FISCAL POLICY AND STOCK MARKET RETURNS VOLATILITY
The Case of Indonesia

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Abstract: This paper separately studies the impact of different kind of fiscal policy on the stock return stabilization in the case of Indonesia. Using quarterly data over the period 2001-2013, we obtained that the discretionary and automatic stabilization fiscal policy tend to induce the stock returns volatility. While the credible debt rule policy leads to decrease the volatility of stock returns, the deficit rule policy is found to be incredible and does not have any effect. Accordingly, the lower ratio of government expenditure to GDP along with improving commitment tightly to the planned deficit ratio is a good signal for stabilizing financial market.

Keywords: Automatic Stabilizer, Discretionary Fiscal Policy, Deficit Rule, Debt Rule, Stock Returns Volatility.

1 Introduction
The impact of macroeconomic policy on the stock market performance has been in centre of debates over the last three decades. On one hand, the role of monetary policy in explaining stock returns has been extensively investigated (Jensen et al., 1996; Patelis, 1997; Thorbecke, 1997; Bernanke and Kuttner, 2005). In general, most recent studies have successfully confirmed the impact of monetary policy on the US asset markets. On the other hand, little attention has been devoted to exploring the informational role of fiscal policy on the stock market (Darrat, 1988; 1990).

In addition, most papers analyzing their determinants do not focus on the specific characteristics of fiscal policy measures. More specifically, most empirical studies rely on the discretionary fiscal policy, mainly government revenue and government spending shocks, to affect the stock market returns (Afonso and Sousa, 2011; Laopodis, 2009; and Arin et al., 2009) particularly in developed countries. In contrast, there is no paper assess the effects of rules-based fiscal policy on the stock market returns primarily in developing countries.

The macroeconomic effects of fiscal rules, including the implications on stock market performance, remain poorly understood (Leeper, 2010). As a result, there is still no consensus on the size or even the sign of the effects of fiscal rules policy on the stock market returns movement. Basically, fiscal rules are as formalized numerical restrictions on the relevant aggregate fiscal variables, such as revenue, expenditure, deficit, and/or debt. All these rules share at least one feature in common: they seek to confer credibility to the conduct of macroeconomic policies by removing discretionary intervention (Kopits, 2001).

The world economic recovery and tapering fiscal policy pioneered by US recently, the possibility of conducting fiscal austerity policy in the corridor of fiscal rules remains open. BIS (2009) and IMF (2010) note that asset prices have started to improve leading to improvement in public finances through the revenue channel. However, given that uncertainty remains high and the recovery might be more gradual than expected, this could have significant effects, in terms of
volatility, on asset markets and asset prices, which have negative implications on economic activity, fiscal balances, and the fiscal consolidation effort.

The sharp instability in the stock market returns raises the question as to the nature of the relationship between the stock market returns volatility and the implementation of fiscal rules policy. Our question in mind is whether the credibility of fiscal rules policy can also contribute to mitigate the stock market returns fluctuations in developing countries. Accordingly, it seems that further empirical work is desirable in order to make progress in understanding the relationship between fiscal rules and the stock market returns.

Indonesia provides a unique opportunity to examine the relationship between fiscal rules and the stock market returns. Following Asian financial crisis in 1997/98, the external debt increased significantly from more than US$ 136 billion in 1997 to more than US$ 151 billion in 1998, mainly due to the depreciation of Rupiah (see: Kuncoro, 2011). After the bad experiences, the government and parliament made a political decision that the most deficits should be financed by the domestic financial resources. As a result, the domestic debt stock has been ten times only during one decade.

The sharp increase in fiscal deficits and public debt in that period has raised concerns about the sustainability of public finances and highlighted the need for a significant adjustment over the medium term. According to the Law No. 17/2003, since 2004 Indonesia has been implementing a fiscal rule based on maximum deficits and debt ratios adopted from Maastricht Treaty. Accordingly, she shifted her budget deficit financing strategy from the multilateral and bilateral foreign debt to the market financing debt in 2005 by issuing bond both in the domestic and global markets.

Stock returns in emerging market have been characterized as having higher volatility than those in developed markets (Aburri, 2008). Indonesia’s Stock Exchange (IDX) is a typically immature and emerging capital markets. There exist many disparities between IDX and mature capital markets of developed countries and regions with respect to their backgrounds of establishment, modes of operation, and developing processes etc. The respective regulatory roles and effectiveness of national macroeconomic policies on the two types of markets are also very different.

