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THE CREDIBILITY OF FISCAL RULES POLICY AND BUSINESS CYCLE VOLATILITY

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Abstract

The aim of this paper is two-fold; first, it studies the impact of the credibility of fiscal rule policy on the stability of output growth; second, it compares the effectiveness of fiscal rule policy to discretionary and automatic stabilizer fiscal policies to address the fluctuation of output growth. Employing quarterly data over the period 2001-2013 in the case of Indonesia, we obtain that the credible debt rule leads to a decrease in the volatility of output growth while the non-credible deficit rule does not have any effect. Both unsystematic and systematic components of discretionary fiscal policy have a stabilizing function. Interestingly, the automatic stabilization tends to induce the volatility of output growth. Given those results, we infer that government spending is not a good automatic stabilizer. It seems that the lower ratio of government expenditure to GDP along with improving credibility of deficit rule policy has a smoother effect on the economy. Therefore, they implicitly support expenditure cuts when implementing fiscal adjustment with the purpose of reaching fiscal sustainability in the short-run and a stable economic growth in the long-run.

Keywords: volatility of output growth, credible fiscal policy, government size, openness

JEL classification: E32, E62, H60

1. INTRODUCTION

The effect of fiscal policy on economic performances has received much attention in the last decade. The central question is whether fiscal policy effectively can stabilize macroeconomic condition primarily during the global financial crisis erupted in late 2007. Despite the destabilizing effects generated by fiscal policy (Debrun and Kapoor, 2010), in fact, many countries around the world rely on the fiscal policy to combat the adverse economic impacts generated by the global financial crisis.

Along with the emergence of a large body of literature on output growth stabilization, surprisingly, very little is known about the ultimate effects of fiscal policy on business cycle volatility. To smooth out business cycle fluctuations, governments can generally use discretionary changes in fiscal policy and automatic stabilizer. However, the use of

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discretionary fiscal policy and automatic stabilizer may be ineffective to achieve the stabilization goals since countries are subject to both symmetric and asymmetric shocks (Furceri, 2009).

In a bid to achieve the goal of broader stabilization, many countries have adopted some form of fiscal rule (or a combination of fiscal rules). Basically, fiscal rules are mechanisms to support fiscal credibility, fiscal sustainability, and counter-cyclical fiscal policies by removing discretionary intervention (Kopits, 2001). However, in emerging countries fiscal rules policy tends to amplify business cycle fluctuations whereas in developed countries fiscal rules policy tends to mitigate aggregate instability (Kaminsky *et al.*, 2004). As a result, developing countries are characterized by a relatively large volatility of output growth (Lane, 2003).

Along with the world economic recovery and tapering fiscal policy pioneered by US recently, the central issue has shifted to the possibility of conducting fiscal austerity policy through tax hike or spending cut or both. The deficit and debt limitation through fiscal austerity policy raises the question as to the nature of the relationship between economic stabilization and fiscal rules. Our question in mind is whether the fiscal austerity in line with fiscal rules policy can effectively offer a better precondition to achieve economic growth in the short-run and stabilization in the long-run.

Knowing the fluctuations of the output growth is important. In fact, the fluctuations of the output growth crucially determine a large number of economic outcomes (Giovanni and Levchenko, 2009) and therefore also the perceived success or failure of economic policies. Higher output volatility is shown to be connected to lower private investment (Aizenman and Marion, 1999), substantial welfare effects (Barlevy, 2004), and eventually also to lower long-run economic growth (e.g., Ramey and Ramey, 1995; Imbs, 2007).

Given the adverse impacts of fluctuation of the output growth, the credibility of fiscal policy is an important aspect in understanding macroeconomic policy. While governments with a strong reputation of fiscal prudence may have less need for discretionary policy action, the credible fiscal policy can help private agents to learn the systematic behavior of the fiscal authorities and then reduce the negative effects of output growth shocks. Therefore, the credibility of fiscal policy has been widely mentioned as one of the most important fundamentals of macroeconomic policy.

Indonesia provides a unique opportunity to examine the nature of fiscal policy. Asian financial crisis in 1997/98 has directed government expenditures to focus on the economic recovery. At the same time, the external debt increased significantly from more than US$ 136 billion in 1997 to US$ 151 billion in 1998. The concurrence of the sharp instability in fiscal deficits and public debt has raised the question as to the nature (permanent or temporary) of the two measures in line with fiscal sustainability (Kuncoro, 2015). According to the Law No. 17/2003, since 2004 Indonesia has been implementing a fiscal rule based on maximum deficit and debt ratio. Given her fiscal performance has been significantly improving as required by the fiscal rule (Blöndal *et al.*, 2009), it is necessary to test whether the deficit and debt rules are credible.

During the global financial crisis, the fiscal stimulus programs in fact have contributed substantially to Indonesia faster and stronger than the expected recovery (Hur *et al.*, 2010). After that, gradually she is in 2010 one of the largest developing countries to implement various economic liberalization reforms that produce strong economic growth (Abdurohman, 2013). It is interesting to evaluate whether the strong economic growth is associated with the

stricter fiscal rules that mitigate adverse impacts on growth stemming from big governments or it has gained more from the implementation of credible fiscal rules.

