

Innovation, Tax Avoidance and Firm Values

Zaenal Fanani^{a*}, Anjelina^b, ^{a,b}Department of Accountancy, Faculty of Economics and Business, Universitas Airlangga, Email: fanani@feb.unair.ac.id

This study aims to examine the effect of innovation on tax avoidance and firm value, as well as the effect of tax avoidance on firm value. Using a total sample of 133 manufacturing companies listed in the Indonesia Stock Exchange (IDX) during 2007-2017 with 1025 observations, this study proves that companies which have many patents do not carry out tax avoidance. This finding is drawn from the small difference in accounting and fiscal profits of the innovation company. It also shows that companies that innovate do not shift their profits through tax avoidance to keep innovating. Furthermore, this study found that the higher the innovation, the higher the value of the company. This result supports the signal theory which states that innovation is a positive signal for a company because it reflects the company's competitiveness, which will increase its firm value.

Key words: *Innovation, R&D expenses, patent, tax avoidance, firm value.*

Introduction

Innovation makes a country or company more productive and competitive. Innovation is also one of the factors that drive a country's economic growth. According to the 2018 Global Innovation Index data, Indonesia ranks 85th out of 126 countries, and 14th below the Philippines and Brunei Darussalam at the SEAO level (South East Asia, East Asia, and Oceania). The Global Innovation Index rests on two sub-indices, namely the innovation input sub-index and the innovation output sub-index. Measured by education, research, and development, *human resources and research* is one of the pillars contained in the innovation input sub-index, while one of the pillars contained in the innovation output sub-index is *creative output*, which is measured by intangible assets. Patents are one of the benchmarks of a country's progress.



Companies that innovate frequently produce more patents. If a company has a foreign branch, that branch is charged for using its intellectual property. This is the company's strategy of imposing these costs on branches that have lower tax rates (Guo, 2014). Research results from Mukherjee et al. (2017) show that low tax rates will increase innovation. This is in line with the results of a study by Atanassov and Liu (2014a), which show that a reduction in tax rates strongly influences innovation, especially for companies that experience financial constraints, weak governance, and that avoid tax. A high tax burden will limit a company's innovation activities (Radionova & Boger, 2014) and will diminish the capital of entrepreneurs and business entities. This shows that, as a consequence of a higher tax burden, entrepreneurs have less money to reinvest into their businesses. Entrepreneurs will also be discouraged if they feel that a large part of their profits will be spent on high taxes (Igbinoia & Okoye, 2017). This is in line with Clark's statement (2015) that, in general, individuals and companies recognize that throwing money at something just "because you can" is a way of avoiding bankruptcy. Developing better products, hiring more employees, etc., are the best ways of using the remaining funds. The company's perception is why it has to pay more tax than is required by the law.

Innovation process is the process of reengineering and improving the internal operations of business processes (Narsa, 2019). Innovation is a risky activity because it involves high costs, time, and a significant failure rate (Gao et al., 2016). Its high risk makes costs incurred for research and development (R&D) as costs in the calculation of taxes. R&D expenditures are positively related to the uncertainty of future benefits from these investments (Kothari et al., 2002). The high burden of this expenditure, however, allows companies to avoid tax because of this uncertainty. Innovation increases a company's performance but it does not always increase tax revenue for the government (Cheng et al., 2018; Karabulut, 2015). Thus it can be said that innovative companies can avoid taxes through credit, reducing R&D, or by diverting revenue abroad. This claim is supported by the many innovative companies in the US that are criticized for not paying taxes according to tax regulations. The New York Times estimates that 71 technology companies in the S&P 500 index (including Apple and Google) pay taxes with an average effective tax rate one third lower than other companies (Duhigg & Kocieniewski, 2012).

