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Research Paper

The Role Of Effective Variables On The Relationship Between Tax Avoidance And Investment Efficiency

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ABSTRACT

The present study explained the effective components' role in the relationship between investment efficiency and tax avoidance. The study's statistical population is the firms listed on the Tehran Stock Exchange. Using the systematic elimination sampling method, 128 firms were selected as the research sample in the 8 years between 2014 and 2021. Data for measuring the variables were collected from the Codal website and the firms' financial statements; preliminary calculations were made in Excel; then, the research hypotheses were analysed and tested using a multivariate regression model with panel data in Stata and Eviwes software. The results show that tax avoidance has a negative effect on investment efficiency. Also, the comparability and readability of financial statements have an inverse effect on the relationship between tax avoidance and investment efficiency. It can be concluded that the comparability and readability of financial statements weaken the inverse relationship between tax avoidance and investment efficiency. Other findings showed that the firm's information environment has a direct and significant effect on the relationship between tax avoidance and investment efficiency, and competitive power does not significantly affect the relationship between tax avoidance and investment efficiency.

1 Introduction

In the current century, the intensity of completion and its induced complexities and uncertainties has been increased thus has led firms to become more sensitive to spending their financial and non-financial resources so that they do their best to spend the resources on projects create value for the company [4]. Following the new classic theory, firms are required to undertake all positive net present value projects and refrain from engaging in negative net present value projects. They also need to conduct certain investment to maximize their values until the equilibrium level of income-expenditure is achieved [3]. Effective investment can cause sustainable economic growth and development in today's commercial and economic environments. Managers with an optimal level of investment can create maximum efficiency and provide the interests of shareholders by taking advantage of profitable opportunities. Investment has always been considered one of the main ways to develop firms and prevent a recession. It should be noted that resource limitations have made investment efficiency very important in addition to the amount of investment. Investment efficiency is achieved when the firm

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invests only in projects with positive net present value. When there are weak corporate governance or agency problems and the manager's access to external resources is limited, the probability of investing in positive net present value projects decreases [11].

One of the characteristics of successful firms is their competitive power. Competitive power is defined as the firm's economic ability to maintain its share in international markets or increase its share in the market. The competitive environment has an essential informational role that can improve investment efficiency [46]. Firms operating in a highly competitive business environment avoid taxes to reduce costs and focus on supporting the firm's survival during the market competition [39]. Tax avoidance is a type of tax management that is legally allowed [62] and is considered a tool to reduce taxes. Tax avoidance increases available funds, creating wealth for shareholders or increasing agency problems [29]. On the other hand, if the firm's accounting system and financial statements are more comparable with other firms, market participants such as analysts, investors, and legislators can more accurately evaluate the firm's economic performance. Since increasing comparability reduces the final cost for shareholders to acquire and process accounting information of similar firms [20]. In other words, if the firm's comparability is high, its accounting environment becomes so transparent that managers lose their motivation to hide the firm's real performance [17]. argue that accounting comparability reduces the cost of information acquisition and increases the overall quantity and quality of information available to decision-makers. This should help firm managers to make better investment decisions and be more efficient in research and development investments. Comparability significantly reduces the firm's cash assets. Accordingly, higher comparability of financial statements is expected to be associated with higher financial reporting transparency and less information asymmetry, reducing the cost of tax avoidance.

The readability of financial reporting is defined as 'transparency and comprehensibility of financial information, which helps to understand the numbers and figures included in the financial statements and is of great importance. In other words, the readability of financial statements provides valuable information about the firm's financial performance. The theory of managerial ambiguity states that managers with less ability have a greater incentive to reduce the transparency of the information environment and hide their managerial weakness to reduce the capital market's adverse reaction. One of the methods of reducing the transparency of the information environment to hide the firm's bad news is to present complex and less readable financial reports [41]. According to agency theory, agency problems can create a weak firm information environment [60]. As the conflict of interests between managers and owners increases, information asymmetry will increase, and the information environment will become inappropriate. The increase in the quality of the information environment will indicate the improvement of the supervisory mechanisms and, as a result, the reduction of opportunistic managers' behavior. In addition, according to agency theory, the quality of the firm's information environment reduces managers' opportunistic behaviors. Considering that the supervisory role of the information environment may replace or supplement the role of other supervisory tools, it is expected that the relationship between corporate tax avoidance and investment efficiency will be affected and modified by the quality of the information environment.

This research examines the role of effective variables in the relationship between investment efficiency and tax avoidance. This research is new and innovative research by studying the impact of tax avoidance on investment efficiency, along with examining the moderating role of comparability and readability of financial statements, information environment and competitive power of firms listed in the Tehran stock exchange. And it can help develop theoretical foundations and determine the role of

tax avoidance in the investment efficiency of firms. The results of this research contribute to the literature on the issues and lead to an increase in the attention of researchers on the subject of investment and discussing its efficiency and inefficiency in the future and will be helpful in the investment decisions of managers and owners.

