

TAX RATE AND NON-DEBT TAX SHIELD

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Article information

Received: 8 May 2019
Accepted : 1 Jun 2019
Online: 21 Jun 2019

Keywords: *capital structure, debt tax shield, non-debt tax shield, tax rate.*

Paper type: Research paper



Published by Fakultas Ekonomi
Universitas Islam Attahiriyah

ABSTRACT

This paper objective is to provide evidence on how firm usage of debt tax shield and non-debt tax shield (NDTS) change when tax rates change in Indonesia. Multivariate regression analysis performed with NDTS as dependent variable and tax rates change and debt level as an independent variable. Multivariate regression analysis covering 73 Indonesia firms with 146 observations for the period of year 2008 to year 2010. Within this period, Indonesia corporate tax rate being reduced twice from 30% in 2008 to 28% in 2009 and 25% in 2010. This research finds when tax rates decrease, the public firm increases their usage of NDTS with a lag of one year and debt financing remain increased alongside with non-debt tax shield. This finding provides support to debt tax shield and DTS as a complement.

Penelitian ini ditujukan untuk meneliti dan menyampaikan bukti mengenai pengaruh perubahan tarif pajak terhadap penggunaan *debt tax shield and non-debt tax shield* (NDTS). Analisis regresi multivariate menggunakan NDTS sebagai variabel terikat dan perubahan tarif pajak dan tingkat hutang sebagai variabel bebas. Sampel yang digunakan adalah 73 perusahaan public di Indonesia dengan total data 146 pada periode tahun 2008 sampai tahun 2010. Pada periode waktu ini, tarif pajak di Indonesia turun dari 30% tahun 2008 menjadi 28% tahun 2009 dan 25% tahun 2010. Penelitian ini menemukan penurunan tarif pajak mengakibatkan peningkatan penggunaan NDTS, walaupun terlambat 1 tahun, dan hutang masih bertumbuh bersama NDTS. Temuan ini mendukung hipotesis debt tax shield dan NDTS sebagai komplemen.

Pedoman Sitasi : Teja, A. (2019). TAX RATE AND NON-DEBT TAX SHIELD. *Jurnal Riset Manajemen dan Bisnis (JRMB) Fakultas Ekonomi UNIAT*, 4 (2), 257 - 268

Journal homepage: <http://jrmb.ejournal-feuniat.net/index.php/JRMB>

1. Introduction

One important milestone of modern corporate finance theory is Modigliani and Miller Irrelevance Theorem that discuss when capital structure choice do not affect firm value (Modigliani & Miller, 1958) and when capital structure choice do affect firm value (Miller, 1963). Modigliani and Miller capital structure theory point to the importance of government role to provide incentives for firm to change their capital structure choice. The most well known mechanism in corporate finance practice is government allow firm to reduce interest expense from firm taxable income to reduce firm tax obligation. In the process, firm have incentives to use debt financing in order to reduce their tax obligation. While debt financing have benefit to reduce firm tax obligation, debt financing also have costs, i.e. financial distress cost. The relation between debt tax saving and firm value in the presence of financial distress costs is not monotonic. Below optimal capital structure, debt tax saving have higher benefit than financial distress cost that usage of more debt financing results in higher firm value. Above optimal capital structure, debt tax saving have lower benefit than financial distress cost that usage of more debt financing results in lower firm value.

However, government role to provide incentives for firm to change their capital structure choice do not limited only to debt financing. Government provide incentives for firm to increase their competitiveness and reduce their reliance to debt financing by allowing firm to use depreciation expense to reduce their tax obligation. This incentives is known as non-debt tax saving. Since depreciation cost is not a cash outflows, firm may use cash saved from non-debt tax saving as another source of firm financing. Current research shows that there are growing firms that reduce their reliance to debt tax shield and increase their reliance to non-debt tax shield (D'Mello & Gruskin, 2014; Strebulaev & Yang, 2013).

While debt tax shield and non-debt tax shield cannot occur in isolation within the same firm. Debt tax shield and non-debt tax shield dynamic interaction become an interesting research strand to understand whether debt tax shield and non-debt tax shield is a substitute or a complement. When debt tax shield and non-debt tax shield is a substitute, an increase in debt tax shield will reduce non-debt tax shield and vice versa (Gao, 2016; Kolay, Schallheim, & Wells, 2013). Strebulaev and Yang (2013) also find evidence that firm that reduce their reliance to debt tax shield and increase their reliance to non-debt tax shield is growing in the last 30 years. When debt tax shield and non-debt tax shield is a complement, an increase in debt tax shield will increase non-debt tax shield.

