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Does the Credible Fiscal Policy Support the Prices Stabilization?¹

Haryo Kuncoro²

Abstract: This paper aims at analyzing the co-movement between fiscal policy and monetary policy rules in the context of price stabilization. More specifically, we observe the potential impact of fiscal policy credibility on the price stabilization in the inflation targeting framework. Motivated by the fact that empirical studies concerning this aspect are still limited, we take the case of Indonesia over the period 2001-2013. Based on the quarterly data analysis, we found that the impact of credibility typically depends on characteristics of fiscal rules commitment. On one hand, the credibility of debt rule reduces the inflation rate. In contrast, the incredible deficit rule policy does not have any impact on the inflation rate and therefore does not support to inflation targeting. Given those results, we conclude that credibility matters in stabilizing price levels. Accordingly, those findings suggest tightening coordination between monetary and fiscal policy to maintain fiscal sustainability in accordance with price stabilization policy.

Key words: Fiscal Rules, Deficit, Debt, Credibility, Inflation Rate

JEL Classification: E52, E58, E63, H62

Introduction

The macroeconomic rule-based policies have been a growing interest in the past three decades. In the monetary area, since introduced in New Zealand, Canada, United Kingdom, Sweden, and Australia for the first time in 1990, inflation targeting has been adopted in many countries. At present, there are 32 countries around the world that have already adopted IT as the monetary policy frameworks (Scott, 2010; Gill, 2011). In general, inflation targeting is a framework by which central banks publicly set and announce the target rate for inflation; financial policy is then conducted according to this target.

In line with that trend, in the public finance area, fiscal rules have been received considerable popularity in various parts of the world. Induced by the high budget deficit in 1970s, there are currently 87 countries around the world that have been implementing fiscal rules (IMF, 2013). The fiscal rules are as formalized numerical restrictions on the relevant aggregate fiscal variables, such as revenue, expenditure, deficit, and debt. All these rules share at least one feature in common: they seek to confer credibility to the

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conduct of macroeconomic policies by removing discretionary intervention (Kopits, 2001).

The recent global financial crisis that erupted in the mid 2008, however, offers some challenges to both monetary and fiscal rules. On one hand, it has been argued that increasing the US inflation rate by four percentage points for a couple of years would significantly help the public (as well as private) deleveraging process (Rogoff, 2008). On the other hand, the increase in inflation rate enforces monetary policy revising the targeted inflation rate followed by the increase in interest rate. The latter would thus also reduce the impact of a possibly contractionary fiscal consolidation.

Given these linkages and spillovers, Blinder (2004) points out that, monetary policy can be used to stimulate the economy, especially in occasional abnormal circumstances (*e.g.*, when recessions are extremely long and/or deep), while fiscal policy is better suited for the role of a macroeconomic stabilizer. In fact, a number studies have been devoted to analyze the effectiveness of fiscal policy on output stabilization (Galí, 1994; Lane, 2009; Fatás and Mihov, 2003, 2006). In contrast, only few empirical studies (Rother, 2004; Sacchi and Salotti, 2014) focus on the prices stabilization.

Interestingly, Rother (2004) found that fiscal discretion policy affects de-stabilization to the inflation rate. Since prices stability is not only a monetary policy concern but it is the result of a fiscal and monetary policy mix, it seems that knowing the interaction of monetary and fiscal policy credibility relating to the inflation rate is important. In an environment of high inflation, fiscal spending increases inflation expectations and borrowing costs, affecting fiscal policy effectiveness. In such uncertainty, the confidence effects are likely to be even more important and responses of agents will very much depend on a government's policy and credibility (Tang *et al.*, 2010).

Indonesia provides a unique opportunity to assess the nature of macroeconomic stabilization policy. Experience of a dramatic depreciation, sky-rocketing inflation rate, and deep negative growth in accordance with Asian financial crisis in 1997/98 has directed the monetary authority to focus on the economic recovery and stabilization. Accordingly, since 1999, Indonesia has been implementing Act No. 23/1999 regarding the central bank independency. Also, refer to Act No. 3/2004, since July 2005 the central bank of Indonesia has been officially adopting inflation targeting in the monetary policy frameworks.