2 Theoretical Foundations And Development Of Hypotheses

2.1 Tax Avoidance And Investment Efficiency

Considering the developments of the world today, especially in the developing countries that are facing many threats, these countries, to solve their economic problems, need appropriate solutions for better use of God-given resources. They are themselves. In this regard, one essential solution is investment development [59]. Considering the limited resources and investment development issue, increasing investment efficiency is one of the most important issues [45]. The imperfections in the capital market, such as ‘agency problems’ and ‘information asymmetry’, hinder investment efficiency and result in either overinvestment or underinvestment [5]. agency problems affect the efficiency of investment due to the selection of weak projects and cause an increase in financing costs.
The information asymmetry between the firm and the investor can prevent efficient investment [40]. Tax avoidance represents a continuous and sustainable strategy in financial planning, which includes completely legal activities [2] and reflects agency theory, which can lead to tax decisions and pursue the manager's personal interests. One of the challenges facing shareholders and the board of directors are finding control methods and incentives to minimize agency costs [32]. [18] believe that managers who seek their own interests make the firm structure more complex and make transactions that reduce taxes. In this way, they use the firm's resources for their own interests, which leads to non-optimal investments. They believe that strong tax officers increase the monitoring of the managers' work and reduce the abuse of the firm's internal resources. [28] believe that tax avoidance reduces the marginal benefits of the interest tax shield and affects capital structure decisions. [32] argue that the separation of ownership from management creates agency problems and encourages managers to make decisions that may be detrimental to the firm and shareholders. Giving more authority to management can lead to opportunistic behaviour on his part. In part of the research conducted in the agency theory framework, the results show that opportunistic managers use tax avoidance techniques and methods in their personal interest [18]. [19] state that tax avoidance increases the over-investment problem. Indeed, firms may be exposed to an overinvestment problem when managers forego investments that generate positive net present value through tax avoidance. [53] found that the inefficiency of investment in the labour force has positive effects on tax avoidance and can play an essential role in the tax decisions of firms. Also, a positive (negative) relationship exists between more (less) investment in labour and tax avoidance. According to researchers such as (See [62],[5]) there is a positive relationship between tax avoidance and investment inefficiency. [51] investigated the effect of tax avoidance on investment efficiency. According to their findings, increasing tax avoidance reduces the investment efficiency of the firm. [8] found that as tax avoidance increases, overinvestment also increases. So Based on the above discussions, the first hypothesis is formulated as follows:
H1: There is a positive relationship between corporate tax avoidance and investment efficiency

2.2 Information Environment And Investment Efficiency

The transition from the age of industry to the age of information has highlighted the role of infor-

mation in the decision-making process. In such an era, information is considered a valuable commodity, access to which creates a competitive advantage [35]. [61] believes that the information environment refers to the outside the organization that the organization always seeks to clarify and reduce its ambiguity. According to agency theory, the conflict of interests between managers and owners due to the separation of ownership and management leads to representation issues that can create a weak firm information environment [60]. Undoubtedly, with the increase in the conflict of interests, the level of information asymmetry will increase, and the information environment will become inappropriate and weaker. An improper and weak information environment and information asymmetry can make investors unwilling to participate in the capital market, prevent the optimal allocation of resources, and increase the firm's cost of capital. Asymmetry is a characteristic of the information environment, which can be used to measure the information environment of a business entity. Studies have shown that the problem of information asymmetry and a weak information environment will be more severe in firms with more growth opportunities [15]. As a result, a secure information environment for investment and reducing information asymmetry is considered one of the characteristics of a good business where managers work for the interests of shareholders. In addition, in such an environment, managers tend to increase the firm's value through efficient investments [58].

A high-quality information environment improves the coordination of information between different businesses and will ultimately make firm's tax planning more efficient. On the other hand, Firms with a high-quality information environment are in a better position to more easily identify transactions with higher tax benefits, which may enable them to avoid more taxes [34]. In addition, according to the agency theory, the quality of the information environment of firms leads to a reduction in the opportunistic behaviour of managers and affects the relationship between tax avoidance and investment efficiency [25]. So Based on the above discussions, the second hypothesis is formulated as follows:

H2: the information environment moderates the association between tax avoidance and investment efficiency.

2.3 Competitive Power And Investment Efficiency

[56] consider competitive power as the ability of a firm to sell products profitably. In other words, for a firm to compete, it must offer its products at a lower price and higher quality. One of the factors influencing efficient investment is the firm's competitive and supervisory ability. High competitive power improves the monitoring of investment decisions by reducing investment - when managers tend to invest more - and facilitates access to cheap foreign financing through increasing investment - when managers tend to invest less [26]. The more the firm can produce a cheaper and better quality product with special features and has reached near-monopoly conditions, the more tax avoidance behavior it will carry out. Product market power can increase tax avoidance activities because product market power leads to greater profitability, which can be invested in acquiring tax avoidance knowledge. Also, Product market power helps insulate the firm from negative cash flow shocks by passing these shocks on to consumers by increasing product prices (See [31],[49]). Therefore, product market power provides a natural economic environment of more resources and immunity from negative cash shocks; as a result, such firms can engage in tax avoidance activities with less concern about the negative consequences of unsuccessful tax planning. On the other hand, the less competition there is between firms or the firm is in a monopoly situation, the less it will engage in tax avoidance activities. Generally, firms under more competitive pressure have more incentive to avoid paying taxes to preserve financial resources for emergencies and investment when necessary. Therefore, firms in