Minimizing tax obligation need both debt tax shield and non-debt tax shield but their dynamic do not need to be symmetric. A substitution hypothesis show that debt tax shield and non-debt tax shield have negative correlation. On the other side, a complement hypothesis show that debt tax shield and non-debt tax shield have positive correlation. Both substitution and complement hypothesis have symmetric relations. However, research shows their dynamic is not always symmetric. When tax rates is increasing, firm increase their leverage to maximize the benefit of debt tax shield. When tax rates is decreasing, firm maintain their leverage to maintain the benefit of debt tax shield, i.e. maintain the option to default, but increase the usage of non-debt tax shield (Heider & Ljungqvist, 2015).

Above research shows that findings on debt tax shield and non-debt tax shield as a substitute and a complement is not yet conclusive. This paper objective is to extend Heider and Ljungqvist (2015) research from developed market to emerging market to understand how emerging market firm usage of debt tax shield and non-debt tax shield. I choose to focus on (1) corporate tax reduction on consideration countries effort to increase their competitiveness and reduce their systematic risk (Bernasconi, Marenzi, & Pagani, 2005) and (2) non-debt tax shield as dependent variable based on consideration that research on the impact of corporate tax rate reduction to firm usage of non-debt tax shield is relatively rare. Based on research of Heider and Ljungqvist (2015), Bernasconi, Marenzi, and Pagani (2005), and different focus on tax shield from debt tax shield to non-debt tax shield, this paper research questions are presented from number 1 to number 3.

1. What is the impact of corporate tax rates reduction to firm usage of non-debt tax shield?

2. What is the impact of debt financing to non-debt tax shield?
3. What is the simultaneous impact of corporate tax rates and debt financing to non-debt tax shield?

Each firm is unique and their capabilities to changing their capital structure is different. Based on this consideration, I choose three control variable, i.e. business risk, growth sales, and asset size, to understand how firm unique characteristics influence to firm usage of non-debt tax shield. This control variable related research questions presented in number 4.

4. What is the impact of tax rates, debt financing, business risk, growth sales, and asset size to non-debt tax shield?

The Indonesian firm as focus of analysis was choosed to provide an empirical evidence on the relation between debt tax shield and non-debt tax shield. Indonesia experience two corporate tax rates reduction from 30% in 2008 to 28% in 2009 and to 25% in 2010. I search similar research through google scholar at May 01, 2019 with keyword "non-debt tax shield", "Indonesia" shows that research on the impact of corporate tax rates reduction to firm usage of non-debt tax shield in Indonesia is not yet being done. Non-debt tax shield also used as independent variable as opposed to this paper treat non-debt tax shield as dependent variable.

There are three novelty of this paper. First, adding new evidence to closing the gap regarding inconclusive findings on firm behavior usage to debt tax shield and non-debt tax shield, as a substitute and as a complement. Second, adding new literature on the impact of tax rates change and debt level to non-debt tax shield in the context of decreasing tax rates. Third, providing evidence on sophistication level of Indonesia firm corporate finance department to provide the most efficient source of finance for firm capital expenditure.

This paper two important findings are (1) firm increase their non-debt tax shield usage when government reduce tax rates, and (2) conflicting results between partial analysis and holistic analysis findings on relation of debt level to non-debt tax shield. Partial analysis more consistent with debt tax shield and non-debt tax shield as a substitute but holistic analysis more consistent with debt tax shield and non-debt tax shield as a complement. From three control variable, business risk and average 5 years sales growth do not have significant influence but change in asset size have significant influence to non-debt tax shield. This findings show that firm have a good understanding of different source of tax saving and act accordingly.

2. Literature review

The government influence economic growth by giving incentives to firm to growing their business. One of government well known fiscal policy tool is tax rates. Since, firm sees tax rates as cost and the cost is a significant one. Then, when government changing their tax rates, e.g. increase or decrease, firm's expected tax cost also changing proportionally. This tax rates change will change residual cash flow available to shareholders and change firm decision whether to grow their business or maintain their business.

