



Impact of Policies and Macroeconomic Variables on Tax Revenue and Effective Tax Rate of Infrastructure, Utility, and Transportation Sector Companies Listed in Indonesia Stock Exchange

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ABSTRACT

Taxes are the major source of state revenue for financing government expenditures. Tax revenues are influenced by government policies and macroeconomic variables. This study aims to analyze the impact of macroeconomic and policy changes on tax revenue and effective tax rate (ETR). Panel data was utilized for companies in the infrastructure, utilities and transportation sector for the period 2010-2015. Analysis was carried out using a simultaneous equations model and estimated using the two-stage least squares. Seidel's method was selected to analyze the impact simulation. It was found that there was a greater inflationary impact on tax revenue and ETR, causing them to increase, followed by tax rates, gross domestic product, exchange rates and interest rates of the Bank of Indonesia (BI).

Keywords: Effective Tax Rate, Macroeconomic variable, Policy Impact

JEL Classification: EP5

1. INTRODUCTION

Tax is an obligation; it is the compulsory contribution made by every citizen towards state financing and national development. Tax contributes around 70% to the state budget, which makes it of crucial importance for the operation of governance and development of Indonesia (MoF, 2016). Figure 1 shows that the increment in tax revenue over the period 2010-2015 was quite high, as was the dependence on tax revenue for the state budget (APBN-P). The growth trend in received tax payment can be seen to increase from year to year.

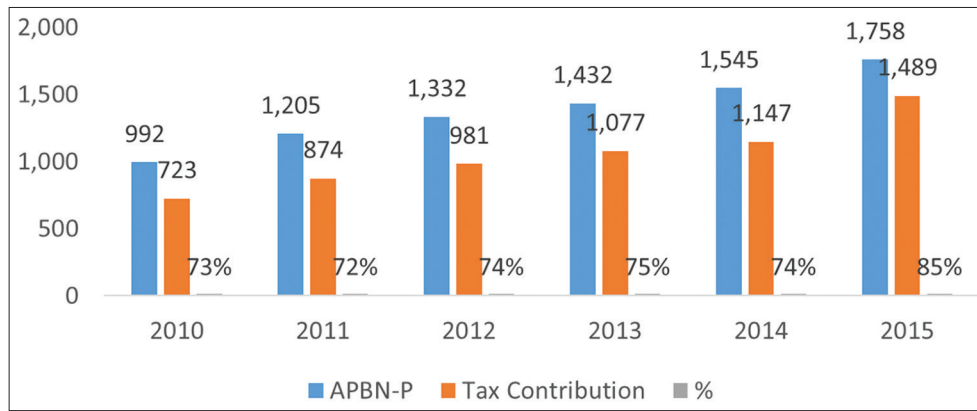
The growth in tax revenue in Indonesia has not been followed by an improved tax revenue ratio. Compared with other ASEAN countries, Indonesia's tax ratio is relatively low (PWC, 2017). Table 1 shows that Indonesia's tax revenue ratio (11.9%) was below that of Thailand (17.6%), Malaysia (15.3%), Singapore

(13.8%) and even Laos (13.7%). The low tax revenue ratio indicates the low effectiveness of tax revenue in Indonesia.

The novelty of this research lies in the fact that it (1) uses the ETR concept, which is the ratio of PPh Tax admission, and earnings before interest and tax, depreciation and amortization (EBITDA) of companies in IDX were utilized as a benchmark for companies and government, and (2) uses the simultaneous equation model to analyze the impact of changing governmental policy, monetary authority and macroeconomic variables on tax revenue and ETR.

This research aims to: (1) Analyze the effective tax rate (ETR) of infrastructure, utilities and transportation companies listed on the Indonesia Stock Exchange and (2) analyze the impact of changing governmental policy, monetary authority and macroeconomic variables on tax revenue and ETR in infrastructure, utilities and transportation companies listed on the Indonesia Stock Exchange.

Figure 1: Tax contribution to APBN-P



Source: MoF (2010-2015)

2. LITERATURE REVIEW

Tax revenue in Indonesia comes from income tax (PPh), value added tax, land and buildings tax (PBB), duty on the acquisition of rights over land and buildings (BPHTB), export/import tax duties and other taxes, and shows unbalanced proportions (DJP, 2016). This is reflected in the fact that income tax revenue is above 45% compared with total tax (MoF, 2016). However, the trend in corporate income tax revenue tends to decrease from year to year, as shown in Table 2. This decline could be due to various factors, such as relatively low compliance rate, decreasing tax rate and unstable macroeconomic conditions.

The formal compliance level of taxpayers was 56.21% in 2013, 59.21% in 2014, and 60.42% in 2015. The level of formal compliance remains below the target set by the Directorate General of Taxes, which expected it to reach 70% (DJP, 2016). The low level of taxpayer compliance ultimately affects the state revenue. Taxes are the main source of income for the state, but reduce companies' income. Any change in macroeconomic conditions could affect state tax revenue (Chen and Hung, 2010; Lendvai et al., 2013; Oueslati, 2014; Mahzar and Meon, 2016; Hung, 2017), central bank influence on optimum tax revenues (Nolivos and Vuletin, 2014), and correlation between investment and tax policies applied by the state (Galindo and Marcela, 2010; Cozmei, 2015). ETRs are required in order to create good government revenue. Table 3 shows the effectiveness of tax collection or ETR for companies on the Indonesia Stock Exchange (IDX), which fluctuated between 2010 and 2015. The average ETR of companies on the IDX from 2010 to 2015 fluctuated and tended to decline. In 2010, the average ETR on the IDX was 17.58%, before increasing slightly in 2011-17.75%, then decreasing until it reached 14.58% in 2015 (IDX, 2015). The downward trend in ETR is expected to provoke changes in macroeconomic conditions.

