THE ROLE OF MANAGERIAL ABILITY IN INDONESIA: INVESTMENT OPPORTUNITY SETS, ENVIRONMENTAL UNCERTAINTY, TAX AVOIDANCE

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Abstract

Purpose of the study: This study aims to obtain empirical evidence of the effect of investment factors that consist of investment opportunity sets and environmental uncertainty on tax avoidance and the role of managerial ability in moderating these effects.

Methodology: The analysis was conducted on 49 manufacturing companies listed on the Indonesia Stock Exchange from 2012 to 2018. It was chosen through a purposive sampling method, so 343 observations were obtained. This study engages two-panel data regression models, a model with and without moderation managerial ability. Also, this study employs factor analysis to produce investment opportunity sets that can represent this variable.

Main Findings: This study reveals that investment opportunity sets and environmental uncertainty positively affect tax avoidance. Meanwhile, managerial ability failed to moderate the effect of investment opportunity sets and environmental uncertainty on tax avoidance.

Implications: The results of the profiling can be used as an early warning, especially for account representatives and tax auditors at the Indonesia Tax Authority, so that potential tax exploration and examination can be more in-depth for firms that fulfill these characteristics. Also, this study provides advice to the Government of Indonesia to provide tax holidays for firms with high IOS who invest in the real sector and tax incentives for firms that are facing an environment with high uncertainty.

Novelty: This study deploys managerial ability as a moderating variable between the relationship of investment opportunity sets and environmental uncertainty to tax avoidance. The managerial ability has an important role in firms' IOS and environmental uncertainty faced by the firms because the level of managers will produce differences in the economic outcomes and the effectiveness of the discretion.

Keywords: *Environmental Uncertainty, Investment Opportunity Sets, Managerial Ability, Tax Avoidance*.

INTRODUCTION

Tax is one of the sources of state revenue, which has the most considerable portion in the Indonesian National Budget (APBN). The large portion of the tax provides benefits for the government to finance its programs as well as for people who will experience increased welfare due to the running of the government program.

However, imposing taxes on citizens with the appropriate amount expected is tough. It can be proven through the realization of tax revenue, which has always been lower than the target since 2009. Also, the tax ratio as a measure of a country's tax performance can be used to see Indonesia's low tax performance. According to the report from the Organization for Economic Co-Operation and Development (OECD), Indonesia's tax ratio in 2017 is the lowest compared to other countries in the Asia Pacific region. Indonesia's tax ratio in 2017 was 11.5% and lower than the OECD country's average tax ratio, which reached 34.2%. It is also lower than the average tax ratio from countries in Africa (18.2%) and neighbouring countries such as Thailand (17.6%), Philippines (17.5%), Singapore (14.1%), and Malaysia (13.6%) (OECD, 2019). The OECD stated that one of the causes of Indonesia's low tax ratio is tax avoidance (Bisnis.com). The Indonesian Forum for Budget Transparency (FITRA) suspects that every year tax avoidance in Indonesia is as much as Rp 110 trillion (Suara.com). Thus, the gap causes between the tax target and revenue, along with the low tax ratio in Indonesia, is exciting to examine.

Desai & Dharmapala (2006) stated that companies tend to avoid tax. For companies, taxes are a burden and reduce shareholder wealth. The tax paid is calculated based on the firm's income, which directly reduces the firm's net income. Tax avoidance carried out by the firm can be explained through the political cost hypothesis, which is one of the hypotheses in positive accounting theory (Watts & Zimmerman, 1990). The theory explains that the higher political costs will increase the likelihood of managers to choose accounting policies that shift the profit from the current year into the coming period. Taxes are political costs that reduce profits (Watts & Zimmerman, 1990). Therefore, managers tend to adopt opportunistic accounting policies that will reduce taxable income. There are several cases related to tax avoidance, including cases of alleged tax avoidance by Google and IKEA that exploit regulatory loopholes by transferring profits to a tax haven country (finance.detik.com, kumparan.com, kompas.com). Also, the alleged tax avoidance was carried out by PT Adaro Energy Tbk by transfer pricing activities (tirto.id).

Hanlon & Heitzman (2010) defined tax avoidance broadly as activities that reduce direct taxes. Dyreng et al. (2008) also defined tax avoidance as all transactions that reduce corporate tax relative to accounting income before tax. Darussalam & Septriadi (2009) stated that tax avoidance is a transaction scheme aimed at minimizing the tax burden by utilizing loopholes in a country's taxation provisions.

According to McGuire et al. (2014), taxes can be associated with factors that influence investment. McGuire et al. (2014) stated that investment opportunity sets (IOS) and environmental uncertainty are factors that influence investment decisions. Both of these factors affect the preparation of business strategies in making investment decisions. The intended business strategy includes a tax strategy in which tax planning is included. The output of tax planning is lower tax payments. Therefore, this study examines the effects of the two factors that influence these investments on tax avoidance.