Without necessarily mentioning the recurring phenomena of large fluctuations seriously deviating from Indonesia’s economic development, IDX also reacts oppositely from expectations of macroeconomic regulatory policy makers. Therefore, systematically and deeply researching effects of changes in macroeconomic policies on IDX has very important theoretical and practical implications for improving the government’s regulation and supervision effectiveness on the stock market. Surprisingly, the rule has not been tested, as Indonesia’s fiscal performance has been significantly better than the limits contained in the fiscal rule (Blöndal et al., 2009).

Knowing asset prices fluctuation is crucial for several reasons (Tagkalagis, 2012). First, asset price developments could convey information on current and future prospects of economic developments, on top of the information provided by other economic activity indicators. This means that the policy maker should pay proper attention to asset price movements. Second, abrupt asset price changes and increased asset price volatility could be signalling the realization of adverse tail probability events, such as the recent economic and financial crisis. This requires increased awareness and vigilance on the side of policy maker and to the extent possible early policy action, to avert the risk of a full blown financial crisis. Third, fiscal policy actions to stabilize financial markets increase fiscal policy volatility. At the same time they generate a
feedback effect on asset price volatility, which further impacts on the volatility of fiscal policy outcomes.

This paper will analyze the dynamic relationship between stock prices index and various types of fiscal policy primarily fiscal rules policy credibility. Additionally, this study attempts to evaluate in terms of sensitivity of IDX towards the implementation of fiscal rules policy since 2004. 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

From a broader theoretical perspective, the economic impacts of fiscal policy depend on whether one takes a Classical, Ricardian, or Keynesian view of the economy. The Classical economists focus on the crowding out effects of fiscal policy in the market for loanable funds and of the productive sectors of the economy. They emphasize that the fiscal policy effects will be less important in an economy which operates close to its potential output. Hence, fiscal policy could potentially drive stock prices lower through the crowding out of private sector activity.

Ricardian view stipulates that fiscal policy can have no impact on the aggregate demand. The excessive government expenditure financed by public borrowing will be neutral as any public borrowing will be offset by the private savings of rational households. Therefore, from a Ricardian perspective (Barro, 1974; 1979) fiscal policy is impotent and as such will have no effect on the whole economy. In short, Ricardian paradigm argued that the budget deficits (in a broader sense fiscal policy) will be inconsequential to the market stock prices consistent with stock market efficiency hypothesis.

Keynesian and Real Business Cycles (RBC) economists believe that fiscal policy can effectively influence the whole economy. While RBC believes that government spending is as the main factor, Keynesians consider both government spending and tax revenues. Keynesian theory sets out the prescription as to the appropriate role of fiscal policy through three main channels. The first one is the automatic reduction in government saving during downturns and increase during upturns. This proposition is characterized by a cyclical and non-discretionary.

Such automatic stabilization occurs because tax revenues tend to be proportional to national income. In general, public spending reflects government commitments independent of the business cycle and entitlement programs specifically designed to support spending during downturns. Since fiscal policy is a trade-off action between government revenue collections and government spending (Laopodis, 2009), one can argue that budget deficits (difference between government spending and revenue) is more appropriate to analyze the impact of fiscal policy.

In this regard, Darrat (1988) finds that the fiscal deficit exerts a highly significant adverse effect on the current stock prices. Darrat (1990) continues the work on identifying a good measure of such relationship. The later paper tests whether changes in Canadian stock returns are caused by a number of economic variables, including base money and fiscal deficits. The empirical results from monthly data show that lagged changes in fiscal deficits, in particular, Granger-cause stock returns. Similarly, Ewing (1998) shows that the past budget deficits contain information regarding future movements in the stock markets in Australia and France.

Adrangi and Allender (1998) verify that deficit reductions in the US have a reducing impact on equity returns. Their finding implies that as deficits fall, future tax burden, interest rates, and the dollar’s value fall, leading to an increase in corporate profits in the US because of strong domestic as well as export revenues. The stronger sales are likely to lead to higher net
earnings, thus, rising equity prices. It seems that non-discretionary fiscal policy in general tends to support to the Classical economic theory, i.e. unbenevolent impact on the stock market prices.

As advocated by Keynesian economists, a cyclically balanced budget is not necessarily balanced year-to-year, but is balanced over the economic cycle, running a surplus in boom years, and running a deficit in lean years, with these offsetting over time. In the dynamic framework, these stabilizing effects can vanish as long as the assumptions of Ricardian equivalence are satisfied. Therefore, the second one is that governments can deliberately change public spending and tax instruments to offset business cycle fluctuations (labelled a discretionary and systematic fiscal policy) as responses of the government to the state of the economy in nature.