The objective of this paper is to analyze the impact of the credibility of fiscal rules on the output growth stabilizations in the case of Indonesia in order to achieve the fiscal sustainability in the short-term and stable economic growth in the long-term. To the best of our knowledge, this approach has not been used in the literature. The rest of this paper is organized as follows. Section 2 highlights the existing literature as well as previous results. The methodology is described in the next section. This is followed by reporting the main empirical results. Finally, some concluding remarks are drawn.

2. LITERATURE REVIEW

The contribution of fiscal policy to the macroeconomic stability can be analyzed through three main channels. The first one is the automatic stabilizer in the forms of government spending and tax revenue. In general, the fiscal authority might reduce government spending during downturns and/or increase tax revenue during upturns. Since public spending reflects government commitments independent of the business cycle and tax revenues tend to be broadly proportional to national income, this proposition is characterized as *cyclical, non-discretionary* (Debrun and Kapoor, 2010).

Empirical study regarding the relationship between fiscal aggregates and output volatility is pioneered by Galí (1994). Taking the case of 22 OECD countries, he systematically investigates the role of income taxes and government purchases as automatic stabilizers. By adding international openness as controlling variable, Fatás and Mihov (2001) conduct a similar research as Galí (1994). Both studies find that government size and output volatility have a negative relationship indicating that the larger-government economies, the milder the economic fluctuations (Debrun *et al.*, 2008).

Alesina *et al.* (2008) recognize that revenues and surpluses are insignificant public-sector variables. Using government expenditures only, they show that the counter-cyclical fiscal policy is conducted by developed countries whereas pro-cyclical fiscal policy is engaged in less developed countries. More recent studies suggest that the stabilizing effect of government size may have significantly declined since the 1980s (Mohanty and Zampolli, 2009). The latter evidence is consistent with the decline of fiscal multipliers observed by Perotti (2005).

However, the relationship between government size and volatility is still questionable (Eller *et al.*, 2013). Karras and Song (1996) argue that the correlation changes considerably over time. Second, the relationship between government size and volatility works in the manner of nonlinearities. According to Crespo Cuaresma *et al.* (2011), the business cycle smoothing effect vanishes for countries with large governments meanwhile output volatility may actually increase. Third, as observed by Debrun and Kapoor (2010), the stabilizing effect tends to hold in advanced OECD countries rather than in developing countries.

In a dynamic framework, these stabilizing effects can vanish as long as the assumptions of Ricardian equivalence are satisfied. Hence, the second channel is that governments can deliberately change public spending and tax instruments to offset business cycle fluctuations. In such circumstances, the change in public spending (labeled *a discretionary and systematic* fiscal policy) should be counter-cyclical as responses of the government to the state of the economy in nature.

However, some obstacles (politicians' short-sightedness, common pool, and free rider problems) create a bias towards fiscal deficits, leading to public expenditure distortions and pro-cyclicality (pressures to overspend, in particular in good times). Real Business Cycles (RBC) and Keynesian economists believe that fiscal policy can cause fluctuation in business cycles, with the exception that RBCs' believed in government spending as a factor of volatility while Keynesians consider both government spending and tax revenues.

Fatás and Mihov (2003) use the government size over GDP as a proxy of the measure of the automatic stabilizers where the government size is measured as the level of government spending. Further, they try to identify alternative measures of the automatic stabilizers by decomposing the government expenditures and revenues to their primary components respectively. Their results show that only the measure of indirect taxes lacks the standard attributes of the automatic stabilizers.

The element of systematic discretionary responses to cyclical fluctuations is modeled by fiscal rules by Galí and Perotti (2003). They estimate separately for government revenue and expenditure for Euro area countries and find that, while government revenue is a-cyclical, the reaction of government expenditure to the output gap is significantly pro-cyclical in the period preceding the Maastricht Treaty. Moreover, the estimation for government investment provides evidence of a significant and strong pro-cyclical response to the output gap.

Fatás and Mihov (2006) continue the work on identifying a good measure of discretionary fiscal policy. They firstly estimate a measure of discretionary fiscal policy starting from a government expenditure series in order to exclude endogenous fiscal reactions to economic conditions, and then investigate its effects on output volatility. Their conclusions suggest that the aggressive use of fiscal policy induces macroeconomic instability and that discretionary changes in fiscal policy tend to amplify output volatility.

The third channel is *a discretionary and non-systematic component*, that is, budget decisions not related to economic fluctuations. The non-systematic discretionary changes are "fiscal shocks"; changes in the fiscal stance that are exogenous to the economy and to built-in characteristics of the tax and spending process. In this regard, the structure of the tax and transfer system can be designed to maximize economic efficiency and market flexibility, thereby enhancing the resilience of the economy in the face of shocks.

