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Does the sustainable fiscal policy foster its credibility?

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Abstract

This paper examines the credibility and sustainability of fiscal policy in the case of Indonesia. The standard model of fiscal sustainability is modified to accommodate the credibility aspect. The empirical estimates are done by employing several aspects of the time series econometric literature including unit roots, degree of integration, co-integration, and stability tests. Based on the deficit forecast error reaction function, we estimate the quarterly data over the period 2001-2013 relying on the autoregressive distributed lag model. The results present that the deficit rule policy is not credible while central government's debt is unsustainable. The coexistence of non-credibility and unsustainability of fiscal policy in Indonesia is also closely related to the world oil prices and trade openness fluctuations. Under these strong external circumstances instability, the fiscal authority credibility plays an important role in conducting fiscal rule policy which operates primarily through a signalling effect.

Abstrak

Makalah ini membahas kredibilitas dan kesinambungan kebijakan fiskal kasus Indonesia. Model standar keberlanjutan fiskal dimodifikasi untuk mengakomodasi aspek kredibilitas. Analisis empiris dilakukan dengan menggunakan beberapa analisis data time series termasuk uji akar unit, uji integrasi, co-integrasi, dan tes stabilitas. Berdasarkan fungsi reaksi defisit anggaran, kami mengestimasi data kuartalan selama periode 2001-2013 menggunakan autoregressive distributed lag (ARDL). Hasil analisis menyajikan bahwa kebijakan defisit tidak kredibel sementara utang pemerintah pusat tidak berkelanjutan. Hubungan jangka panjang kredibilitas dan keberkelanjutan kebijakan fiskal di Indonesia juga terkait erat dengan harga minyak dunia dan fluktuasi keterbukaan perdagangan. Dalam lingkungan ketidakstabilan eksternal yang kuat, kredibilitas otoritas fiskal memainkan peran penting dalam melakukan kebijakan fiskal terutama melalui efek signaling.

Introduction

Fiscal policy has been received much attention considerably in the recent years. In response to the global financial and economic crisis that started in 2008, for example, countries around the world embarked on an unprecedented level of intervention. Within months of the crisis, for example, stimulus packages were announced, ranging for example from 1.4 percent of GDP in the UK to close to 6 percent of the GDP in the US, and over 12 percent of GDP in China (ILO, 2011).

The sharp increase in fiscal deficits and public debt induced by government expenditure to mitigate the adverse impact of the crisis in most advanced and several developing economies has raised concerns about the sustainability of public finances and highlighted the need for a significant adjustment over the medium term (Cottarelli, 2009). Moreover, government off-balance-sheet liabilities related to support for the financial sector and the consequences of population ageing pose additional significant risks (ECB, 2011). As a result, safeguarding the sustainability of public finances has become one of the major challenges facing policy-makers.

Along with world economic recovery and tapering fiscal policy pioneered by US recently, a serious attention is devoted to the issue of fiscal consolidation in order to control the irresponsible fiscal policy through emphasizing the importance of fiscal rules. Theoretically, fiscal rules are a type of fiscal institution -- the arrangements that form a nation's public finance framework. Generally, it is widely accepted that a government with a strong reputation of fiscal prudence does not necessarily need to be constrained

by rules. However, when this is not the case, international evidence shows that fiscal rules can provide a useful framework for fiscal policy and can ultimately contribute to macroeconomic stability and economic growth (Galí, 1994; Rother, 2004; Fatás & Mihov, 2003, 2006; Badinger, 2009; Sacchi & Salotti, 2014).

Empirically, the impact of fiscal rules on the budget performance has been justified by numerous studies primarily in developed countries (IMF, 2009; Marneffe et al., 2011). The long-term benefits of government debt reductions seem to have become the received wisdom. In contrast, there are quite few studies that try to assess the budget performance in the emerging economies. As a result, there is no uni-fied view on the short-term budgetary effects of fiscal austerity. Accordingly, it seems that further empiri-cal work is desirable in order to make progress in understanding the relation between fiscal rules and fiscal sustainability.

In a broader sense, fiscal sustainability is the basis of credibility (Kaasik, 2009). Both sustainability and credibility are critical to private sector confidence and are an essential part of the foundations for an eventual recovery. The credible fiscal plans that aim at restoring fiscal sustainability will be essential to counter the present increase in either debt or deficit levels. The macroeconomic scenario of such plans will be also crucial. Hence, there is now a greater need for close monitoring of fiscal developments not only for fiscal outcomes but also fiscal plans (Marinheiro, 2011).

Furthermore, fiscal transparency is also an important predictor of a country's fiscal credibility. The fiscal transparency followed by fiscal commitment to the planned budget or fiscal rules preserves the fiscal policy credibility. The question that comes to mind here is whether the fiscal commitment behavior is tem-porary or permanent in nature. If the answer is permanent, the subsequent one is whether it can be ex-plained systematically by certain endogenous macroeconomic factors. It is also important to ask whether such budget plans is too small, and hence non credible, or too large, and hence non sustainable (Passama-ni, Tamborini, R., & Tomaselli, 2015).