This type of fiscal policy is modelled as fiscal reaction function by Fatás and Mihov (2006). In particular, similar to automatic stabilizers, a discretionary fiscal policy should also act in a counter-cyclical manner. The combination of discretionary and automatic stabilizers will depend on the extent and composition of the role of government in the economy. Tavares and Valkanov (2001) show that US fiscal policy affects asset price volatility in a VAR model. An increase in tax receipts reduces the expected stock returns significantly while government spending does not significantly affect the expected stock returns.

Arin et al. (2009) use automatic stabilizer of fiscal policy to test the effect of tax policy on market returns. The result finds that the tax policy has a significant effect on stock market returns. Afonso and Sousa (2011) obtain that government expenditure shocks boost the stock prices, while government revenue shocks have a small and reducing effect. Apart from government's reaction to asset prices, Afonso and Sousa (2012) show that unexpected changes in fiscal policy increase the variability in asset prices.

Da et al. (2012) examine whether government fiscal policies lower equity returns by smoothing consumption. Evidence indicates that consumption volatility and stock returns are lowered by counter-cyclical fiscal policies. Agnello and Sousa (2013) analyze the effect of fiscal policy in a panel VAR of ten industrialized countries. They show that a fiscal expansion declines the stock and house prices for the US. In short, most studies based on the systematic fiscal policy above in general is in line with Keynesian paradigm that is in one hand increases the stock prices and on the other hand induces its volatility.

While the systematic fiscal policy that is modelled as fiscal rules by Gali and Perotti (2003) contributes to the economic variability in many countries, interestingly little attention is given to explain the role of fiscal rules policy on stock prices. The role of fiscal policy to determine asset prices is emphasized by researchers (see for example: Canzoneri et al., 2011) mostly exploiting a discretionary and non-systematic component as the third channel. The non-systematic component is budget decisions not related to economic fluctuations; changes in the fiscal stance that are exogenous and to built-in characteristics of the tax and spending process.

The non-systematic component could lead to more uncertainty about economic activity which could cause the equity risk premium to increase (Darrat and Brocato, 1994). However, Friedman (1986) believes that the effect of fiscal policy on the expected returns of an asset depends on assets’ relative substitutability in investors’ aggregate portfolio, and the substitutability in turn depends on how investors perceive the risks associated with the respective asset returns. He shows that government’s deficit financing raises expected debt returns relative to expected equity returns, regardless of the maturity of the government’s financing.

Roley and Schall (1988) posits that the effect of federal budget deficits on the stock market depends on the condition of the economy. In particular, stimulative fiscal actions are most likely to raise output and corporate cash flows when the economy is in a recession. During
such periods, higher budget deficits are likely to boost stock prices. However, when the economy is near full employment, the positive output effects are likely to be negated by higher interest rates and inflation that cause a decline in stock prices.

Taylor (2009) provides an empirical investigation of the role of government actions and interventions in the financial crisis. Ardagna (2009) finds that fiscal adjustments based on expenditure reductions are related to an increase in stock market prices. Van Aarle et al. (2003) and Laopodis (2010) also provide evidence that fiscal policy matters for stock prices. It seems that the impact of discretionary and non-systematic component on stock market performance tends to be convergent (induces the volatility of stock price) suggesting the important role of fiscal rule policy to stabilize the stock market.

The research findings about the relationship between fiscal policy and stock market are based on the western social and economic and political context, and may not reflect the actual situation of emerging stock market. Chaudhuri and Koo (2001) investigate the volatility of stock returns in some Asian emerging markets. They find that both domestic macroeconomic variables and international variables are found to have explanatory power for stock return volatility. They also document that the role of government in term of fiscal policy in the smooth functioning of the stock market is crucial in this region.

A study conducted by Saleem et al. (2012) reveals that, in Pakistan, a long run positive causal relationship between budget deficit and stock prices exists. However, in India, because of high current expenditures, a long run negative relationship between budget deficit and stock prices is observed. Aye et al. (2012) study the effect of unexpected changes in fiscal policy on asset prices for South Africa. They show that fiscal policy announcements reduce the effects of fiscal policy shocks on asset prices in a sign restricted VAR. They also find that increasing taxes could limit the consolidation process, especially when it reduces asset prices.

Gupta et al. (2014) estimate a TVP-VAR for South Africa and show that a nonlinear relationship exists between fiscal policy and asset prices. They identify two significant regimes where this relationship changed. They also demonstrate that fiscal expansions reduced both asset and house prices from the 1970’s until the mid 1990’s. Since 2000, however, asset prices increased in response to fiscal expansions. For the socialist economy, Hsing (2013) finds that Poland’s stock market index is not affected by the ratio of government deficits or debt to GDP.

