term contracts to reduce investment altogether. Thus, Exchange Rate can reduce corporate investment. However, it is unclear whether companies will consider it when making investment decisions because it has a significant impact on the scale of production and large-scale projects.

The results of this section are consistent with those obtained by Heaton [29], Malmendier& Tate [30] and Shamsi et al [5]. Furthermore, according to H2, Exchange Rate exacerbates the impact of CEO overconfidence on corporate overinvestment in TSE. According to the results, CEOs are recommended to abandon optimism about macroeconomic risks such as inflation and consider it as a warning for investment inefficiency, such as overinvestment. This is because Exchange Rate leads to phenomena such as the sales downturn and the disturbed expected profitability of mixed projects. Hence, it is crucial to have reasonable expectations instead of adapting to past trends under such conditions. As noted earlier, it is advisable to choose financing methods based on stock issuance rather than using debt-based methods under inflationary conditions.Results this research show that managerial overconfidence leads to company's over-investment. When listed companies successfully raise large sum of funds from the capital market, overconfident managers are more likely to over-invest by overestimating potential returns or underestimating potential risks of new projects.

Therefore, some projects with negative NPV are approved with being noticed. In this sense, listed companies shall establish rigorous and effective mechanisms for investment management to prevent possible damage to the interests of shareholders and other stakeholders as a result of overconfident managers' over-investment. This is especially important for state-owned and state-controlled companies in which the principal-agent chain is usually too long to make the detection of over-investment behaviors quite difficult. Finally, To the extent that CEO overconfidence (and other potential biases) matter, then some approaches to corporate governance will be more robust than others. Providing equity-linked compensation may mitigate traditional misalignment of CEO incentives but is unlikely to affect the choices of biased managers, who already believe they are maximizing value.Regarding the results, more dynamic monitoring mechanisms are recommended to be applied to control the CEOs' cognitive skills to finally hire the most competent one. These mechanisms may reduce the agency costs through controlling the CEOs' self-interested incentives, and protect the shareholders and investors' incentives to create an appealing marketplace to them. Likewise, such initiatives as the development of a financial performance evaluation system, which encompasses various dimensions including financing and trade credit, the development of monitoring mechanisms for choosing investment projects using expert consultants, the establishment of certain policies to attract external investments via solidifying the economic infrastructures, educating employees and giving periodical exams to make sound predictions about the future of the corporate decisions are suggested to be implemented to mitigate the CEO's perceptual biases in economic decision-making and judgment.

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