Tax avoidance activities also affect the value of the firm. A company is involved in tax avoidance activities when the benefits outweigh the costs (Chen et al., 2014). According to Wang (2011), investors place a premium value on companies that avoid tax, while Chen et al. (2014) found tax avoidance would increase agency costs and reduce the firm's value. Oktavia et al. (2019) shows that users of financial derivatives who tend to hide information about their derivative transactions have more aggressive tax avoidance behaviour compared to companies that explicitly disclose information on their derivative transactions. The results of the study are in line with Hanlon and Slemrod (2009), who found that the market reacts

negatively to companies publicly involved in tax avoidance activities. Inconsistent research results also occur in Indonesia. Adityamurti and Ghazali (2017) and Inanda et al. (2018) found that tax avoidance affected a firm's value, while Tarihoran (2016) and Eka and Muid (2017) found that tax avoidance did not affect a firm's value.

Apart from being an indicator of a country's progress, innovation can also reflect the value of the firm. Management accounting innovations, and information capital maturity level are two important factors that underlie the success of business process performance (Soewarno & Mardijuwono, 2018). Innovation and corporate values have a positive relationship. According to Belenzon and Pataconi (2013), several factors are considered in acquiring a company, specifically its tangible and intangible assets, its capital costs, and taxes. In recent years, however, intellectual property has become a very important factor. Patents positively affect the value of a firm. A patent has temporary monopoly power over the patent, and increases bargaining power in negotiations. Innovation can also increase a firm's value when viewed from the purpose of diversification. One of the reasons companies diversify is to find a good match between innovation activities and existing business lines in order to more efficiently allocate resources. Diversification is considered a process of increasing productivity. When a diversified company has more innovations that can be applied in the industry it enters, such compatibility increases the value of the firm (Rong & Xiao, 2017; Tirtha, et.al 2017).

The aim of this research is to examine the effect of tax avoidance as researched by Gao et al. (2016) because it is still rarely studied in Indonesia. Some innovation-related studies have been conducted in Indonesia. However, these studies are rarely associated with the tax variable (corporate tax and tax avoidance). The innovation variable has only been associated with the cost of research and development (R&D) and other measurements that exclude the number of patents. For example, Prihadyanti and Laksani (2015) examined R&D and innovation in manufacturing sector companies, and measured the innovation variable by the total score of the existence of a defective product reduction, reduction in the use of raw materials and energy, and others during 2010-2011. Nohong (2016) on the other hand examines innovation, growth, size, and the value of pharmaceutical companies in Indonesia. The innovation variable was measured by the costs incurred by the company for research and development activities. Both studies in Indonesia do not measure innovation with patents and do not link innovation with tax variables. This research also develops the existing body of research by making tax avoidance a mediating variable in the relationship between innovation and corporate value.

This study uses a total sample of 133 manufacturing companies listed on the Indonesia Stock Exchange (BEI) during 2007-2017 with 1025 observations. The analysis technique used is panel data regression analysis with the STATA program 13. Innovation is measured using two proxies: the number of patents and R&D intensity on sales. Tax avoidance is measured

by three proxies: GAAP ETR (Effective Tax Rate), CETR (Cash Effective Tax Rate), and BTB (Book Tax Difference). The firm's value is measured by TobinsQ.

The results of this study prove that companies with many patents do not avoid tax. This finding is drawn from the small difference in accounting and fiscal profits in the innovating company. It also shows that the innovating company does not shift its profits through tax avoidance to keep innovating. Furthermore, this study found that the higher the innovation, the higher the value of the firm. This result supports the theory of signals which states that innovation is a positive signal for the company because innovation reflects the company's competitiveness, increasing the firm's value in turn.

This paper will proceed as follows: literature review; explanation of variables, samples, and research models; empirical analysis results and hypothesis testing results; and a summary or conclusion of the study, including suggestions for further research.

Literature Review and Hypothesis Development

Effect of Innovation on Tax Avoidance

Patent activity is closely related to tax avoidance practices. The level of tax avoidance is higher in innovative companies with headquarters in countries that have R&D tax credits (Gao et al., 2016). Innovative companies can avoid taxes through credit, reducing R&D, or by diverting revenue abroad. This is evidenced by the many innovative companies in the US that are criticized for not paying taxes according to tax regulations. The New York Times estimates that 71 technology companies in the S&P 500 index (including Apple and Google) pay taxes with an average effective tax rate one third lower than other companies (Duhigg & Kocieniewski, 2012).