more competitive industries and a relatively low position should have a stronger incentive to avoid paying taxes [14]. [33] investigated the relationship between product market competition and investment efficiency and concluded that improving product market competition improves investment efficiency. Also, [13] showed that the relationship between product market competition and investment efficiency is stronger for firms with more information asymmetry. In addition, [5] showed that product market competition mediates the association between corporate tax avoidance and investment inefficiency. So Based on the above discussions, the third hypothesis is formulated as follows:
H3: Product market competition moderates the association between corporate tax avoidance and investment efficiency.

2.4 Financial Statement Comparability And Investment Efficiency

The objective of general-purpose financial reporting is to provide users with information that enables them to assess the amount, timing, and uncertainty of a firm's future net cash flow [48]. The FASB [24] states that information is most likely to satisfy this objective when it can be readily compared with similar information reported by other entities and by the same entity in other periods. On the other hand, Comparability refers to the quality of information that allows users to identify similarities and differences in the firms' financial statements. Comparability is essential for investors in capital and debt markets because their investment and lending decisions are based on evaluating alternative opportunities or projects, and these decisions cannot be made without this comparable information. Accounting comparability is enhanced when accounting numbers reflect economic events properly [5]. Recent studies on comparability show that the comparability of a firm's financial statement can reduce users' costs for acquisition and processing and increase the quality of financial information (See [17], [9], [38] and [16]). In addition, the comparability of financial statements provides criteria for detecting tax fraud. It reduces the costs of acquiring and processing information for the tax authority and provides the opportunity to make a more appropriate assessment of the financial information related to the firm's taxable transactions by comparing the firm's financial information. This way, identifying tax avoidance activities is improved [57]. Therefore, it is expected that higher financial statement comparability is associated with higher financial reporting transparency and lower information asymmetry, which in turn lower the agency cost of tax avoidance [5] and reduce the ability and motivation of managers for tax avoidance (See [55], [53]). Based on this, [57] provided evidence of a negative relationship between a firm's comparability of financial statements and tax avoidance. So Based on the above discussions, the fourth hypothesis is formulated as follows:
H4: Financial statement comparability moderates the association between corporate tax avoidance and investment efficiency.

2.5 Readability Of Financial Statements And Investment Efficiency

One of the critical factors for obtaining comprehensible information is that a person can read a text correctly and process the available information easily. This concept is called readability [6]. [52] believes that the low readability of financial statements leads investors to assess the information as unreliable and react less to it. On the other hand, investors tend to invest in firms whose financial statements are more transparent, legible and accurate. Managers use certain styles to present their financial reports; when presenting a good performance report, they try to publish more readable financial statements. Despite this, most managers try to hide their poor performance by presenting ambiguous information in the firm's annual reports. Suppose the managers intend to cheat on the financial state-

ments. In that case, they publish more complicated and less readable financial reports to hide their opportunistic behaviour and reduce the possibility of its detection by investors, financial analysts and other legal entities [41]. Based on this argument, [42] stated that firms with less readable financial reports are more likely to commit fraud in financial statements than other firms. Similarly, [12] also provided evidence of a negative relationship between the readability of a firm's financial reporting and the possibility of fraud. Considering that tax avoidance benefits firms, financial reports may be published in a complicated manner to prevent the discovery of facts. Therefore, it is expected that the more comprehensible and readable the firms' financial reports are, the less the possibility of tax avoidance [63]. [36] found that tax aggressiveness will decrease with increased readability of financial reports. [50] stated that tax planning activity reduces financial reporting transparency. In other words, it can be said that tax planning activity is required for masking complex transactions. This negatively affects the information environment of the firms and reduces the readability of financial reporting. So Based on the above discussions, the fifth hypothesis is formulated as follows:

H5: Financial statement readability moderates the association between corporate tax avoidance and investment efficiency.

3 Research Methodology

3.1 Sample

The statistical population of this research consists of all the firms listed on the Tehran Stock Exchange (TSE). Sampling was done by systematic elimination, whereby all firms in the statistical population that met the following criteria were included in the sample:

1. Not being or being part of any bank, financial institution, investment firm, holding firm, or leasing firm (because, given the nature of activities of these firms, the studied variables will have unique relationships that cannot be generalized to other firms).
2. Being listed on the Tehran Stock Exchange before March 2013 and remaining listed from March 2013 to March 2020.
3. . Availability of the firm information between March 2014 and March 2020.
4. No change in the financial reporting period.

After eliminating the firms that did not meet these criteria, 128 firms were included in the statistical sample.