The government strives to maintain constant and growing tax revenue to cover deficit spending and, moreover, consistently endeavors to maintain stable macroeconomic conditions (MoF, 2016). Previous tax studies have focused more on the effect of macroeconomic tax reforms in Indonesia (Amir et al., 2013), but the impact of governmental policies and macroeconomic changes on tax revenue has not been taken into account by many

Table 1: Tax ratio of ASEAN countries in 2011

Country	Tax ratio (%)
Cambodia	10.0
Indonesia	11.9
Laos	13.7
Malaysia	15.3
Philippines	12.4
Singapore	13.8
Thailand	17.6

Source: PWC (2017)

Table 2: Proportion of income tax (PPh) to total tax revenue (Rp Billion)

Year	Tax revenue			% income tax to total tax
	Income tax	Other taxes	Total	
2010	357 045	366 363	723 307	49.36
2011	431 122	442 752	873 874	49.33
2012	465 070	515 448	980 518	47.43
2013	506 442	570 865	1 077 307	47.01
2014	546 181	600 685	1 146 866	47.62
2015	679 370	809 886	1 489 256	45.62

Source: MoF RI (2010-2016)

researchers. Thus, this research is more specific regarding ETR developments, the impact of governmental policies, monetary authorities and macroeconomic changes on tax revenue and the effectiveness of effective corporate tax rate (ETR) taxation in the infrastructure, utilities and transportation (IUT) sector. The choice of sector is due to the government's focus on the IUT sector development program over the last decade (MoF, 2016).

3. THEORETICAL FRAMEWORK

It is necessary that the government provides tax revenue security in order to realize the plan of state revenue from the tax sector. Because of this, an appropriate policy and taxation system should be created. This idea is supported by previous research in which tax and policy changes were found to affect investments (Galindo and Marcela, 2010; Cozmei, 2015), tax reform was shown to govern macroeconomics (Amir et al., 2013; Oueslati, 2014), and in which inflation (Mahzar and Meon, 2016; Hung, 2017), macroeconomics and the central bank (Lendvai et al., 2013; Chen and Hung, 2010) were all shown to have an influence on taxes

(Nolivos and Vulcet, 2014). Under certain conditions, excessively high tax rates could reduce economic growth and Foreign Direct Investment, as well as increase tax avoidance (Devereux et al., 2002; Lee and Gordon, 2005; Becker et al., 2006; Hong and Smart, 2007; Chen et al., 2008; Galindo and Marcela, 2010; Amiel et al., 2012). Depending on the case, it is important to analyze the development of ETR and the impact of government policy, monetary authority and macroeconomic changes on income tax revenue in the IUT sector.

4. MATERIAL AND METHODS

The study employs secondary data from the IDX database for four companies in the sector of infrastructure, utilities and transportation for the period 2010-2015. The research uses two methods: Descriptive analysis and simultaneous equation model. The simultaneous equation model produces estimations using the 2 stage least square (2SLS) method. Procedures of analysis include specification, identification, estimation, validation, and simulation.

4.1. Model Specification

The model specification reveals the relationships between variables (endogenous and exogenous) in the form of simultaneous equation systems. Figure 2 presents a diagram showing the links between the variables.

The constructed simultaneous equation model specification consists of structural equations and identity equations.

The equation of sales is: (Structural)

$$SALES_{it} = a_0 + a_1 SIZE_{it} + a_2 INF_{it} + a_3 GB_{it} + a_4 GDP_{(t-1)} + a_5 TREN_t + a_6 SALES_{(t-1)} + U1_{it} \quad (1)$$

Hypothesis: $a_1, a_2, a_3, a_4, a_5 > 0$; and $0 < a_6 < 1$

The equation of EBITDA is: (Identity)

$$EBITDA_{it} = EBIT_{it} + DA_{it} \quad (2)$$

The equation of depreciation and amortization (DA) is: (Structural)

$$DA_{it} = c_0 + c_1 AT_{it} + c_2 TREN_t + c_3 DA_{it-1} + U3_{it} \quad (3)$$

Hypothesis: $c_1, c_2 > 0$; and $0 < c_3 < 1$

The equation of EBIT is: (Identity)

$$EBIT_{it} = SALES_{it} - HPPBUA_{it} \quad (4)$$

The equation of interest expense (INT) is: (Structural)

$$INT_{it} = g_0 + g_1 DEBT_{it} + g_2 BIR_{t-1} + g_3 INT_{t-1} + U7_{it} \quad (5)$$

Hypothesis: $g_1, g_2 > 0$ and $0 < g_3 < 1$

The equation of total cost (TC) is: (Structural)

$$TC_{it} = b_0 + b_1 DA_{it} + b_2 HPPBUA_{it} + b_3 DGDP_t + b_4 INT_{it} + b_5 NT_t + b_6 PC_{it} + b_7 TREN_{it} + U2_{it} \quad (6)$$

Hypothesis: $b_1, b_2, b_3, b_4, b_5, b_6, b_7 > 0$

The equation of EBT is: (Identity)

$$EBT_{it} = SALES_{it} - TC_{it} \quad (7)$$

The equation of EAT is: (Identity)

$$EAT_{it} = EBT_{it} - TAX_{it} \quad (8)$$

The equation of Profit is: (Identity)

$$PROFIT_{it} = EAT_{it} / SIZE_{it} \quad (9)$$

The equation of fixed assets (AT), (structural) as follows:

$$AT_{it} = d_0 + d_1 EAT_{it-1} + d_2 EQ_{it} + d_3 TREN_t + d_4 AT_{it-1} + U4_{it} \quad (10)$$

Hypothesis: $d_1, d_2, d_3 > 0$; and $0 < d_4 < 1$

The equation of current assets (AL) as follows:

$$AL_{it} = e_0 + e_1 SALES_{it} + e_2 DDEBT_{it} + e_3 TREN_t + U5_{it} \quad (11)$$