Key to countries economic prosperity is vibrant business. To create vibrant business, countries have to attract investments from domestic and foreign firm. Countries attempt to attract investment drive competition among countries to reduce tax rates (Kato, 2015). Research shows that changing tax rates to stimulate economic growth is getting more common practice (Andrejovská, Mihóková, & Martinková, 2017; Bernasconi et al., 2005; Gordon & Lee, 2001). While reducing tax rates reduces government tax revenue in the short term, government expect that lower tax revenue in the short term will be compensated by larger tax revenue in the long term. Larger tax revenue is possible because larger pool of taxable income generated from larger investment.

Whatever government policy regarding tax rates e.g. increase or decrease, firm always strive to minimize tax obligation in order to maximize shareholder value. Each dollar tax saved equal to each dollar shareholder value gained. There are two main mechanism to minimize firm tax obligation that allowed by the government. First mechanism is debt tax saving. Government allowing interest expense from debt financing to reduce tax obligation. In so doing, government provide subsidy for firm to used debt in order to push firm to grow faster than their capabilities to accumulate capital (Karpavičius & Yu, 2016). As Modigliani and Miller (1963) shows that (1) the relation between debt tax saving and firm value is not monotonic and (2) debt tax saving value is growing proportional with the level of debt used but financial distress cost are start small and until certain threshold financial distress cost growing exponentially with the level of debt used. Below optimal capital structure, debt tax saving have higher benefit than financial distress cost that usage of debt financing results in higher firm value. Above optimal capital structure, debt tax saving have lower benefit than financial distress cost that usage of debt financing results in lower firm value. See figure 1 below.

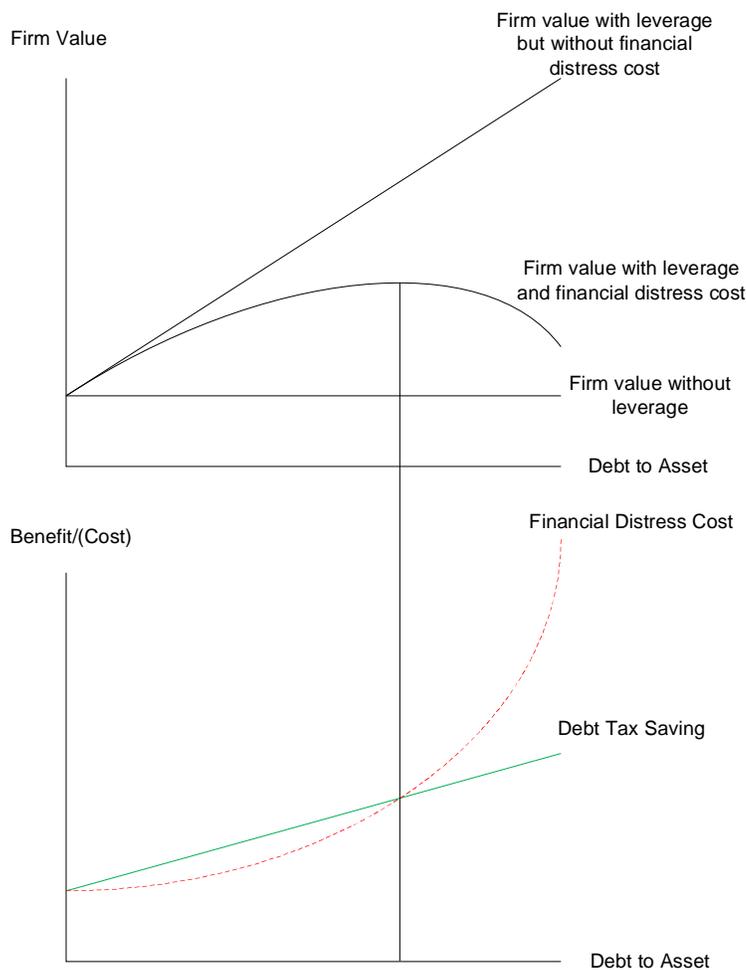


Figure 1. Firm value, debt tax saving, and financial distress cost.

Source: Modigliani and Miller (1963) processed.