3.2 Research Models

The models are estimated using panel data and ordinary least squares (OLS) regression. The hypotheses are tested using the following equations. Equations (1), (2), (3), (4) and (5) test the first, second, third, fourth and fifth hypotheses, respectively:

$$\begin{aligned} Efficiency_{i,t} = {} & \beta_0 + \beta_1 TAX_{it} + \beta_2 SIZE_{it} + \beta_3 MTB_{it} + \beta_4 ZScore_{it} + \beta_5 Tangible_{it} \\ & + \beta_6 DIV_{it} + \beta_7 Age_{it} + \beta_8 Loss_{it} + \beta_9 LEV_{it} + \beta_{10} CFO5SD_{it} \\ & + \beta_{11} SALE5SD_{it} + \beta_{12} inst_{it} + \beta_{13} Cash_{it} + \beta_{14} OP_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} Efficiency_{i,t} = {} & \beta_0 + \beta_1 Tax_{it} + \beta_2 IE_{it} + \beta_3 (Tax_{it} * IE_{it}) + \beta_4 SIZE_{it} + \beta_5 MTB_{it} \\ & + \beta_6 ZScore_{it} + \beta_7 Tangible_{it} + \beta_8 DIV_{it} + \beta_9 Age_{it} + \beta_{10} Loss_{it} \\ & + \beta_{11} LEV_{it} + \beta_{12} CFO5SD_{it} + \beta_{13} SALE5SD_{it} + \beta_{14} inst_{it} + \beta_{15} Cash_{it} \\ & + \beta_{16} OP_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

$$Efficiency_{i,t} = \beta_0 + \beta_1 Tax_{it} + \beta_2 \text{AbilityCom}_{it} + \beta_3 (Tax_{it} * \text{AbilityCom}_{it}) + \beta_4 SIZE_{it} + \beta_5 MTB_{it} + \beta_6 ZScore_{it} + \beta_7 Tangible_{it} + \beta_8 DIV_{it} + \beta_9 Age_{it} + \beta_{10} Loss_{it} + \beta_{11} LEV_{it} + \beta_{12} CFO5SD_{it} + \beta_{13} SALE5SD_{it} + \beta_{14} inst_{it} + \beta_{15} Cash_{it} + \beta_{16} OP_{it} + \varepsilon_{it} \quad (3)$$

$$Efficiency_{i,t} = \beta_0 + \beta_1 Tax_{it} + \beta_2 Comp_{it} + \beta_3 (Tax_{it} * Comp_{it}) + \beta_4 SIZE_{it} + \beta_5 MTB_{it} + \beta_6 ZScore_{it} + \beta_7 Tangible_{it} + \beta_8 DIV_{it} + \beta_9 Age_{it} + \beta_{10} Loss_{it} + \beta_{11} LEV_{it} + \beta_{12} CFO5SD_{it} + \beta_{13} SALE5SD_{it} + \beta_{14} inst_{it} + \beta_{15} Cash_{it} + \beta_{16} OP_{it} + \varepsilon_{it} \quad (4)$$

$$Efficiency_{i,t} = \beta_0 + \beta_1 Tax_{it} + \beta_2 FOG_{it} + \beta_3 (Tax_{it} * FOGRead_{it}) + \beta_4 SIZE_{it} + \beta_5 MTB_{it} + \beta_6 ZScore_{it} + \beta_7 Tangible_{it} + \beta_8 DIV_{it} + \beta_9 Age_{it} + \beta_{10} Loss_{it} + \beta_{11} LEV_{it} + \beta_{12} CFO5SD_{it} + \beta_{13} SALE5SD_{it} + \beta_{14} inst_{it} + \beta_{15} Cash_{it} + \beta_{16} OP_{it} + \varepsilon_{it} \quad (5)$$

3.3. Research Variables

Dependent Variable: Investment Efficiency

Following [54], investment efficiency is measured by multiplying the residual of the following model by (-1).

$$Inv_{i,t} = \alpha_0 + \alpha_1 Grow_{i,t-1} + \sum jControl_{j,i,t-1} + \varepsilon_{i,t} \quad (6)$$

Where:

$Inv_{i,t}$: Change in net fixed assets, long-term investment and intangible assets divided by average assets of the yeart-1.

$Grow_{i,t-1}$: Annual revenue growth rate of the yeart-1.

Control j, i, t-1: Control variables that are:

$Size_{i,t-1}$: Natural logarithm of stock market value in yeart-1.

$Lev_{i,t-1}$: Liabilities divided by total assets for firm i in yeart-1.

$Age_{i,t-1}$: The logarithm of the number of years between the time of establishment and the current year for firm i in yeart-1.

$Cash_{i,t-1}$: Ratio of cash and cash equivalents to average assets in year t-1.

Reti, t-1: Return on annual shares purchased and maintained by i firm in year t-1.

Independent Variable: Tax Avoidance

This study uses the effective tax rate (ETR) to measure tax avoidance.

$$ETR_{i,t} = \frac{TTE_{i,t}}{PTE_{i,t}} \quad (7)$$

Where:

$ETR_{i,t}$: Effective corporate tax rate i in t.

$TTE_{i,t}$: Total tax expense of firm i in year t.