Innovation affects tax avoidance through R&D and patents in different ways. The cost of R&D legally reduces taxes through tax credits or deductions, while patents are used to reduce taxes aggressively through income transfers (Cheng et al., 2018). Companies that often innovate produce more patents and practice tax avoidance (Guo, 2014). One type of company that is most likely to avoid tax is a company with a high R&D intensity. It does so by allocating taxable income away from high-tax jurisdictions (Desai et al., 2006; Lisowsky et al., 2013). This statement is in line with Belz et al. (2017) who state that research and development (R&D) activities will produce intellectual property such as patents, and that companies place their intellectual property in countries with lower taxes, or tax havens like Bermuda.

H1: The higher the firm's innovation the more the firm will avoid tax.



Effect of Innovation on a Firm's Value

Innovative companies obtain high stock returns (Ronald & Tom, 1999). Companies that do more innovation increase corporate value (Bayus et al., 2003). New products introduced by innovative companies will increase sales. This is in line with Artz et al. (2010) who state that the company's ability to produce sustainable innovation becomes more important for increasing the value of the firm.

When companies develop new business models, they must also invest in R&D to increase the firm's value. Srinivasan et al. (2009) prove that investors react positively through stock returns to companies that launch innovations. Commercialization activities such as innovation positively affect the rate of return, because it is a signal of the company's competitive ability and the expansion of its products (Sood & Tellis, 2009). Thus, based on signal theory, innovation is a positive signal for companies that innovate because it is a signal of the firm's competitive ability. Companies that innovate will also increase company value because innovation has a competitive advantage (Artz et al., 2010).

H2: The higher the firm's innovation, the higher the firm's value.

Effect of Tax Avoidance on the Firm's Value

Tax avoidance can force direct and indirect changes in current or future cash flows. Tax avoidance can directly improve cash flow through tax savings, but it is also associated with high agency costs. On the other hand, aggressive tax avoidance complicates business transactions, diminishing the transparency of information and indirectly reducing the value of the company (Chen et al., 2014). This is in line with Kim et al. (2011) who state tax avoidance facilitates the extraction of managerial rent and creates negative headlines by justifying this opportunistic behaviour. Past a certain tipping point, the build-up and accumulation of negative publicity will cause a collapse in stock prices. Hiding negative information about the company also prevents investors and the board of directors from taking corrective actions on time or liquidating bad projects early. If left too long, this inefficiency will result in a collapse of asset prices (Bleck & Liu, 2007).

Tax avoidance activities are associated with administrative sanctions, loss of reputation, and will ultimately reduce the value of the company (Chen et al., 2014). Indirect tax avoidance also impacts unreliable financial statements, increases the possibility of earnings management, and increases capital costs (Desai, 2005; Frank et al., 2009; Lambert et al., 2007). According to the positive influence of innovation on tax avoidance and corporate value, and the negative effect of tax avoidance on corporate value, tax avoidance can be said to be a mediating variable in the relationship between innovation and a firm's value.

H3: The higher the tax avoidance, the lower the value of the company.

H4: Tax avoidance mediates the effect of innovation and corporate value.

Methodology

Samples and Data Sources

This research data comes from the annual financial statements of companies listed on the Indonesia Stock Exchange for the period 2007-2017 and company patent data listed on the website of the Directorate General of Intellectual Property Ministry of Law and Human Rights of the Republic of Indonesia (DJKI) for the period 2007-2017. The sampling criteria for research are (1) manufacturing companies listed on the Indonesia Stock Exchange in the 2007-2017 period, (2) companies that do not have a positive tax burden on the income statement, (3) companies that do not have negative pre-tax profits.