Hypothesis: $e_1, e_2, e_3 > 0$

The equation of SIZE is: (Identity)

$$SIZE_{it} = AT_{it} + AL_{it} \quad (12)$$

The equation of DEBT as follows:

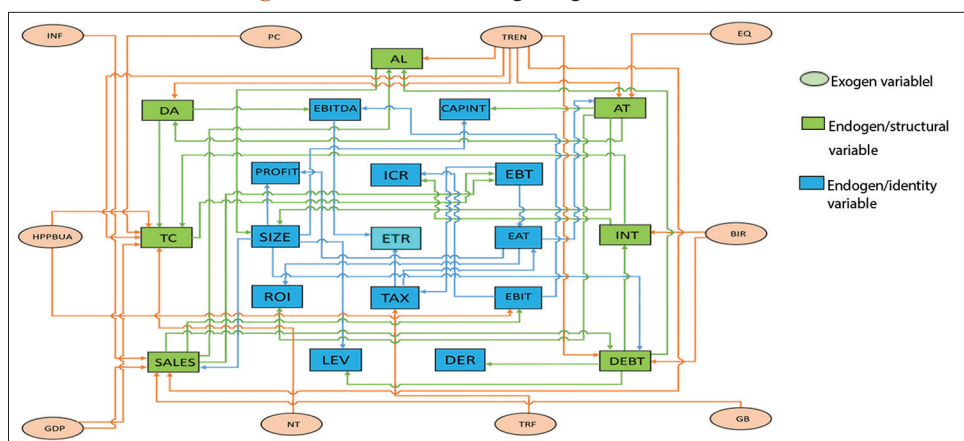
$$DEBT_{it} = f_0 + f_1 DSALES_{it} + f_2 SIZE_{it} + f_3 DBIR_{it} + f_4 TREN_t + f_5 DEBT_{it-1} + U6_{it} \quad (13)$$

Hypothetical parameter sign: $f_1, f_2, f_3, f_4 > 0$; $0 < f_5 < 1$

The equation of ICR is: (Identity)

$$ICR_{it} = EBIT_{it} / INT_{it} \quad (14)$$

Figure 2: The variable linkage diagram in the model



The equation of DER is: (Identity)

$$DER_{it} = DEBT_{it} / EQ_{it} \quad (15)$$

The equation of ROI adalah is: (Identity)

$$ROI_{it} = EAT_{it} / AT_{it} \quad (16)$$

The equation of LEVERAGE is: (Identity)

$$LEV_{it} = DEBT_{it} / SIZE_{it} \quad (17)$$

The equation of Capint is: (Identity)

$$CAPINT_{it} = AT_{it} / SIZE_{it} \quad (18)$$

The equation of TAX is: (Identity)

$$TAX_{it} = EBT_{it} \times TARIF_t \quad (19)$$

The equation of effective tax rate is: (Identity)

$$ETR_{it} = TAX_{it} / EBITDA_{it} \quad (20)$$

SALES: Sales (Billion Rp)

GB: Large group

SIZE: Company size (Billion Rp)

GDP: Gross domestic product

INF: Inflation (%)

TC: Total cost

NT: Exchange rate (Rp/US\$)

INT: Company's interest expense

HPPBUA: cost of goods sold and general cost & administration
(exchange rate of Rp)

PC: Political connection

AT: Fixed assets

DA: Depreciation and amortization

EAT: Earnings after tax

DEBT: Debt

AL: Current assets

BIR: BI rate

ETR: Effective tax rate

TAX: Corporate income tax

EBT: Earnings before tax

TARIF: Tax rates

EBIT: Earnings before interest and tax

ICR: Interest coverage ratio

EQ: Company's equity

DER: Debt to equity ratio

LEV: Company's leverage

ROI: Return on investment

CAPINT: Capital intensity ratio

PROFIT: Corporate profitability

EBITDA: Earnings before interest, tax, depreciation and amortization

4.2. Model Identification and Estimation

Regarding model estimation, model identification was carried out in advance. Model identification exploits order condition criteria (Pindyck and Rubinfeld, 1997). Based on the order condition, the result of an equation identification is: (1) Exactly identified, if $(K-M) = (G-1)$; (2) over-identified, if $(K-M) > (G-1)$; and

(3) under-identified, if $(K-M) < (G-1)$ (Pindyck and Rubinfeld, 1997). K is the number of variables in the model (endogenous and pre-determined), M is the number of variables (endogenous and exogenous) in an identified equation, and G is the number of equations (the number of endogenous variables) in the model. In the model used in this paper, there are 20 equations (G), consisting of 7 structural equations and 13 identity equations; the total number of variables (K) is 30. An equation requires a maximum of 7 variables (M), so $K = 30$, $M = 7$ and $G = 20$, thus, $K(30) - M(7) = 23$ and $G(20) - 1 = 19$, giving $(K - M) > (G - 1)$. According to the order condition criterion, the model is identified as overidentified and can be estimated using the 2SLS method. Data processing is carried out using the computer software program SAS/ETS version 9.4.

4.3. Validation and Model Simulation

Model validation aims to determine the model's ability to represent the real world by using Theil's Inequality Coefficient (U) indicator (Pindyck and Rubinfeld, 1997). The coefficient value of Theil (U) ranges between 1 and 0. If $U = 0$ means the model estimation is perfect, $U = 1$ means the model estimation (Pindyck and Rubinfeld, 1997) is naive. Alternative model simulation scenarios are as follows: (1) 10% increase in tax rate, (2) 10% decrease in BI rate, (3) 5% increase in gross domestic product (GDP), (4) 10% increase in inflation, (5) 5% depreciation in rupiah exchange rate, (6) a combination of 10% increase in tax rate and 5% increase in GDP, (7) a combination of 10% increase in both tax rate and inflation, (8) a combination of 10% increase in tax rate and value, (9) a combination of 10% decrease in BI rate and 10% increase in inflation, (10) a combination of 10% decrease in BI rate and 5% depreciation in rupiah exchange rate, (11) a combination of 10% increase in tax rate and 10% decrease in BI rate, (12) a combination of 5% increase in GDP and 10% increase in inflation, (13) a combination of 5% increase in GDP, 10% increase in inflation and 5% depreciation in rupiah exchange rate.