Several previous studies have tested the influence of IOS, including on the firm's performance (Sun et al., 2014), the financing decisions and the decision of dividends (Gaver & Gaver, 1993; Abor & Bokpin, 2010), the decision of compensation (Smith & Watts, 1992; Gaver & Gaver, 1993) and tax avoidance (Rubai, 2009; Handayani, 2013; McGuire et al., 2014; Lubis, 2015; Firmansyah & Bayuaji, 2019). Firms with high IOS tend to reduce the proportion of debt so that firms may not take advantage of debt interest, which can reduce the firms' tax burden (Rubai, 2009). Debt interest is a tax deduction that is usually an incentive for firms to avoid tax (Cheng et al., 2012). Rubai (2009) states that IOS has a positive influence on the firms' tax burden that is reflected by the effective tax rate (ETR). That is, firms with high IOS use less debt in optimizing their investment, so firms do not use debt interest to reduce their tax burden.

Several previous studies that examined the effect of IOS on tax avoidance gave different results. Rubai (2009), McGuire et al. (2014), Lubis (2015), Firmansyah & Bayuaji (2019) found that high IOS tends to reduce corporate tax avoidance activities. A different result was found by Handayani (2013), who did not find the influence of IOS on tax avoidance activities. Based on the results of previous studies that have not given consistent results, the research on the effect of IOS on tax avoidance is interesting to be further examined.

In response to environmental uncertainty, managers often use flexibility and discretion to adapt to changing environments. Several studies have tested the manager's flexibility and discretion in a volatile environment, such as the relationship of performance (Yenidogan & Windsperger, 2014), corporate investment decisions (Arieftiara & Mariana, 2018), and earnings smoothing (Habib et al., 2011). Meanwhile, related to the effect of environmental uncertainty on tax avoidance, some previous studies have not produced consistent results. McGuire et al. (2014) found that firms with high operating uncertainty will reduce investment activities in tax shelters because operating uncertainty results in uncertainty of future tax savings. Huang et al. (2017) and Arieftiara (2017) found that high environmental uncertainty will encourage increased tax avoidance activities. A volatile environmental causes firms to be more careful in planning, including tax planning because taxes represent a significant expense for the firms and reduce shareholders' wealth.

Ratu & Siregar (2018) found that firms that face high environmental uncertainty will increase tax avoidance activities. Firms with high environmental uncertainty will face a more risky situation so that firms will try to display the image of a low-risk by managing firms' cash flow by lowering firms' costs. One method that managers can take to overcome environmental uncertainty is by avoiding taxes (Ghosh & Olsen, 2009). The difference in results in previous studies related to the effect of environmental uncertainty on tax avoidance is interesting for further study.

The difference between this research and previous studies is the use of managerial ability as a moderating variable between the relationship of investment opportunity sets and environmental uncertainty to tax avoidance. The managerial ability has a role prominent in the success of the company (Francis et al., 2008; Shavinina & Medvid, 2009), one of which is appropriate investments. Managers can influence economic outcomes because managers with capable abilities can better understand industry trends, predict demand accurately, and invest in projects that add value. Chemmanur et al. (2009) found evidence to suggest that the more capable managers are more able to identify projects that have a high NPV, thus increasing more significant investment. Besides, Lee et al. (2018) found that higher managerial ability caused more significant investment opportunities. Managerial abilities also have an essential role when firms face a volatile environment. A volatile environment causes variability in revenue growth (Huang et al., 2017). When firms face high environmental uncertainty, managers will have the discretion to reduce this variability by managing revenue. Some things managers can do to overcome environmental uncertainty include using earnings management, budgetary slack, and income smoothing (Dunk & Nouri, 1998; Davila & Wouters, 2005; Ghosh & Olsen, 2009). The ability level of managers will produce differences in the effectiveness of the discretion.

By the agency theory, managers who have more information about the company than shareholders have the potential to avoid taxes for their purposes. It reflects the manager's ability to increase tax avoidance activities (Rubai, 2009; Handayani, 2013; Akbari et al., 2018; Koester et al., 2016). On the other hand, managers who have high capabilities tend to avoid potential risks that may arise due to tax avoidance activities such as sanctions, fines, and damage to the reputation of both the company and manager. Managers with high capabilities are more concerned with reputation than aggressive actions that benefit in the short term, such as tax avoidance. It shows that high managerial abilities will reduce tax avoidance activities (Francis et al., 2015; Park et al., 2015; Huang et al., 2017).

By considering the above, this study is anticipated to provide input to the Tax Authorities in order to make the appropriate policies in terms of increasing state revenue or providing tax facilities by paying attention to firms' tax avoidance behavior that is influenced by the IOS and environmental uncertainty.

LITERATURE REVIEW

According to the political cost hypothesis in positive accounting theory, tax is the highest political cost and can be ~~felt~~ considered directly by the firm (Godfrey et al., 2010). Wang et al. (2019) found that political costs have an essential role in corporate tax avoidance decisions. According to the political cost hypothesis, firms with high profitability will attract the attention of the government, which causes an increase in political costs, one of which is tax. Therefore, the political cost hypothesis assumes that firms tend to choose income decreasing accounting methods for the current year to avoid the spotlight from the government (Scott, 2015). It is supported by research conducted by Zimmerman (1983), who found that the effective tax rate (ETR) of large firms in the manufacturing, trading, and retail were lower than smaller firms.