At the same time, the sharp increase in fiscal deficits and public debt has raised concerns about the sustainability of public finances and highlighted the need for a significant adjustment over the medium term. According to the Act No. 17/2003, since 2004 Indonesia has been operating a fiscal rules based on maximum deficits and debt (3 and 60 percent of GDP respectively) replacing the balance budget rule that had been implemented since 1967 resulting the high monetization of hidden deficits (Snyder, 1985).

Then in 2008, fully supported by central bank of Indonesia, the government attempted to revive economic activity through various fiscal stimulus measures to face the adverse impacts of the global financial crisis. In fact, the fiscal stimulus programs have contributed substantially to recover Indonesian economy faster and stronger than expected (Hur *et al.*, 2010). After that, gradually Indonesia in 2010s has been one of the largest developing countries implementing various economic liberalization reforms that pro-

duce strong economic growth (Abdurohman, 2013). All of them are aimed at achieving the single goal, *i.e.* Rupiah stabilization both in terms of inflation and exchange rate.

Those facts bring us back to the challenge for dominant inflation targeting theories, which are typically silent about the role of credible fiscal policy and therefore warrant further attention. Accordingly, the fiscal policy credibility has been widely mentioned as one of the most important fundamentals of macroeconomic policy. 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).

Those economic environments above are similar to Central and Eastern European (CEE) countries. As noted by Mihaljek (2009), to great extent, CEE countries financed their long expansion by foreign borrowing. In addition to that, they have faced growing challenges in their ongoing economic development: the transition to the market economy; the efforts of catching up the gap from the advanced EU economies; and the challenge of achieving the constraints imposed by Maastricht Treaty (Stoian, 2012). Hence, government's interventions were strongly needed also requiring credibility.

This paper explores the potential linkage between credibility of fiscal policy rules and inflation targeting in the case of Indonesia. We hope that lessons from Indonesia will be useful to develop a better stabilization fiscal policy design for transition economic countries. The rest of the paper is divided into seven sections. The next three sections present the theoretical framework as well as the related empirical studies. This is followed by an explanation of the econometric procedure and data used. The proceeding section exposes the empirical findings. The last section provides some concluding remarks of this paper.

Literature Review

The interaction between fiscal and monetary policies can be explained in many ways. In the most basic macroeconomic theory, they interact as they both have an impact on some key macroeconomic variables. Fiscal policy, for one thing, affects prices via its effects on aggregate demand or via changes in indirect taxes. Monetary policy, on the other hand, affects the short-term interest rates which influences the government budget and the economic environment in which governments operate. This implies that actions by one authority have an impact on the variables underlying the policy objectives of the other.

Regarding to their impacts on inflation, the interaction between fiscal and monetary policies is slightly segmented. In the case of the government runs budget deficit financed by debt, monetary dominant or Ricardian regime exists when the government adjusts primary deficit to limit debt accumulation and the central bank does not monetize debt (Sargent and Wallace, 1981). Fiscal deficits cause inflation because governments find money creation to finance the deficits leading to inflation as a monetary phenomenon.

The fiscal theory of price level initiated by Woodford (1994; 1998) argues that a fiscal dominant regime may arise when fiscal policy is not sustainable and government bonds are considered net wealth (Barro, 1974). The wealth effects could make it difficult to

meet the objective of price stability, irrespective of the central bank commitment to low inflation (Woodford, 1994; 1998; Leeper, 1991; Sims, 1994, and Cochrane, 1998; 2001). In other words, if government solvency is not guaranteed, monetary policy will not be able to control the price level. The inconsistency of fiscal policies could lead to an inflation spiral.

The implication is that in a fiscal regime the government's fiscal policy is sustainable through debt deflation. An increase in prices erodes the real value of public debt and in turn the real value of financial wealth until demand equals supply and a new equilibrium is reached. Therefore, prices are determined by fiscal policy, and inflation becomes a fiscal phenomenon. In this sense, a monetary commitment to a low inflation target should be accompanied by a fiscal commitment in relation to the fiscal solvency.