5. RESULTS AND DISCUSSIONS

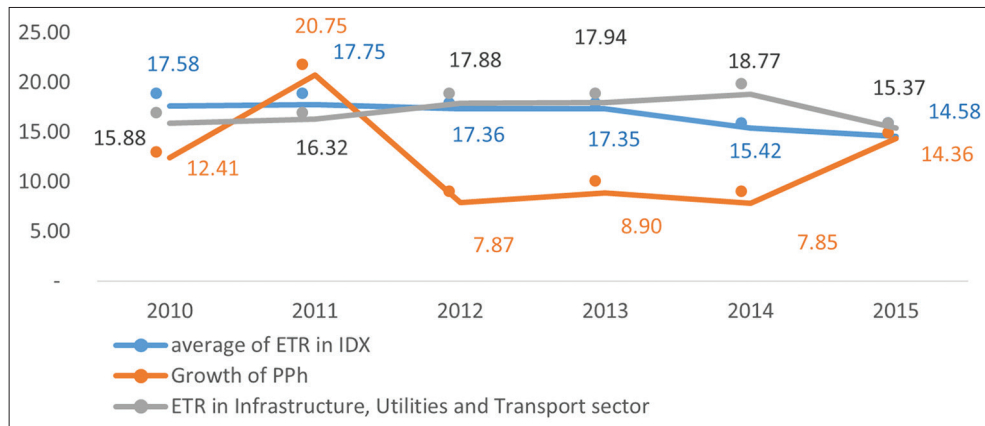
The companies studied have a continuous profit over the period. The simulations of the constructed models provided the following results.

5.1. ETR Development

In the period of 2010-2015, companies' ETR in the IUT sector averaged at 17.03%. The average achievement of IUT sector ETR was greater than the overall IDX average by 16.67%. ETR trends in the IUT sector tended to increase, except in 2015 when they were found to decline (Figure 3).

During 2010-2011, the ETR of the IUT sector was lower than the overall IDX average. However, from 2012 to 2015, the ETR average in the IUT sector was higher. The highest average of ETR as shown in Table 4 was achieved by PT Citra Marga Nusaphala (CMNP) at 18.25%, followed by PT Telekomunikasi Indonesia (TLKM) at 18.12%, then PT Perusahaan Gas Negara (PGAS) at 15.90%, and the lowest average was that of PT Jasa Marga (JSMR), at 15.85%. The averages for JSMR and PGAS were found to be lower than the overall ETR average in the IDX. This suggests that

Figure 3: Growth of PPh and ETR in the infrastructure, utilities and transport sector and average ETR in IDX companies from 2010 to 2015



Source: MoF 2008-2015

various factors were involved, for instance huge investment cost, high capital cost and tight business competition. The low ETR for PGAS is not surprising due to the decrease in oil and gas prices globally from 2008 to 2015; meanwhile, the cost of production/production load is strangely increasing.

Indonesia's economic growth as measured by GDP growth from 2010 to 2015 is positive, in the range of 4%-6% per year, followed by the upward trend in ETR in the IUT sector. Overall, ETR on the IDX tends to show a downward trend. Increasingly tight business competition was suspected to induce the decrease in corporate profits and an increase in tax avoiding which presumably occurred; furthermore, even tax evasion could be happening. This corresponds to Varvarigos' study (2016) which showed a link between tax evasion and economic growth. The pattern of GDP growth, BI rate and inflation rate from 2010 to 2015 is shown in Figure 4. The pattern indicates the effect of fiscal policy and macroeconomic conditions on taxes, similar to Romer and Romer in 2007.

5.2. Impact of Government Policy Changes, Monetary Authority and Macroeconomic variables on Tax and ETR

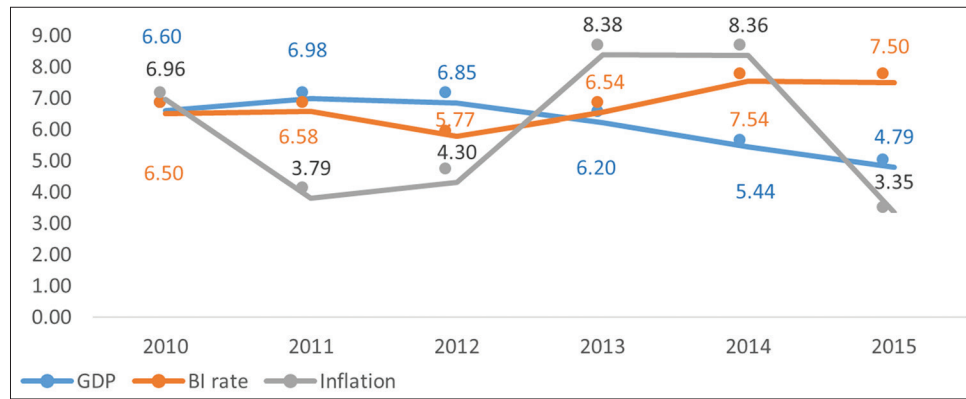
The results from the model estimation show that all estimation parameters match the expectation (hypothesis). The model validation denotes that the value of U Theil is 85% lower than 0.40, so the model is quite suitable to apply to the simulation model.