In the context of Indonesia, knowing the credibility of fiscal policy is important. Historically, the Indonesia's government has been implementing fiscal deficit relying on foreign debts and recently domes-tic debts to promote economic growth. Given the substantial deficits for a long time, whether its impacts is a key political and economic issue. Accordingly, by the Law No. 17/2003, since 2004 Indonesia has been implementing a fiscal rule based on maximum deficits and debt adopted from Maastricht Treaty. Surpri-singly, the rule has not been tested, as Indonesia's fiscal performance has been significantly better than the limits contained in the fiscal rule (Blöndal, Hawkesworth, & Choi, 2009).

This paper enriches the literature on fiscal policy credibility in developing countries with focus on Indonesia. We quantitatively measure the fiscal rule policy credibility and relate it to the fiscal policy sus-tainability. Then, we attempt to estimate fiscal rule policy credibility based on the specific economic fac-tors. The article is organized as follows. In the next section, we briefly present the literature and previous empirical researches both in developed countries and developing countries including Indonesia. The third section describes the dataset and empirical techniques used. Then, we present the results of the empirical tests. In the end, we conclude with a summary of key findings.

Policy credibility lies in the intersection between politics and economics. Credibility is a term widely used by politicians who like to claim that their policies and programs have a stamp of approval and must be followed through to their logical conclusion (Riley, 2012). For politicians, credibility is also be linked to the word trust – i.e. trust among the public that economic policies are being used to meet a broader range of economic and social objectives.

From public's point of view, Baxter (1985) defines that credibility is the subjective probability, as assessed by agents in the economy, that a reform has in fact taken place. Therefore, policy credibility will be closely related to the policymaker reputation. Credibility is associated with the degree of confidence that the public has on policy maker's ability and determination to keep itself on an announced goal and to achieve it. Reputation is related to the public's belief about the preferences of the policymaker and to the expectations formed by the public about the actions that policy will take (Drazen & Masson, 1994).

In economic theory, the problem of credibility of policy has been framed as the problem of time inconsistency initiated by Kydland & Prescott (1977). Doing something at t_1 that differs from what the government announced at t_0 about its plans for t_1 is the root of the problem. Accordingly, time inconsis-tency in the form of discretionary policy is often confronted to the rules-based policy. In the rules-based policy frameworks, policymakers announced in advance to the public how policy will respond in various situations and commit them to following through.

The models of self-fulfilling prophecies above determine the credibility of economic policies adopted. Therefore, the maintenance of a given policy is only credible when the benefits derived from it outweigh the costs. This relationship between costs and benefits is represented by the loss function. As example of Barro & Gordon (1983), lower rates of inflation and unemployment (higher economic growth) minimize losses to the society. Minor losses imply greater credibility in policy engendered by the authorities.

In relation to the sustainable fiscal policy, fiscal rules policy credibility can be traced back to the government budget constraint. In principle, government spending, as far as possible, should be financed by domestic revenues. If the domestic revenue is insufficient to cover it, the available financing option to fulfil deficits is debt and/or money printing. The state budget sustainability can be achieved if the additional debt equals to the current overall deficit. Even if the government takes debt, the fiscal sustainability can be maintained as far as the additional debt must be proportional to the primary balance surplus (Dinh, 1999).

The concept of fiscal sustainability is associated with solvency, which, in turn, refers to the ability of the government to honor its debt commitments. If a country enjoys fiscal credibility, and if a fiscal deficit appears in the short term, private economic agents believe it will be rapidly corrected. They do not expect that this country's fiscal solvency will be threatened, or that its public debt ratio will become excessive (Artus, 2014). More operationally, the closeness of actual deficit to the planned deficit is the key of fiscal policy credibility.

However, they are not always the same from time to time. The ability to estimate that will happen in the future becomes an important consideration in preparing the budget deficit. The ability to see far ahead of the future situation and accommodate it properly will determine the accuracy of the budget and its realization. From the behavioral perspective, the existence of the budget gap is an indication of the lack or weakness of the public sector's entrepreneurial spirit (Osborne & Gaebler, 1992).

The deviation of actual deficit from the planned one would be to discern to what extent revisions reflect the relevant "news" embedded in the newly available information, or rather reflect "noise" in the production of the previous estimate (Mankiw & Shapiro, 1986). In the case of "noise", it is assumed that the revision does not contain any new information, while in the case of "news", the change in the estimate of the variable of interest from one vintage to the next can be attributed to the incorporation of new information. Regardless of "news" or "noise", the production of new fiscal data performs inefficiency in public finance.