$PTE_{i,t}$: earning before tax for firm i in year t.

The effective tax rate is multiplied by (-1) to measure tax avoidance.

Moderating Variables:

- **Comparability**

Following [17], two firms are considered the same when they have provided the same financial report (e.g. accounting profit) for a set of similar economic events (such as returns). To measure the compa-

rability between the two firms i and j, first, for each firm-year, the regression model is estimated using time series data for the last four years ending in year t.

$$Earning_{i,k} = \alpha_{i,k} + \beta_{i,k} Return_{i,k} + \varepsilon_{i,k} \quad (8)$$

Earning_ (i, k): net earnings for firm i in the year k divided by the firm stock market value

Return_ (i, k): the return of shares of the firm i.

The estimated coefficients ($\alpha\hat{}_i$ and $\beta\hat{}_i$) and ($\alpha\hat{}_j$ and $\beta\hat{}_j$) refer to the accounting functions of firm i and firm j, respectively. In measuring the similarity of accounting functions between firm i and firm j, [17] assume that firm i and firm j have the same return, i.e. they experience the same economic events (Return). They compute the accounting reactions of firms i and j to the same economic phenomena (RETURN$iiii$) as follows

$$E(Earning)_{ii,k} = \alpha_i + \beta_i Return_{i,k} \quad (9)$$

$$E(Earning)_{ij,k} = \alpha_j + \beta_j Return_{i,k} \quad (10)$$

where $E(Earning)_{ii,k}$denotes the forecast earnings of firm i given the firm i's accounting function and the returns of firm i in year t. $E(Earning)_{ij,k}$is the forecast earnings of firm j given the firm j's accounting function and firm i's returns in year t. Following [17], the comparability score between firm i and firm j (ComAcc) is computed as follows:

$$ComAcc_{ij,t} = -1/4 \sum \left| E(Earmimg)_{ii,k} - E(Earning)_{ij,k} \right| \quad (11)$$

Greater values of ComAcc indicate the smaller difference between $E(Earning)_{ii,k}$and $E(Earning)_{ij,k}$, that is, higher financial statement comparability between firms i and j [17].

- **Readability Of Financial Statements**

Following [30], [1] and [55], the readability of financial reporting is measured by Fogg's index, which is a function of two variables: sentence length (in terms of words) and complex words (defined as the number of words with three or more segments), which is calculated as follows:

Fog index = 0.4 (Average number of words per sentence + percentage of complex words)

The process and method of determining the level of readability of financial reports in the above index are as follows:

1) selecting a sample of one hundred words from the beginning, one sample of one hundred words from the middle and one sample of one hundred words from the end of the report.

2) Counting the number of sentences in each of the samples.

3) Determining the average length of the sentences by dividing the number of words by the number of complete sentences in each sample of one hundred words.

4) Counting the number of three-syllable and more than three-syllable words in each of the 100-word texts.

5) Adding the number of complex words with the average number of words in the sentences.

6) Multiplying the sum of the number of difficult words and the average number of words in the sentences with a fixed number of 0.4.

7) Performing steps 4, 5, and 6 for two more samples of one hundred words.

8) Calculate the average results of all three samples.

The relationship between the FOG index and the ability level is as follows: FOG>18 means the text is not readable and is very complex, 18-14 (difficult text), 14-12 (suitable text), 12-10 (acceptable text)

and 8-10 (easy text).

- **Information Environment**

According to [21], the following proposed model is presented to calculate the information environment:

$$IEI_{it} = \sum_{s\in S} W_{s\,it}\ \frac{P_{s\,it}}{\max\limits_{1\le i\le N}\{P_{s\,it}\}} + \sum_{k\in K} W_{k\,it}\ \frac{\max\limits_{1\le i\le N}\{P_{k\,it}\}-P_{k\,it}}{\max\limits_{1\le i\le N}\left\{\max\limits_{1\le i\le N}\{P_{k\,it}\}-P_{k\,it}\right\}} \tag{12}$$

Where:

IEI_{it} = the information environment index of firm i in year t.

N= Number of firms.

S= Index set of factors directly related to the information environment.

K= Index set of factors indirectly related to the information environment.

W_{jit}= the weight of the factor j of the firm i in the year t.

P_{jit}= the value of the factor j of the firm i in the year t.

If M is the total number of factors affecting the information environment, then M=| S|+| K|. Where | S| Indicates the number of elements in the S set and | K| Indicates the number of K set elements.

- **Competitive Power**: the ratio of the firm's sales to the industry's total sales.