In addition to positive accounting theory, several previous studies place the agency theory framework as a theoretical foundation in understanding corporate tax avoidance activities (Crocker & Slemrod, 2005; Desai et al., 2007; Desai & Dharmapala, 2009; Hanlon & Heitzman, 2010). Agency theory explains that every party in the agency relationship has its economic interests and so the relationship that both parties have is called utility maximizers (Jensen & Meckling, 1976). Therefore, it is natural that the agent does not always act in the interests of the principal. The Agency theory framework in tax avoidance activities includes the relationship between shareholders, management, and government (tax authority) (Hanlon & Heitzman, 2010). Although tax avoidance does not directly reflect agency problems, the separation between owners and managers (principals and agents) can lead managers to take corporate tax decisions in their interests (Hanlon & Heitzman, 2010).

Hypothesis Development

IOS is considered as a firm activity in minimizing agency problems. Higher IOS will make managers have an excellent opportunity to choose various investment options so that it is in line with the interests of shareholders who want additional wealth in the long run. Firms that have many investment options will feel more comfortable to choose an investment that generates maximum returns (NPV) with minimal risks so it will reduce the possibility of firms to invest in tax avoidance activities such as tax shelters. It is consistent with previous research, which found that high IOS will reduce tax avoidance activities in firms (Rubai, 2009; McGuire et al., 2014; Lubis, 2015). Therefore, this study suspects that a high IOS will encourage smaller tax avoidance, so the first hypothesis of this study is as follows:

H₁: Investment opportunity sets negatively affects tax avoidance.

According to agency theory, humans, in general, have the nature of, among others, self-interest, bounded-rationality, and risk-averse. When facing high environmental uncertainty, managers will avoid risks more and maximize their utility. Also, the pressure from shareholders so that the firm can overcome the problem of environmental uncertainty causes managers to try to maintain the firm's operations to remain efficient. Therefore, managers will use their judgment and discretion more when facing high environmental uncertainty. Tax avoidance is an effective way to overcome risks arising from environmental uncertainty (Ghosh & Olsen, 2009). Tax avoidance will provide additional funds for the firm so that cash flow becomes more stable and will reduce the risk arising from environmental uncertainty. It is consistent with previous research, which found that more considerable environmental uncertainty caused more unusual tax avoidance activities (Huang et al., 2017; Arieftiara, 2017; Ratu & Siregar, 2018). Therefore, this study suspects that high environmental uncertainty drives companies to avoid taxes, so the second hypothesis of this study is as follows:

H₂: Environmental uncertainty positively affects tax avoidance.

Lee et al. (2018) found that higher managerial ability caused a more significant investment opportunity. More capable managers can increase assets in place and create various investment options. It allows managers to choose the most profitable investment with the least risk to minimize investment selection in tax avoidance activities. This shows that more capable managers less engage in tax avoidance activities (Francis et al., 2015; Park et al., 2015; Huang et al., 2017). On the other hand, because of its opportunistic nature, managers with high ability can create high IOS to do more significant tax avoidance activities because high IOS will create a complex information environment, so tax avoidance will be more challenging to detect. Therefore, the role of managerial ability is exciting to test regarding its effect on the relationship between IOS and tax avoidance and to find out whether managerial ability will increase or decrease tax avoidance activities. Therefore, the third hypothesis of this study is as follows:

H₃: Managerial ability moderates the effect of investment opportunity sets on tax avoidance.

Environmental uncertainty causes variability in revenue growth (Huang et al., 2017). When companies face a volatile environment, managers will have the discretion to reduce this variability. Some things managers can do to overcome environmental uncertainty include using earnings management, budgetary slack, and income smoothing (Dunk & Nouri, 1998; Davila & Wouters, 2005; Ghosh & Olsen, 2009). Managers are expected to be able to identify and analyze environmental conditions so that they can make the right decisions, including those related to tax planning. Previous

studies have shown that when faced with high environmental uncertainty, managers with high abilities will lower tax avoidance than managers with low abilities (Huang et al., 2017). Ratu & Siregar (2018) find different results that when faced with high environmental uncertainty, managers with high abilities will be more likely to carry out tax avoidance activities. Therefore, the fourth hypothesis of this study is as follows:

H₄: Managerial ability moderates the effect of environmental uncertainty on tax avoidance.

METHODOLOGY

This study uses data from financial statements and annual reports of manufacturing companies listed on the Indonesia Stock Exchange (IDX) in the period 2012-2018. The manufacturing sector was chosen because it produces the most substantial tax revenue for Indonesia (Ministry of Industry, 2018). The sample in this study was selected using a purposive sampling method with several criteria, as in Table 1.