Table 1: Sample Selection Distribution

Year of Sample Distribution	Observation
2007	80
2008	69
2009	86
2010	103
2011	102
2012	101
2013	95
2014	107
2015	92
2016	96
2017	94
Total sample distribution of manufacturing companies 2007-2017	1025

Based on the criteria for the sample selection process, the number of sample observations in this study consisted of 133 manufacturing companies listed on the Indonesia Stock Exchange from 2007 to 2017, so the total observations in this study were 1205 company financial statements.

Empirical Findings

The following are the results of the model selection and assumption tests conducted in this study.

Table 2: Model Selection and Assumption Test

Descriptions	Chow FEXPLS	Hausman FEXRE	LM REXPLS	Mult	Het	Auto	Robust
Model 1							
	0.000 FE	0.000 FE		2.33v	x	x	xtsc
Model 2	0.0000 FE	0.9764 RE	0.0006 RE	2.83 v			
Model 3	0.0000 FE	0.7569 RE	0.0000 RE	2.83 v			
Model 4	0.0000 FE	0.000 FE		2.83 v	x	0.6574 v	ro
Without Control Variable							
Model 1	0.0000 FE	0.0067 FE		1.68 v	x	x	xtsc
sModel 2	0.0000 FE	0.9488 RE	0.000 RE	2.45 v	x	x	
Model 3	0.000 FE	0.9424 RE	0.000 RE	2.45 v			
Model 3	0.000 FE	0.000 FE		2.45 v	x	0.7321 v	ro

Note:

1. $FV = \alpha_1 + \beta_1R \& D + \beta_2 PATENT + \beta_3 GAAPETR + \beta_4 CETR + \beta_5 BT D + \beta_6 LE + \beta_7 PR + \beta_8 TL + \varepsilon$ (Model 1)
2. $GAAPETR = \alpha_2 + \beta_1R \& D + \beta_2 PATENT + \beta_6 LE + \beta_7 PR + \beta_8 TL + \varepsilon$ (Model 2)
3. $CETR = \alpha_3 + \beta_1R \& D + \beta_2 PATENT + \beta_6 LE + \beta_7 PR + \beta_8 TL + \varepsilon$ (Model 3)
4. $BT D = \alpha_4 + \beta_1R \& D + \beta_2 PATEN + \beta_6 LE + \beta_7 PR + \beta_8 TL + \varepsilon$ (Model 4)

So, the model used to explain the interpretation of this research model analysis is:

Table 3: Effect of Innovation and Tax Avoidance on a Firm's Value

Variables	Dependent: Firm Value					
	Without Control Variable			With Control Variable		
	Fixed Effect Model			Fixed Effect Model		
	β	t	p > t	B	t	p > t
Constant	1.4411	9.89		1.3996	9.46	
Patent	0.0135	2.27	0.000***	0.0139	2.91	0.000***
R&D/Sales	15.0796	1.02	0.025***	-18.2434	-1.09	0.004***
GAAP ETR	0.0216	1.65	0.309	-0.0175	-1.07	0.276
CETR	0.0223	1.82	0.101	0.0146	1.66	0.284
BTD	1.0649		0.071*	-0.8365	-4.12	0.100*
Leverage				-0.4324	-3.43	0.000***
Profitability				-3.5854	-3.92	0.001***
Tangibility				-0.5344	-8.43	0.000***
F			34.38			32.14
Prob > F			0.000***			0.000***
R ²			0.0961			0.1322

Note : Sig level: ***. = 0.01; **. = 0.05, *. = 0.1

Table 4: Effect of Innovation on Tax Avoidance with control variables

Variables	Dependent: Tax Avoidance								
	GAAP ETR			CETR			BTD		
	Random Effect Model			Random Effect Model			Fixed Effect Model (3)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
B	z	p > z	β	z	p > z	β	t	p > t	
Constant	-3.5023			-0.8312			0.0380		
Patent	-0.0000	-0.29	0.770	-0.0003	-0.33	0.742	-0.0005	-27.56	0.000**
R&D	-0.1188	-0.60	0.953	1.7022	0.15	0.881	-0.7692	-3.76	0.000**
Leverage	-0.0895	-1.75	0.080*	-0.5324	-1.99	0.047***	-0.0166	-0.93	0.354
Profitability	-0.529	-3.3	0.001***	2.4836	2.87	0.004***	0.0597	0.51	0.614