Refer to the case of Indonesia; the similar researches in Indonesia are rare. PPE UGM and BAF (2004) conclude that Indonesia’s foreign debt has been large because the borrowing costs are cheaper than the cost of domestic debt. Kuncoro (2011) concerns with the real rather than nominal cost of public debt services. Based on the quarterly data analysis, he concludes that the cost of domestic debt services is more expensive than that of foreign debt. However, the usage efficiency of domestic debt is higher than the latter.

Dealing with other domestic financial sources, Adiningsih (2009) analyzes whether the expansionary fiscal policy funded by issuing debt instruments in financial markets will increase short-term interest rates. Her empirical study shows that the crowding-out problem occurred in Indonesia implying that financing budget deficit in Indonesia by issuing debt instruments in the financial markets has a negative impact on the private sector. More recently, Laksmi et al. (2012) point out that the rising interest rate as impacts of government debt issuance is evident in Indonesia during period of 2000-9.

Based on the brief survey above, it is notable that (1) there is no study taking into account fiscal rules to assess the effectiveness of fiscal policy on the stock returns stabilization and (2)
most studies tend to neglect credibility aspects in their analysis. Those suggest the existence of fiscal policy cyclicality and potentially reflect the lack of fiscal discipline (Woo, 2006). They further bring us back to the issue of fiscal rules policy credibility.

The credibility of policy, indeed, is more popular in the context of monetary policy rather than fiscal policy. Baxter (1985) and Hauner et al. (2007) argue that credibility is the idea living in the minds of market agents about and react to how close the results of a policy will be to the announced policy. The fiscal rule policy is said to be credible if there is a little difference between actual and the announced fiscal measures (Naert, 2011). Accordingly, the fiscal policy credibility has been widely mentioned as one of the most important fundamentals of macroeconomic policy.

3 Research Method

The movements in stock market prices growth are determined not only by fiscal but also non-fiscal factors. The possibility of isolating fiscal from non-fiscal influences on stock market prices 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. By definition, stock return (R) is the relative change in the stock prices:

\[ R = \frac{SP_t - SP_{t-1}}{SP_{t-1}} \equiv \log SP_t - \log SP_{t-1} \]  

(1)

The volatility of stock return is then measured by the standard deviation (SD) of the relative change in stock return for 4 consecutive quarters:

\[ \text{VOL}_{SP} = SD(R) \]  

(2)

Based on (1) and (2), hence, the volatility of stock return will be dependent on the level of stock prices in the previous period. As shown by Blanchard (1981), the non-fiscal influences on the stock returns can well be captured by the stock prices information in the previous period.

The dynamic stock prices 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. Gali (1994) and Fatás and Mihov (2003; 2006) 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:

\[ GS = \frac{G}{GDP} \]  

(3)

We assume that budgetary projections have to be regarded as the announcements of a political target. The credibility of fiscal policy (C_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):

\[ C_t = A_t - P_t \]  

(4)

The positive values of \( C_t \) 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_t) as follows:

\[ CI_t = \frac{A_t}{P_t} \]  

(5)
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 more than 1.

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:
\[
\text{DEF}_A = \text{REV}_A - \text{EXP}_A \tag{6}
\]
\[
\text{DEF}_P = \text{REV}_P - \text{EXP}_P \tag{7}
\]

Refer to (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 deficit rule policy credibility. Combining (5), (6), and (7), we use the ratio between the actual deficit and the planned deficit:
\[
Z_1 = \frac{\text{DEF}_A}{\text{DEF}_P} \tag{8}
\]

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 auto-regression procedure as suggested by Aizenman and Marion (1993) to identify the credibility of debt rule policy:
\[
(\log \text{DEBT})_{AR} = \phi + \lambda \log \text{DEBT}_{t-1} \tag{9a}
\]
\[
Z_2 = (\log \text{DEBT})_A / (\log \text{DEBT})_{AR} \tag{9b}
\]

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 private output growth volatility. 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:
\[
G_t = C Y_t^\delta \tag{10}
\]

Equation (10) can also be written in the logarithmic linear form:
\[
\log G_t = \log C + \delta \log Y_t + \varepsilon_t \tag{11}
\]

Transforming into the first-difference, (11) becomes:
\[
\Delta \log G_t = \delta \Delta \log Y_t + \mu_t; \quad \mu_t = \varepsilon_t - \varepsilon_{t-1} \tag{12}
\]

where \(C\) and \(\delta\) are parameter to be estimated and \(\mu_t\) is independent and identically distributed disturbance terms with mean 0 and variance \(\sigma^2\).