Table 1: Selection Process of Research Samples

Criteria	Amount
Firms listed on the IDX as of November 2019	657
Firms are not in the manufacturing sector	-479
Manufacturing sector firms listed on the IDX after January 1, 2012	-52
Firms that were delisting and relisting during period 2012 until 2018	-2
Firms with negative pre-tax profits	-55
Firms that use currencies other than Rupiah as the reporting currency	-7
Firms whose fiscal year ends other than December 31	-2
Firms that have incomplete data for the period 2008 to 2018	-11
Number of Samples	49
Year	7
Total observations	343

Source: Processed data

The dependent variable in this study is tax avoidance, while the independent variables are investment opportunity sets and environmental uncertainty. This study uses managerial abilities as a moderating variable, while the control variables used are firm size, leverage, and profitability. Operationalization of variables and proxies used in research are as follows:

Tax Avoidance

Tax avoidance has many definitions, and no one definition is universally acceptable (Hanlon & Heitzman, 2010). Some studies divide tax avoidance into legal actions utilizing loopholes in tax regulations to minimize tax payments and tax evasion by using unlawful methods such as fraud and embezzlement. Frank et al. (2009) stated that tax aggressiveness is actions that manipulate corporate taxable profits using either legal (tax avoidance) or illegal (tax evasion) methods. This study uses the definition of tax evasion by Darussalam & Septriadi (2009), which stated that tax avoidance is a transaction scheme aimed at minimizing the tax burden by utilizing loopholes tax regulation of a country. The tax avoidance proxy used in this study is the abnormal permanent difference (DTAX) as used by Rachmawati & Martani (2017), who adapted the Frank et al. (2009) and have been adjusted to the conditions in Indonesia. The proxy is as follows:

$$PERMDIFF_{i,t} = \alpha_0 + \alpha_1 INTANG_{i,t} + \alpha_2 NOL_{i,t} + \alpha_3 LAGPERM_{i,t} + \varepsilon_{i,t}$$

Where:

$PERMDIFF_{i,t}$ = Permanent difference between accounting and tax that is total book-tax difference minus the temporary difference in the firm-year, or $[BI_{i,t} - (CTE_{i,t}/STR_t)] - (DTE_{i,t}/STR_{i,t})$, scaled by total assets in year t-1.

$BI_{i,t}$ = Pre-tax book income for firm i in year t.

$CTE_{i,t}$ = Current tax expense firm i in year t.

$DTE_{i,t}$ = Deferred tax expense firm i in year t.

$STR_{i,t}$ = Statutory tax rate (income tax rate according to the income tax regulation) in year t.

$INTANG_{i,t}$ = Goodwill and other intangible assets firm i in year t, scaled by total assets in year t-1.

$\Delta NOL_{i,t}$ = Changes in the net operating loss that can be compensated for the firm i in the year t, scaled by total

assets in year t-1.

LAGPERM$_{i,t}$ =   One-year lagged PERMDIFF for firm i in year t, scaled by total assets in year t-1.

$\varepsilon_{i,t}$ =   Discretionary permanent difference (DTAX) for firm i in year t.

Investment Opportunity Sets (IOS)

IOS is a combination of the choice of assets in place and several future investment options with a positive net present value (NPV) (Myers, 1977). IOS can form a variety of activities, such as new investment activities in the form of tangible or intangible such as the acquisition of other firms, maintenance and replacement of assets, increased capacity, expansion projects, and development of the brand.

Proxies that describe the size of a firm's IOS are very diverse so that it allows researchers to use various ratios as IOS proxies. Some researchers use a single ratio as a measure, which is considered to represent the IOS. Also, other studies use the composite measure as a proxy that represents IOS because it is considered better in measuring IOS variables. The composite measure will reduce measurement errors caused by a single proxy because of the nature of IOS that cannot be observed and measured by external parties so that a single proxy has a considerable risk of error in capturing the IOS of a firm (Kallapur & Trombley, 2001).

This study employs a composite measure approach which combines five variables of IOS single proxies that have been widely used in previous studies (Gaver & Gaver, 1993; Kallapur & Trombley, 2001; Rubai, 2009; Handayani, 2013; McGuire et al., 2014; Lubis, 2015; Firmansyah & Bayuaji, 2019) as follows:

(1)   Market to book value of equity (MVEBVE)

$$MVEBVE = \frac{Number\ of\ Outstanding\ Shares\ x\ Closing\ Price}{Total\ Equity}$$

(2)   Market to book value of assets (MVABVA)

$$MVABVA = \frac{Total\ Asset - Total\ Equity + (Outstanding\ Share\ x\ Closing\ Price)}{Total\ Asset}$$

(3)   Earning to price ratio (EPR)

$$EPR = \frac{Earning\ per\ Shares}{Closing\ Price}$$

(4)   The ratio of capital expenditure to book value of the asset (CAPBVA)

$$CAPBVA = \frac{(Book\ value\ of\ fixed\ assets_t - Book\ value\ of\ fixed\ assets_{t-1})}{Total\ Asset}$$