There are many other factors determining the difference of actual budget to the planned one. Crain & Tullison (1993) offer an extensive and robust test of the time-inconsistency theory of fiscal politics. Employing data of US states from 1969 to 1989, the results of their tests indicate the variables such as legislative stability and executive term limits have strongly predictable impacts on the volatility of various measures of fiscal policy.

Beetsma et al. (2011a) comprehensively identify that fiscal positions could have deteriorated through: (1) the unwinding of macroeconomic imbalances and the outfall from the crisis; (2) misreporting and weaknesses in national budgeting processes; and (3) insufficient incentives to comply with the fiscal rules. They argue that the relevance of each of these factors differs across countries mostly in the case of Euro zone.

DeCastro, Pérez, & Rodríguez (2011) provide useful insights into the effects of the last two on fiscal outcomes. They explore the properties of subsequent revisions in the budget balances of a given year. The quality of the first-release figures is important, because these figures are an input for the next budget. Moreover, fiscal surveillance is based on these figures. They may indicate that fiscal policy is on an unsustainable course and, hence, enable policymakers to undertake timely corrections. Their results show that preliminary data releases are biased estimators of final data.

Beetsma et al. (2011b) confirm those findings. They analyze the credibility of the whole budget process from planning to implementation and ex-post control. An *implementation error* arises when fiscal outcomes at the implementation stage (in real time) differ from fiscal plans. A *revision error* arises when ex-post data differ significantly from real-time data. Their conceptual framework stresses that ministries of finance control the production of first-release figures, and may have an incentive to be over-optimistic at this stage.

It seems that real-time cash data is more appropriate reflecting the accurate intra-annual forecasts of an economy's fiscal position to issue early warning signals for the need to correct fiscal imbalances. Hallett, Lewis, & Kattai (2012) show that large corrections are often necessary early to make the later adjustments acceptable in size and to keep debt ratios from escalating. They also find the differences between front-loaded and back-loaded adjustment schemes are likely to be vital for the time consistency and hence credibility of fiscal policy making.

Commitment to comply with the rule is largely a political factor (Bova, Carcenac, & Guerguil, 2014). Naert (2011) suggests that political factors affect the credibility of fiscal policy properly. While Beetsma, Giuliodori, & Wierts (2009) judge the role for political factors to be rather limited; his empirical analyses suggest that its role may not be dismissed. Political determinants, i.e. both ideology and fragmentation, define credibility in a significant way. There is also evidence of a political business cycle effect; governments overestimate the budget balance in election years and thus mislead voters pretending that they are doing better than they actually doing.

In the case of Indonesia, the research dealing with fiscal policy credibility is limited. Abdullah, Warokka, & Kuncoro (2011) propose the use of budget gap as a measure of time inconsistency. According to their study, budget gap indicates the disability of government to take into account all chances and risks in the future. Taking the case of Jakarta province over the period of 2004-07, their study provides the test of government policy consistency towards its campaigned programs.

At the national level, Surjaningsih, Utari, & Trisnanto (2012) conclude that the absence of discretionary fiscal policy made by the government. Kuncoro (2014) investigates the impact of fiscal policy credibility on its volatility. He comes to the conclusion that the credible fiscal policy particularly debt rule policy instead of deficit rule credibility effectively reduces the government expenditure volatility. Unfortunately, he did not explain the behaviour of non credible deficit rule policy as a complementary analysis.

Some notes emerge from those studies. First, since Abdullah et al. (2011) take the case of local government, their conclusion does not reflect the credibility of national fiscal policy. Second, Surjaningsih et al. (2012) did not explore further the role of fiscal rule in their work. Third, refer to Kuncoro (2014), the more comprehensive approach is needed to reassess the source of non credible deficit rule policy in the case of Indonesia. In the next section, we empirically examine whether the deficit forecast error that is representing the fiscal rule policy credibility can be systematically predicted.

Research Method

We assume that budgetary projections have to be regarded either as the announcements of a political target or the rules. Analogously to Naert (2011) and Naert & Goeminne (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:

$$E_t = A_t - P_t \qquad (1)$$

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:

$$CI_t = \frac{A_t}{P_t} \qquad (2)$$

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.

We use both two measures in the context of deficit rule policy credibility. 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:

$$DEF_A = REV_A - EXP_A \qquad (3)$$

$$DEF_P = REV_P - EXP_P \qquad (4)$$

Combining (1) and (2), we use the ratio between the actual deficit and the planned deficit:

$$Z = DEF_A \div DEF_P \qquad (5)$$

As (2), the accuracy of deficit rule policy is indicated by a score of 1 (one). If the budget deficit realization in the current period is less than what has been targeted before, the budget deficit credibility index would be indicated less than unity. Meanwhile, if the budget deficit realization exceeds the projected figures, the index will have a greater than unity.

