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The Impact of Real Manipulation and Tax Management on Future Market Value: An Artificial Intelligence Simulation of High Earnings Quality

Muljanto Siladjaja[1], Yuli Anwar*[,2], Ismulyana Djan[2]

[1] *IKPIA Perbanas*
[2] *Universitas Binaniaga Indonesia*

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ABSTRACT

Providing empirical proof of the negative impact of manipulation activity pushed management to adhere to the available regulation by publishing high financial reporting quality. This one has a significant effect negatively on a volatile market price movement because of illustrates the actual earnings. It is not an obstacle for the investor in predicting the future return with high accuracy when there is a minimum chance for the opportunity behavior. This causal research has developed a new variable to measure the investor's perception, and it is the future market value as a proxy for future return. The observation data used the samples on the listed company in the industrial manufacturing sector from 2015 until 2020, which amounted to 384 observations. The management's effort to deduct the manipulation activity can be interpreted as the minimum level of misleading information. When the investor has no tolerance for manipulation activity, the management should be "prudent" in designing the accounting treatment policy to illustrate real earnings. It is a sign of high probability in reaching out to the better prospect, proving the interactive feedback between management and investor through the Decision Tree Model and Bayes Theorem. This research has adopted the maximum simplex models as an Artificial Intelligence simulation for maximizing each party's maximum utility as implication game theory, like investors and management in making their strategic decisions. Principally, the regulator should force management to level up the quality of financial reporting because of no tolerance for any infringement on the legal regulations.

Introduction

In the past literature, the issue of actual manipulation activity has been the crucial issue in disseminating the actual earnings during the publication period, where it signs a negative market perception as a practical implication of Agency Theory. The majority shareholder takes a concerned high-quality financial reporting with no manipulation activity (Mehrani, Moradi, & Eskandar, 2017), (Ghaleb, Kamardin, & Tabash, 2020) and (Sakaki, Jory, & Jackson,

* Corresponding author.
E-Mail address: julianwar@unbin.ac.id
ORCID: 0000-0002-5421-0594

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2021), proving that an institutional ownership concentration company has the alert of high earnings quality. This result supported (Sakaki, Jackson, & Jory, 2017), which pointed out that shareholders' high involvement minimizes the opportunity motive, including the effort to level up the obedience to accounting standards. The management tends to use the actual earnings manipulation activity to adjust the subjective valuation in the short run, particularly for a seasoned equity offering (SEO). (Kothari, Mizik, & Roychowdhury, 2016) and (Martínez-Ferrero, Banerjee, & García-Sánchez, 2016) declared that the negative impact of earnings manipulation had been in the long run because of periodically overvaluation, which (Dichev, Graham, Harvey, & Rajgopal, 2016) stressed on the distortion in accounting information has the misleading information. As one phenomenon in high earnings quality, almost all the CEO in the big companies has been verified to implement low obedience because of asymmetric information in capturing the accounting information. By considering the signal of the performance on the right track, the shareholder takes intense pressure on the high-quality financial reporting (Takacs, Szucs, Kehl, & Fodor, 2020) and (Fan, Radhakrishnan, & Zhang, 2021), which will pave the way for estimating the prospect precisely (Persakis & Iatridis, 2017), (daSilva & Nardi, 2017) and (Pompili & Tutino, 2019).

The bad news of real earnings manipulation is the high risk (Ma, 2017), (Wang, Lin, Werner, & Chang, 2018) and (Mellado & Saona, 2020), where the low earnings quality brings the high cost of equity as a sign of low prospect. This one has been run by management cyclically when the probability of reaching out to the better prospect is low, so the management used to communicate with pseudo information, especially in the financial crisis (L. Chen, Krishnan, & Yu, 2018). The market price adjustment has been made dynamically, based on the management's objectives, including maximum or minimum value. The high consistency in implementing accounting treatment policy is crucial to leveling up the high earnings quality (Dempster & Oliver, 2019) and (Ason, Bujang, Jidwin, & Said, 2021). It has related to the required return in the following period so that the investor has zero-tolerance for any infringement on the accounting standard and tax regulation. This one is an effort to anticipate effort for smoothing the volatile movement of the agency cost.

To understand the fiscal authority of calculating the taxable income, the investor realized the gap between accounting and tax rules is a tolerable limit area compared to market price as a concept of fair value measurement (Yorke, Amidu, & Agyemin-Boateng, 2016). The investor should be alert to agency costs in the following period. High obedience to accounting standards and high compliance with tax regulation is critical for the investor in monitoring the management (Ozili, 2016) and (Sticca & Nakao, 2019). As a sign of opportunistic motive in tax management, explicitly, the management used the tax saving as a good achievement in deducting the tax cost, besides the investor accentuating the volatile movement of agency cost as the impact of violence on tax regulation. Specifically, there is no tolerance for any violation of tax regulation; this one refers to the impact of high compliance of investment to guarantee investment in a safe, secured area. This same one has been supported by (Hu, Cao, & Zheng, 2015) and (Jacob & Schütt, 2020) with emphasis on the awareness of tax accruals as a negative sign stimulating the negative movement of the market price.

This research used a new measurable variable as a proxy for investor perception to measure investor perception empirically, known as future market value. This one has been obtained by modifying the multistage of growth model H (Damodaran, 2012) by assuming that the dividend payout is constant and zero growth. The predicted market price

indicates that the investor has the action on the reported earnings. The dividend payout has been used as an indicator of high earnings quality, where is no manipulation in published accounting information (Chansarn & Chansarn, 2016), (Deng, Li, & Liao, 2017), and (Pathak & Ranajee, 2020). The market price reflects the capital gain and required return as the implication of the Hypothesis Efficient Market with a semi-strong form. The current earnings have fulfilled the expected return as a positive sign for the performance on the right track. In contrast, a high earnings quality plays a critical role (Hong, Ma, & Zhang, 2019).

By testing the high-quality accounting information on the investor's action, this research used the real earnings quality as a proxy of high accruals quality and discretionary tax accruals quality as a proxy of tax management to measure this impact on the future market value as a new measurement of investment decision. This one proves that the high earnings quality has no chance for any infringement on the available regulation, where it illustrates real earnings quality with high reliability and integrity; each party has the intense effort of maximum utility as an implication of game theory (Askari, Gordji, & Park, 2019). This research provides the mapping of the connection of these variables with the Decision Tree and Bayes Theorem by calculating the probability of an investor's decision. This one has been strengthened by (Datta, Iskandar-Datta, & Singh, 2013) and (H. (Amy) Chen & Wu, 2021) has implied that the decision is based on the accounting information quality during the publication period.