This framework requires first and foremost the creation of adequate "fiscal space" to prevent the emergence of such financing constraints in bad times, or to prevent the rapid changes in investor sentiment and ease the vulnerability to financial crises, especially given the small size of automatic stabilizers. Numerical fiscal rules have emerged as the response to create the "fiscal space" and to provide a credible medium-term anchor for public finances.

Dealing with fiscal rules as a stabilizing tool, Afonso and Jalles (2013) study the relevance of fiscal rules for growth in an EU panel. Their results show that fiscal rules foster growth, while stricter fiscal rules mitigate the adverse impact on growth from big governments. Moreover, more recent EU member states have gained from the implementation of fiscal rules. Recently, Sacchi and Salotti (2014) find that the aggressive use of discretionary fiscal policy leads to higher volatility of output. However, when strict fiscal rules are introduced, discretionary policy becomes output-stabilizing rather than destabilizing.

Beyond the three types of fiscal policy, the literature identifies other factors that have an impact on output volatility. The relationship between trade openness and overall volatility is found to be positive (Giovanni and Levchenko, 2009); political instability tends to increase volatility (Dutt and Mitra, 2008); geography and institutions also play a role, as

remote countries are more likely to experience greater volatility in output growth (Malik and Temple, 2009). Finally, Fountas and Karanasos (2007) find mixed evidence regarding the relationship between inflation and volatility of the output growth.

In the case of Indonesia, a specific study dealing with fiscal policy is limited. In general, the previous studies relate to the impact of fiscal policy. Basri and Rahardja (2011) find that unanticipated shocks in central government spending had a little negative effect on real GDP. In the same spirit, regarding to the cyclicality of fiscal policy, Akitoby *et al.* (2006) and Baldacci (2009) do not find any counter-cyclicality in fiscal policy. However, Abdurohman (2013) shows that fiscal policy tends to be pro-cyclical.

Surjaningsih *et al.* (2012) conclude that the discretionary fiscal policy was not present during 1990-2009. More recently, Kuncoro (2014) observes that the credible fiscal policy has a strong impact on government expenditure volatility. He concludes that in the case of Indonesia, where government dominates the economy, the government expenditure volatility eventually affects the volatility of economic growth. Therefore, Doraisami (2013) suggests that Indonesia needs to be cognizant of specific structural and institutional features when employing fiscal policy as an economic stabilization tool.

3. RESEARCH METHOD

Based on the brief survey above, two important notes emerge: (1) most studies neglect credibility aspects to assess the effectiveness of fiscal rules policy on the economic stabilization; and (2) particularly in Indonesia, there is no study finding the presence of counter-cyclicality of fiscal policy. The later suggests that pro-cyclicality is dominant and potentially reflects the lack of fiscal discipline (Woo, 2006). This brings us back to the issue of the credibility of fiscal rules policy.

Furthermore, the movements in economic growth are determined not only by fiscal but also non-fiscal factors. The possibility of isolating fiscal from non-fiscal influences on output growth and hence its volatility and the identification of the nature of fiscal impacts can be of great importance for the conduct of fiscal policy. For this reason, we focus on the private output growth. By definition, private output is GDP minus government spending (*G*). The private output growth (*POG*) is the relative change in private GDP:

$$POG = \text{Log (GDP-G)}_t - \text{Log (GDP-G)}_{t-1} \quad (1)$$

The volatility of private output growth is then measured by the standard deviation (*SD*) of the relative change in private GDP for 4 consecutive quarters:

$$SD_{YP} = SD\ (POG) \quad (2)$$

Based on (1) and (2), hence, the volatility of private output growth will be dependent on the level of private GDP (*GDPP*) in the previous period (in logarithm).

Growth cycles may be represented as the response of the economy to a series of random shocks. Most instability originates on the demand side of the economy, which fiscal policy both influences and reacts to. Some works (Fatás and Mihov (2003) and Mohanty and Zampolli (2009), among others) suggest that government size can be used as a proxy for fiscal stabilization policy. We follow their approach by dividing government consumption to GDP as a measure of stabilizing function of fiscal policy:

$$GS = (G / GDP) \tag{3}$$

According to Giovanni and Levchenko (2009), the relationship between trade openness and overall volatility exists and consequently it should be taken into account to predict the volatility of the private output growth. Trade openness of a country is simply presented by the size of goods exported (*EX*) and imported (*IM*) divided by GDP:

$$Open = [(EX + IM) / GDP] \tag{4}$$

We measure the credibility of fiscal rules policy as the difference between the actual budget balance and the planned budget balance as suggested by Naert (2011). We assume that budgetary projections have to be regarded as the announcements of a political target. Analogously to Annett (2006) and Pina and Venes (2011) the credibility of fiscal policy (E_t) is measured as the difference between its actual budget balance in year *t* (A_t), and its most recent target for the budget balance for year *t* in *t-1* (P_t), or thus:

$$E_t = A_t - P_t \tag{5}$$

The positive values of E_t mean a better-than-projected policy execution, yielding a higher surplus or a lower deficit. The negative values indicate that governments achieved results that were worse than projected or that forecasts were optimistic, that is, underestimations of the deficit or overestimations of the surplus.