(5)   The ratio of capital expenditure to the market value of assets (CAPMVA)

$$CAPMVA = \frac{(Book\ value\ of\ the\ fixed\ asset_t - Book\ value\ of\ the\ fixed\ asset_{t-1})}{Total\ Asset - Total\ Equity + (Outstanding\ Share\ x\ Closing\ Price)}$$

These five proxies are considered to represent the size of the price-based and investment-based proxy. According to Kallapur & Trombley (2001), price-based and investment-based proxies consistently correlate with growth realization. As with Gaver & Gaver (1993), the five IOS ratios above will be reduced by using factor analysis to obtain a combined factor score, which is a representation of the IOS variable. The variable used is a variable that has a significant correlation. The factor used is a factor that has eigenvalues above one because it is considered to have represented all the variables (Hair et al., 2014). The factor analysis process will be explained in the Results section.

Environmental Uncertainty

Environmental uncertainty is the degree of change or variation in the environment outside the organization, which mainly includes customers, competitors, government regulations, and labor unions (Tung, 1979). This study employs sales volatility as a proxy, as used by Huang et al. (2017). According to Ghosh & Olsen (2009), sales volatility is a better proxy than technological volatility because technological volatility is part of management discretion. Managers can cut R&D expenditures or capital expenditures when the environment becomes uncertain. Therefore, technological volatility is more like management's response to the external environment than directly measuring the uncertainty of the environment itself. The sales volatility proxy is as follows:

$$CV\ (S_i) = \frac{\sqrt{\sum_{i=0}^{n} \frac{(S_i - S_{mean})^2}{5}}}{S_{mean}}$$

Where:

CV   =   Coefficient of variation of sales.

| S_i | = | Firm's sales scaled by total assets in the year i. |
| S_{mean} | = | Average sales scaled by total assets over the previous five years. |

Managerial Ability

Managerial ability is the ability to increase firms' value by utilizing limited resources efficiently throughout business operations (Demerjian et al., 2012). Managerial abilities that are generally related to the dimensions of human capital management are essential for the success of the company (Francis et al., 2008; Shavinina & Medvid, 2009). Demerjian et al. (2012)) state that the characteristics of managers (abilities, talents, reputation, or managerial style) can influence the outcome of company activities. According to Meindl et al. (1985), managers or leaders of the company are the centres of organizational processes and the main strengths for the organization in carrying out its business activities.

This study uses a managerial ability measurement model introduced by Demerjian et al. (2012) and then continued by Park et al. (2015). There are two stages in measuring managerial abilities. The first stage is looking for efficiency at the company level with The Data Envelopment Analysis (DEA) approach in the same industry annually. The DEA score for the most efficient company is 1 and referred to as frontier. The farther a firm is from the frontier, the lower its efficiency score. Park et al. (2015) refer to Demerjian et al. (2012) in measuring the efficiency of the Decision-Making Unit (DMU) using expenses, fixed assets, and intangible assets as input and sales as an output. Referring to the research, the relative efficiency of the company is measured based on data from the IDX using the following DEA model:

$$max\ \theta \atop v = \frac{SALES}{v_1 COGS + v_2 SG\&A + v_3 PPE + v_4 OPsLease + v_5 R\&D + v_6 OtherIntan}$$

Where:

SALES	=	Sales.
COGS	=	Cost of goods sold.
SG&A	=	Sales, Administration, and General Expenses.
PPE	=	Fixed assets.
OpsLease	=	Operating Lease.
R&D	=	Research and Development.
OtherIntan	=	Other intangible assets.

The next stage is to parse out total firm efficiency score (DEA score) into firm efficiency and managerial ability by regressing total firm efficiency on six firm characteristics that affect firm efficiency. Thus, this study employs Tobit regression to estimate managerial ability as the following model:

$$FE = \beta_0 + \beta_1 SIZE_t + \beta_2 MS_t + \beta_3 FCF_t + \beta_4 AGE_t + \beta_5 BUSEG_t + \beta_6 FCI_t + \sum_{t=1}^{T} \varphi_t\ YEAR_t + \varepsilon$$

Where:

F.E.	=	Total firm efficiency score, measured by DEA.
SIZE	=	Natural logarithm of total assets.
M.S.	=	Firm revenue divided by total industry revenue per year.
FCF	=	Dummy variable, given a value of 1 if the free cash flow is greater than 0, a value of 0 if vice versa.
AGE	=	Natural logarithm of the number of years the firm has been listed on the IDX at the end of the year t.
BUSEG	=	The number of business segments in the firm.
FCI	=	The absolute value of the total gain or loss of foreign currency translation accounts divided by total revenue.
ε	=	Managerial ability score then marked with the MASCORE code.