According to Fatás and Mihov (2006), the term of \(\mu_t\) in equation (12) is a quantitative estimate of unsystematic discretionary fiscal policy shock in government spending. We extract both unsystematic \((\mu_t)\) and systematic \((\Delta \log G_t)\) components of government expenditure as measure to identify the power of discretionary fiscal policy.

Eventually, we might separately construct the stock market returns volatility model that is a function of types of fiscal policy \((FP)\), lagged \(\log SP\), and lagged \(VOLSP\):
\[
\text{VOLSP}_t = a + b_1 FP_t + c_1 \log \text{SP}_{t-1} + c_2 \text{VOLSP}_{t-1} + c_3 \text{DGFC} + e
\]
\[
\text{FP} \in \Delta \text{GS}; \Delta \log G_t; \mu_t; Z_1 \text{and } Z_2
\]

Dummy variable (DGFC) to accommodate the change in stock market in line with global financial crisis since 2007 is included in the model. The lagged dependent variable is also
incorporated into the equation model to capture the degree of persistency where $0 \leq c_2 \leq 1$ and $(I - c_2)$ is the coefficient of adjustment.

The model (13) will be estimated with quarterly data for the period 2001(1)–2013(4). The data have already been available on a quarterly basis except the overall balance. The 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 Central Bank of Indonesia (www.bi.go.id), Ministry of Finance (i.e. Debt Management Office), and Central Board of Statistics (www.bps.go.id).

The government consumption is derived from the national income standard account based on expenditure approach. Total debt is the central government (foreign and domestic) debt only. The foreign debt is denominated in US dollar and then transformed into Rupiah using midpoint official exchange rate published by the central bank. The IDX composite index is used to measure the behaviour of stock market. The data come from IDX database. The GDP deflator at constant prices in 2000 is used to convert all variables into the real values.

4 Results and Discussion
Elementary statistics covering mean, median, and extreme values for variables of interest is presented in Table 1. Each median value is close enough to the respective mean, except unsystematic discretionary fiscal policy ($\mu$). The wide range (maximum and minimum distance) is consistent with the value of standard deviation. The volatility of unsystematic discretionary fiscal policy and deficit rule credibility has higher variability indicated by relatively high standard deviation to mean ratio.

The closeness of median to its mean values preliminary indicates that the corresponding variables are normally distributed. The normal distribution of the seven variables is confirmed by the moderate value of skewness. The volatility of stock returns has the highest positive skewness suggesting that most of the mass data lies in the right side. Furthermore, kurtosis measures the flatness of the distribution with an expected value of 3.0. The volatility of stock returns, deficit rule credibility ($Z_t$), and systematic discretionary fiscal policy have the greatest value of kurtosis; most of the mass data tend to have a distinct peak near the mean and have heavy tails.

<<Table 1>>

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 confirming the positive value of skewness. Applying one-sample test proves that t-test is 3.71 higher than the corresponding critical value. It means that the mean value of $Z_t$ significantly exceeds from zero at 5 percent confidence level. Accordingly, the test implies that the deficit rule policy is not credible.

Conversely, the debt rule credibility index estimated by auto-regression procedure on the average is quite close to unity indicating that the actual debt stock level almost equals to the expected value. Again, one-sample test is conducted resulting t-test (-0.11) is lower than the corresponding critical value at 5 percent confidence level (2.0117). It accepts the null hypothesis that the mean value statistically equals to unity. Given the result above, we can say that the debt rule policy is credible.

<<Figure 1>>

Figure 1 visually offers the stock prices indices, volatility of stock market returns, and government size. After deeply drop in 1998 as consequence of Asian financial crisis, the stock market price indices in IDX gradually increased. As a result, the volatility of stock market
returns decreased along with the launch of some economic stabilization package programs. In accordance with economic recovery process, the stock price index had been slightly increasing. In addition, the volatility of stock market returns consistently declined.

The highest stock market returns volatility took place in 2009 as a consequence of global financial crisis. However, it is clear that the trend of government size, even though fluctuated especially in the recent years, is continually increasing. It seems that there is a synchronized pattern between government size and stock prices indices. Therefore, we can expect that there is a positive relationship between the two variables. Conversely, there is a negative relationship between government size and stock prices indices with the volatility of stock market returns.

Figure 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 surrounding months the volatility of fiscal policy remained stable in the next three years even though still high.

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 equivalently 1.7 percent 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 stock market returns volatility, deficit rule, and debt rule deviations increase remarkably during observation periods.

Our questions in mind are: what does really Figure 2 imply? Indeed, the correlation between the planned deficits and the actual ones is highly positive (0.61). Is a positive deviation equal to a negative one? Is a government that continuously performs better than targeted as incredible as a government that performs systematically worse? As far as the fiscal rule policy credibility is concerned, governments that do better than planned do not as a consequence suffer from a drop of credibility (Naert, 2011). In our view, we prefer to work with a full linear measure: the higher the figure the higher the credibility.