In the similar way, we might construct the credibility of fiscal policy index (*CI*) as follows:

$$CI_t = A_t \div P_t \tag{6}$$

Based on this formula, the accuracy of fiscal policy is indicated by a score of 1. If the budget realization were less than what has been targeted before, the credibility index would be indicated less than 1. Meanwhile, if the budget realization exceeds the projected figures, the index will be greater than 1.

We use both measures in the context of the credibility of deficit and debt rule policy. Furthermore, budget deficit is the difference between government revenue (*REV*) and government expenditure (*EXP*). This will be applied for the actual (subscript *A*) and the planned (subscript *P*) budgets:

$$DEF_A = REV_A - EXP_A \tag{7}$$

$$DEF_P = REV_P - EXP_P \tag{8}$$

Regarding equation (5), the deficit rule policy is said to be credible if there is a little difference between actual and projected fiscal measures (Naert, 2011). Hence, the ratio of the actual deficit to the planned deficit represents the credibility of deficit rule policy. Combining (6), (7), and (8), we use the ratio between the actual deficit and the planned deficit:

$$Z_1 = DEF_A \div DEF_P \tag{9}$$

The similar idea is applied for debt because debt is a legacy of past deficits. Unfortunately, neither flow nor stock of the planned debt series data is unavailable in Indonesia. Therefore, it is necessary to estimate the projected debt value. In this paper, we use the cyclical component of the debt variable using Hodrick-Prescott (HP) filter procedure to identify the credibility of debt rule policy:

$$Z_2 = (\text{Log DEBT}_t)_A \div (\text{Log DEBT}_t)_{HP} \tag{10}$$

Regarding the discretionary government expenditure, the most important fiscal policy lever in the hands of the Indonesian government is government consumption. It would be worthwhile to see how change in government consumption impacts the volatility the private output growth. We estimate the actual government expenditure (*G*) using the key macroeconomic variable (*Y*).

Following methodology used by Akitoby *et al.* (2006), we suppose there is a steady-state (or long-run path) relationship between actual budget and the key macroeconomic variable given by:

$$G_t = C\, Y_t^{\delta} \tag{11}$$

Equation (11) can also be written in the logarithmic linear form:

$$\text{Log } G_t = \text{Log } C + \delta \text{ Log } Y_t + \varepsilon_t \tag{12}$$

Transforming into the first-difference, (12) becomes:

$$\Delta \text{ Log } G_t = \delta\, \Delta \text{ Log } Y_t + \mu_t; \qquad \mu_t = \varepsilon_t - \varepsilon_{t-1} \tag{13}$$

where C and δ are parameter to be estimated. μ_t is independent and identically distributed disturbance terms with mean 0 and variance σ^2.

According to Fatás and Mihov (2003; 2006), the term of μ_t in equation (13) above is a quantitative estimate of unsystematic discretionary fiscal policy shock in government spending.

$$Z_3 = \mu_t \tag{14}$$

We extract both unsystematic and systematic (Δ *Log* G_t) components of government expenditure as measure to identify the power of discretionary fiscal policy.

Eventually, we can construct the complete model of volatility of the private output growth that is a function of lagged GDPP ($GDPP_{t-1}$), government size (*GS*), trade openness (*OPEN*), credibility of deficit rule policy (Z_1), credibility of debt rule policy (Z_2), unsystematic discretionary fiscal policy (Z_3), and systematic discretionary fiscal policy ($\Delta Log\ G_t$):

$$\begin{aligned} SD_{YP} = a + b_1 \text{ Log GDPP}_{t-1} + b_2 \text{ GS}_t + b_3 \text{ OPEN}_t + b_4 Z_1 + b_5 Z_2 + b_6 Z_3 + \\ b_7 \Delta \text{ Log } G_t + b_8 \text{ DFR} + e \end{aligned} \tag{15}$$

A dummy variable to accommodate the change in fiscal rules (*DFR*) since 2004 is also included in the model.

We expect that b_4 and b_5 is negative, i.e., the credibility of fiscal rules policy tends to reduce the volatility the private output growth. Furthermore, as noted in the previous section, fiscal policy itself might be a source of business cycle fluctuations. It means that there is a causality problem. Therefore, we test first the causality problem between fiscal policy measures and GDP growth using Granger method to avoid simultaneous bias.

The model (15) will be estimated with quarterly data for the period 2001(1)–2013(4). The total sample comprised 52 observations. Since we have to calculate the moving average for 4 consecutive quarters and the lagged variable in the model, the estimable sample would reduce. The reduced sample would be only 48 points. The data for this study have already been available on a quarterly basis except for the overall balance data. The overall balance data is interpolated linearly from annual basis in order to fit the other data in the model. Then we compare the planned budget to its realization. In general, the data are obtained mainly from IMF, World Bank, Central Bank of Indonesia, Ministry of Finance (i.e., Debt Management Office), and Central Board of Statistics.