Variable Control

This study employs several control variables selected based on the frequency of use and their significance in studies of tax avoidance as in the researches; Gupta & Newberry (1997); Rego (2003); Chen et al. (2010); Lisowsky (2010); Samingun (2012). The firm's size (SIZE) is used to control the effects of economics scale, so it needs to be controlled. SIZE is measured using the natural logarithm (ln) of the total firm's assets. Leverage (LEV) needs to be controlled because of the burden of interest from debts is a deduction from gross income, so it needs to be controlled to ensure that the tax savings are not from high debt. LEV is measured by the ratio of total debt to total assets in the current year. Profitability (ROA) needs to be controlled because the firm's performance can cause the amount of tax to change from year to year. Profitability is measured using the return on assets and calculated as the ratio of income before taxes divided by total assets in the current year.

Research Model

This study used two research models. The first research model examines the effect of IOS and environmental uncertainty on tax avoidance as hypotheses 1 and 2. The regression model for this research is as follows:

$$DTAX_{i,t} = \beta_0 + \beta_1 IOS_{i,t} + \beta_2 EU_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROA_{i,t} + \varepsilon_{i,t}$$

Meanwhile, the second research model examines the role of managerial ability in moderating the effect of IOS and environmental uncertainty on tax avoidance as hypotheses 3 and 4. The regression model for this research is as follows:

$$DTAX_{i,t} = \beta_0 + \beta_1 IOS_{i,t} + \beta_2 EU_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 ROA_{i,t} + \beta_6 MASCORE_{i,t} + \beta_7 (IOS_{i,t} * MASCORE_{i,t}) + \varepsilon_{i,t}$$

Where:

$DTAX_{i,t}$	=	Tax Avoidance firm i in year t
$IOS_{i,t}$	=	Investment opportunity sets firm i in year t
$EU_{i,t}$	=	Environmental uncertainty firm i in year t
$MASCORE_{i,t}$	=	Managerial ability firm i in year t
$SIZE_{i,t}$	=	Natural logarithm of total assets firms i in year t
$LEV_{i,t}$	=	Leverage firm i in year t.
$ROA_{i,t}$	=	Profitability firm i in year t
$\varepsilon_{i,t}$	=	Error.
β	=	Constants.

RESULTS

KMO Testing and MSA Measurement

Based on Table 2, the value of KMO and Bartletts's test of sphericity is 0.507, with a significance of 0.000. These results indicate that the value is above 0.5, with a significance of 0.000 (0.000 < 0.05). According to Bilson (2005), the value of KMO is considered sufficient if the value is between 0.5 to 1 so that these variables can be analyzed further.

Table 2: KMO and Bartlett's Test Result

Kaiser-Meyer-Olkin Measure of Sampling	0.507	
Bartlett's Test of Sphericity	Approx. Chi-Square	1394.607
	df	10
	Sig.	0.000

Source: processed data

Based on Table 3, MVEBVE, MVABVA, EPR, and CAPMVA can be further analyzed because each variable has an MSA value greater than 0.5. The next test is to repeat The KMO & Bartletts' test and MSA testing of the four variables that pass the previous test so that all variables have an MSA value greater than 0.5 (Hair et al., 2014).

Table 3: Anti-image Matrices Result

Single Proxy IOS	MVEBVE	MVABVA	EPR	CAPBVA	CAPMVA
MVEBVE	0.510				
MVABVA		0.510			
EPR			0.572		
CAPBVA				0.492	
CAPMVA					0.504

Source: Processed data

Factoring

Factoring is a process of extracting several variables that have passed from the previous testing. Table 4 shows that two factors have eigenvalues above 1, namely factor 1 and factor 2. Therefore, factoring stops at two factors only.

Table 4: Total Variance Explained Result

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of	Cumulative	Total	% of	Cumulative %
1	2.076	51.899	51.899	2.076	51.899	51.889
2	1.170	29.256	81.155	1.170	29.256	81.155
3	0.694	17.347	98.502			
4	0.060	1.498	100.000			

Source: Processed data

Table 5 shows the magnitude of the correlation of each variable formed, while Table 6 shows more clearly which variables will enter into factor 1 or factor 2. Based on Table 5, factor 1 that has dominant variables are MVEBVE and MVABVA, while factor 2 that has the dominant variables are EPR and CAPMVA. These two factors are then added together to form a proxy representing IOS, which will then be used in the regression model of the research model (Dadri, 2011).

Table 5: Component Matrix Result

Single Proxy	Factor	
	1	2
MVEBVE	0.949	0.262
MVABVA	0.929	0.325
EPR	-0.353	0.741
CAPMVA	-0.434	0.668

Source: Processed data

Table 6: Rotated Component Matrix

Single Proxy	Factor	
	1	2
MVEBVE	0.982	-0.068
MVABVA	0.975	-0.133
EPR	-0.032	0.820
CAPMVA	-0.135	0.785

Source: Processed data

Descriptive Statistics

Table 7 shows the descriptive statistics of the variables in this study, which include mean, median, maximum value, minimum value, and standard deviation.