The main determinant of debt tax saving are interest rates and corporate tax rates. Each determinant have positive correlation with debt tax saving. The higher interest rates, the higher debt tax saving. The same also true for corporate tax rates. The higher tax rates, the higher debt tax saving. Research provide empirical evidence to firm increase debt financing when tax rates is increased (Gao, 2016;

Kolay et al., 2013). Positive correlation between tax rate and debt tax saving also imply that when government reduce tax rates, firm will reduce their usage of debt tax saving and increase usage non-debt tax saving. Lower tax rates will lower the benefit of debt tax saving but not firm financial distress cost.

The government also aware the negative implication of debt financing, e.g. increased firm systematic risk and financial distress cost. In order to mitigate the negative implications of debt financing and reduce firm incentive to use debt financing, government introduced second mechanism to reduce firm tax obligation. The second mechanism is non-debt tax shield. One of the most well known non-debt tax shield is depreciation expense. Government allowing depreciation expense from fixed asset investment to reduce firm tax obligation. Since depreciation expense is not a cash outflow, cash saved from depreciation expense is becoming another source of financing alongside with retained earnings and debt financing. Depreciation as source of financing have benefits to reduce firm systematic risk, through low firm investment to grow their competitiveness, and firm financial distress cost, through lower cost and lower risk source of financing as compared to debt financing. The drawback of depreciation as source of financing is their very limited amount of financing provided. Beside depreciation expense, non-debt tax shield also cover wider range firm activities such as expensing cost from Research and Development, expensing contribution Defined Benefit Pension Plan, Lease in Lease Out (LILO), Cross Border Dividend Capture, Transfer Pricing, and expensing Stock Option (Graham & Tucker, 2006). Based on this argument, this paper first hypothesis is:

Hypothesis 1: Tax rates change have positive influence on non-debt tax shield.

To minimize firm tax obligation, firm need both debt tax saving and non-debt tax saving. Heider and Ljungqvist (2015) find that firm do not necessarily reduce debt financing when tax rates decreasing. Firm maintained their debt financing growth but increase the usage of non-debt tax shield. Based on this argument, this paper second hypothesis is:

Hypothesis 2. Debt have positive influence to non-debt tax shield.

Based on hypothesis 1 and hypothesis 2, this paper third hypothesis is:

Hypothesis 3. Tax rates and debt have positive influence to non-debt tax shield.

Each firm have their own unique characteristics that may affect their ability to change their source of firm financing. Firm unique characteristics represented by business risk, growth sales, and asset size. Firm that have higher business risk have more difficulties to obtain debt financing because their expected survival is lower (Cole & Sokolyk, 2018). Firm with higher business risk have higher propensity to use non-debt tax shield. Firm that have higher growth opportunity as shown by larger historical sales growth have higher borrowing capacity (Karpavičius & Yu, 2019). Firm with higher sales growth have lower propensity to use non-debt tax shield financing because of their limited amount. Firm size have larger need of financing and more diverse source of financing (Driver & Muñoz-Bugarin, 2019). Firm with larger asset size tend to not attracted to non-debt tax shield financing because of their limited amount. The entire hypothesis discussed above summarized in Table 1.

Table 1. Hypothesized impact of independent variables to non-debt tax shield.

No	Independent Variables	Null	Alternative
1	Tax rates change	0	+
2	Debt level	0	+
3	Business risk	0	+
4	Sales growth	0	-
5	Firm size	0	-

Source: Processed.

3. Methodology

3.1. Sample Selection

Indonesia changes corporate tax rates from 30% in year 2008 to corporate tax rates 25% in year 2010. Based on these changes, sample of public firm that listed in Indonesia Stock Exchange gathered from Bloomberg terminal. Data on public firm have to meet two criteria. First, excluding public firm in financial sector because financial sector usage of non-debt tax shields is different with non-financial sector usage of non-debt tax shields.

Second, public firm have to be a public firm for at least 5 year prior to year 2008 to ensure that fund received from Initial Public Offering (IPO) already used up and new financing investment for fixed asset only come from debt financing, retained earnings, and new equity issuance. Data gathered for year 2008 to year 2010 are Depreciation and Amortization Expenses, Debt to Total Asset, Earning Before Interest and Taxes (EBIT), Sales, and Asset Size. Data gathered for year 2003 to 2007 are EBIT, Sales, and Asset Size. Final sample is 146 time series data from 73 public firm for the period year 2008 to year 2010 for multivariate analysis and 730 time series data to calculate historical business risk and historical average growth sales.

3.2. Measurement

Data gathered from Bloomberg Terminal processed based on definition in table 2.