Furthermore, budget deficit and debt are closely related in the fiscal sustainability framework since debt is a legacy of past deficits. Unfortunately, neither flow nor stock of the planned debt for each year in Indonesia is unavailable. Hence, we use debt to GDP ratio instead of planned debt. In this regard, we hypothesize that the change in debt ratio can explain positively the deficit forecast error. The debt stock ratio is obtained by dividing the debt stock to the GDP in from of the following equation:

$$RD = Debt \div Y \tag{6}$$

Openness to world markets can enhance the credibility of fiscal policy by making more apparent implicit government subsidies flowing through the goods/services market. The sharp change in terms of trade has prompted governments in developing countries to intervene in the economy in various ways (Ezema, 2012; among others) including increase in government spending to compensate for increasing risk caused by possible international market turbulence (Rodrik, 1998).

In contrast, trade openness is recognized as one of the prime determinants of the magnitude of fiscal multipliers (see for example: Spilimbergo, Schindler, & Symansky, 2009). Indeed, greater openness to international trade is generally predicted to reduce the effectiveness of domestic fiscal policy. Given those arguments, it is not clear the sign of the influence of economic openness on the deficit forecast error. The degree of economic openness is calculated from the following equation:

$$OPENNESS = (EX + IM) \div Y \tag{7}$$

where *EX* is export and *IM* is import values respectively.

Furthermore, the process of budget formulation in Indonesia takes much time and complex. It involves many institutions, not only the central government but also local governments, government bodies, ministries, politicians, or even academicians. Initially, the Fiscal Policy Office of Ministry of Finance prepares the economic assumptions and revenue forecasts for the budget, thus establishing the maximum level of expenditures under the government's deficit target (see for detail: Blöndal et al., 2009).

Two of the basic economic assumptions are world oil price and foreign exchange rate. Therefore, it is reasonable to incorporate them to the model. We will assess the sensitivity of the deficit forecast error to the change in world oil price (*OILP*) as used by Jha (2009) and foreign exchange rate respectively (*ER*) as exploited by Kuncoro (2011). Eventually, we might construct the budget deficit policy credibility model that is a function of oil prices, exchange rates, debt stock, and economic openness:

$$Z_t = a + b_1 DR_t + b_2 OPENNESS_t + b_3 \log OILP_t + b_4 \log ER_t + e_t \tag{8}$$

In the short-term relationship, we prefer to use the restricted ARDL (auto-regressive distributed lag) model to accommodate some adjustments. The use of the ARDL model is justified by the fact that it makes possible to easily assess the relative change in *Z* both in the short-run and in the long-run. Another advantage of this specification is the consistency and efficiency of estimates in the presence of endogenous regressors.

Moreover, bearing in mind that standard unit root tests are susceptible to misleading results, further Pesaran & Shin (1999) show that ARDL models yield consistent estimates of the coefficients irrespective of whether the underlying regressors are *I(1)* or *I(0)*, as the Johansen framework, thus providing robustness to the results. The model takes the unrestricted form as follows:

$$\Delta Z_t = \alpha + \beta_1 \Delta DR_t + \beta_2 DR_{t-1} + \beta_3 \Delta OPENNESS_t + \beta_4 OPENNESS_{t-1}$$
$$+ \beta_5 \Delta \log OILP_t + \beta_6 \log OILP_{t-1} + \beta_7 \Delta \log ER_t + \beta_8 \log ER_{t-1}$$
$$+ \beta_9 Z_{t-1} + \varepsilon_t; \varepsilon_t = e_t + \phi e_{t-1} \tag{9}$$

To investigate the presence of long-run relationships among *Z*, *DR*, *openness*, log(*oilp*), and log(*er*), bound testing under Pesaran, Shin, & Smith, (2001) procedure is used. The bounds test method co-integration has certain econometric advantages in comparison to other methods of co-integration which are the following: (1) all variables of the model are assumed to be endogenous; (2) bounds test method for co-integration is being applied irrespectively the order of integration of the variable; and (3) the short-run and long-run coefficients of the model are estimated simultaneously.

The bound testing procedure is based on the F-test. The F-test is actually a test of the hypothesis of no co-integration among the variables against the existence or presence of co-integration among the variables, denoted as:

Ho: $\beta_2 = \beta_4 = \beta_6 = \beta_8 = \beta_9 = 0$ (10a)

i.e., there is no co-integration among the variables.

Ha: $\beta_2 \neq \beta_4 \neq \beta_6 \neq \beta_8 \neq \beta_9 \neq 0$ (10b)

i.e., there is co-integration among the variables.

The ARDL bound test is based on the Wald-test (F-statistic). The asymptotic distribution of the Wald-test is non-standard under the null hypothesis of no co-integration among the variables. Two critical values are given by Pesaran et al. (2001) for the co-integration test. The lower critical bound assumes all the variables are *I(0)* meaning that there is no co-integration relationship between the examined variables. The upper bound assumes that all the variables are *I(1)* meaning that there is co-integration among the variables.