The brief visual inspection raises preliminary hypothesis that government size boosts the stock market returns volatility and the adoption of fiscal rules policy has not been successfully yet to reduce the stock market returns volatility. In such a case, systematic and unsystematic discretionary fiscal policy, and level of stock prices index play an important role and potentially can explain systematically the volatility of stock market returns. We shall check it again empirically later using sophisticated econometric tools.

It is widely known that fiscal policy itself might be a source of business cycle fluctuations and exacerbate macroeconomic volatility. It means that there is a causality problem. Therefore, Granger causality test highlights the presence of at least unidirectional causality linkages. A unidirectional causality informs about leader-follower relationships in terms of adjustments. An optimal lag order of 2 was selected for the VAR models by minimizing the LR, SC, FPE, AIC, and HQ criteria respectively, where a maximum of 4 lags is considered.

On the basis of Granger causality test results presented in Table 2, short-run bidirectional causality from the change in fiscal policy to stock market prices 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 the
change in government expenditure is not a growing factor in significance in the stock market prices growth, and vice versa.

<<Table 2>>

The same test applied for the growth of government spending presents short-run unidirectional causality running from government expenditure growth to stock market prices growth. The conventional F statistical test is 4.17, higher than the corresponding critical value at 5 percent confidence level. Given these results, we infer that there is no simultaneous bias in our model. The variability of stock market prices growth, and hence the stock market returns volatility, does not cause the growing factor of fiscal policy in the long-run.

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 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 stationary.

Dealing with the difference level of data stationary, we conduct co-integration test. Using Johansen’s maximum likelihood approach, we test the bi-variate among the seven variables with 1 lag in all cases with intercept and no deterministic trend. The trace statistics together with maximum eigen-value for testing the rank of co-integration are shown in Table 3. The test performs the presence of the co-integrating equations (at most 2) between the different levels of stationary 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.

<<Table 3>>

After ensuring that most of the variables of interest are co-integrated, we move on analyzing the magnitude of influence for each independent variable on the volatility of stock market returns behaviour as reported in Table 4. Model (A) deals with the change in automatic stabilization fiscal policy and model (B) incorporates systematic component of discretionary fiscal policy. The last two models take into account the unsystematic component of discretionary fiscal policy and fiscal rules credibility respectively.

The volatility of stock market returns is generally in line with the existing literature. The results show that the lagged stock prices level significantly reduces the volatility of stock market returns. It suggests that the higher stock prices index level would be followed by the higher volatility of stock market returns implying that the stable stock market performance can be achieved in the long-run when the stock prices index has already been advanced. This finding also might explain why stock returns in emerging market have been characterized as having higher volatility (Abuiri, 2008).

The estimated coefficient of the government size as automatic stabilizer fiscal policy is statistically significant in model A. It suggests that the stock market returns movement is positively related to the degree of government size as found in the causal analysis. The higher the government size, the higher stock market returns fluctuation. Theoretically, this result is consistent with Real Business Cycles and Keynesian economists. To the extent that fiscal policy has an impact on the state of the economy, it will also have an indirect effect on market returns.

The same result is found in the case of the systematic discretionary fiscal policy as model (B). The corresponding variable ($\Delta \log G$) significantly induces the fluctuation of stock market returns. A one percent increase in government expenditure tends to reduce standard deviation of stock market returns for about 0.02 point on the average. This result is not in line with Tavares
and Valkanov (2001) and Afonso and Sousa (2012). It seems that automatic stabilizer and systematic discretionary fiscal policy cannot be functioning as shock absorber.

When we remove the systematic discretionary fiscal policy into the unsystematic discretionary fiscal policy, the conclusion does not alter. As shown by model (C), the unsystematic discretionary component of fiscal policy ($\mu$) fails to lower the volatility of stock market returns as found by Van Aarle et al. (2003) and Laopodis (2010). While they provide evidence that fiscal policy matters for stock prices, Ardagna (2009) finds that fiscal adjustments based on expenditure reductions are related to an increase in stock market prices which challenges our result.

<<Table 4>>

Unfortunately, the deficit and debt rules policy credibility in model (D) give a different result. In one hand, the coefficient of deficit rule policy credibility is not significant suggesting that the corresponding variable does not have any impact on the stock market returns variability. Since the $t$-test proves that the deficit rule is incredible, the deviations of actual deficit from the target should not be associated with higher costs in terms of public disapproval which translates then into larger premium on government securities in financial markets.