Variables that will be used are specified as follows. Regarding government consumption, export, and import we analyze quarterly data derived from the national income standard account based on expenditure approach. Total debt is the central government total (foreign and domestic) debt only (excluding Central Bank of Indonesia, state-owned enterprises, local government-owned enterprises, and local government debts). The foreign debt is denominated in US dollar and then transformed into Rupiah using mid-point official exchange rate published by central bank. The GDP deflator at constant prices in 2000 is used to convert all variables into the real values.

4. RESULTS AND DISCUSSION

Table no. 1 presents descriptive statistics covering mean, median, and extreme (maximum and minimum) values for selected variables of interest. Each median value is close enough to the respective mean, except for the unsystematic discretionary fiscal policy and the government expenditure growth. The wide range (maximum and minimum distance) is consistent with the value of standard deviation. The credibility of deficit rule (Z_1), unsystematic discretionary fiscal policy (Z_3), and the growth of government expenditure (Δ *Log G*) have the higher variability compared to the other variables.

The closeness of median to its mean values preliminary indicates that the corresponding variables of interest are normally distributed. The normal distribution of the seven variables is confirmed by the moderate value of skewness. The unsystematic discretionary fiscal policy has the highest negative skewness suggesting that most of mass data lies in the left side. Furthermore, kurtosis measures the flatness of the distribution with an expected value of 3.0. The credibility of deficit rule (Z_1) has the greatest value of kurtosis; most of mass data lies nearby the mean value.

It is also important to note that the credibility index of deficit rule on the average is slightly higher than zero (0.0055) implying that the actual deficit ratio is greater than the projected one indicating upward deficit bias. It confirms the positive value of skewness. The positive skewness indicates that the series are skewed to the right; the lower tail of the distribution is thicker than the upper tail. Applying one-sample test proves that t-test is 3.37 higher than the corresponding critical value. It means that the mean value of Z_1 significantly

exceeds zero at 5% confidence level. Accordingly, the test overall implies that the deficit rule policy is not credible.

Conversely, the credibility of debt rule index on the average is close to unity (1.0016) indicating that the actual debt stock level almost equals the expected value. Again, one-sample test is conducted resulting t-test (0.31) is lower than the corresponding critical value at 5% confidence level (2.0117). It accepts the null hypothesis that the mean value statistically equals to unity. Given those result above, we can say that the debt rule policy is credible.

Table no. 1 – Descriptive statistics

	SDYP	Z_1	Z_2	Z_3	Δ LOG G	GS	OPEN
Mean	0.0932	0.0055	1.0016	-0.0014	0.0441	0.1920	0.5414
Median	0.0723	0.0043	0.9959	0.0603	0.1236	0.1841	0.5423
Max	0.1639	0.0410	1.0929	0.3099	0.3137	0.3888	0.6669
Min	0.0383	-0.0237	0.9402	-0.5730	-0.5469	0.0785	0.4375
Std. Dev.	0.0486	0.0103	0.0369	0.2346	0.2466	0.0829	0.0584
Skewness	0.4483	0.3955	0.5114	-1.0105	-0.9685	0.5568	0.0622
Kurtosis	1.4783	5.6620	2.3619	3.2668	2.8969	2.4146	2.2111
Obs	48	48	48	48	48	48	48

Figure no. 1 presents the volatility of private output growth, trade openness, and government size. After a deep drop (13%) in 1998 as consequence of Asian financial crisis, the Indonesian economic growth has slowly increased. As a result, the volatility of output growth was still high even though some economic stabilization package programs were launched. Since 2004, along with economic recovery process, the volatility of private output growth has been slightly increasing. The highest volatility of the private output growth took place in 2009 as a consequence of global financial crisis.

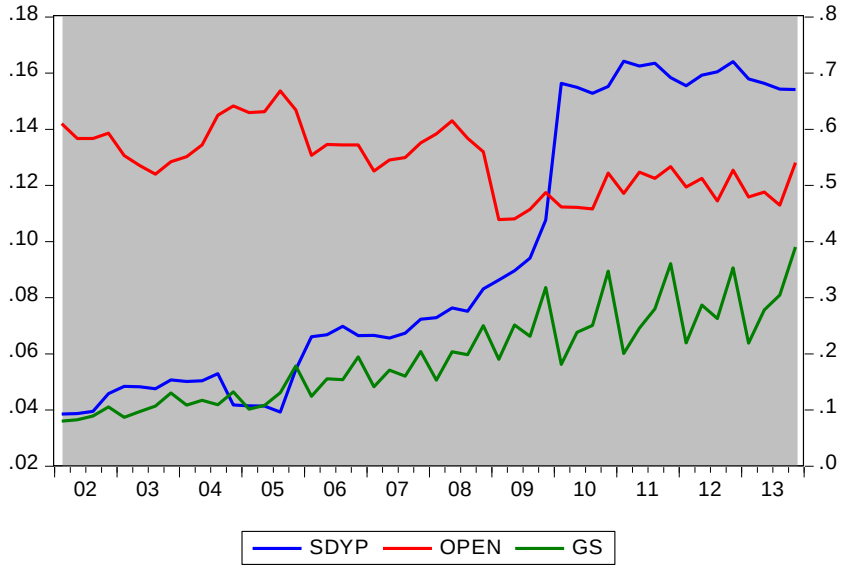

Figure no. 1 – Volatility of private output growth, trade openness, and government size