Since we concern with credibility, we need reliable and long span time series data on fiscal policy comprising revenue, expenditure, and, consequently, deficit. Unfortunately, the quarterly or monthly data of government budget are publicly unavailable. Regarding to the limitation, in this paper we interpolate the annual data into quarterly basis. This is because the planned budget is established once time even though then revised in the mid-year. In the mid-year budget revision, the government does not announce to the public the new targeted budget. Therefore, we analyze the difference between the accumulation of actual budget (before and after budget revision) and the original planned budget.

The independent variables that will be used are specified as follows. Debt that is analyzed here is the central government total 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. The latter is also used as exchange rate series data. The trade openness is calculated from export and import to GDP ratio derived from the national income account standard.

Inflation rate is derived from the relative change in GDP deflator at constant prices in 2000. The deflator is also used to convert all variables into the real values. The world crude oil prices data come from IMF commodity prices database. They present a simple average of the three spot prices; Dated Brent, West Texas Intermediate, and the Dubai (stated in US Dollar per barrel). The sample periods chosen for this study extend from 2001(1) to 2013(4).

Results and Discussion

Table 1 presents the elementary statistics covering mean, median, and extreme (maximum and minimum) values for all variables of interest. We begin describing the independent variables. The mean value of the two exogenous factors – world oil prices and exchange rates – is close to its median value respectively. In addition, they are not highly fluctuated ranging from 2 and -0.02 respectively. The tight standard deviation compared to its mean value supports to the conclusion that the movement of the world oil prices and exchange rates considerably does not vary.

Regarding to the internal factors – debt ratio and trade openness – the median value is closer to the maximum rather than the minimum value suggesting that the most data series lay in the right side of the mean value. The positive value of skewness (0.72 and 0.66 respectively) proves that the series are not symmetric or normally distributed but slightly skewed to the right; the lower tail of the distribution is thicker than the upper tail. Given the high kurtosis, the closeness of median to the mean value preliminary indicates that all of the variables of interest are normally distributed.

Table 1. Descriptive statistics

	Z	RD	Openness	Log OILP	Log ER
Mean	0.7457	0.1620	0.5492	4.0767	9.1532
Median	0.7180	0.1342	0.5482	4.2223	9.1308
Maximum	3.0792	0.3055	0.7810	4.8792	9.4083
Minimum	-0.4397	0.0912	0.4375	2.9189	9.0222
Std. Dev.	0.6621	0.0690	0.0674	0.5379	0.0834
Skewness	0.9996	0.7215	0.6611	-0.4590	1.2814
Kurtosis	5.1961	2.1002	4.1182	1.9343	4.5253

The first goal of this paper is to check whether the deficit rule policy is credible. The deficit rule credibility indicates that the deviation of actual deficit from the planned one is substantial. The average value of Z suggests that the actual deficit is 75 percent of the planned deficit indicating downward deficit bias. However, when we look at the positive value of skewness index, most of the series data locate in the right side and thus imply upward deficit bias; inconsistent with the previous measurement above.

To ensure the characteristics of deficit rule policy credibility, we apply one-sample test. The result presents that the null hypothesis that the mean value equals to unity against the alternative hypothesis that the mean value does not equal to unity can be rejected at 5 percent confidence level. The t-stat is, -2.74, far enough from the critical value for corresponding degree of freedom, 2.01. Those figures convincingly imply that the deficit rule policy is not credible suggesting that overall the fiscal authority in the sample period cannot fulfil the planned budget. In other words, the fiscal authority's commitment to the deficit rule is quite low.

The fiscal policy is also aimed at achieving sustainability and solvency of the state budget (Geithner, 2002). Both can be pre-conditionally tested by several methods. The simplest method refers to the government budget constraint requiring that the additional debt should equal to the deficit. Figure 1 presents the evolution of the deficit rule policy credibility and the change in debt ratio for all the sampled periods.

It is notable that there is an unclear synchronized pattern between the debt ratio and deficit forecast error. In one hand, the incremental debt ratio (even though fluctuated in the earlier years) tends to increase. On the other hand, the deficit forecast error seems to be stagnant or even increase in recent years. To ensure whether the relationship is rigorous or not, we calculate the coefficient of correlation. The correlation between the two variables of interest is positively weak, 0.29, and statistically insignificant.
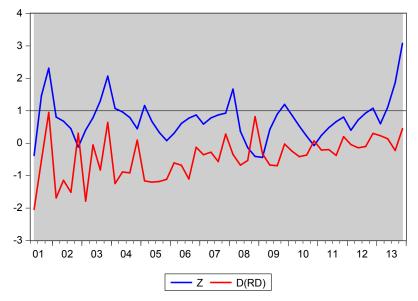

Figure 1. Deficit rule credibility and change in debt ratio

However, when we divide into pre- and post-global financial crisis, the conclusion does considerably change. The correlation between the two particular variables of interest for both periods is 0.51 and 0.17 respectively. Overall, those figures suggest that the deficit forecast error is not associated with the relative change in the debt ratio primarily after crisis implying that fiscal policy is unsustainable. In this point, we preliminary prove that fiscal sustainability is the basis of credibility.