From the government expenditure side, it is necessary to decompose fiscal policy in the discretionary and the nondiscretionary components (Canzoneri *et al.*, 2002). The discretionary component is treated as a shock that monetary policy has to face, in the line of Blanchard and Perotti (2002) or Fatás and Mihov (2003; 2006). With respect to the nondiscretionary component, the automatic stabilizers, Canzoneri *et al.* (2002) argues that it may not be necessary to impose a fiscal constraint in order to keep price stability.

Those paradigms implicitly assume that the policy for each authority is credible, i.e. committed to the announced policy. Baxter (1985) and Hauner *et al.* (2007) argue that credibility is the idea living in the minds of market agents about how close the results of a policy will be to the announced policy. In this case, the fiscal policy is credible if it induces economic agents' confidence to support the policy. Roger (2009) and Freedman and Ötoker-Robe (2010) explicitly incorporate credibility in the analysis. For them, fiscal rules may affect the inflation as a credibility-signaling effect with regard to financial markets' expectations.

Furthermore, the credibility crisis regarding the sustainability of public debt has transformed into the markets for government bonds. A new sensitivity of creditors for the risk of sovereign default has pushed up financing costs or has even cut them off from market access. Hence, the lack of a credible fiscal policy may open the door to equilibria in which accelerating inflation leads to de-monetization of the economy, even when policies are also consistent with stable equilibria. This theoretical possibility may influence the central bank thinking, even though it has rarely if ever been observed (Sims, 2004).

Previous Empirical Studies

While the credibility has an important influence on the fiscal policy effectiveness, empirical studies concerning this aspect ironically are still limited. The main problem is that the concept of credibility further remains unquantifiable. The second one is a classic: forecasting the economic prospects in the future is more of an "art" than "science". In addition, any forecasting is more difficult with annual "point estimate" target than "interval estimate" target in the shorter periods (Clark, 2011).

Some authors use different approaches when dealing with them in their own empirical studies. It seems that no general consensus on how exactly to measure credibility has

been reached so far. Minea and Villieu (2010) and Minea *et al.* (2012), for example, use institutional quality to capture the policy credibility. They show that inflation targeting does produce an incentive for governments to improve institutional quality and this monetary strategy should encourage the government to reinforce its tax collection system and rationalize its public expenditures.

From monetary policy point of view, Lucotte (2012) explores credibility based on independence of the central bank. He concludes that the adoption of inflation targeting, which involves strengthening the independence of the central bank and maintaining a low level of inflation, had a large and significant effect on the effort of tax revenue mobilization or collection. The three works deal with the impact of inflation targeting adoption on the behavior of fiscal policy and support to the conclusion that credibility matters.

In the reverse direction, Abo-Zaid and Tüzemen (2012) assess the potential impact of fiscal policy on the prices stabilization. Dealing with fiscal policy credibility, they focus on fiscal discipline. They have come to a conclusion which showed that the developed inflation targeters were leading their fiscal policy in a more disciplined manner after the adoption of inflation targeting. Furthermore, improvements in budgetary imbalances in some developing inflation targeters may have been partly due to attempts to achieve the inflation target. They also conclude that these imbalances are significantly improved when countries, especially developed countries, explicitly target inflation. Thus, the non-inflation targeters will greatly benefit by adopting the inflation targeting policy.

Budgetary discipline in terms of the budget deficit performance is used by Kadria and Ben-Aissa (2014). They try to examine whether the implementation of inflation targeting monetary policy and its discipline character allow reducing the budget deficit in emerging countries. Their empirical analysis shows that, in general, inflation targeting adoption has had a considerable and significant effect in reducing the budget deficit resulting lower inflation rate.

Some empirical studies above seem partially to assess vis-à-vis the impact of fiscal policy and monetary policy credibility. Combes *et al.* (2014), in contrast, examine the joint impact of inflation targeting and fiscal rules on fiscal behavior and inflation. Specifically, the combination of inflation targeting and fiscal rules appears to deliver more disciplined macroeconomic policies than each of these institutions in isolation. In addition, the sequencing of the monetary and fiscal reforms plays a role: adopting fiscal rules before inflation targeting delivers stronger results than the reverse sequence.