Table 7: Statistical Descriptive

Variables	Obs.	Mean	Median	Std. Dev	Min	Max
DTAX	343	2.37E-19	-0.002	0.033	-0.102	0.300
IOS	343	-3.00E-16	-0.277	1.414	-2.211	13.118
EU	343	0.121	0.101	0.080	0.009	0.615
MASCORE	343	-6.11E-10	0.011	0.141	-0.323	0.262
SIZE	343	28.629	28.198	1.660	25.579	33.473
LEV	343	0.416	0.404	0.176	0.119	0.881
ROA	343	0.122	0.095	0.109	0.001	0.624

Source: Processed data

Hypothesis Test

The results of hypothesis testing and regression analysis can be seen from the following table.

Table 8: Regression Result

Variables	Expected	Model 1			Model 2		
		Coefficient	Prob.		Coefficient	Prob.	
C		-0.276	0.000	***	-0.312845	0.000	***
IOS	-	0.003	0.000	***	0.003355	0.000	***
EU	+	0.034	0.015	**	0.027603	0.138	
SIZE		0.009	0.001	***	0.009995	0.001	***
LEV		0.010	0.103		0.012922	0.299	
ROA		0.131	0.000	***	0.145631	0.000	***
MASCORE					-0.017003	0.349	
IOS*MASCORE	?				0.004172	0.533	
EU*MASCORE	?				-0.071722	0.522	
R-Squared		0.496			0.502		
Adj. R-Squared		0.404			0.405		
F-Statistic		5.376			5.165		
Prob. (F-Statistic)		0.000			0.000		

Information: * significant at the level (0.10). ** significant at the level (0.05), *** significant at the level (0.01)

Source: Processed data

DISCUSSIONS

The effect of investment opportunity sets on tax avoidance

Based on Table 8, this study suggests that IOS has a positive effect on firms' tax avoidance. The results of this study are not in line with the research by Rubai (2009), McGuire et al. (2014), Lubis (2015), and Firmansyah & Bayuaji (2019) who found that the IOS had a negative effect on tax avoidance. Meanwhile, this study is not in line with the research conducted by Handayani (2013), who found that IOS does not affect tax avoidance. This research supports the theory of the political cost hypothesis, which states that a bigger firm tends to choose accounting methods that reduce profits to avoid political costs. A firm with a large IOS is a growing firm. Along with the growth of the firm, manufacturing firms will reduce their political costs, one of which is by reducing the tax burden. Zimmerman (1983) found that in manufacturing, trading, and retail, large firms have lower tax rates than smaller firms. Skinner (1993) also found that the greater IOS firms led firms to choose income decreasing accounting methods, especially accounting policies related to inventory.

According to agency theory, risk aversion and horizon problem are matters that cause motivational differences between managers and shareholders. A firm with high IOS means that the firm has many investment options. However, managers tend to choose investments that provide the highest NPV with the lowest risk, and managers are more interested in short-term cash flow than shareholders. One of the projects that can provide a positive NPV, lower the risk of failure, and can generate cash flow in the short term is tax avoidance activities such as investment in tax shelters because, for firms, tax is considered as a revenue centre (McGuire et al., 2014).

Furthermore, large investment opportunities will make the investment environment more complex because the choice of investment options depends on the manager's discretion in determining expenditure choices (Smith & Watts, 1992; Cahan et al., 2008). Manager's discretion is difficult to predict and supervised by external parties, including tax authorities. It can lead to increased tax avoidance activities by firms.

The effect of environmental uncertainty on tax avoidance

Based on the result in Table 8, this study suggests that environmental uncertainty has a positive effect on tax avoidance. The result of this study is in line with the research by Armstrong et al. (2012), Huang et al. (2017), and Arieftiara (2017), who found that there was a positive influence on environmental uncertainty on tax avoidance. However, the result of this study is not in line with the study conducted by McGuire et al. (2014), who found that firms with large operating uncertainty will less engage in investment in tax shelters.

When facing high environmental uncertainty, managers will face a variety of pressures both from themselves and shareholders. High uncertainty business environments, characterized by increased business competition, unpredictable changes in consumer tastes, and other turbulent conditions, will increase managers' risk in achieving the predetermined targets as sales and revenue targets. It can result in deduction of income, reduced bonuses, or dismissal of managers. Also, when facing a volatile environment, shareholders have a high expectation that the firm can still increase their wealth and optimize firm profits. To overcome this, managers will use the flexibility and discretion to use different strategies and plans when dealing with environmental uncertainty such as budgetary slack and income smoothing (Dunk & Nouri, 1998; Davila & Wouters, 2005; Ghosh & Olsen, 2009).

Judgments and plannings related to firm taxes, including one made by managers to influence the tax burden, must be borne by the company. When facing high business uncertainty, managers will increase their efforts to reduce tax expense as efficiently as possible because the tax is one of the contributors to the decline in profits after tax, the rate of return, and cash flow (Santoso and Rahayu, 2013). Therefore, in uncertain environmental conditions, companies will attempt to minimize their tax payments more than when they are in normal conditions.