Relating among independent variables, there is a strong correlation between the debt ratio and world oil prices (-0.94) and that and openness (0.69). Meanwhile, the correlation between the debt ratio and exchange rate is weak enough (-0.05). Given those results, we can argue that the debt unsustainability in Indonesia is closely associated with the world oil prices and trade openness fluctuations instead of currency depreciation. We shall check it again empirically later using more sophisticated econometric tools.

Unit roots test is another way to assess fiscal sustainability as suggested by Hamilton & Flavin (1986). The unit roots test is conducted for both level and first-difference by imposing intercept and 1 lags

without trend. The results of the Augmented Dickey-Fuller (ADF) unit roots tests are presented in Table 2. At the level data, only the deficit rule policy credibility and trade openness series data have a unit roots at the 95 percent level of confidence.

At the first difference data, most of the variables under study have a unit roots. They imply that the series data are stationary at the first difference [*I(1)*] and the behavior of the variables vary around to the mean value and invariant overtime (Enders, 2004). The occurrence of unit roots in those series gives a preliminary indication of shocks having permanent or long lasting effect, thus making it very difficult for traditional stabilization policies to survive.

An exception applies for the debt ratio series data. The debt ratio has a unit root at the second-order difference. Their t-statistics value is -13.1452, much greater than the critical value at the 5 percent significance. However, the debt ratio has no a unit roots neither at level nor first-difference data. The absence of unit roots of the debt ratio series confirms to the finding of fiscal (debt) unsustainability above.

Table 2. ADF unit roots tests

Series to be Tested	Level		First-Difference		Conclusion
	t-stat	Prob.	t-stat	Prob.	
Z	-11.5298	0.0000	-	-	I(0)
RD	-2.1503	0.2267	-0.8929	0.7819	-
Openness	-3.4400	0.0140	-	-	I(0)
Log OILP	-1.4593	0.5459	-6.4785	0.0000	I(1)
Log ER	-2.4355	0.1375	-7.2657	0.0000	I(1)

Stationary is required to perform co-integration. Co-integration is an important concept to analyze the data behavior in the long-run. Using Johansen's maximum likelihood approach, we test the bi-variate among the five variables with 1 lags and no deterministic trend in the basic model. The trace and Max-Eigen value (λ-max) statistics for testing the rank of co-integration are shown in Table 3.

The result of the test denies the absence of co-integrating relation deficit rule policy credibility series at most 1. Furthermore, both tests suggest the presence of at most one co-integrating equation at the 5 percent confidence level or better 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. This is complement to the result of correlation analysis.

Table 3. Johansen co-integration test

Unrestricted Co-integration Rank Test (Trace): Z RD OPEN Log OILP Log ER				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.6075	109.6348	69.8189	0.0000
At most 1 *	0.4860	62.8756	47.8561	0.0011
At most 2	0.3277	29.5947	29.7971	0.0528
At most 3	0.1673	9.7397	15.4947	0.3013
At most 4	0.0117	0.5872	3.8415	0.4435
* denotes rejection of the hypothesis at the 0.05 level				
** MacKinnon-Haug-Michelis (1999) p-values				

Alternatively, we estimate first the unrestricted ARDL model as equation (9). The results show that the coefficients of lagged independent variables do not entirely present statistically significant. But the coefficient of lagged dependent variable is highly significant. This preliminary performs the presence of co-integration. To ensure the presence of co-integration, then we test the possibility of co-integration by implementing the bound test. The result is presented in Table 4.

The Wald test (F and χ^2 statistics) is computed to test the null hypothesis, Ho: there is no co-integration as (10a) against the alternative hypothesis, Ha: there is co-integration as (10b). The test does not fail to be co-integrated. The Wald test value falls outside the upper bound in the lower probability value. It means that the null hypothesis of no co-integration is rejected suggesting the presence of co-integrating relation. In other words, all of those variables in each model are said to be co-integrated con-

firming to the Johansen test above. In other words, all of those variables in each model are said to be co-integrated and, consequently, those series tend to move towards the equilibrium relationship in the long-run.

Table 4. Bound test of co-integration

Test	Value	df	Prob.	Conclusion
F-stat	41.5256	(5, 41)	0.0000	Co-integrated
χ^2	207.6279	5	0.0000	

Our questions in mind are: what do really those results imply? Does the deficit rule policy become less credible when the results of the government expenditure (and revenue) policy are better than the projected ones? Does the deficit rule policy become more credible when the government debt is higher? In our view, the use of debt to GDP ratio as the representative indicator of sustainability *per se* is inappropriate. This is because both GDP and debt tend to be cyclical even though the size of debt in general tends to decrease overtime. Consequently, the ratio tends to be underestimated. The analogy can be applied in the deficit ratio. Eventually, the conclusion would be misleading.