	9	2							
Tangibility	-0.0090	-0.19	0.849	0.1592	0.64	0.524	-0.0053	-0.32	0.749
Wald chi2/F			13.42			11.59			328.42
Prob > chi2/F			0.0197** *			0.0408** *			0.000** *
R ²			0.0285			0.0192			0.0478

Note : Level sig: ***. = 0.01 ; **. = 0.05, *. = 0.1

Table 5: Effect of Innovation on Tax Avoidance without control variables

Variables	Dependent: Tax Avoidance								
	GAAP ETR Random Effect Model (1)			CETR Random Effect Model (2)			BTD Fixed Effect Model (3)		
	B	z	p > z	β	z	p > z	β	t	p > t
Constant	-0.3418			-0.7644			0.0353		
Patent	0.0000	0.33	0.743	0.0003	0.28	0.778	-0.0005	-32.61	0.000***
R&D	0.1302	0.06	0.948	3.2368	0.28	0.777	-0.8298	-586	0.000***
Wald chi2/F			0.15			0.31			710.75
Prob > chi2/F			0.93			0.8563			0.000***
R ²			0.0005			0.0009			0.0424

Note : Level sig: ***. = 0.01 ; **. = 0.05, *. = 0.1

H1 test results show a significance value of 0,000, less than the significance level of 1% (0,000 < 0.01) with a negative coefficient. These results indicate that the higher the innovation of the firm, the lower the level of corporate tax avoidance or vice versa, so it can be concluded that H1 is rejected.

H2 test results show a significance value of 0,000, less than the significance level of 1% (0,000 < 0.01) with a positive coefficient. These results indicate that the higher the innovation of the firm, the higher the value of the firm, so it can be concluded H2 is accepted.

H3 test results show the effect of tax avoidance on a firm's value using BTD proxy, with a sig value of 0.1 (<0.1) so it can be concluded that H3 is accepted. Thus H4 is accepted with partial mediating (competitive) status.

Discussion

The results of this study indicate that innovation has a negative effect on tax avoidance, which means that the higher the innovation of the company, the lower the level of tax avoidance or vice versa. The results of this study are not consistent with the results of previous studies (Cheng et al., 2018; Gao et al., 2016; Guo, 2014) which state that innovation has a positive effect on tax avoidance. Innovation is important for the survival of a company, especially for manufacturing companies. According to Guo (2014), companies that often innovate produce more patents and avoid tax. Desai et al. (2006) also state that one of the types of companies most likely to avoid tax through tax havens is a company that has a high R&D intensity. As explained earlier, innovating companies will avoid taxes in two ways: one, by maximizing tax deduction through R&D costs according to taxation rules and two, by placing intellectual property rights in the form of patents in countries with low tax jurisdiction (Cheng et al., 2018). However, the statement was not in accordance with the results of the research on the manufacturing sector companies listed on the Indonesia Stock Exchange in the 2007-2017 period, which increasingly innovated and avoided taxation, or vice versa.

Innovating companies continue to develop products through R&D activities and, if successful, will patent the product. However, R&D activities are not always successful. Companies bear the risk of uncertainty over the success of these activities for a long period. This is supported by the results of Sampurno (2007), which show that pharmaceutical companies need 12 years to find and develop new products with relatively low success rates. If the R&D activity is successful, the company may still have to cover losses at the testing stage before the product is finally marketed. With the high risk of uncertainty and failure, innovating companies do not take tax loopholes to cover the failure of R&D activities or collect cash from tax avoidance to keep innovating, because innovation is a demand of the times.