It is clear that the trade openness tends to decrease consistently. In contrast, the trend of government size, even though it has fluctuated during the recent years, is continually increasing. It seems that there is a synchronized pattern among the three variables. Therefore, we can expect that there is a negative relationship between trade openness and volatility of the private output growth. On the contrary, government size and volatility of the private output growth move in the same direction.

Figure no. 2 presents the indices of deficit rule and debt rule credibility. It seems that since the adoption of fiscal rules in 2004, both indices tended to be highly fluctuated. The high deficit ratio over the planned one in mid-2005 was associated with the spike in oil price. The high world oil price enforced the government of Indonesia to enlarge subsidy. After increasing the domestic oil prices in the subsequent months the volatility of fiscal policy remained stable in the next three years even though still high.

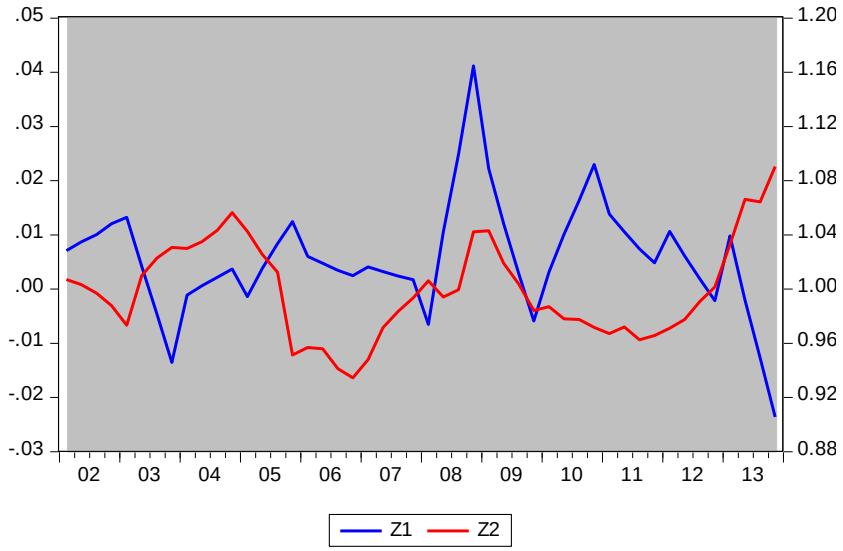

Figure no. 2 – Credibility of deficit rule and debt rule indices

The peak of deficit rule and debt rule deviation took place in late 2008 as a consequence of global financial crisis. In that period, the central government launched fiscal stimuli amounting 73.3 trillion Rupiah (or equivalent to 1.7% of GDP) allocated mostly to the social welfare. After that, the indices of deficit rule and debt rule credibility move in the opposite direction. It is also notable that overall the volatility of the private output growth, deficit rule, and debt rule deviations increase remarkably during observation periods.

By evaluating briefly Figure no. 1 and Figure no. 2, two preliminary hypotheses are raised (a) the government size seems to induce the volatility of the output growth and (b) the adoption of fiscal rules fails to reduce the volatility of the output growth. In such a case, discretionary fiscal policy, trade openness, and level of private GDP play an important role and potentially can explain systematically the volatility of private output growth. This will be investigated again with the help of econometric tools.

So far, we have focused on correlations and not causality. Correlation does not mean causality. Therefore, Granger causality test highlights the presence of at least unidirectional

causality linkages as an indication of some degree of integrations. Unidirectional causality informs about leader-follower relationships in terms of adjustments. An optimal lag order of 3 was selected for the VAR models by minimizing the LR, SC, FPE, AIC, and HQ criteria respectively, where a maximum of 6 lags is considered.

On the basis of Granger causality test results presented in Table no. 2, short-run bi-directional causality from government size to private sector economic growth is not detected. In addition, the presence of a similar relation in the opposite direction is denied. Given the independent causal relationship between the two variables, these results suggest that government expenditure to GDP ratio factor is not growing in significance in the private output growth, and vice versa.

The same test applied for the growth of government spending presents short-run unidirectional causality running from government expenditure growth to economic growth. The conventional F statistical test is 2.82, lower than the corresponding critical value at 5% confidence level. Given these results, we infer that there is no simultaneous bias in our model. The variability of economic growth and hence the volatility of the output growth, does not cause the variability of fiscal policy.