Therefore, to evaluate the credibility of deficit rule policy, we refer to the planned budget deficit instead of GDP. Table 5 reports the OLS estimation results of three regression models as specified equation (9) in the previous section. Model (A) deals with the basic model. Model (B) incorporates institutional factor, i.e. dummy of fiscal rule policy implementation since 2004. The last model takes into account the international economic environment in relation to global financial crisis since 2007.

The estimation results show that most of the hypothesized variables are found to be statistically significant at least at the 10 percent or even lower confidence level. They are confirmed by the high coefficient of determination (R^2) and F statistic values. Overall, the deficit forecast error equation is generally in line with the existing literature. The results show that the lagged either dependent or dependent variables are statistically significant in the three specified models suggesting that separately there is co-integration among those variables in the long-run.

Both in short- and long-run, we observe that the direct impact of sustainability of debt ratio on the deficit rule policy credibility. The incremental debt to GDP ratio – which is unsustainable – induces the deficit forecast error. The higher deficit forecast error typically implies that the deficit rule policy credibility will get worse. However, along with the evolution which is continuously taking place in public finance in the country, in the long run, the debt sustainability will promote its credibility.

In contrast, the degree of economic openness can potentially decrease the magnitudes of deficit forecast error primarily only in the long-run perspectives. A negative value of the response is consistent with a wider interpretation of replacement hypothesis, as it implies that government expenditure decreases with the increase in trade openness. It seems is that in the short-run Indonesia's government has no capacity to substitute the external risks in order to offset the costs of globalization but in the long-run she does.

The higher increase in deficit generated by government expenditure compared to the increase in external risks is due to the economic system adopted by Indonesia is mixed. In fact, the economic success of Indonesia relies on their steadily increasing in openness. Lack of the government intervention without concentrated to the economic insecurities generated by liberalization and globalization may harm the prospects of sustainable economic growth of the country.

Accordingly, as noted by Kueh, Puah, & Wong (2009), the extreme competitive pressures faced by Indonesia as she is moving towards liberalization and globalization. As a result, domestic firms might not have the ability to overcome the challenges of the liberalization impacts. Therefore, the government plays prominent role in ensuring stability in the economic and acts as risk bearer in mitigating eternal risk due to the high degree of trade openness and the terms of trade fluctuation. This result is basically in line with Agnello & Sousa (2014). Hopefully, joining the AEC (ASEAN Economic Community) in 2015 will significantly induce the credible fiscal policy in Indonesia.

The regression estimation results show that the impact of world oil prices is everywhere significant and positive. This indicates that the higher increase in oil prices induces the deficit forecast error beyond the tolerable bound so that the fiscal policy becomes non credible. This finding holds both in the short- and long-run. In addition, Jha (2009) found that the oil price has a significant effect to the sustainable state budget related to the subsidies liabilities to the domestic oil market.

The depreciation Rupiah against the US Dollar could also significantly deteriorate the deficit forecast error only in the long-run. In model C, one percent depreciation of Rupiah tends to jeopardize the deficit over the planned deficit for about 2.5 percent in the short-run. It seems that stabilizing the exchange rate in the long-run is a necessary condition for central government to maintain the soundness of state budget. This finding is similar and confirms to the study of Kuncoro (2011).

Surprisingly, the coefficient of dummy variable of fiscal rules adoption is positive. It seems that the fiscal policy credibility after adoption fiscal rule is worse. Fortunately, the corresponding variable is statistically insignificant. This is a plausible result because the implementation of fiscal rules in Indonesia is in the earlier steps after switching from the balance budget rule adoption for a long time. Along with the evolution of public finance which is currently taking place continually, the adoption of fiscal rules will support to the fiscal policy credibility.

As expected, there is a significant difference of deficit rule credibility between pre- and post-global financial crisis. This is verified by the coefficient of DGFC which is statistically significant at the 5 percent confidence level. The deficit rule credibility tends to be lower in the post-global financial crisis. As a result, the government spending consistently inclines to face the adverse impacts. In contrast, the planned deficits in the corresponding period have been set no more than 3 percent of GDP. Thus, this makes the deficit forecast error is higher compared to the planned deficit.

The estimation of the coefficients of lagged dependent variable is highly significant for all of the models specification. The corresponding coefficient also displays persistence. The deficit forecast error persistence can be considered as a measure of the degree of dependence of current deficit forecast error behaviour on its own past developments. The coefficient of lagged dependent variable is 0.8, suggesting that a change in the deficit forecast error between quarter t-1 and t drives up the deficit forecast error process in quarter t only 80 percent partial adjustments to respond to the desired/targeted deficit forecast error. Consequently, the deficit forecast error tends to be less persistent than to respond to economic conditions in the short-run.