On the other hand, the debt rules policy credibility significantly declines the stock market returns volatility. It implies that the gap between the actual debt level and its target does not generate the substantial shocks for investors. Then, the investors 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 behaviour of stock market returns tends to be unchanged in the long-run leading to the lower volatility.

Looking at the other variable control, dummy variable DGFC to accommodate global financial crisis in 2007 seems to be statistically positive and significant. It suggests that the volatility of stock market returns in the post-global financial crisis is higher. This result further implies that the implementation of fiscal rules policy since 2004 cannot stabilize yet the stock market. This is a plausible result since fiscal rules in Indonesia is in the early stages after switching from balanced budget policy fulfilled by exploiting excessive foreign debt to budget deficit satisfied by exploring domestic debt.

The estimation of the lagged dependent variable gives the high significant coefficients for all models specification. The associated coefficient displays the degree of persistence. The stock market volatility persistence can be considered as a measure of the degree of dependence of current stock market volatility behaviour on its own past developments. The coefficient of lagged dependent variable is 0.6 suggesting that a change in the interest rates between quarter $t-1$ and $t$ drives up the stock market volatility process in $t$ only 0.6 or equivalently 40 percent partial adjustments to respond to the desired/targeted stock market volatility. Consequently, the stock market volatility tends to be more persistent than to respond to the all types of fiscal policy measure. In short, the market efficiency hypothesis has not achieved in the country.

5 Conclusion
Stability of asset market is important. Stock price or return has become the main concern for all investors since the stock price determines their return or loss from their investments. The aim of this paper was to comprehensively provide direct empirical evidence on the relationship between the three types of fiscal policy (automatic stabilizing, systematic and unsystematic discretionary fiscal policy, and fiscal rules) and the stock market returns movement in the case of Indonesia.
The main contribution of this paper is concerned with the credibility of fiscal rules policy. Unlike the previous studies, this paper explicitly considers the deficit rule and debt rule in the forms of deviation of actual to the planned budgets. Using OLS method in a sample of quarterly data over the period 2001–13, we obtain that the unsystematic and systematic fiscal policy and automatic stabilizer tend to induce the stock market returns volatility. In contrast, the credible debt rule policy leads to decrease the volatility of stock market returns. However, the deficit rule policy is found to be incredible and it does not have any effect on the stock market returns.

This paper separately checks for the robustness of the results by introducing a list of controls, i.e. lagged stock prices, lagged stock prices volatility, and dummy variable. It can also be concluded that government spending is not a good automatic stabilizer, which is confirmed by RBC paradigm. Those results provide some important economic policy implications. The lower ratio of government expenditure to GDP as required by fiscal austerity along with improving credibility of deficit rule policy has a smoother effect on the stock market. Therefore, reducing the budget deficits in order to make up the fiscal policy credibility is a good signal for financial market -- which is obtained by decreasing government expenditures to achieve fiscal sustainability -- will dampen the stock market returns fluctuations.

References


Table 1 Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>VOLSP</th>
<th>Log SP</th>
<th>GS</th>
<th>Log G</th>
<th>μ</th>
<th>Z₁</th>
<th>Z₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.0460</td>
<td>7.4505</td>
<td>0.1920</td>
<td>11.3892</td>
<td>-0.0014</td>
<td>0.0055</td>
<td>0.9997</td>
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<tr>
<td>Median</td>
<td>0.0359</td>
<td>7.5638</td>
<td>0.1841</td>
<td>11.4580</td>
<td>0.0603</td>
<td>0.0043</td>
<td>0.9990</td>
</tr>
<tr>
<td>Max</td>
<td>0.1303</td>
<td>8.5053</td>
<td>0.3888</td>
<td>12.5141</td>
<td>0.3099</td>
<td>0.0410</td>
<td>1.0449</td>
</tr>
<tr>
<td>Min</td>
<td>0.0235</td>
<td>5.9865</td>
<td>0.0785</td>
<td>10.2736</td>
<td>-0.5730</td>
<td>-0.0237</td>
<td>0.9315</td>
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<tr>
<td>Std. Dev.</td>
<td>0.0225</td>
<td>0.7698</td>
<td>0.0829</td>
<td>0.6287</td>
<td>0.2346</td>
<td>0.0103</td>
<td>0.0205</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.9555</td>
<td>-0.4122</td>
<td>0.5568</td>
<td>-0.0855</td>
<td>-1.0105</td>
<td>0.3955</td>
<td>-0.1721</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>7.3182</td>
<td>1.9553</td>
<td>2.4146</td>
<td>1.8337</td>
<td>3.2668</td>
<td>5.6620</td>
<td>4.6664</td>
</tr>
</tbody>
</table>