Control Variables

- SIZE: natural logarithm of the total firm assets
- Qtobin ratio (MTB): the ratio of the market value of assets to the book value of the assets of firm i in the year t.
- Z-SCORE refers to financial distress using Altman's (1968)
- Fixed assets (Tangible): the ratio of tangible fixed assets to total assets.
- Dividend (DIV): the dividend ratio to net earnings per share.
- Firm Age: the natural logarithm of the firm's life from the year of establishment to the current year [22].
- Loss: If the firm had a loss in the previous year equal to one, otherwise zero.
- Financial leverage (LEV): the ratio of total debt to total assets.
- The standard deviation of cash flows (CFO5SD): the standard deviation of a firm's scaled operating cash flows computed over the prior five years.
- Standard Deviation of Sales Growth (SALE5SD): the standard deviation of a firm's sales growth (Changes in sales compared to the previous year's sales) over the prior five years.
- Institutional ownership (inst): Institutional ownership includes the number of ordinary shares of the firm that are available to institutional investors (big investors such as banks, insurance firms and investment firms) divided by the total number of ordinary shares of the firm at the end of the financial period.
- Cash: the ratio of cash and short-term investments to total assets.
- The ratio of accounts receivable to sales (OP): the ratio of accounts receivable to a firm's sales

4 Findings

4.1 Descriptive Statistics

In order to examine the general characteristics of the variables and their precise analysis, it is necessary to be familiar with the descriptive statistics related to the variables. Table 1 shows the descriptive statistics of the data related to the variables used in the research.

Table 1: descriptive statistics of research variables

maximum	Minimum	Standard Deviation	Average	Number	Symbol	Variable name
-0/0016	-0/68	0/117	-0/091	1024	Efficiency	Investment efficiency
0	-0/317	0/085	-0/1005	1024	Tax	Tax avoidance
-0/0003	-0/473	0/068	-0/0742	1024	Comp	Comparability
25	8	4/885	16/79	1024	FOG	Readability of financial statements
20/768	11/161	1/435	14/615	1024	SIZE	Firm size
11/344	0/691	1/55	2/304	1024	Qtobin	Qtobin ratio
0/499	-0/776	0/123	-0/0112	1024	ZScore	
0/782	0/203	0/166	0/244	1024	Tang	Fixed assets
0/989	0	0/287	0/297	1024	DIV	Dividends
4/234	2/564	0/358	3/625	1024	Age	Firm age
1/132	0/031	0/207	0/564	1024	Lev	Financial Leverage
0/372	0/0055	0/048	0/082	1024	CFOSTD	The standard deviation of cash flow
0/964	0/0053	0/176	0/33	1024	SaleSTD	The standard deviation of sales growth
0/95	0/06	0/180	0/708	1024	Inst	Institutional ownership
0/49	0/002	0/090	0/05	1024	Cash	Cash
0/96	0/0059	0/264	0/357	1024	OP	Accounts receivable to sales

As seen in the above table, the average value for the financial leverage variable is equal to 0.564, which shows that in the sample firms, 56% of the total assets are financed through debts. In general, dispersion parameters are a measure to determine the degree of dispersion from each other or their degree of dispersion compared to the average. One of the most important dispersion parameters is the standard deviation. The value of this parameter for the readability of financial statements is equal to 4.885, and the standard deviation of cash flow is equal to 0.048, which shows that these two variables have the highest and lowest standard deviations, respectively. Minimum and maximum also show the minimum and maximum in each variable. For example, the maximum financial leverage is 1.132. Considering that the fog index is an inverse measure for measuring the readability of financial statements, the fog index is multiplied by (-1) in the final estimation of the regression model.

4.2 The Results Of the Research Hypotheses Test

According to table 2 for all models, the probability of the chow test is less than 0.05. So, model estimation should be done using panel data method. In addition, the probability of the Hausman test is less than 0.05. Therfore the estimation of the model with the fixed effects method is preferred. Also, the results of the heterogeneity of variance test show that the probability of the test statistic is equal to 0.000 and is less than 0.05. For this reason, the null hypothesis of this test, there is no heterogeneity of variance, is rejected and the research model has heterogeneity of variance. Therfore, the estimation of the model will be done through the weighted method or generalized least squares. In the Serial autocorrelation test, considering that the probability for the first model is less than the 5% significant lev-

el, the model (1) has autocorrelation and to solve it, we use the AR(1) first order autoregression process. The results of the VIF statistic in last column show that there is no collinearity between the independent variables. The results of research hypotheses through the weighted or generalized least squares and fixed effects method are shown in Table 2