Table 5. Estimation results of deficit rule policy credibility

Dependent Variable: Z	A		B		C	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
C	-0.3831	0.0005	-0.3923	0.0005	-0.4809	0.0001
Δ RD	0.4434	0.0041	0.4840	0.0061	0.4729	0.0017
RD(-1)	0.2149	0.0007	0.2471	0.0065	0.2525	0.0001
Δ Openness	-0.0158	0.5268	-0.0241	0.4231	-0.0394	0.1401
Openness(-1)	-0.0657	0.0091	-0.0765	0.0220	-0.1008	0.0009
Δ Log OILP	1.4313	0.0109	1.4831	0.0103	1.5492	0.0047
Log OILP(-1)	1.9373	0.0038	2.1293	0.0064	2.6290	0.0004
Δ Log ER	2.2030	0.1310	2.0900	0.1598	2.5192	0.0749
Log ER(-1)	3.4218	0.0019	3.4278	0.0021	4.3637	0.0002
Z(-1)	-0.8116	0.0000	-0.8317	0.0000	-0.8612	0.0000
DFR	-	-	0.2265	0.6109	-	-
DGFC	-	-	-	-	-0.6138	0.0372
R.		0.8459		0.8469		0.8619
R-adj		0.8121		0.8086		0.8274
SEE		0.4937		0.4982		0.4731
F		25.0082		22.1291		24.9721
DW		1.3344		1.3720		1.6145

Furthermore, the significance of the lagged dependent variable indicates that the estimated deficit rule policy credibility model is well specified. Thereafter, it is necessary to check for the stability of the deficit rule policy credibility function. This is because of the importance of the stability of the deficit rule policy credibility function for an effective fiscal policy. This, therefore, makes it necessary to test whether the estimated deficit rule policy credibility equation has shifted over time as an important part of this empirical study.

We use CUSUM and CUSUMSQ to detect the possibility the coefficients of regression changes overtime. The CUSUMSQ stands for cumulative summation of (squared) recursive residual generated by the regression equation. If the CUSUMSQ values locate within the tolerated lower and upper bands, the

regression function is said to have a constancy of parameter regression. Figure 2 delivers the results of stability tests regarding constancy of parameters regression.

The CUSUM test confirms the existence of the parameter regression constancy indicating that the parameters are stable during the sample period. The entire residuals plot lies within the 5 percent tolerable bands. The CUSUMSQ test reports the same result. The plots of squared residual are within the tolerated bands. Overall, the estimated deficit rule policy credibility has a more stable function implying further that it can be used for prediction and policy simulation purposes.
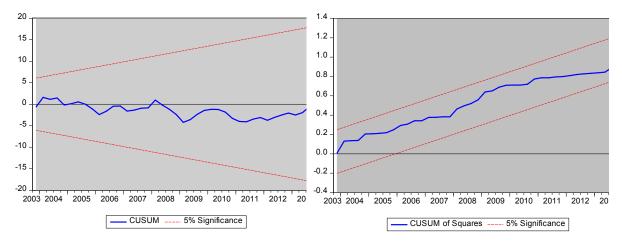

Figure 2. CUSUM and CUSUMSQ stability tests

Conclusion

This paper analyzed the deficit rule policy credibility in an emerging country namely, Indonesia. First, we measured the deficit rule policy credibility using deficit forecast error to the planned deficit. Second, we tested the fiscal policy sustainability by relating it to deficit and debt. Third, we estimated the deficit forecast error reaction function taking into account the selected basic assumptions of budget formulation. This study employed secondary data published by formal institutions focusing on the world oil prices, exchange rates, total debt, and trade openness. We used quarterly data over the period 2001(1)-2013(12) relying on the ARDL model.

We found that the existence of non credible deficit rule policy. Moreover, the non credible deficit rule policy was associated with the debt unsustainability. The coexistence of non credibility and unsustainability of fiscal policy in Indonesia was also closely related to the world oil prices instead of exchange rates fluctuations. Fortunately, the economic openness can boost the credibility of deficit rule policy. It seemed that in the short-run Indonesia's government had no capacity to substitute the external risks in order to offset the costs of globalization but in the long-run she does.

Referring to those findings, this paper concluded that fiscal policy credibility in Indonesia put too much emphasize on stabilizing the domestic economy thus leading to benign neglect of stabilizing its external economy, ultimately resulting in increased deficit forecast error. Accordingly, the fiscal policy would not be optimal without taking external factor movements into consideration. Under these strong external circumstances instability, those findings suggest that fiscal authority credibility plays an important role in conducting fiscal rule policy which operates primarily through a signaling effect to achieve both the internal and external economic stabilizations simultaneously.

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