Managerial ability as a moderating variable in the effect of investment opportunity sets on tax avoidance

Based on Table 8, this study suggests that managerial abilities failed in moderating the effect of IOS on tax avoidance. Managerial positions in the firms are assumed to be formal positions. Important firm decisions related to firm efficiency are based more on firm factors than manager factors. It is evident from the low mean value of MASCORE, which is the residue from firm efficiency regression. The regression aims to separate managerial ability that comes from the company factor and the manager factor itself. The low residual value means that the manager has a minimal role. The formality of the manager's position can be caused by the process of recruitment that is not ideal that occurs in developing countries where the selection of managerial positions (directors and boards of directors) is made by the state or major politicians based on the relationship they have (Akbari et al., 2018).

Other reasons that led to the failure of managerial ability to moderate the effect of IOS on tax avoidance are financial constraints, unhealthy financial conditions, inherent firm characteristics, and incentive compensation. Financial constraints and unhealthy financial conditions would cause managerial ability to have no significant influence on the firm IOS (Lee et al.,2018). Great investment opportunities cannot be obtained by firms that have financial constraints even though the firms have managers with high abilities. Also, firms with a high probability of bankruptcy will prefer to use their resources to overcome the risk of default rather than creating future growth. Meanwhile, Koester et al. (2016) found that inherent firm characteristics and incentive compensation caused no significant influence of managerial role on tax avoidance. It might not be advantageous for managers to make new policies that change the characteristics of the company just to avoid taxes. Besides, varied conditions of tax avoidance are much influenced by compensation incentives, making the managerial factor not to affect tax avoidance activities (Koester et al., 2016).

Managerial ability as a moderating in the effect of environmental uncertainty on tax avoidance

Table 8 suggests that managerial ability failed in moderating the effect of environmental uncertainty on tax avoidance. Managers are assumed to have no educational background in finance and management, especially taxation. Without knowledge of taxes, even though managers are well aware of the environmental conditions facing the firm, managers cannot plan and implement tax strategies (Koester et al., 2016). The recruitment system of managers in developing countries is still politically based on the proximity relationship, chosen by the state, politicians, and based on the amount of share ownership (Akbari et al., 2018) so that it causes managerial positions only as formal positions. Besides, the existence of an effective corporate governance (C.G.) system can prevent aggressive behavior from managers, especially related to tax avoidance (Koester et al., 2016).

CONCLUSIONS

This study concludes that investment opportunity sets have a positive effect on tax avoidance, which means firms with considerable assets in place and have various investment options will more likely to consider engagement in tax avoidance activities. Secondly, environmental uncertainty positively affects tax avoidance. Firms that face a volatile environment will more consider conducting tax avoidance to overcome the problem of environmental uncertainty. Third,

managerial ability failed to moderate the effect of IOS on tax avoidance. The formalities on managerial positions only as formalities, financial constraints, unhealthy financial conditions, inherent firm characteristics, and incentives compensation. Fourth, the managerial ability does not succeed in moderating the effect of environmental uncertainty on tax avoidance. Managers who are assumed of lacking competence in finance and management, especially taxation and the existence of corporate governance, which are implemented effectively, limit the influence of managerial ability.

Based on the research results, this study provides advice to the Indonesian Tax Authority to conduct profiling of firms with high IOS characteristics that are marked by large assets in places and firms that are facing high environmental uncertainty such as intense competition or fluctuations in sales. The results of the profiling can be used as an early warning, especially for account representatives and tax auditors at the Indonesian Tax Authority, so that potential tax exploration and examination can be more in-depth for firms that fulfill these characteristics. Also, this study provides advice to the government to provide tax holidays for companies with high IOS who invest in the real sector. The tax holiday will reduce tax revenue in the short term, but it will have a multiplier effect on the economy so that in the long-run, tax revenue will increase. The Government of Indonesia can provide tax incentives for companies that are facing an environment with high uncertainty as well. The incentives will help the firm survive in an uncertain condition so that the tax base can be maintained.

LIMITATION AND STUDY FORWARD

This study has limitations such as the exception for firms that have negative pre-tax profits that cause data samples to be reduced to 55 firms, thus reducing the number of samples. Therefore, the results of this study cannot be used to generalize all firms on the Indonesia Stock Exchange (IDX). Besides, managerial ability variables cannot observe daily decisions made by management because these variables are measured from financial information contained in financial statements that are used to identify the firm's strategic management decisions rather than daily decisions.

Future studies can use samples other than of the manufacturing sector so that they can explain the nature of research variables in other sectors. Also, future studies can use a sample of several sectors of firms listed on the stock exchange so that it can be known as the effect of the variables in general or partially per sector. Future studies can also use other managerial ability proxies such as the manager's education level, manager's background, CEO compensation, and managerial ability ranking (MARANK).

AUTHORS CONTRIBUTION

David Gilang Dwi Laksono contributed to the concepts, theories, and methodology. The concepts, theories, and methodology were supervised by Amrie Firmansyah. The data and its processing were conducted by David Gilang Dwi Laksono. Data analysis and discussion were conducted altogether by David Gilang Dwi Laksono and Amrie Firmansyah.

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