The research uses linear programming modeling as an artificial intelligence simulation to reflect rational decision-making. The different approaches are used to obtain the maximum utility, where the background of investor motive can be explained by the Prospect Theory (Kahneman & Thaler, 2006). It refers to the expectation that the future will be better as a sign of a "good prospect," the linear oriented a preference as a fittest mathematics model to obtain the maximum utility (Trippi & K, 1996). This research has modified the simplex model with maximum orientation in designing their decision when the high earnings quality plays a crucial role in the market price movement. As the pattern of forcing the management to publish high financial reporting, the regulator should fix the dividend policy as a mandatory obligation to level up the transparency when the dividend has a sign of low risk and better prospects, including deducting the low probability of low cost of capital.

Literature review

Positive accounting theory

Positive Accounting Theory has been the dominant issue in accounting for the last decade (Watts & Zimmerman, 2003) introduced that this theory has a better explanation of the volatile fluctuation of market price and the normative model has a limited area in illustration of the opportunity behavior (Scott, 2016). As the implication of Agency Theory, the management has shared the communication process as a signaling effect about the current performance, and this theory assumes *contracting and monitoring costs*. It has been echoed that accruals take consequences as political costs (Kothari, S P, Leone & Simon, William E, Wasley, 2005). Because of the negative impact of accruals on the investor perception, (Zarowin, 2015) and (Dichev et al., 2016)stressed the maximum effort to level up the accruals quality as "good news" to indicate a better prospect, where the strategic advantages are to obtain the low cost of capital (Persakis & Iatridis, 2017), (Hong et al., 2019) and (Ezat, 2019).

Based on social-political cost, there is a connection between the community and the regulator party, and the management should be aware of accruals in calculating the published earnings. The benefit of these dividends is to trust better prospects, underlining that the management has the proclivity to reduce the internal conflict by running this policy as a periodic corporate action. High obedience to accounting standards can reduce the risk, where the high shareholder's involvement has a critical role. This theory gives a comprehensive guideline of political cost, which covers the incentive schema and credit agreement. The probability of accruals has been widely opened when management has discretionary authority in designing the accounting treatment policy. The high involvement has pressured the management to take a prudent decision with minimum risk. This one should work out with the investor to keep the controlling and monitoring tool instrument. It has influenced how the management keeps the high sustainability in the long run (Rezaee & Tuo, 2019) and (Lopez & Vega, 2019).

Regulation theory

This theory depicts the relationship between the external and internal parties as to the power of politics; meanwhile, the market has demanded the primary requirements on stimulating the correction action on the market condition, commonly known as *the regulatory capture theory* (Stigler, 2012). This one stated that the government has the formal intervention in calculating the earnings; it can be seen by the fiscal policy with fixing out the tax tariff for corporate tax (Godfrey, Jayne, Hodgson, A., Tarca, A.,, Hamilton, Jane., Holmes, 2014). It can be traced by calculating the taxable income; the fiscal correction is commonly known as the impact of this theory.

By learning about the high earnings quality, the investor is concerned about the high compliance with tax regulation, so the management should design the tax management with a low probability of tax investigation. Because of zero tolerance on any infringement on tax regulation (Ryu & Chae, 2014) and (Liu & Lee, 2019) underlined that tax avoidance has a negative impact, where all regulation is to deduct the possibility of opportunities motive. There is a unique tax treatment in Indonesia's tax regulation; every firm can be treated as one single business unit; the tax rule did not recognize the consolidated firm as a base for calculating the taxable income. Based on (Yorke et al., 2016), (Osegbue, Nweze, Ifurueze, & Nwoye, 2018), and (Jacob & Schütt, 2020), the finding of a sign of high compliance for predicting the future return has pointed out the high awareness of high-quality financial reporting. Based on this theory, the management has a positive motive to take the corporate decision prudently because of the efficient contracting. *High accruals quality* is a signal that indicates no misleading information with the minimum level of opportunity behavior, and it is used to predict the accuracy of the expected return in the subsequent period.

Rational decision model

By taking an assumption of the Efficient Market Hypothesis as the basic description of a rational decision model (Khotari, 2001), the prospect theory has inspired the linear modeling of predicting the investors' decisions (Kahneman & Thaler, 2006) and (Bandi, 2012). In making a decision, the characteristics of considering some critical factors have been mapped (Kaplan, 1996) by developing the decision tree model, where the two variables have limited the

capability of human beings to assess a simple case of what-if analysis as a rational model. Bayes Theorem has completed the final development for this model for calculating the probability.

The combination of the decision tree and linearity model as an adoption model of capability in learning the previous experience for reaching the higher ones in the future this model accommodates the limited resources as a constraint of each variable in determining the composition of these factors, based on supported by the positive correlation. Using a constraint in this model as the representative of the distinctive variable is aimed to capture the actual condition as a problem of linear trend modeling. Finally, the primary mathematic model can calculate the maximum utility simultaneously by considering the limited amount for each supporting variable as the constraint variable. (Trippi & K, 1996) has modified the linear programming with artificial intelligence for creating the intelligent portfolio; the model has been known as artificial intelligence simulation. Because this model capable of measuring some variables with constraints, this means that this model can be used to estimate the composition of each variable for the maximum utility in the mathematic equation so that it depicts the linking of the investor's capabilities in assessing the limited resources, including a tendency of opportunity motives. Mainly, this simple model with linearity assumption can be used to predict the mathematic model's decision to detect the potential defect with minimum cost. This "simplex model" as an artificial intelligence model is the guideline for setting up each critical factor's composition by minimizing the negative effect of the decision; it refers to the maximum utility model or minimum cost model.