Figure 1 Stock Price, Government Size, and Stock Price Growth Volatility
Figure 2: Deficit Rule and Debt Rule Credibility Indices

Table 2: Pair-Wise Granger Causality Tests

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Obs</th>
<th>F-Stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Delta \text{LOG G} ) does not Granger Cause ( \Delta \text{LOG SP} )</td>
<td>49</td>
<td>0.0362</td>
<td>0.9645</td>
</tr>
<tr>
<td>( \Delta \text{LOG SP} ) does not Granger Cause ( \Delta \text{LOG G} )</td>
<td></td>
<td>0.1991</td>
<td>0.8202</td>
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<tr>
<td>( \text{LOG G} ) does not Granger Cause ( \text{LOG SP} )</td>
<td></td>
<td>4.1695</td>
<td>0.0218</td>
</tr>
<tr>
<td>( \text{LOG SP} ) does not Granger Cause ( \text{LOG G} )</td>
<td>50</td>
<td>2.8358</td>
<td>0.0692</td>
</tr>
</tbody>
</table>

Table 3: Johansen Co-integration Test

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigen-value</th>
<th>Trace Statistic</th>
<th>Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None *</td>
<td>0.9553</td>
<td>263.8611</td>
<td>125.6154</td>
<td>0.0000</td>
</tr>
<tr>
<td>At most 1 *</td>
<td>0.6296</td>
<td>120.9274</td>
<td>95.7537</td>
<td>0.0003</td>
</tr>
<tr>
<td>At most 2 *</td>
<td>0.5313</td>
<td>75.2470</td>
<td>69.8189</td>
<td>0.0173</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.4455</td>
<td>40.3912</td>
<td>47.8561</td>
<td>0.2088</td>
</tr>
<tr>
<td>At most 4</td>
<td>0.1935</td>
<td>13.2667</td>
<td>29.7971</td>
<td>0.8790</td>
</tr>
<tr>
<td>At most 5</td>
<td>0.0561</td>
<td>3.3744</td>
<td>15.4947</td>
<td>0.9473</td>
</tr>
<tr>
<td>At most 6</td>
<td>0.0155</td>
<td>0.7194</td>
<td>3.8415</td>
<td>0.3963</td>
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</table>

* denotes rejection of the hypothesis at the 0.05 level
** MacKinnon-Haug-Michelis (1999) p-values
Table 4 Regression Results of Stock Market Returns Volatility

<table>
<thead>
<tr>
<th>Dep. Var: VOLSP</th>
<th>(A)</th>
<th>(B)</th>
<th>(C)</th>
<th>(D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.1203*</td>
<td>0.1167*</td>
<td>0.1156*</td>
<td>0.3499*</td>
</tr>
<tr>
<td>Δ GS</td>
<td>0.0640***</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Δ Log G</td>
<td>-</td>
<td>0.0163***</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>μ</td>
<td>-</td>
<td>-</td>
<td>0.0174***</td>
<td>-</td>
</tr>
<tr>
<td>Z₁</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.2653</td>
</tr>
<tr>
<td>Z₂</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.2072***</td>
</tr>
<tr>
<td>Log SP(-1)</td>
<td>-0.0149**</td>
<td>-0.0145**</td>
<td>-0.0143**</td>
<td>-0.0177*</td>
</tr>
<tr>
<td>VOLSP(-1)</td>
<td>0.5526*</td>
<td>0.5613*</td>
<td>0.5707*</td>
<td>0.4800*</td>
</tr>
<tr>
<td>DGFC</td>
<td>0.0211**</td>
<td>0.0209**</td>
<td>0.0205**</td>
<td>0.0280*</td>
</tr>
<tr>
<td>R²</td>
<td>0.6008</td>
<td>0.6041</td>
<td>0.6047</td>
<td>0.6081</td>
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<tr>
<td>R²-adj</td>
<td>0.5627</td>
<td>0.5663</td>
<td>0.5670</td>
<td>0.5603</td>
</tr>
<tr>
<td>SEE</td>
<td>0.0150</td>
<td>0.0150</td>
<td>0.0149</td>
<td>0.0151</td>
</tr>
<tr>
<td>F</td>
<td>15.7997</td>
<td>16.0185</td>
<td>16.0608</td>
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<td>DW</td>
<td>1.9706</td>
<td>1.9849</td>
<td>1.9811</td>
<td>2.0237</td>
</tr>
</tbody>
</table>

(*), (**), and (***)) denote significant at 1, 5, and 10 percent respectively
Athanasios Tagkalakis. "Fiscal policy and asset price volatility", Empirica, 01/29/2011