The result for simulation of policy impact related to the changes in tax rate as shown in Table 5, at 10% higher than the prevailing rates for the previous period, has a positive impact on tax revenue (3.39% increase) and ETR (8.16% increase). Increased tax rate has a downward impact on EBT which also causes sales to decline by 1.87%. The decline in sales generates a 4.70% decrease in EBITDA. The decrease in EBITDA subsequently causes a 6.01% decline in EBT. This 6.01% decline, when multiplied by a 10% increase in tax rate compared to the previous period, provokes higher taxes from the government, otherwise the condition will subside the profit for the company which is evidenced by the 9.15% decrease in companies' EAT. These results support Mazhar and Meon (2016) who concluded that changing tax rates have an effect on tax revenue.

A combination of overly expansive monetary and fiscal policies may encourage a warming/enhancing of economic activity (BI, 2004). Changes in BI interest rates will influence the cost of funds in the IUT industry sector with long-term financing characteristics (Manurung, 2012). The influence of the central bank will affect optimal tax (Nolivos and Vuletin, 2014). The simulation results (Table 5) showed that if the monetary authority decides to lower the BI interest rate (BI rate) by 10%, the outcome may be an increment in both tax (3.61%) and ETR (1.88%). In the simulation of a 10% decline in BI rate, interest expense was found to decrease by 16.07%, which collaterally lead to a reduction in total cost of 0.53%. The consequence is that when total cost reduction occurs, it causes EBT to increase by 3.61%, which then increases tax payments by 3.61%, thus producing upward impact on ETR by 1.88%. The condition explains that the interest rate relationship with ETR is inversely proportional, which could be seen from the fact that when the BI rate is lowered, the interest expense borne by the company decreases, as does the total cost. As the total cost reduces, it improves EBT (profit before tax), then affects the increment in both the company's tax payment and ETR. The relationship between interest rate and ETR was studied by Creedy and Gemmill (2017), who concluded that there is a link between interest rates and ETR.

In the simulation of GDP growth, the 5% rise in GDP generates an increase in both tax (2.74%) and ETR (0.68%). The simulation results showed that when GDP rises by 5% (Table 5) compared to the prior period, this causes companies' sales to increase by 0.85%. Along with the increment in sales of 0.85%, the impact on current assets was found to increase by 0.72%. Moreover, the rise in current assets subsequently increases companies' size by 0.52%. The increment of company size leads to a 0.47% rise in company debt. When company debt increases, this will lead the company's interest expense to increase by 0.47%. Increased interest expense borne by the company will increase the company's total cost by 0.02%. This increased total cost will impact on the company's EBT. Because the increase in percentage of sales is higher than the increase in total cost, it contributes to the increment in EBT of 2.74%. Furthermore, it produces a rise in tax payment of 2.74% and ultimately increases the ETR by 0.68%. The impacts of economic growth on tax revenue are similar to those found by Barro and

Figure 4: Growth of GDP, BI rate and inflation rate from 2010 to 2015



Source: MoF 2010 – 2015

Redlick (2010), Abbas and Klemm (2013), Suzuki (2014), Cozmei (2015) and Sun et al. (2016).

In the simulation, if inflation is 10% higher compared with the previous period, this results in an increment both in tax, of 9.84%, and ETR, of 2.28%. When inflation rises by 10%, the price of goods generally increases, resulting in a 3.04% increase in sales (sales of the companies). The impact of increased sales causes EBT to increase by 9.84%, and tax payment to increase by 9.84%, and subsequently causes the ETR to increase by 2.28%. The impact of rising inflation on the ETR at a certain level (range of 5% per year) is relatively good for increasing state revenues from the tax sector and the effectiveness of tax collection or ETR. The link between inflation and taxes conforms with the studies carried out by Abbas and Klemm (2013), Nolivos and Vuletin (2014) and Dhaliwal et al. (2015).

In the simulation of changes in rupiah exchange rate, when this depreciates by 5%, this causes a decrement of 3.22% in tax revenue and of 1.77% in ETR (Table 5). The decline in tax and ETR was caused by the depreciation of the exchange rate and the 0.47% increase in total cost. Along with the increase in total cost, this creates a downward impact on EBT, which decreases by 3.22%. Subsequently, it influences tax decrement by 3.22%, and ultimately generates a 1.77% reduction in the company's ETR. It also indicates that in this sector, there are companies importing raw materials or equipment for production. The results support Johdo and Hashimoto (2009) who found a relationship between exchange rate and tax policy.

Combined simulation of two macroeconomic variables under the existence of a policy for an increment in tax rate of 10% and in GDP of 5% as shown in Table 6 caused companies' sales to decrease by 1.06%. Along with the 1.06% reduction in sales, companies' current assets also decreased by 0.91%. The decline in current assets reduces companies' size by 1.03%. Thus, this reduction in size subsequently led to a 1.03% drop in company debt%. When companies' debt dropped, their interest expense collaterally reduced by 0.94%. This reduction of interest expense reduced the companies' total cost by 0.03%. The reduction in total cost generates a lower EBT. Since the decrement percentage of EBT, 3.41%, is smaller compared to the increment percentage of

the tax rate, 10%, the tax payment continues to increase by 6.25% and ultimately increases ETR by 9.01%. The results support Mazhar and Meon (2016) who revealed that tax rate changes affect tax revenue, as well Barro and Redlick (2010), Abbas and Klemm (2013), Suzuki (2014), Cozmei (2015) and Sun et al. (2016), who found tax revenue to have an impact on economic growth.