Conceptual framework

Based on the explanation above, the conceptual research framework can be arranged as follows:

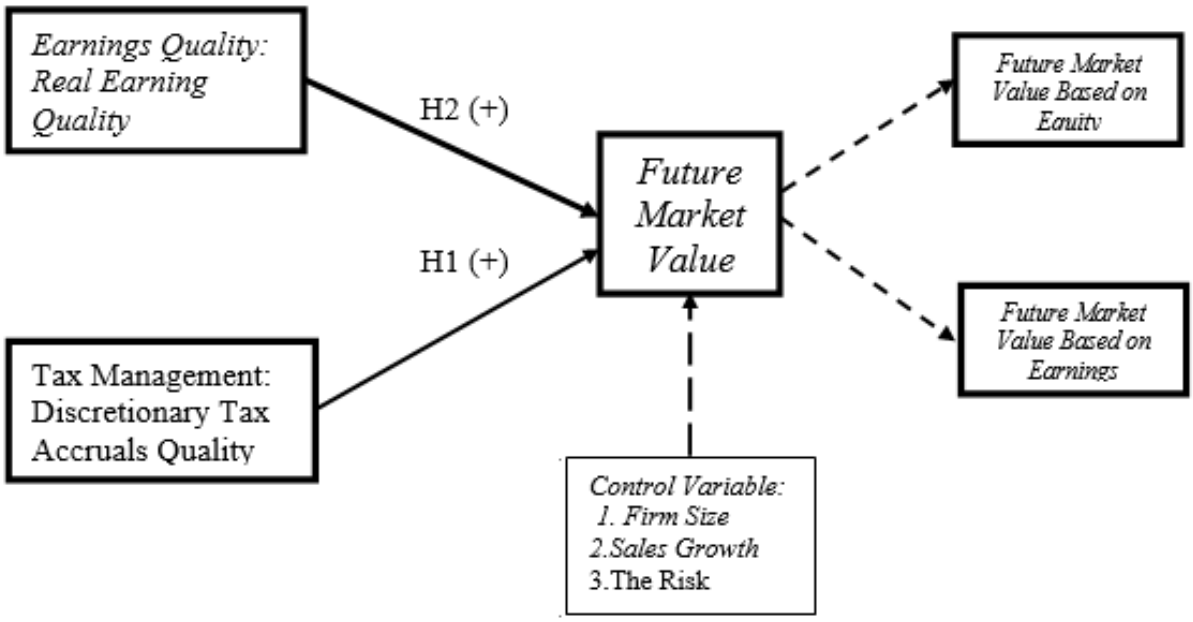

Figure 1. Conceptual Framework

Note: Based on the objective and title of this research

Hypothesis

Based on the previous literature, the formulation of the hypothesis can be detailed, as follow:

To test the hypothesis with real earnings quality

The previous research used the item earnings quality to measure the obedience to the accounting standard, where the reliability and integrity are high ((Dempster & Oliver, 2019). (Mehrani et al., 2017) and (K. H. Jeong & Choi, 2019) used the real manipulation of earnings as an empirical indicator for earnings quality; meanwhile, the high earnings quality has the low manipulation or any infringement can be recognized in accounting standards. (Pathak & Ranajee, 2020) found the relationship between the high earnings quality and dividend pay-out policy among the normal condition. The higher earnings quality reduces the dividend pay-out during the financial crisis. The high earnings quality stimulates the high yielded dividend pay-out policy. This research has to modify the investor perception, which used the historical dividend pay-out to predict the market price in the following period. It is empirically called a future market value. Using the assumption of constant and zero growth as an effect of pandemic COVID-19 in 2020, predicting market price uses dividend pay-out in the current period for market price for future with the firm value approach. By accentuating the effort to minimize the accruals as a positive sign, this research uses the item of real earnings quality. It indicates that the high level of manipulation is high real earnings quality. It means that the accounting standard's compliances are at maximum level, and there are zero areas for opportunity motives. Illustrating real earnings produces a positive sentiment during the publication period because predicting the required return precisely and obtaining the low risk.

This research has divided measurement into two operational variables in estimating investor perception. Therefore, the first hypothesis has been formulated as follows:

H1a: *Real earnings quality positively impacts future market value based on equity.*

H1b: *Real earnings quality positively impacts future market value based on earnings.*

To test the hypothesis with discretionary tax accruals quality.

(Lee, 2016), (Sticca & Nakao, 2019) and (Duy & Tran, 2020) pointed out that the investor may be under unwanted scrutiny by tax regulators because of any infringement. It needed a high agency cost for anticipating tax investigations. No other way, this investor had no tolerance for any infringement on available regulations. It impacts future performance. Using the item of "quality" indicates it has been linked by a positive relationship as a one-way hypothesis. The higher the tax accruals, the higher the accounting information, which means that the probability of tax investigation is low. When the investor is concerned about the high compliance with the tax regulation, tax investigation in low probability refers to the agency cost for anticipating any violence (Ryu & Chae, 2014) and (Choudhary, Koester, & Shevlin, 2016). The willingness of management is to carry out the compliances on the tax regulation consistently with a maximum level in designing the tax management, and this one signs a positive indicator for movement of market price in the following period (Yorke et al., 2016) and (Jacob & Schütt, 2020). In measuring how high compliance has a positive contribution to future return, this calculation of tax management used modifying

the tax accruals (Báez-Díaz & Alam, 2012) and (Osegbue et al., 2018), known as discretionary tax accruals. By distinguishing the measurement of equity and earnings, the same treatment has been done to test the impact of tax management. Therefore, a second hypothesis has been formulated, as follows:

H2a: *Discretionary tax accruals quality as a proxy of tax management positively impacts future market value based on equity.*

H2b: *Discretionary tax accruals quality as a proxy of tax management positively impacts future market value based on earnings.*

Research method

Population, sample, and collection data

This quantitative research has the causal model with the multiple regression model to test the relationship between the real earnings quality and tax management on the future market value as a classic phenomenon in the capital market. All secondary data were collected from 2010 to 2020 because the real earnings manipulation activity was estimated as primary testing statistically for the previous five years. The criteria of research objects could be arranged as follows (Sekaran & Bougie, 2016):

1. The company had dividend payments within the observation period.
2. The company had a positive average Price-Earnings and Price Book Value.

This research period was from 2015 to 2021; the secondary data needed were gathered by ICMD (Indonesia Market Capital Directory), the Indonesia Stock Exchange (www.IDX.co.id), and Yahoo Finance. The population of this study is 154 companies observed with about 450.

Measurement of real manipulation activity

This research has real earnings manipulation activity, which is based on three proxies, as follows: (B. K. Jeong & Sohn, 2013) and (Kothari et al., 2016). The regression formula can be arranged as follow:

First Proxy: Abnormal CFO.

$$\frac{CFO_t}{Asset_{j,t-1}} = \alpha 0 + \alpha 1 \left(\frac{1}{Asset_{i,t-1}}\right) + \alpha 2 \left(\frac{Sales_{j,t}}{Asset_{j,t-1}}\right) + \alpha 3 \left(\Delta \frac{Sales_{i,j}}{Asset_{j,t-1}}\right) + \varepsilon j,t \qquad (1.1)$$

Second Proxy: Abnormal Discretionary Expenses

$$\frac{DISEXP_t}{Asset_{j,t-1}} = \alpha 0 + \alpha 1 \left(\frac{1}{Asset_{i,t-1}}\right) + \alpha 2 \left(\frac{Sales_{j,t}}{Asset_{j,t-1}}\right) + \varepsilon j,t \qquad (1.2)$$