More recently, Minea and Tapsoba (2014) explore the performances of inflation targeting adoption in terms of fiscal discipline. Using a sample of developing and developed countries, they show that inflation targeting adoption exerts a positive and significant effect on fiscal discipline. Moreover, this effect is statistically significant only in developing countries, a result that may fuel the current debate regarding the relevance of inflation targeting adoption in general, and particularly for developing countries.

Studies of the effect of fiscal institutions in general and fiscal rules in particular, face severe empirical limitations. As noted by Bova *et al.* (2014), a fiscal rule, however strong, cannot substitute for commitment to comply with the rule, which is largely a political factor, and as such hard to measure. Establishing a direct link between the rule

and a given outcome is equally challenging, as the outcome may be due to a host of other factors, some difficult to observe. And even if a link is found, it may be impossible to determine the direction of causality (fiscal discipline may have led to the establishment of the rule, rather than the other way around).

Researches in Indonesia

In the case of Indonesia, most empirical works regarding inflation have been widely conducted in particular after the inflation targeting adoption. The existing empirical researches focusing on the relationship between fiscal policy and prices stabilization in Indonesia can be divided into three grand categories. The first one deals with the inter-relationship among inflation, interest rate, and exchange rate. The second one assesses the potential impact of fiscal policy on the prices stabilization. The third category deals with the joint impact of fiscal policy and monetary policy on the policy outcomes.

In the first category, Juhro (2008) observes the superiority of interest rate as a policy variable, or an operational target, against monetary base. De Brouwer *et al.* (2006) point out that the current interest rates seem to be still higher than what the rule suggested. Hsing (2008) finds that the monetary policy does not react to the change in real exchange rate and would be more responsive to a change in the inflation rate. However, according to Ramayandi (2007), Indonesia still seems to be able to handle the inflation pressure without having to increase the interest rate.

In general, they are dedicated solely to the effect of monetary policy. Linking monetary and fiscal policies, in the second group, ADB (2010) emphasizes that the track record of Indonesia in keeping inflation in the range was not so good. The target range is fairly narrow, and the inflation rate was more volatile than in other economies; hence the target was missed from time to time. The narrow band is not only changed from year to year but also highly influenced by the budget assumptions set by the Ministry of Finance.

In a broader scope, Artha (2007) finds that the central bank independence in Indonesia really brought about a shift in monetary policy from a reaction on cyclical developments to a reaction on inflation. Moreover, monetary policy is not responsive to the fiscal policy especially in the pre-inflation targeting periods. From the estimated fiscal authority's reaction function, he finds that the movement of inflation and unemployment is not significantly determining fiscal surplus.

In the third one, Hermawan and Munro (2008) suggest that fiscal policy contributes meaningfully to macroeconomic stabilization in Indonesia, leading to better outcomes than monetary policy alone. Mochtar (2004) analyzes the fiscal and monetary interaction and found that the economic crisis has generated quasi fiscal activities by the central bank. Further result shows that though it can be classified in weak form with respect to the recent fiscal reform measures introduced by the government to bring down its deficits, fiscal policy has played a dominant role in fiscal and monetary interaction in Indonesia since 1997.

Kuncoro and Sebayang (2013) show that in the short term monetary policy reacts to the fiscal policy – in the sense that government has an ability to run a primary surplus. This

action makes fiscal sustainability easier to achieve in the long run. However, fiscal policy marginally reacts to the monetary policy so that fiscal sustainability will be more difficult to attain given the opposite response of governments to public debt shocks. Furthermore, the interaction matrix indicates that monetary policy is more dominant which is in contrast with Mochtar (2004).

The empirical above-mentioned studies carried out primarily in Indonesia, however, have tended to ignore the credibility of monetary and fiscal policy. While credibility of monetary policy has been extensively addressed in the literature (Kydland and Prescott, 1977; Barro and Gordon, 1983), the credibility of fiscal rules-based policy is assessed rarely. As a result, they might bias the estimate of the effect of fiscal rules in those early studies above. A more formal re-evaluation of the impact of fiscal rules on prices stabilization, taking into account the credibility problem in policy adoption, is therefore necessary.