Table 2. Variable Definition

No	Variable	Name	Abbreviation	Description
1	Dependent	Non-debt tax shields	NDTS	Change from previous year, depreciation and amortization divided by total assets ratio.
2	Independent	Tax rates changes	Tax	Nominal tax rates change from year 2008 to year 2009 and year 2009 to year 2010.
3		Leverage	DebtTA	Change from previous year, debt to total assets ratio.
4	Control	Business risk	BusRisk	Change from previous year, standard deviation EBIT to Sales ratio of the last 5 year.
5		Growth sales	GSales	Change from previous year, average sales compound growth of the last 5 year.
6		Asset size	InAsset	Change from previous year, natural logarithmic of assets size.

3.3. Analysis Technique

This paper uses the following multivariate regression analysis model to measure the changes in non-debt tax shield induced by change in corporate tax rates and change in debt level and controlled with several control variables, e.g. business risk, growth sales, and asset size.

Model 1.

$$NDTS_{it} = \beta_{0it} + \beta_1 Tax_{it} + \varepsilon_{it}$$

Model 2.

$$NDTS_{it} = \beta_{0it} + \beta_1 DebtTA_{it} + \varepsilon_{it}$$

Model 3.

$$NDTS_{it} = \beta_{0it} + \beta_1 Tax_{it} + \beta_2 DebtTA_{it} + \varepsilon_{it}$$

Model 4.

$$NDTS_{it} = \beta_{0it} + \beta_1 Tax_{it} + \beta_2 DebtTA_{it} + \beta_3 BusRisk_{it} + \beta_4 GSales_{it} + \beta_5 lnAsset_{it} + \varepsilon_{it}$$

4. Findings and discussions

4.1. Descriptive Statistics Results

Indonesia public firm react with a lag to corporate tax rate decrease. From figure 2, ratio of non-debt tax shields to total assets relatively unchanged from year 2008 to year 2009 but the ratio increase significantly in year 2010 to 18.76% or an increase of 441%. Within the same period, Indonesia public firm reducing their debt level. Debt to total assets ratio decrease from 18.40% in year 2008 to 13.68% in year 2010.

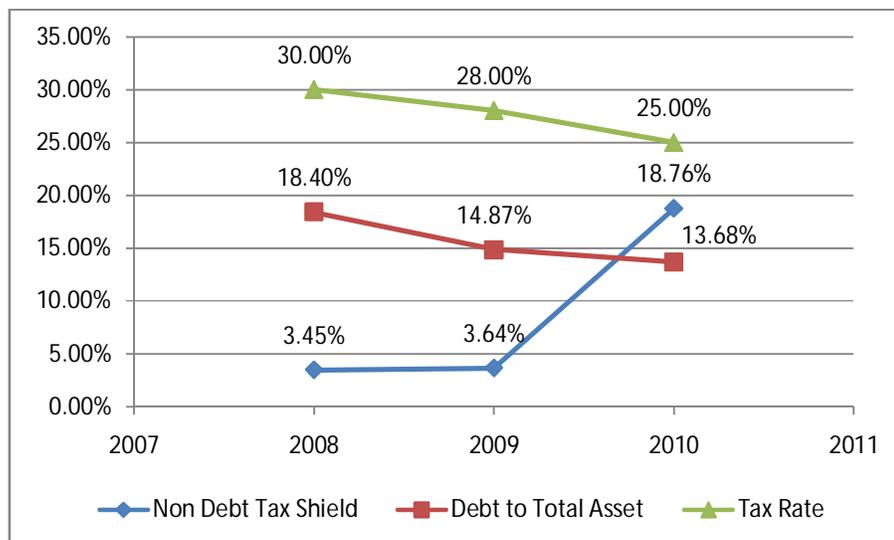


Figure 2. Corporate Tax Rate, Non-Debt Tax Shields, and Debt to Total Asset.

Source: Bloomberg Terminal processed.

Consistent with above explanation, average non-debt tax shield increase 7.65% per annum while average debt to total asset decrease 16.04% per annum and median debt to total asset decrease 4.96% per annum within year 2008 to year 2010 period. When corporate tax rates decrease, some public firm maximize the usage of non-debt tax shields as shown with maximum value of non-debt tax shields that

grow 52.15% per annum and while some public firm reduce the usage of non-debt tax shields as shown with non-debt tax shields decreasing 5.08% per annum. See table 3 below.