Third Proxy: Abnormal Production Costs.

$$\frac{PROD_t}{Asset_{j,t-1}} = \alpha 0 + \alpha 1 \left(\frac{1}{Asset_{i,t-1}}\right) + \alpha 2 \left(\frac{Sales_{j,t}}{Asset_{j,t-1}}\right) + \alpha 3 \left(\Delta \frac{Sales_{j,t}}{Asset_{j,t-1}}\right) + \varepsilon j,t \qquad (1.3)$$

The regression for total earnings manipulation can be arranged as follow:

$$Real\ Earnings\ Quality = \varepsilon \mathrm{j,t} \left(\frac{CFOt}{Asset_{j,t-1}}\right) + \varepsilon \mathrm{j,t} \left(\frac{DISEXP_t}{Asset_{j,t-1}}\right) - \varepsilon \mathrm{j,t} \left(\frac{PROD_t}{Asset_{j,t-1}}\right) X - 1 \qquad (1.4)$$

where:

$CFO_{j,t}$ = abnormal CFO on firm i period t has been pointed by εj,t (estimation error) on equation (1.1).

$DISEXP_{j,t}$ = abnormal discretionary expenses on firm i period t has been pointed by εj,t (estimation error)) on equation (1.2).

$PROD_{j,t}$ = production costs are the total cost of goods sold, and inventory adjustment on firm j year t has been pointed by εj,t (estimation error) on equation (1.3). The error residual has a contradiction way with abnormal CFO and discretionary expenses (Perotti & Wagenhofer, 2014).

Manipulation Activity t is the total residual error on regression abnormal cash flow, discretionary expenses and production costs on firm j period t have been pointed by εj,t (estimation error).

Measurement of tax management

As a new measurement of tax management, so this research used the discretionary tax accruals, which have been multiplied between error residual with -1 (Perotti & Wagenhofer, 2014). The formulation can be arranged as follows: (Báez-Díaz & Alam, 2012) and (Choudhary et al., 2016).

First: To Calculate Tax Accruals.

$$Taxable\ Income_{j,t} = Commercial\ Net\ Income_{j,t} + \text{Fiscal Correction}_{j,t} \quad (1.5)$$

$$Total\ Accruals_{j,t} = Total\ Tax\ Accruals_{j,t} + Total\ Book\ Accruals_{j,t} \quad (1.6)$$

$$Total\ Tax\ Accruals_{j,t} = Taxable\ Income_{j,t} - Cash\ Fow\ Operational_{j,t} \quad (1.7)$$

Second: To Calculate Discretionary Tax Accruals with Total Tax Accruals.

$$Total\ Tax\ Accruals_{j,t} = (Absolute_{\varepsilon j,t}) = \alpha 1 + \lambda 11(Cash\ Fow\ Operational_{j,t}) + \lambda 12\ (Tax\ Liability_{j,t}) + \lambda 13(Sales\ Growth_{j,t}) + \lambda 14(Adjusted\ Net\ Profit_{j,t}) + \varepsilon j,t \quad (1.8)$$

Expectation for every variable: λ0>0; λ11>0; λ12>0; λ13>0; λ14>0

where:

Adjusted Net Profit = Net Profit after Fiscal Correction on firm j period t.

Sales Growth = The growth of sales on firm j period t.

Tax Liability = The tax liability on firm j period t.

Cash Flow Operational = Cash Flow Operational on firm j period t

Discretionary Tax Accruals Quality j,t = ε j,t.

X -1= absolute error value on firm j period t.

Future Market Value.

To more understand how to predict the market price in the future, the adoption model of the H model with the Two-Stage Model for Growth (Damodaran, 2012) can be detailed as follows:

First stage: Calculating the estimated dividends.

$Div_{16} = Div_{14}(1+g_k)^1$ for data of dividends in the period of 2015
$Div_{16} = Div_{15}(1+g_k)^1$ for data of dividends in the period of 2016
$Div_{17} = Div_{16}(1+g_k)^1$ for data of dividends in the period of 2017
$Div_{18} = Div_{17}(1+g_k)^1$ for data of dividends in the period of 2018
$Div_{19} = Div_{18}(1+g_k)^1$ for data of dividends in the period of 2019
$Div_{20} = Div_{19}(1+g_k)^1$ for data of dividends in the period of 2020
$Div_{21} = Div_{20}(1+g_k)^1$ for data of dividends in the period of 2021

There is some assumption for the prediction period of 2018-2019, where the value g = ROE x b, g_k= average "growth" period 2013-2018, and k = free risk + beta (market return-free risk) as a proxy for calculating the present value of future return with using CAPM model as the indicator of expected return for investor's viewpoint.

Second stage: The zero growth of dividend is to anticipate COVID-19's effect for the future period.

By assuming that there is no growth of dividend as a impact of Pandemic effect, the prediction Period of 2020-2022 used assumptions, likes Div20 = Div21 = Div22 =Div23 = Div24 = Div25 =Div26 and *Price*20 = *Price* 21= *Price*22 =*Price*23= *Price* 24= *Price*25 =*Price*26.

Third stage: Calculation of the market price.

Based on (Bodie, Z., Kane A., Marcus , J, 2013) and (Brigham, Eugene, F, Houston, Joel, 2013), the composition of market return consists of fluctuating market price and dividend, so the formulation of the estimated price = Dividend Yield + Capital Gain. Based on this one, the prediction market price can be separated partially, as below:

$Price_{estimated\ 15} = \frac{Div_{16}}{(1+k)^1} + \frac{Div_{17}}{(1+k)^2} + \frac{Div_{18}}{(1+k)^3} + \frac{Div_{19}}{(1+k)^4} + \frac{Price_{19}}{(1+k)^4}$ for data of price period of 2015

$Price_{estimated\ 16} = \frac{Div_{17}}{(1+k)^1} + \frac{Div_{18}}{(1+k)^2} + \frac{Div_{19}}{(1+k)^3} + \frac{Div_{20}}{(1+k)^4} + \frac{Price_{20}}{(1+k)^4}$ for data of price period of 2016

$Price_{estimated\ 17} = \frac{Div_{18}}{(1+k)^1} + \frac{Div_{19}}{(1+k)^2} + \frac{Div_{20}}{(1+k)^3} + \frac{Div_{21}}{(1+k)^4} + \frac{Price_{21}}{(1+k)^4}$ for data of price period of 2017

$Price_{estimated\ 18} = \frac{Div_{19}}{(1+k)^1} + \frac{Div_{20}}{(1+k)^2} + \frac{Div_{21}}{(1+k)^3} + \frac{Div_{22}}{(1+k)^4} + \frac{Price_{22}}{(1+k)^4}$ for data of price period of 2018