Combined simulation of two macroeconomic variables under the existence of a policy for an increment in tax rate of 10% and in inflation of 10% (Table 6) caused companies' sales to rise by 1.03%. Along with a 1.03% rise in sales, companies' current assets increased by 0.87%, and this increase in current assets caused companies' size to increase by 0.22%. Thus, an increase in company size subsequently results in higher company debt (0.21% higher). When company debt increases, companies' interest rate collaterally increases by 0.21%. This increase in interest expense causes the company's total cost to rise by 0.01%, and the increasing in the company's total cost impacts the company's EBT increment. As the increment in percentage of sales is higher than the total cost increment, it causes EBT to increase by 3.36%. As the EBT rises by 3.36%, the tax payment subsequently increases by 13.69% and in turn increases the ETR by 10.90%. The results are consistent with Mazhar and Meon (2016) who found that tax rate changes affect tax revenue, as well as Abbas and Klemm (2013), Nolivos and Vuletin (2014) and Dhaliwal et al. (2015) regarding the existence of an inflation-to-tax relationship.

Combined simulation of two macroeconomic variables under the existence of a policy for a 10% tax rise and a 5% depreciation of rupiah exchange rate (Table 6) showed that companies' total cost increased by 0.42%. This increase in total cost causes companies' EBT to decrease by 9.09%, and this decrease subsequently causes EAT to decrease by 12.12%. The decline in EAT provokes a decrement in profitability of 7.44%, in ROI of 7.00% and in AT of 1.98%. The decrease in AT impacts size reduction by 2.01%. The size reduction decreases sales by 2.47%, and decreased sales collaterally cause a decline in debt, by 1.81%, and AT, by 1.98%. Thus, debt reduction results in a 1.81% decline in INT, which in turn affects the total cost. Because the INT decrement percentage is smaller than the rupiah exchange rate depreciation at 5%, TC continues to increase by 0.42%. Along with the increase in TC, it causes EBT to decrease by 9.09%. As the EBT decrease

Table 3: ETR of companies listed on the Indonesia Stock Exchange (2010-2015)

Sector name	Effective tax rate (%)						
	2010	2011	2012	2013	2014	2015	2008-2015
Infrastructure, utilities and transportation	15.88	16.32	17.88	17.94	18.77	15.37	17.03
Average ETR of IDX listed companies	17.58	17.75	17.36	17.35	15.42	14.58	16.67

Source: IDX (2015)

Table 4: ETR of IUT sector companies (2010-2015)

Stock code	Effective tax rate						
	2010	2011	2012	2013	2014	2015	AVERAGE
CMNP	18.86	17.91	18.89	18.82	17.76	17.23	18.25
JSMR	11.20	14.10	16.49	15.37	18.00	19.93	15.85
PGAS	16.19	16.26	17.55	18.85	20.60	5.93	15.90
TLKM	17.28	17.00	18.59	18.73	18.69	18.40	18.12
AVERAGE	15.88	16.32	17.88	17.94	18.77	15.37	17.03

Source: Processed data

Table 5: Simulation of policy and macroeconomic impacts on ETR and tax

Performance variables	Basic value	Simulation					
		Increase rate 10%	Decrease rate 10%	Decrease BIR 10%	Increase GDP 5%	Increase INF 10%	NT depreciation 5%
Δ %							
Sales	35.0515	-1.87	2.04	0.73	0.85	3.04	-0.65
Ebitda	16.4460	-4.70	5.12	1.82	2.02	7.24	-1.64
DA	4.9250	-2.40	2.61	0.92	0.70	2.53	-0.83
EBIT	11.5210	-5.68	6.19	2.21	2.58	9.24	-1.99
INT	0.8445	-1.37	1.49	-16.07	0.47	1.68	-0.47
TC	24.3846	-0.05	0.06	-0.53	0.02	0.07	0.47
EBT	10.6669	-6.01	6.55	3.61	2.74	9.84	-3.22
EAT	8.0002	-9.15	10.10	3.61	2.74	9.83	-3.23
Profit	0.2273	-5.59	5.81	2.02	1.41	4.97	-1.94
AT	43.3282	-1.49	1.63	0.58	0.44	1.59	-0.52
AL	15.8164	-1.59	1.74	0.62	0.72	2.59	-0.56
Size	59.1446	-1.52	1.66	0.59	0.52	1.86	-0.53
Debt	28.1909	-1.37	1.49	0.60	0.47	1.68	-0.48
ICR	26.8510	-1.92	2.01	89.66	1.18	4.26	-0.65
DER	1.6474	-1.24	1.31	0.58	0.48	1.73	-0.42
ROI	0.3488	-5.28	5.50	1.92	1.49	5.25	-1.81
LEV	0.4925	0.24	-0.24	-0.04	-0.06	-0.22	0.08
CAPINT	0.7113	0.03	-0.03	0.00	-0.10	-0.38	0.01
TAX	2.6667	3.39	-4.10	3.61	2.74	9.84	-3.22
ETR	0.1753	8.16	-8.56	1.88	0.68	2.28	-1.77

Source: Processed data

percentage is smaller than the increase in tax rates, the simulation showed an increase of tax rate by 10% while NT depreciates by 5%; meanwhile, tax revenue was found to increase by 0.01%, and ETR by 6.10%. The result of this research supports the study of Johdo and Hashimoto (2009), which showed the relationship of the exchange rate and taxes, and Mazhar and Meon (2016), which found that a change in tax rate has an effect on.

Combined simulation of two macroeconomic variables under the existence of monetary authority to lower the BI rate by 10% and increase GDP by 5% (Table 6) caused companies' sales to increase by 1.57%. Along with the 1.57% increase in sales, companies' current assets also increase by 1.34%. The increment in current assets increases company size by 1.11%. The increase in company size causes company debt to increase by 1.07%. Even

though corporate debt increased, it causes the company's interest expense to decrease by 16.61%. This decrease in interest expense will result in a decrease in the company's total cost of 0.51%. The decrease in the company's total cost will have an impact on the company's EBT increment. Thus, the rising EBT will increase the company's taxes by 6.34%, and eventually increase ETR by 2.57%. The relationship between interest rate and ETR was also studied by Creedy and Gemell (2017), who found a link between interest rates and ETR, as well as Barro and Redlick (2010), Abbas and Klemm (2013), Suzuki (2014), Cozmei (2015) and Sun et al. (2016), who explored the impact of economic growth on tax revenue.