Table 2: The result of the hypothesis test

	Model5	**Model4**	**Model3**	**Model2**	**Model1**	**Variable**
VIF	Coefficients	Coefficients	Coefficients	Coefficients	Coefficients (prob)	
1/56	0/119 (0/364)	-0/116 (0/065)	0/0720 (0/162)	-0/1205 (0/011)	-0/1001 (0/030)	Tax
4/00				0/1093 (0/004)		IE
1/58				0/0697 (0/029)		Tax* IE
3/14			0/0314 (0/473)			AbilityCom
3/01			0/0084 (0/971)			Tax* AbilityCom
2/12		0/347 (0/000)				Comp
3/21		-0/039 (0/020)				Tax* Comp
2/15	-0/009 (0/035)					FOG
4/56	-0/014 (0/048)					Tax*FOG
2/68	-0/009 (0/010)	-0/008 (0/100)	-0/0088 (0/117)	-0/0177 (0/003)	-0/007 (0/004)	SIZE
2/84	-0/009 (0/001)	-0/011 (0/003)	-0/0109 (0/005)	-0/0018 (0/613)	-0/011 (0/000)	Qtobin
1/61	-0/059 (0/182)	-0/022 (0/546)	-0/0428 (0/284)	-0/0360 (0/357)	-0/034 (0/379)	ZScore
1/45	0/173 (0/000)	-0/1609 (0/000)	-0/1511 (0/000)	-0/1633 (0/000)	-0/1603 (0/000)	Tang
1/25	0/033 (0/026)	0/041 (0/019)	0/0366 (0/045)	0/0425 (0/028)	0/035 (0/014)	DIV
1/11	0/001 (0/924)	-0/001 (0/887)	-0/0014 (0/879)	-0/0075 (0/367)	0/004 (0/693)	Age
1/42	-0/048 (0/003)	-0/032 (0/543)	-0/0447 (0/006)	-0/0446 (0/006)	-0/0102 (0/527)	Loss
1/69	0/084 (0/004)	0/008 (0/772)	0/0131 (0/670)	0/0106 (0/730)	0/019 (0/457)	Lev
1/09	-0/1008 (0/272)	-0/0909 (0/208)	-0/0994 (0/147)	-0/1302 (0/072)	-0/131 (0/087)	CFOSTD
1/06	-0/0402 (0/112)	-0/041 (0/075)	-0/0454 (0/056)	-0/0482 (0/034)	-0/039 (0/057)	SaleSTD
1/19	0/008 (0/738)	0/008 (0/668)	0/0169 (0/388)	0/0367 (0/045)	0/022 (0/263)	Inst
1/56	0/059 (0/297)	0/043 (0/244)	0/0488 (0/230)	0/0506 (0/208)	0/056 (0/229)	Cash
1/30	-0/049 (0/006)	-0/035 (0/043)	-0/0362 (0/056)	-0/0388 (0/052)	-0/027 (0/061)	OP
----	0/067	0/1206	0/0929	0/0603	0/051	C

Table 2: The result of the hypothesis test

	Model5	Model4	Model3	Model2	Model1	Variable
	(0/413)	(0/132)	(0/277)	(0/459)	(0/423)	
	119/65 (0/0000)	195/09 (0/0000)	147/71 (0/0000)	137/11 (0/0000)	104/73 (0/000)	Wald statistics (prob)
	0/2060	0/1546	0/0982	1/1099	0/1024	R-squared
	2/11 (0/0000)	2/17 (0/0000)	1/50 (0/0006)	1/44 (0/0019)	1/99 (0/0000)	Chow test (prob)
	64/46 (0/0000)	70/34 (0/0000)	58/29 (0/0000)	45/63 (0/0001)	69/67 (0/0000)	Hausman test (prob)
	63593/71 (0/0000)	49230/37 (0/0000)	2145/86 (0/0000)	1880/76 (0/0000)	41384/89 (0/0000)	Test of heterogeneity of variance (prob)
	0/461 (0/4982)	0/045 (0/8316)	0/415 (0/5206)	0/984 (0/3230)	1/516 (0/0000)	Serial autocorrelation test (prob)

The estimated tax coefficient in model (1) indicates a significant negative association between tax avoidance and investment efficiency. Therefore, the first hypothesis of the research is confirmed. Also, The findings show that firm size, Q-Tobin ratio, the amount of investment in fixed assets, and sales growth have a negative and significant effect on investment efficiency. Still, the dividend amount has a positive and significant relationship with investment efficiency. The results of model (2) show a positive and significant association between the information environment and investment efficiency. By improving the quality of the firm's information environment, the level of access to information related to investment projects has increased. Therefore, the quality and efficiency of decision-making about investment will improve. The estimated coefficient of Tax* IE (The interactive variable of tax avoidance*information environment) is significant and positive. Therefore, the second hypothesis of the research is confirmed. Therefore, the information environment affects the association between tax avoidance and investment efficiency.

The results of model (3) show that competitive power with a positive coefficient (0/031) and a significance level of more than 5% has no significant association with investment efficiency. The estimated coefficient of tax* AbilityCom (The interactive variable of tax avoidance* competitive power) isn't significant. Therefore, the third hypothesis of the research isn't confirmed. Therefore, competitive power doesn't moderate the association between tax avoidance and investment efficiency. The results of model (4) show that the variable of comparability of financial statements with a positive coefficient and a significance level of less than 5% has a positive and significant association with investment efficiency. The higher the level of comparability of information, the less opportunistic behavior and the amount of information manipulation, and the more attention is paid to compliance with accounting standards and guidelines. As a result, the quality and efficiency of decision-making about investment will improve. Also, the estimated coefficient of tax* Comp (The interactive variable of tax avoidance* comparability) is negative and significant. Therefore, the comparability of financial statements has a negative effect on the association between tax avoidance and investment efficiency, and the fourth hypothesis is confirmed. The results of model (5) show that the readability of financial statements with a negative coefficient (0/009) and a significance level of less than 5% has a negative and significant association with investment efficiency. The higher the complexity of the information in the financial statements, the lower the quality of investment decisions. Also, the estimated coefficient of tax* Read (The interactive variable of tax avoidance*readability of financial statements) is negative and significant. Therefore, the increase in complexity and ambiguity in the text of financial statements

has an inverse and significant effect on the association between tax avoidance and investment efficiency, and the fifth hypothesis is confirmed.