$Price_{estimated\ 19} = \frac{Div_{20}}{(1+k)^1} + \frac{Div_{21}}{(1+k)^2} + \frac{Div_{22}}{(1+k)^3} + \frac{Div_{23}}{(1+k)^4} + \frac{Price_{23}}{(1+k)^4}$ for data of price period of 2019

$Price_{estimated\ 20} = \frac{Div_{21}}{(1+k)^1} + \frac{Div_{22}}{(1+k)^2} + \frac{Div_{23}}{(1+k)^3} + \frac{Div_{24}}{(1+k)^4} + \frac{Price_{24}}{(1+k)^4}$ for data of price period of 2020

$Price_{estimated\ 21} = \frac{Div_{22}}{(1+k)^1} + \frac{Div_{23}}{(1+k)^2} + \frac{Div_{24}}{(1+k)^3} + \frac{Div_{25}}{(1+k)^4} + \frac{Price_{25}}{(1+k)^4}$ for data of price period of 2021

Fourth stage: Controlling the prediction model.

Using The Tracking Signal as an indicator of the Error Range between Estimated Price t + 1 and Average Market Price t + 1, the estimated price has ranged between the prediction range -2.0 <Tracking Signal <2.5. The tracking signal used the indicators cumulative forecast error and mean average deviation (Heizer, Jay, Render, Barry and Munson, 2017); statistically, this calculation can be stated that the H model has high accuracy in predicting value**.**

Future Market Value Based on Estimated Asset

Future market value (FMV) based on equity as a proxy for investor perception of the prospect is developing the yield book instrument model for bonds (Homer, Leibowitz, Bova, & Kogelman, 2013). The formula is arranged as follows:

$$FMV\ on\ Equity = \frac{Equity\ Period_t}{Estimated\ Price\ Period_{t+1}} \quad (1.9)$$

Future Market Value-Based on Estimated Earnings Per Share

Future market value based on earnings as a new measurement for prospects based on future earnings is modified by the adjusted earnings yield in the following period (Wilcox, 2007) and (Abraham, Harris, & Auerbach, 2017). The formulas can be arranged as follows:

$$FMV\ on\ Earnings = \frac{Earnings\ Per\ Share\ Period_t}{Estimated\ Price\ Period_{t+1}} \quad (1.10)$$

Control variables

This research has some control variables, where it aimed to level up the validity, as follows.

1. First Control Variable with *Size* (Total Asset), (Mangala & Isha, 2017) and (Siekelova, Androniceanu, Durana, & Michalikova, 2020) stressed the positive impact of size on the pattern of earnings quality. The mathematic formula can be arranged:

   $$Book\ Value = Value\ Total\ Asset \quad (1.11)$$

   for the current period, then

   $$Size = Log\ (Natural\ Book\ Value) \quad (1.12)$$

2. Second Control Variable with Sales' *Growth*, (Datta et al., 2013) stated that sales have a positive impact on earnings quality. The mathematic formula can be arranged:

   $$Sales\ Growth\ period_t = \frac{(Sales_t - Sales_{t-1})}{Sales_{t-1}} \quad (1.13)$$

   $$Delta\ Sales\ Growth\ (\%) = Sales\ period_t - Sales\ period_{t+1} \quad (1.14)$$

3. Third Control Variable with Risk (Debt To Equity Ratio), (Ping, 2016) and (Li, Li, Xiang, & Geri Djajadikerta, 2020) referred that the risk has related to the abnormal return, because of discretionary accruals. The mathematic formula can be arranged:

   $$Total\ Debt = Short\ Term\ Debt + Long\ Term\ Debt \quad (1.15)$$

Therefore, developed into:

$$Debt\ to\ Equity\ Ratio = \frac{Total\ Debts}{Equity} \quad (1.16)$$

Result and discussion

Description statistics

By doing the descriptive testing, this research provides the summary in Table 1, as below:

Table 1. Descriptive testing

No	Description	N	Minimum	Maximum	Mean	Std. Deviation
1	*Future Market Value on Equity*	204	0.105	0.510	0.350	0.212
2	*Future Market Value On Earnings*	204	0.121	0.950	0.375	0.280
3	*Real Earnings Accruals Quality*	204	-0.941	0.821	0.612	0.321
4	*Discretionary Tax Accruals Quality*	204	-0.812	0.912	0.532	0.411
5	*Dividend Pay Out*	204	0.030	0.500	0.276	0.136
6	*Total Asset* (in thousand)	204	476,149	1,447,865	859,497	63,617
7	The Growth of Sales (in thousand)	204	-3.238	0.720	-0.296	0.036
8	The Risk (beta)	204	0.000	1.010	0.458	0.201

Source: Secondary Data.

This descriptive testing in Table 1 shows that the abnormal distribution of real earnings quality and discretionary tax accruals quality, (Lebert, 2019) stated the research about accruals quality in the capital market had the abnormal distribution because there are many variations of real manipulation activity earning quality and tax management, where had been indicated by measurement of error. As a reality of research in the capital market, this testing had used the data panel, where this one combined the cross-section and time-series data over the different times (Hair, Black, Babin, & Anderson, 2010). When the data panel has the common effect model, the testing can be continued by the classic assumption testing; there is an unbalanced panel for every company implementing the dividend policy as a standard corporate policy. The fixed and random effect model has unique characteristics in the inability to fulfill normality's principles.

Statistical testing

By running the Outlier testing with winzorize model, where the limit area ranged from -1.5 > Z Score > 1.5 (Gujarati, 2011), it aimed to level up the validity level testing; this treatment had been trimmed all observed data until the valid data amounted to 204. This research summarizes Table 2, as below:

Table 2. Summary of data panel testing

The Phase-in The Testing Data Panel	FMV on Equity Real Earnings Quality	FMV on Earnings Real Earnings Quality
Chow Testing	p value=0.079 (>0,05) H_0, Accepted Common Effect Model	p value=0,006 (<0.05) H_0, Rejected Fixed Effect Model
Hausman Testing	Not Done	p value=0.003 (<0.05) H_0, Rejected Fixed Effect Model
Lagrange Multiplier Testing	Prob. Breusch-Pagan = 0.081 (>0.05) H_0, Rejected Random Effect Model	Not Done

Source: Secondary data

Table 2 illustrates that the first model has the random effect model and the second model has the fixed effect, so classic assumption testing should not run. When The testing on earnings quality has a high variation (Perotti & Wagenhofer, 2014) and (Lebert, 2019) underlined that the research about accruals quality in the capital market had an abnormal distribution because of various patterns of earning quality and tax management (Alipour, Ghanbari, Jamshidinavid, & Taherabadi, 2019) and (Hutton & Stocken, 2021). The statistical testing of the data panel has been the most efficient econometric model, where the comparative model between the using cross and time series has been done. The testing of the data panel pointed out that the first model has the random effect model and the second model has the fixed effect model, so the assumption that classic testing should not be run. Explicitly, the testing on the pattern of earnings quality has high variation, so the constant coefficient is a meaningless indicator because of some constant.