Table no. 2 – Pair-wise Granger causality tests

Null Hypothesis	Obs	F-Stat	Prob.
Δ LOG GDPP does not Granger Cause Δ (GS)	48	1.7242	0.1770
Δ (GS) does not Granger Cause Δ LOG GDPP		1.3411	0.2743
Δ LOG GDP does not Granger Cause Δ LOG G	48	2.8225	0.0506
Δ LOG G does not Granger Cause Δ LOG GDP		4.0066	0.0137

In the proceeding section, we focus on the time series properties of each series. Many studies point out that using non-stationary macroeconomic variable in time series analysis causes superiority problems. It is well known in the literature that applying regression on a set of non-stationary series is likely to produce a spurious estimation. Thus, a unit roots test should precede any empirical study employing such variables. The conventional DF and ADF unit roots tests present that all series data do not have the same degree of stationarity.

Table no. 3 – Co-integration test

Hypothesized No. of CE(s)	Eigen-value	Trace Statistic	0.05 Critical Value	Prob.**
Unrestricted Co-integration Rank Test (Trace): SDYP Z_1 Z_2 Z_3 Δ LOG G GS OPEN LOG GDPP(-1)				
None *	0.9930	406.6490	159.5297	0.0000
At most 1 *	0.7851	178.1742	125.6154	0.0000
At most 2 *	0.7225	107.4535	95.7537	0.0062
At most 3	0.4255	48.4868	69.8189	0.7020
At most 4	0.2438	22.9884	47.8561	0.9612
At most 5	0.1408	10.1325	29.7971	0.9783
At most 6	0.0649	3.1531	15.4947	0.9596
At most 7	0.0015	0.0676	3.8415	0.7949

* denotes rejection of the hypothesis at the 0.05 level
** MacKinnon *et al.* (1999) *p*-values

Dealing with the different level of stationary data, we conduct a co-integration test. Using Johansen's maximum likelihood approach, we test the bi-variate among the eight variables with 1 lag in all cases with intercept and no deterministic trend. The trace statistics together with maximum eigen-value (λ *max*) for testing the rank of co-integration are shown in Table no. 3. The test performs the presence of the co-integrating equations (at most 2) between the non stationary (or stationary at the different levels) series which means that the linear combinations of them are stationary and, consequently, those series tend to move towards the equilibrium relationship in the long-run.

After ensuring that most of the variables of interest are co-integrated, we move to analyzing the magnitude of influence for each independent variable. Table no. 4 reports the OLS estimation results of three regression models as specified in the previous section. Most of the hypothesized variables are found to be statistically significant at 5 or at least 10%. In some cases, the significance lies even at 1% confidence level. They are confirmed by the high coefficient of determination (R^2) and F statistic values.

Table no. 4 – Regression results of the volatility of private output growth

Dependent Variable: SDYP	**(1)**		**(2)**		**(3)**	
	Coeff.	**Prob.**	**Coeff.**	**Prob.**	**Coeff.**	**Prob.**
C	-2.0384	0.0091	-3.1048	0.0001	-3.2385	0.0002
Z_1	-	-	0.0571	0.8217	0.0233	0.9324
Z_2	-	-	-0.1624	0.0280	-0.1722	0.0321
Z_3	0.0342	0.4541	-	-	-0.0735	0.0000
Δ LOG G	-0.0978	0.0329	-0.0829	0.0000	-	-
GS	0.2843	0.0034	0.2420	0.0019	0.1580	0.0538
OPEN	-0.1550	0.0181	-0.1037	0.0887	-0.1663	0.0088
LOG $GDPP_{(-1)}$	0.1677	0.0068	0.2628	0.0000	0.2771	0.0001
DFR	-	-	-0.0228	0.0172	-0.0166	0.0928
R^2		0.8736		0.8995		0.8816
R^2-adj		0.8586		0.8819		0.8608
SEE		0.0183		0.0167		0.0181
F		58.0713		51.1377		42.5370

The volatility of output growth is generally in line with the existing literature. The results show that in the three specified models the lagged GDPP level (in logarithmic form) significantly induces the volatility of output growth. It suggests that the higher GDPP level, the higher volatility of GDPP growth, implying that the stable economic growth can be achieved in the long-run when the GDPP has already been steady-state. This finding also might explain why developing countries are generally characterized by a relatively large volatility of output growth in comparison to industrial economies (Lane, 2003).

The estimated coefficient of the government size as automatic stabilizer fiscal policy is statistically significant in all of the model specifications. It suggests that the GDP growth movement is positively related to the degree of government size as found in the causal analysis. The higher the government size, the higher the fluctuation of output growth which is consistent with Real Business Cycles and Keynesian economists.

In contrast, trade openness significantly dampens the fluctuation of GDP growth. A one percent increase in export and import over the GDP tends to reduce standard deviation of economic growth for about 0.1 point on the average. It seems that international goods and

services market can function as shock absorber. This result is in line with Fatás and Mihov (2001) but denies Giovanni and Levchenko (2009) proposing that the relationship between trade openness and overall volatility is found to be positive.