The second hypothesis of this study states that the higher the innovation, the higher the value of the firm. The results of this study indicate that innovation has a positive effect on a firm's value. The results of this study are in line with those of other researchers (Bayus et al., 2003; Ronald & Tom, 1999). Innovation is a positive signal for a company because it reflects the company's competitiveness. Companies that innovate will increase profitability (Artz et al., 2010). Innovating companies will improve their performance, and ensure their capacity to have a higher profit than their competitors. The results of this study also prove that innovative

companies have a high market capitalization value and that investors react positively to company innovation. Innovation is a demand of the times. Consumers need innovative products. Companies that have unique resources will have good performance and will increase the firm's value, and innovation is the result of companies that have "unique" resources (Yuliani, 2014).

The third hypothesis of this study states that tax avoidance affects a firm's value. The results of this study indicate that tax avoidance has a positive effect on a firm's value. This is consistent with previous studies done in Indonesia (Anggoro & Septani, 2015; Herdiyanto & Ardiyanto, 2015; Kurniawan & Syafruddin, 2017). The results of this study indicate that the higher the level of tax avoidance, the higher the value of the firm. Income tax expense is a significant cost for the company, so tax avoidance should increase the value of the firm (Wang, 2011). According to Kirchler et al. (2003) tax avoidance is associated with something that does not violate the law "legal", the intention to save tax "tax saving", cleverness "cleverness, and a good idea" good idea ".

Based on this research data, companies that have high BTD values on average have high TobinsQ values. This shows that the higher the difference between accounting profit and fiscal profit, the higher the market capitalization value of the firm. Companies that avoid taxes have high company value. In Indonesia, the reason for this is that tax avoidance is an advantage, not a risk. It can increase the value of the company because the company will have a low tax burden, be able to increase profits, and thereby attract the attention of investors (Chasbiandani & Martani, 2012; Herdiyanto & Ardiyanto, 2015).

The fourth hypothesis states tax avoidance is a mediating variable, which is to say that the relationship between innovation and corporate value can be concluded with partial mediating (competitive) status. This happens because the negative influence of innovation on tax avoidance has a positive effect on a company's value. The results of this study prove that innovation is a demand for companies because the economy is currently dominated by intangible assets, such as patents and R&D that represent innovation. Based on the theory of innovation signal, it is a positive signal that represents the company's competitiveness: in order to survive the company must innovate. Thus, with the presence or absence of tax avoidance, the company innovates in order to increase the value of the firm. Tax avoidance is not a variable that mediates the relationship between innovation and corporate value.

Conclusion

The results of this study indicate that innovation has a negative effect on tax avoidance. Thus, hypothesis one states that the higher the innovation of the company, the more the company will avoid tax avoidance. Innovation has a positive effect on a firm's value. Thus, the second



hypothesis states that the higher the innovation of the company, the higher the value of the firm is accepted. Tax avoidance has a positive effect on a firm's value, so the third hypothesis stating tax avoidance affects the value of the company is accepted. There is no indirect effect of tax avoidance on the relationship between innovation and a firm's value because hypothesis one is rejected, so the fourth hypothesis which states that tax avoidance indirectly affects the relationship between innovation and a firm's value is accepted. This shows that tax avoidance is a mediating variable of the relationship between innovation and a firm's value.

This study has two limitations. The first is that the value of the amount of tax paid cannot capture the level of corporate tax avoidance as there are still some missing values of the taxes paid for local taxes and customs. The second is that this research only considers domestic companies in Indonesia, while the level of tax avoidance for companies that innovate is mostly done by companies that have branches abroad and patents in countries with lower taxes. Further research will be able to separate the amount of tax paid for income tax, VAT, and customs duties so that it is more representative of the value of calculating tax avoidance through the amount of tax paid. The next researcher should also compare innovations for domestic companies and companies that have patents abroad. Tax evasion by companies that innovate is done in two ways: tax avoidance, or the placement of patents in countries that have lower taxes.



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