The statistical testing can be provided in Table 3, as below:

Table 3. Coefficient regression by testing real earnings quality.

The Independent Variables	*Future Market Value Based on Equity*			*Future Market Value Based on Earnings*	
The fundamental indicator	Unstandardized Coefficient	Sig One Tail	Hypothesis	Unstandardized Coefficient	Sig One Tail
Constanta	-0.042	0.541	Meaningless	-0.106	0.371
The Dependent Variable					
1. Real Earnings Quality	0.064	0.021	H1a and H1b accepted	0.042	0.032
2. Discretionary Tax Accruals Quality	0.073	0.034	H2a and H2b accepted	0.086	0.043
Control Variable			Note :		
3. Log Total Asset	0.016	0.022	Positive and Significant	0.028	0.016
4. Growth Sales	0.009	0.041	Positive and Significant	0.003	0.045
5. Risk	-0.271	0.024	Negative and Significant	-0.196	0.021
F Calculated	2.312 (>F_{Table} 0.338)		Significant	1.876 (>F_{Table} 0.338)	
Coefficient R-Square	0.281		Positive and Low	0.264	
Adjusted R Square	0.213		Positive and Low	0.207	
Significant Level	0.000 (<0.05)		Significant	0.000 (<0.05)	
Durbin Watson Testing	2.021 (1.845 < X <2.154)		No autocorrelation	1.973 (1.845 < X <2.154)	

Source: Analyzing Secondary Data Sig One Tail = Sig has divided by 2 F calculated = (0.05, 0.338); t calculated = (0.05, 0.519).

Table 3 pointed out that F calculated > F Table (the high significance), where the independent variables have a simultaneous effect on the dependent variables. This model has fulfilled the main requirement of *predictive modelling.*

First, multiple regression can be arranged as follows:

Future Market Value on Equity = -0.042 + 0.064 REQ + 0.073 DTAQ + 0.016 Asset + 0.009 Growth – 0.271 Risk *(1.17)*

Second multiple regression can be arranged, as follows:

Future Market Value On Earnings = -0.106 + 0.042 REQ + 0.086 DTAQ + 0.028 Asset + 0.003 Growth – 0.196 Risk *(1.18)*

Based on Table 3, the first statistical testing can be broken down, as below:

1. Real earnings quality has the positive coefficient of regression in 0.064 and sig one tail 0,021 < 0.05, so hypothesis H1a has been accepted. Real earnings quality has a positive coefficient of regression in 0.042 and sig one tail 0,032<0.05, so hypothesis H2b has been accepted. It implies that the real earnings quality positively contributes significantly to future market value based on equity and earnings.
2. Discretionary tax accruals quality has sig one tail 0.032<0.05 and the positive coefficient of regression in 0.073, so hypothesis H2a has been accepted. Discretionary tax accruals quality has sig one tail 0.043<0.05the positive coefficient of regression is 0.086, so hypothesis H2b has been accepted. It implies that tax management with discretionary tax accruals quality positively contributes significantly to future market value

based on equity and earnings. In the testing of the relationship between dividend policy and earnings quality, this moderated variable is quasi moderator because of the significant level of each variable partial, and the moderation process has been significant (less than 0.05), where the moderated variable has the same function as the independent variable.

3. The contribution of the Control Variable can be detailed, as follow.
    a. Sales and total assets as control variables have a significant positive contribution (less than 0.05) to future market value as a guideline for better prospects. The indicators have been used to signify a minimum chance of misleading information because of the high business existence.
    b. Risk as a control variable has a negative contribution significantly (less than 0.05) on the future market value as an indicator of the low probability of uncertainty and unpredictability of future return. The indicators have been used to be a sign of capability of grabbing the low cost of capital.

Based on the statistical testing, this research-proven the earning quality has a positive contribution to the prospect. There is a market response to the accounting information during the publication period. When any infringement has legal consequences on the agency cost in the following period, it refers to the negative movement of market price as a “bad news” sign. Empirically, this research supports (Alhadab & Clacher, 2018), (Shayan-Nia, Sinnadurai, Mohd-Sanusi, & Hermawan, 2017), (Diri, 2017) and (Mellado & Saona, 2020), where the real manipulation activity is an indicator of incapability for keeping sustainability for the long term. To detect the management performance, most shareholders are concerned about the earnings quality as an essential sign of the right track in the future (Ghaleb et al., 2020), which happened in the tax management policy. Practically, the management sometimes adjusts this policy dynamically, and it depends on the target in the future because of inconsistency in implementing discretionary tax accruals, both positive and negative. By being aware of this fact, the investor pays serious attention to this policy, which has a high probability of tax exposure. It can be reflected by tax investigation, which impacts the earnings directly in the future.

By analysing the connection between earnings quality and future return, this research proves the existence of game theory; there is the market response to the published financial reporting, and the management adjusts the corporate decision as feedback of market response. It is a circular process done by management’s inconsistency in implementing accounting treatment policy; it cover-up the positive and negative accruals, which can be recognized in accounting standards. At the same time, the investor has a negative perception when the accruals are in a high position by accepting the low accruals, notably the obedience to accounting standards and compliance with tax regulation. By learning (Kaplan, 1996) for mapping the investor’s decision to respond to the high or low-quality financial reporting, the research postulates the model to estimate the probability of the investor action. This predictive modelling in this research has combined the decision tree and Bayes Theorem to predict investor action on the quality of accounting information.