As shown by model (1), the unsystematic discretionary component of fiscal policy (Z_3) fails systematically to explain the volatility of output growth. Meanwhile, the systematic discretionary fiscal policy (Δ *Log G*) could reduce the volatility of the output growth. The previous variable theoretically might induce output growth and hence the volatility of the output growth since the unanticipated fiscal policy commonly generates shocks for economic agents. It seems that in the case of Indonesia, economic agents are more responsive to the systematic discretionary fiscal policy than the unsystematic one.

Unfortunately, the credibility of deficit and debt rules policy in models (2) and (3) give a different result. On the one hand, the coefficient of credibility of deficit rule policy is not significant suggesting that the corresponding variable does not have any impact on the GDP growth variability. The deviations of the deficit from the target should theoretically be associated with higher costs in terms of public disapproval or the loss of credibility which translates then into larger premium on government securities in financial markets. This finding theoretically supports to the Ricardian paradigm regarding the deficit neutrality hypothesis.

In goods and services market, the insignificant impact of deficit rule policy credibility may be attributed to the fact that upward deficit bias is highly driven by the large amount of oil subsidy. The unpredictability of world oil prices movement and subsidy generate uncertainty in domestic market. Some government efforts to create fiscal space in the form of oil subsidy reduction have triggered mixed responses from the public, particularly households and business units. As a result, the budget deficit decreases after the government reduced subsidy through increasing the domestic oil prices (Basri and Rahardja, 2011). Unfortunately, the fiscal space is insufficient to build public trust towards budget sustainability.

On the other hand, the credibility of debt rules policy significantly declines the output volatility. The narrow gap between the actual debt level and its target does not generate the substantial shocks for economic agents. Then, economic agents will not take into account the current state to make some adjustments in the long-run. In other words, uncertainty in the future when the debt must be repaid is not transformed into higher risk in the income level. Eventually, the behavior of economic growth tends to be unchanged in the long-run leading to the lower volatility or even decrease as indicated by dummy variable DFR.

Furthermore, when we remove the unsystematic discretionary component of fiscal policy as shown in model (2), the result does not change. The corresponding coefficient remains negative and highly significant. However, keeping the unsystematic discretionary component of fiscal policy as in model (3), the corresponding variable will reduce the volatility of the output growth. Empirically, this yield challenges to the finding of Fatás and Mihov (2006) and Badinger (2009) pointing out that the aggressive use of discretionary fiscal policy induces macroeconomic instability. The pro-cyclical and the absence of discretionary fiscal policy as found by Abdurohman (2013) and Surjaningsih *et al.* (2012) respectively could be a source of explanation.

This finding is in line with the study of Sacchi and Salotti (2014). They find that when strict fiscal rules are introduced, discretionary policy becomes output-stabilizing. In our result, in the presence of strict fiscal rules, either the systematic or unsystematic discretionary fiscal policy becomes output-stabilizing. However, there is an important difference. While they use rules' indices taking values between zero and five (higher values stand for stricter rules), we measure fiscal rules as deviation of budget realization from the

projected one. In our approach, the stricter rules as meant by Sacchi and Salotti (2014) are represented by zero for credibility of deficit rule and unity for credibility of debt rule policy respectively.

5. CONCLUSION

The instability of economic growth is an undesirable feature of fiscal policy. The smooth time profile of output growth justifies the quest for institutional solutions conducive of steady fiscal policy stance. The rules-based, discretionary, and automatic stabilizer fiscal policies are among the most widespread legislative measures implemented to that end. The aim of this paper was to comprehensively provide direct empirical evidence on the relationship between the three types of fiscal policy and the output growth movement in the case of Indonesia over the period 2001–2013.

Unlike the previous studies, this paper explicitly considers the credibility of fiscal rules. Using OLS method in a sample of quarterly data, we obtain that the credible debt rule leads to decrease the volatility of output growth while the unbelievable deficit rule does not have any effect. With regard to discretionary fiscal policy, both unsystematic and systematic components have a stabilizing function. This paper checks for the robustness of the results by introducing a list of controls, i.e., lagged output level, trade openness, and a dummy variable to accommodate the change in fiscal rules. The main result presents that the automatic stabilization tends to induce the volatility of the output growth.

Given the results of the impact of government size and credibility of deficit rule, we can infer that the stance of fiscal policy in Indonesia puts too much emphasis on the allocation and distribution functions thus leading to benign neglect of stabilizing function. Furthermore, government spending is not a good automatic stabilizer in Indonesia. The lower ratio of government expenditure to GDP along with improving credibility of deficit rule policy has a smoother effect on the economy. Therefore, reducing the budget deficits in order to make up the credibility of fiscal policy – which is obtained by decreasing government expenditures – will dampen the business cycle fluctuations. Accordingly, they implicitly support to implement fiscal adjustment. Smoothing government expenditures rather than stabilizing government revenue is feasible to reach fiscal sustainability in the short-run and stable economic growth in the long-run.

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