Combined simulation of two macroeconomic variables under the existence of monetary authority to lower the BI rate by 10%

Table 6: Simulations of policy and macroeconomic impacts on ETR and taxes

Performance variables	Basic value	Simulation								
		Increase rate 10%, increase GDP 5%	Increase rate 10%, INF 10%	increase rate 10%, NT depreciation 5%	Decrease BIR 10%, increase GDP 5%	Decrease BIR 10%, Increase INF 10%	Decrease BIR 10%, NT Depreciation 5%	Increase RATE 10%, Decrease BIR 10%	Increase GDP 5%, Increase INF 10%	Increase GDP 5%, Increase INF 10%, NT Depreciation 5%
Δ %										
SALES	35.0515	-1.06	1.03	-2.47	1.57	3.76	0.07	-1.19	3.89	3.23
EBITDA	16.4460	-2.78	2.18	-6.22	3.84	9.06	0.18	-3.00	9.25	7.61
DA	4.9250	-1.74	-0.04	-3.17	1.63	3.46	0.09	-1.54	3.24	2.40
EBIT	11.5210	-3.23	3.12	-7.52	4.79	11.45	0.22	-3.63	11.82	9.84
INT	0.8445	-0.94	0.21	-1.81	-15.61	-14.39	-16.55	-17.48	2.16	1.67
TC	24.3846	-0.03	0.01	0.42	-0.51	-0.47	-0.06	-0.59	0.09	0.56
EBT	10.6669	-3.41	3.36	-9.09	6.34	13.44	0.38	-2.57	12.57	9.35
EAT	8.0002	-6.63	-0.09	-12.12	6.34	13.44	0.38	-5.82	12.57	9.35
PROFIT	0.2273	-4.22	-0.79	-7.44	3.43	6.95	0.13	-3.61	6.34	4.49
AT	43.3282	-1.08	-0.02	-1.98	1.02	2.17	0.06	-0.95	2.03	1.51
AL	15.8164	-0.91	0.87	-2.11	1.34	3.21	0.06	-1.02	3.31	2.75
SIZE	59.1446	-1.03	0.22	-2.01	1.11	2.45	0.06	-0.97	2.37	1.84
DEBT	28.1909	-0.93	0.21	-1.81	1.07	2.28	0.12	-0.81	2.15	1.67
ICR	26.8510	-0.75	2.30	-2.54	68.26	25.34	101.87	127.15	5.40	4.79
DER	1.6474	-0.78	0.42	-1.64	1.06	2.31	0.15	-0.69	2.20	1.78
ROI	0.3488	-3.84	-0.23	-7.00	3.38	7.11	0.11	-3.41	6.68	4.93
LEV	0.4925	0.16	0.00	0.30	-0.12	-0.28	0.04	0.18	-0.28	-0.22
CAPINT	0.7113	-0.08	-0.35	0.04	-0.11	-0.39	0.00	0.03	-0.49	-0.48
TAX	2.6667	6.25	13.69	0.01	6.34	13.44	0.38	7.17	12.57	9.35
ETR	0.1753	9.01	10.90	6.10	2.57	3.99	0.17	10.38	2.85	1.31

Source: Processed data

and increase inflation by 10% (Table 6) showed that companies' sales increased by 3.76%. Along with the 3.76% increase in sales, companies' current assets also increase by 3.21%, then the increase in current assets causes company size to increase by 2.45%. The increased company size subsequently increases company debt by 2.28%. Even though corporate debt rose, it was found to decrease company interest expense by 14.39%. This decrease in interest expense caused the company's total cost to decrease by 0.47%. The decrease in total cost influenced the company's EBT increment. Thus, the rise in EBT will increase the company's tax by 13.44%, and ultimately increase ETR by 3.99%. The study supports Creedy and Gemmill (2017), who concluded that there is a link between interest rates and ETR, as well as Abbas and Klemm (2013), Nolivios and Vuletin (2014) and Dhaliwal et al. (2015), who found the existence of the inflation-to-tax relationship.

Combined simulation of two macroeconomic variables under the existence of monetary authority to lower the BI rate by 10% and the rupiah depreciation rate at 5% (Table 6) caused the total cost of the company's sales to decrease by 0.06%. The decline in the company's total cost will cause the company's EBT to increase by 0.38%. The increment in the company's EBT subsequently increases the company's tax payment by 0.38% and will ultimately increase ETR by 0.17%. The study supports Creedy and Gemmill (2017), who discovered the relationship between interest rates and ETR, and Johdo and Hashimoto (2009), who revealed the relationship between exchange rate and tax.

Combined simulation of two macroeconomic variables under the existence of raising policy for tax rate by 10%, while the monetary authority lowers the BI rate by 10% (Table 6), caused company

debt to decrease by 0.81%. This decline will cause the company's interest expense to decrease by 17.48% and the AL to decrease by 1.02%. The decrement in interest expense (INT) will impact the companies' total cost by 0.59%. Furthermore, the decrease in AL will reduce company size by 0.97%, and this reduction in size will then reduce sales by 1.19%. Along with the decrease in the company's total cost and also the 1.19% decrease in company sales, EBT decreases by 2.57%. As the EBT decrement percentage is lower than the increase in tax rates, the tax payment increases by 7.17%. Thus, the increase in tax payment leads to an increment in the company's ETR of 10.38%. The result supports Creedy and Gemmill (2017), who found a link between interest rates and ETR, and also research by Mazhar and Meon (2016), which found that changes in tax rates influenced tax revenue.