By mulling over (Datta et al., 2013), (Askari et al., 2019), (Lei & Gu, 2016), and (H. (Amy) Chen & Wu, 2021) and the imperative role of dividends in levelling up the obedience to all available regulations, which stressed the dynamic relationship between management and investor, These encourage this research to map the decision tree to

illustrate the investment decision pattern. Based on the statistical testing above, this mapping can be arranged systematically, as below:

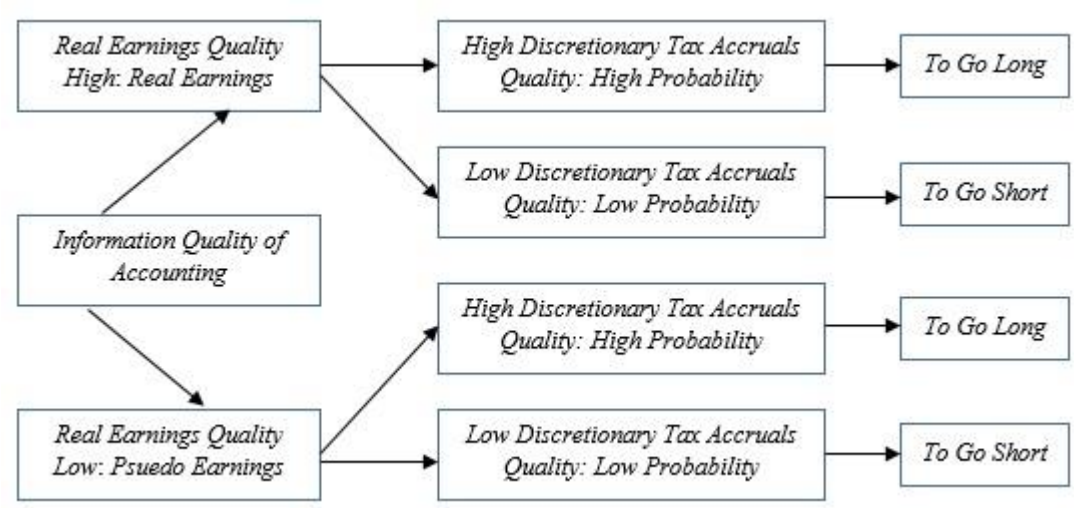

Figure 3. The Mapping of Real Earnings Quality and Tax management on Investment Decision.
Note: To be compiled from Researchers

Figure 3 has a comprehensive illustration for mapping the investor action on the high-quality financial reporting, which was indicated as a movement of the market price. When it happens, there are two ways of movement market price, as follows.

1. A "positive movement market price" can be formed by the higher probability of the "Go Long" position than the probability of the "Go Short" position means that the high obedience and compliance stimulate the positive perception as a sign of obtaining "good news" as proof of efficient contracting.
2. A "negative movement market price" can be formed by the higher probability of the "Go Short" position than the probability of the "Go Long" position means that the high low obedience and compliance stimulate the positive perception as a sign of obtaining "bad news" as proof of opportunity motive.

Meanwhile, this analysis can be interpreted in detail, as follows:

First Condition: The sustainability of an existing business is in a high position. The optimism of better prospects pushes management to carry the no manipulation activity because of the high probability of high sustainability of the existing business. By finding a phenomenon of game theory in the relationship between real earnings quality and tax management policy, the formula for predicting the probability of investment decision can be arranged as follows:

$$P(Tax, Hi|REMQ, Hi) = \frac{P(REMQ, Hi|Tax, Hi)\ X\ P(REMQ,Hi)}{P(REMQ, Hi|Tax, Hi)\ X\ P(REMQ,Hi) + P(REMQ, Hi|Tax, Lo)\ X\ P\ (TaxLo)} \quad (1.19)$$

where:

- $P(REMQ, Hi)$ is the probability of real manipulation quality in high level.
- $P(Tax, Hi)$ is the probability of high tax discretionary accruals quality has been implemented.
- $P(Tax, Lo)$ is the probability of low tax discretionary accruals quality has been implemented.

- $P(REMQ, Hi|Tax, Hi)$ is the probability of real manipulation quality being at a high level when high tax discretionary accruals quality has been implemented.
- $P(REMQ, Hi|Tax, Lo)$ is the probability of real manipulation quality being at a high level when low tax discretionary accruals quality has been implemented.
- $P(Tax, Hi|REMQ, Hi)$ *is the probability of high tax discretionary accruals quality has been implemented when real manipulation quality is at a high level.*

Second Condition: The sustainability of an existing business is in a low position. The pessimistic of existing manipulation activity encourages the management to have the opportunity behavior in disseminating a sign of tracking on the way, where this sign is assumed as incapability of reaching the better prospect. The predictive models for estimating the probability of selling (short position), when real manipulation is low, mainly the high tax discretionary accruals quality, have been implemented. This model can be formulated as follows:

$$P(Tax, Hi|REMQ, Lo) = \frac{P(REMQ, Lo|Tax, Hi)\ X\ P(REMQ,Hi)}{P(\overline{REMQ}, Lo|Tax, Hi)\ X\ P(REMQ,Lo) + P(\overline{REMQ}, Lo|Tax, Lo)\ X\ P\ (TaxLo)} \quad (1.20)$$

where:

- $P(REMQ, Lo)$ is the probability of real manipulation quality in low level.
- $P(Tax, Hi)$ is the probability of high tax discretionary accruals quality has been implemented.
- $P(Tax, Lo)$ is the probability of low tax discretionary accruals quality has been implemented.
- $P(REMQ, Lo|Tax, Hi)$ is the probability of real manipulation quality being at a low level when high tax discretionary accruals quality has been implemented.
- $P(REMQ, Lo|Tax, Lo)$ is the probability of real manipulation quality being at a low level when low tax discretionary accruals quality has been implemented.
- $P(Tax, Hi|REMQ, Lo)$ is the probability of high tax discretionary accruals quality has been implemented when real manipulation quality is at a low level.

By indicating $P(Tax, Hi)$and $P(Tax, Lo)$ is a measurement of tax management probability, which has a critical impact on turning from the short position into a long position when real manipulation quality in low level as the low high compliance on tax regulation. The indicator of $P(Tax, Hi|REMQ, Lo)$ pointed out the probability of obtaining the investor's perception of the financial statement's quality when the management implemented high compliance with tax rules. In the gist, the research has proven that the management tax has been used to change pressure for "to sell" much less than pressure for "to buy" meanwhile, the management has done the communication process to turn *"bad news"* into "*good news*."

When predicting the decision accurately, the next step is to know how the decision has the best impact. As an essential item of "linearity" in the forecasting process, the" history value" which has the most influence on the future performance is a predictor variable. This research encourages that the "simplex model" paves out the decision-making process to formulate these variables' composition for maximum profit or minimum cost. This process is similar to the fuzzy logic model as a development of artificial intelligence. This model can accommodate the constraint of each variable, which is an accurate indicator for reflecting the actual condition.