5 Discussion And Conclusion

5.1. Results And Discussion

Tax avoidance is the use of tax planning methods that legally leads to the reduction of the firm's income tax payment, and cost savings resulting from tax avoidance activities can be considered as a way of financing. Further, reduce financing through debt or other methods. On the other hand, inefficient management decisions on investments create problems such as over-investment and under-investment. The interaction between financing and investment decisions creates costs that can have tax benefits for debt. This research investigates the role of the determinants affecting the association between investment efficiency and tax avoidance. In this regard, investment efficiency as a dependent variable, tax avoidance as an independent variable, and the comparability and readability of financial statements, the information environment, and the competitive power of firms have been considered as the moderating variables of the research. The findings show tax avoidance's reverse and significant impact on investment efficiency. In the absence of an effective monitoring mechanism, tax avoidance leads to the reduction of information asymmetry and, consequently, an increase in liquidity and, as a result, a decrease in investment efficiency and an increase in overinvestment. Therefore, tax avoidance can increase the operational and informational complexity of the firm. As a result, with the increase in liquidity, the necessary conditions for over-investment will be provided. The results of this hypothesis are in accordance with (See [5], [8], [50] and [51]).

The results showed that the information environment moderates the relationship between tax avoidance and investment efficiency in firms listed on the Tehran Stock Exchange. Considering that the interaction of the information environment and tax avoidance and their increase leads to an increase in investment efficiency. It can be said that in firms where more information is available to the public, avoiding paying taxes increases investment efficiency. The result of this hypothesis is in accordance with [19]. Investment in less competitive industries is more efficient. The researchers argue that the firm free cash flow causes overinvestment at the firm level and causes problems such as the reduction of investment efficiency. Therefore, one of the determinants of efficient investment is the firm's competitive and monitoring environment. A strong competitive power improves management's monitoring of investment decisions and can reduce under-investment and over-investment. In addition, the comparability of financial statements reduces the cost of obtaining information and increases the quantity and quality of information available to decision-makers. Therefore, while the comparability of financial statements increases, it increases investment efficiency. The results indicate that the comparability of financial statements weakens the inverse relationship between tax avoidance and investment efficiency. This means that in firms that increase the comparability of financial statements, in this case, the reverse effect of tax avoidance on investment efficiency is weakened. The results of this hypothesis are in accordance with the theoretical foundations and research of [5]. Also, it is related to [44]. Complex financial statements require more time and effort to extract relevant information. Therefore, processing this information is uneconomical for investors and causes a decrease in investment efficiency. Readability and correct processing of information, directly and indirectly, are one of the important detriments of investment decisions and, ultimately, investment efficiency. The results of the research indicate that When the readability of financial statements increases, the adverse effect of

tax avoidance on investment efficiency is weakened. The results of this hypothesis are in accordance with the research of [5].

5.2 Suggestions

Considering that the economy of every country is affected by environmental and human factors, it is suggested that the stock exchange establish rules to increase managers' motivation to improve the quality and efficiency of investment decisions. As a result, the value of the firm increases and leads to the presence of more investors in the capital market. Financial analysts and consultants are advised to pay special attention to the comparability and readability of a firm's financial statements and the financial ratios in their analyses because these factors provide conditions for increasing investment efficiency. It is also suggested to consider the direct relationship between the information environment and investment efficiency in their decision-making models in information analysis. The results of this research emphasize the importance of comparability in capital allocation decisions; So; the results show that the comparability of accounting facilitates the learning of investment opportunities and the efficiency of financial statements of peer firms. In this case, firms can make better investment decisions and have higher investment efficiency.

Therefore, it is suggested that firms pay special attention to the firms active in their industry and the ability to compare their information to provide investment efficiency. It is suggested that investors invest in firms that have less tax avoidance and more readability of financial statements because the investment efficiency is higher in these firms. It is suggested that the trustees of the capital market provide better information disclosure mechanisms so that investors and other users can benefit from the fundamental and specific information of the firms. This improves the firm's information environment and increases its investment efficiency. One of the factors influencing efficient investment is the firm's competitive and monitoring environment. It is recommended to the economic policymakers that increasing and creating stable competition will strengthen the efficiency of investment and ultimately strengthen the country's economy. Future researchers are suggested to study the impact of tax avoidance on investment efficiency and the moderating role of the firm's life cycle. Also, the effect of tax avoidance on investment efficiency, the moderating role of comparability and the readability of financial statements should be done separately for different industries and the results compared. Investigating the effect of managers' reputations on the relationship between tax avoidance and investment efficiency is suggested. Also, the moderating role of the information environment and competitive power on the relationship between tax avoidance and investment efficiency should be investigated in market friction.

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