From table 4, non-debt tax shield have a strong negative correlation with tax rates and relatively weak correlation with debt level. Correlation between non-debt tax shield and tax rates is negative 0.722 and significant at alpha 1%. Correlation between non-debt tax shield and debt level is negative 0.235 and significant at alpha 1%.

Table 3. Descriptive Statistics of Variables

Variable	N	Mean	Std. Deviation	Minimum	Median	Maximum	Skewness
Non-debt tax shield	146	7.65%	10.38%	(5.08%)	3.49%	52.15%	1.60
Debt to Total Asset	146	(16.04%)	23.19%	(86.88%)	(4.96%)	8.35%	(1.46)
Business Risk	146	0.16%	1.43%	(4.20%)	0.02%	7.35%	0.86
5 Year Average Sales	146	(1.70%)	7.85%	(32.76%)	(0.27%)	18.89%	(0.95)
Ln Asset	146	8.85%	12.55%	(70.49%)	8.86%	32.22%	(1.85)

Source: Bloomberg Terminal processed.

Table 4. Correlation among Variables.

Correlation	Tax	NDTS	Debt To TA	Business Risk	Avg Sales
NDTS	(0.722)***				
Debt to TA	0.541***	(0.235)***			
Business Risk	(0.100)	0.196**	0.045		
Avg Sales	0.301***	(0.111)	0.343***	0.152*	
Ln Asset	(0.338)***	0.144*	(0.154)*	(0.004)	(0.204)**

Source: Processed.

Note: ***, **, * mean significant respectively at alpha 1%, 5%, 10%.

4.2. Discussion

This paper analyze the usage of non-debt tax shield when corporate tax rates decrease. The multivariate regression analysis shown below at table 5. From model 1, we can see that changes in tax rates have higher explanatory power to changes in non-debt tax shields with coefficient negative 14.93 and significant at alpha 1% with adjusted R-Square 51.73%. Within the context of decreasing tax rates, the meaning of negative coefficient is decreasing tax rates have positive influence to non-debt tax shield. This finding provide statistical support to hypothesis 1.

In model 2, we can see that decreasing debt level have positive impact to usage of non-debt tax shield. Debt to assets ratio have negative impact with coefficient negative 0.1051 and significant at alpha 1% with adjusted R-Square 4.86%. This finding is contradict with hypothesis 2 that predict positive relationship between debt level and non-debt tax shield. This finding do not provide statistical

support to hypothesis 2. However, model 3 and model 4 results below show positive relationships between debt level and non-debt tax shield.

In model 3, we can see that combining changes in tax rates and changes in debt level results in higher tax rates impact from coefficient positive 14.93 in model 1 to coefficient positive 17.40 in model 4. While the impact of debt level to non-debt tax shield is changing from coefficient negative 0.1051 in model 2 to coefficient positive 0.0987 in model 3 and coefficient positive 0.0897 in model 4. Both model, i.e. model 3 and model 4, statistically significant at alpha 1%. Since, non-debt tax shield is results of firm investment in long-term fixed asset, low debt to total asset coefficient suggest firm using high portion of equity financing as opposed to debt financing.

Model 3 and model 4 results suggest tax rates change variable is robust while debt level variable is not robust because of coefficient sign change. Another interesting findings in model 3 is model explanatory power that slightly lower than combination of model 1 and model 2 with adjusted R-Square 54.88. If both variable perfectly independent, combining both variable will result in adjusted R-Square 56.59%. This result suggest tax rates and debt level have almost independent impact to non-debt tax shield.

In model 4, we can see that coefficient of changes in corporate tax rates increase from coefficient negative 14.93 to coefficient negative 18.03 while both statistically significant at alpha 1%. The opposite results from debt level show that coefficient value is constantly decreasing from coefficient negative 0.1051 to positive 0.0987 while both remain statistically significant at alpha 1%. Control variable that have statistically explanatory power only changes in asset size, while business risk and sales growth are statistically insignificant. Larger asset size reduce the benefit of non-debt tax shield as a source of financing.