This empirical testing has shown that earnings quality played a critical role in their decision, as an explanation above. By modifying the linear programming as an Artificial Intelligence model (Trippi & K, 1996), this maximum model is used to obtain the maximum utility for each party in making the decision. It covered the management and investor model. Practically, this model can be solved by spreadsheet excel in Solver, so this focuses on building the conceptual model. First model: Management. This model can be used to determine the composite approach or policy in levelling up the earnings quality; this approach influences the indicator in constraint function, where it is a proxy of earnings quality. the mathematics formula can be arranged systematically, as follows.

Maximum Model: $Z = D_1 X_1 + D_2 X_2 + D_3 X_3 + D_4 X_4$

where:

- X_1 is a policy of having the optimistic approach
- X_2 is a policy of having the pessimistic approach
- X_3 is a policy of having the debt financing
- X_4 is a policy of having the credit financing
- $D_{1,2,3,4}$ is an indicator of the composite of this maximum Z

After arranging the main model, the constraint function can be built, as below:

1. Earnings Quality = $\mu_1 X_1 + \mu_2 X_2 + \mu_3 X_3 + \mu_4 X_4$ <Average Earnings Quality as a targeted indicator.
2. Real Earnings Manipulation = $\delta 1\ X1 + \delta 2\ X2 + \delta\ 3\ X3 + \delta\ 4\ X4$ <Average Real Earnings Manipulation as a targeted indicator.
3. Dividend = $\alpha 1\ X1 + \alpha\ 2\ X2 + \alpha 3\ X3 + \alpha\ 4\ X4$ < Average Dividend as a targeted indicator.
4. Risk (Beta) = $\varsigma 1\ X1 + \varsigma\ 2\ X2 + \varsigma\ 3\ X3 + \varsigma\ 4\ X4$ < Average Risk (Beta) as a targeted indicator.

Second model: Investor.

This model can determine the maximum return in each investment portfolio by looking over the quality financial reporting. The indicator in constraint function is a proxy of financial variable that has a significant contribution to the investor perception. By assuming that each investor had enough attention to monitoring four portfolios, the mathematics formula can be arranged systematically, as follows.

Maximum Return: $Z = D_1 X_1 + D_2 X_2 + D_3 X_3 + D_4 X_4$

where:

- X_1 is an investment portfolio in company $_1$
- X_2 is an investment portfolio in company $_2$
- X_3 is an investment portfolio in company $_3$
- X_4 is an investment portfolio in company $_4$

For creating a smart portfolio in investment, the mathematics formula in constraint function can be arranged systematically, as follows

1. Earnings Quality = $\mu 1\ X1 + \mu 2\ X2 + \mu 3\ X3 + \mu 4\ X4$ < Average Earnings Quality as a target indicator.
2. Cost of Capital = $\delta 1\ X1 + \delta 2\ X2 + \delta\ 3\ X3 + \delta\ 4\ X4$ < Average Cost of Capital as a target indicator.

3. Dividend = α1 X1 + α 2 X2 + α3 X3 + α 4 X4 < Average Dividend as a target indicator.
4. Risk (Beta) = ς1 X1 + ς 2 X2 + ς 3 X3 + ς 4 X4 < Average Risk (Beta) as a target indicator.

where:

- This variable is only a simulation model; it can use the other indicator.
- The average on the left position is a targeted number as a constraint for reaching the Z maximum.

a. $\mu_1 X_1$ is a composition of earnings quality, can be omitted in the main function as X_1.
b. $\delta_1 X_1$ is a composition of the cost of capital, can be omitted in the main function as X_1.
c. $\alpha_1 X_1$ is a composition of dividend, that can be omitted in the main function as X_1.
d. $\varsigma_1 X_1$ is a composition of risk, that can be omitted in the main function as X_1.

Finally, this research gives a comprehensive guideline on how the investor reacts to the earnings quality, where the management has a proclivity to disseminate the signal for sustainability in the long run. By supported by the mathematics model, it can predict the probability to reach the expected return, and each party should maximize their utility based on the valid accounting information. In the gist, the high financial reporting has a positive contribution from keeping the community's trust in the capital market because of the cross position of monitoring and checking. There is an open chance for accruals but no tolerance of any infringement of the regulation legally.

Conclusion

The conclusion of this research can be interpreted that the *real earnings quality* has a positive contribution significantly to *future market value based on equity* and *earnings*. This positive perception can be formed when the high obedience to the available accounting standard, with no misleading information to illustrate the real earnings. For tax management, the *tax discretionary accruals quality* has a positive contribution significantly to *future market value based on equity* and *earnings*. Because of the flexibility in designing tax management, the high compliance with tax rules has the minimum probability of tax exposure. It refers to agency costs in the following period. This research pushes the regulator to create the incentive for management to release high-quality financial reporting. It covers the punishment and reward system for management for any violence in the accounting system. When the financial reporting was judged to have a low real earnings manipulation quality, it should have a strict approach as an early warning system for management to make prudent corporate decisions. Because the dividend payout policy is an indicator of high earnings quality, the management should implement the dividend payout, so the regulator should fix a free tax tariff for a dividend. Because of the fiscal correction in calculating the taxable income, the tax regulator authority should have the same viewpoint as the authorized capital market regulator to minimize the accounting and tax rule; there is no potential for an opportunistic motive. It relates to recording the fixed asset and revaluation, and it can reflect the tax amnesty's effectiveness in leveling up the compliance level.

Implication

Mulling over the different aspects of the decision-making process for the management and investor, each model has a different point in arranging these variables' composition for the best result. The linear programming with the "simplex model" tests the impact of these variables with the redundant and repetitive process (robust approaches model), so the benefit of this model is a flexible capability of learning and adopting the new input in a dynamic relationship. It refers to the adjustment process that can be done efficiently by detecting the potential or default risk related to reaching the high probability of guaranteeing this successful result as an achievement of the target-oriented process, this model can be implemented with concern about deducting the risk.

Limitation

Based on the conclusion, there is some limitation in doing this research. Firstly, by using the assumption in calculating future market value, this research uses the constant and zero growth during the observation period. This one aimed to anticipate the effect of pandemic COVID-19 in 2020, where the before and after impact stimulates no growth for current and prospects. Secondly, in doing the statistical testing, there are so many rejected data in outlier testing, where all gathering data has amounted to 384 samples, and the rejected sample is 180 samples. It is an effect of real manipulation activity in high variation. Future research can be expected to provide a representative model using the combination of Smart PLS and Multiple Regression to predict the future return, including the portfolio investment. It can be done by implementing the non-linear regression. Finally, it can be considered to use the APT (Arbitrage Pricing Theory) in estimating the risk, and it is used to estimate the existence in the long run. This research used the CAPM model to obtain the beta as a risk indicator. The APT can be more comprehensive in estimating the risk.

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