Combined simulation of two macroeconomic variables under the existence of a 5% GDP increase and a 10% increase in inflation (Table 6) caused companies' sales to increase by 3.89%. Along with the 3.89% increase in sales, the company's current assets also increase by 3.31% and this increase in current assets generates an increment in company size of 2.37%. The increase in company size subsequently causes company debt to increase by 2.15%. When company debt increased, the increase in company interest expense amounted to 2.167%. This increased interest expense produces an increment in the company's total cost of 0.09%. The increment in the company's total cost causes the company's EBT to rise. As the increment percentage in sales is higher than the total cost, it causes EBT to increase by 12.57%, which in turn provokes taxes paid to rise by 12.57% and ultimately increases the ETR by 2.85%. This research supports Barro and Redlick (2010), Abbas and Klemm (2013), Suzuki (2014), Cozmei (2015) and Sun et al. (2016), who

found that economic growth has an impact on tax revenue, as well as the studies carried out by Abbas and Klemm (2013), Nolivos and Vuletin (2014) and Dhaliwal et al. (2015), which showed the existence of an inflation-to-tax relationship.

Combined simulation of three macroeconomic variables under the existence of a 5% increase in GDP, a 10% increase in inflation and a 5% depreciation of the rupiah exchange rate (Table 6) showed that tax revenue increased by 9.35% and ETR by 1.31%. Simulation results showed that the macroeconomic condition as mentioned above will increase company sales by 3.23%. Along with the 3.23% increment in sales, the company's current assets also increase by 2.75%, which will in turn generate a 1.84% increase in company size. The increase in company size results in a 1.67% rise in corporate debt. When company debt rises, it will generate a 1.67% increment in interest expense. The increment in interest expense borne by the company causes the company's total cost to increase by 0.56%. This therefore has an impact on the company's EBT. In a combined simulation, the increase in TC causes EBT increment to increase by 9.35%. The rise in EBT due to the increment in percentage of sales is higher than the increment in total cost. Along with the increment in EBT, tax payments also increase by 9.35%, and ultimately increase the ETR by 1.31%. The study supports Romer and Romer (2007) and Lendvai et al. (2013) who suggest that macroeconomics affects taxes.

5.3. Managerial Implications

The managerial implications drawn from the results are that (1) the ETR in the infrastructure, utilities and transportation sector is lower than the overall average ETR on the IDX. For investors, a low tax rate creates investment opportunities. It is necessary for the government to review the taxation rules policy and examine the company's compliance formally and materially; that (2) the tax rate has an impact on tax revenue and business sectors (sales of company); it is better to stipulate the applicable tax rate to increase state revenue and also support the business sectors; that (3) BI interest rates affect tax and ETR which drive the companies to make loans with low or flat interest rates. For the government, the implications need to coordinate with the monetary authorities to set an effective BI interest rate on tax revenue; that (4) GDP affects tax and ETR, which means that the government needs to maintain stable economic growth by improving bureaucracy, political stability, business regulation and business facility; that (5) inflation impacts tax and ETR which have implications for the government to strengthen the Institutional or Regional Inflation Control Institution; and that (6) the exchange rate affects tax and ETR, which implies that the company needs to hedge the exchange rate. For the government, this implies the demand to maintain exchange rate stability in order to export and control imports and subsequently gain effective tax revenue and ETR.

6. CONCLUSION

Several conclusions can be drawn from this research: (1) The average ETR in the IUT sector for the period 2010-2015 is 17.03% higher than the overall average ETR of BEI, and ETR in this sector tends to increase from year to year; (2) if the government raises the tax rate by 10%, it will increase tax by 3.39% and increase the

ETR by 8.16%. On the contrary, if the government lowers the tax rate by 10%, it will cause a decrement in tax revenue of 4.10% and in ETR of 8.56%; (3) a 10% reduction in the BI interest rate will result in a 3.61% tax rise and a 1.88% rise in ETR; (4) if GDP improves by 5%, it will increase both tax by 2.74% and ETR by 0.68%; (5) if inflation increases by 10%, it will impact both tax by 9.84% and ETR by 2.28%; (6) if there is a 5% depreciation in the rupiah exchange rate, it will cause a decrease in both tax (3.22%) and ETR (1.77%); (7) simulation of combined economic and macroeconomic conditions with an increment in both tax rate (10%) and GDP (5%) causes tax to rise by 6.25% and ETR to rise by 9.01%; (8) a combined simulation with an increment of 10% in both tax rate and inflation leads to a tax rise of 13.69% and a rise in ETR of 10.90%; (9) a combined simulation of a 10% rise in tax rate and a 5% depreciation in the rupiah exchange rate generates an increase in both tax (0.01%) and ETR (6.10%); (10) a combined simulation of monetary policy to reduce the BI rate by 10% and increase the GDP by 5% produces an increment in both tax (6.34%) and ETR (2.57%); (11) a combined simulation of a 10% decrease in BI rate and a 10% increase in inflation induces an increment in both tax (13.44%) and ETR (3.99%); (12) a combined simulation of a 10% decrease in BI rate and a 10% depreciation in the rupiah exchange rate leads to an increment in both tax (0.38%) and ETR (0.13%); (13) a combined simulation of a 10% decrease in BI rate and a 10% increase in tax creates an increment in both tax (7.17%) and ETR (10.38%); (14) a combined simulation of a 5% rise in GDP and a 10% rise in inflation shows an increment in both tax (12.57%) and ETR (2.85%); (15) a combined simulation of a 5% rise in GDP, and a 10% rise in inflation, or a 5% depreciation in the rupiah exchange rate, causes a tax rise of 9.35% and an ETR rise of 1.31%.

If the government plans to increase tax revenue and the ETR, it needs to ensure that macroeconomic conditions, namely inflation, GDP and the rupiah exchange rate, remain stable. Furthermore, the government must establish a tax rate which is pro-business and also continue to increase revenue from the tax sector. With regard to the monetary authority, it will be necessary to establish a policy of BI rate reduction.

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