Table 5. Multivariate Analysis Results

Description	Model 1	Model 2	Model 3	Model 4
Constant	(0.2967)***	0.0597	(0.3426)***	(0.3519)***
Independent Variable				
Tax Rates	(14.93)***		(17.40)***	(18.0300)***
Debt to Total Asset		(0.1051)***	0.0987***	0.0897***
Control Variable				
Business Risk				0.6700
Average 5 Year Sales Growth				0.0602
Ln Asset Change				(0.0905)**
Adj. R-Square	51.73%	4.86%	54.88%	56.40%

Source: Processed.

Note: ***, **, * mean significant respectively at alpha 1%, 5%, 10%.

5. Limitations and directions for future research

The Indonesia public firm appetite for non-debt tax shield increase and while debt tax shield decrease when corporate tax rates declining from 30% in 2008 to 28 % in year 2009 and 25% in year 2010. The results suggest Indonesia government effort to reduce firm appetite to debt financing is successful. However, within the same period year 2008 and 2010 global economy experience severe contraction because of the Subprime Mortgage crises that originated in the United States. Within the same period, Indonesia economy only receive minor impact. From figure 3. we can see comparison of several developed countries GDP growth relative to Indonesia GDP Growth. Based on this context, more work need to be done to understand how Indonesia public firm treat debt tax shield and non-debt tax shield prior and after Subprime Mortgage Crises. This research will uncover whether the impact of tax rates decrease to non-debt tax shield is temporary or permanent.

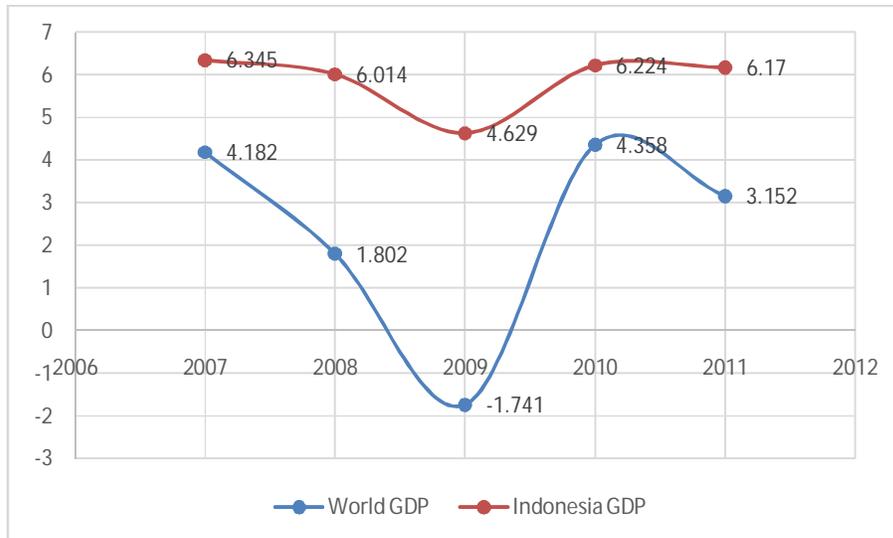


Figure 3. Comparison of World GDP Growth and Indonesia GDP Growth
Source: Worldbank.

6. Conclusion

This paper analyze the influence of decreasing tax rates to non-debt tax shield and how non-debt tax shield change because of change in firm debt level. Multivariate analysis provide support to tax rates decrease, as main variable, increase non-debt tax shield usage which is statistically significant and the model have explanatory power above 50%. Even though debt level is statistically significant, their explanatory power below 5% to firm non-debt tax shield usage. Then the conclusion is Indonesia public firm consider the tradeoff between debt tax shield and financial distress cost in their capital structure decision to finance firm capital expenditure projects.

When tax rates reduced, tax benefit of debt financing is decreasing while financial distress cost remain. Then the best action will be increased the usage of non-debt tax shield as a source of financing to finance firm capital expenditure projects. Firm usage of non-debt tax shield as a source of financing have two benefit. First, higher non-debt tax shield, i.e. higher depreciation costs, meaning firm maintain and grown their competitiveness by actively invested in high value added asset with long time horizon. Second, higher non-debt tax shield mean higher amount of low cost and low risk source of financing as opposed to debt financing that may reduce firm systematic risk.

Reduce tax rates also have direct impact to firm behavior regarding debt financing. Average firm debt to total asset growth decreasing rapidly within year 2008 to 2010. However, decreasing debt to total asset growth do not mean firm shun debt financing. Instead, firm increase their reliance on equity financing, i.e. share sale, retained earnings, and non-debt tax shield as main source of financing

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