Research Method

It is widely argued that the high rate of inflation, as observed especially in many developing countries, is associated with important deficits, mainly financed by seigniorage revenue (see for example: Wimanda *et al.*, 2011). In the case of Indonesia, we cannot adopt this approach since by the law, the central bank of Indonesia is strictly forbidden to finance the government budget deficit. Hence, we do not incorporate the money stock growth as explanatory variable as suggested by classical economic theory. Rather than that, we prefer to consider income as used by Combes *et al.* (2014). Moreover, most studies found that the two variables are highly correlated in the context of money demand (see: Riyandi, 2012).

This paper is closely related to Combes *et al.* (2014). Unlike their study that analyzes both the dynamics of inflation rate and primary balance, we only focus on the earlier since the difference of the starting year for adopting fiscal rules and inflation targeting is short enough. Moreover, the government has the ability to run a primary surplus at the minimum level. As noted by ADB (2010), the inflation targeted is rarely met. In these circumstances, therefore, the fiscal rules policy credibility – instead of the size of deficit and debt – should be made in order to reach prices stabilization in the short- and medium-run.

By definition, inflation rate (*INF*) is the relative change in prices level (*P*). In mathematical form, it can be presented as:

$$INF \equiv \Delta \log(P_t) = \log P_t - \log P_{t-1} \quad (1)$$

When *P* evolves overtime as $\log P = (1 - \lambda) \log P_{t-1}$, so that

$$INF = -\lambda \log P_{t-1} \quad (2)$$

We want to seek the relationship between prices stabilization and credibility of fiscal rules. Fiscal rules take in the forms of deficit rule and debt rule. Furthermore, budget deficit is the difference between government revenue (*REV*) and government expendi-

ture (*EXP*). The deficit ratio (*RDEF*) is the deficit divided by GDP (*Y*). This applies for the actual (subscript A) and the planned (subscript P) budgets:

$$RDEF_A = (REV_A - EXP_A) \div Y \quad (3)$$

$$RDEF_p = (REV_p - EXP_p) \div Y \quad (4)$$

Fiscal policy is said to be credible if there is a little difference between the actual and projected fiscal measures (Naert, 2011). Hence, the difference between the actual deficit and the planned deficit ratios represents the deficit rule policy credibility:

$$Z_1 = RDEF_A - RDEF_p \quad (5)$$

The accuracy of deficit rule policy is indicated by a score of zero. If the deficit budget realization in the current period is less than what has been targeted before, the budget deficit credibility score would be indicated lower than 0. Meanwhile, if the budget deficit realization exceeds the projected figures, the score will be higher than 0.

A similar idea is applied for debt because 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 first estimate the projected total debt level as the bench mark. Following methodology used by Akitoby *et al.* (2006), we suppose that there is a steady-state (or long-run path) relationship between fiscal variable (*F*, *i.e.* total debt) and output (*Y*) given by:

$$F = A \cdot Y^\delta \quad (6a)$$

$$\log F_t = \log A + \delta \log Y_t + \varepsilon_t \quad (6b)$$

Equation (6) can also be written in the first-difference logarithmic-linear form:

$$\Delta \log F_t = \delta \Delta \log Y_t + \mu_t; \quad \mu_t = \varepsilon_t - \varepsilon_{t-1} \quad (7)$$

where Δ is difference operator, δ are parameters to be estimated, and μ_t is unsystematic disturbance terms.

Following Fatás and Mihov (2003; 2006) and Afonso *et al.* (2010), equation (7) can be added by the lagged variable to accommodate persistency:

$$\Delta \log F_t = \delta \Delta \log Y_t + \rho \Delta \log F_{t-1} + \mu_t; \quad |\rho| < 1 \quad (8)$$

where ρ indicates the degree of persistency and $(1-\rho)$ is the coefficient of partial adjustment. The above derivation makes clear the underlying assumption that there is an elasticity relationship between output and debt level (δ). The transitory deviations are random (μ).

In cases where δ is insignificant, there is no steady-state relationship between fiscal variable and output. Therefore, according to Aizenman and Marion (1993), the unex-

pected effect of fiscal policy can be calculated by fitting a first-order autoregressive process and ρ is best estimated by omitting the output variable such that:

$$\Delta \log F_t = \rho \Delta \log F_{t-1} + \mu_t \quad (9)$$

Furthermore, in the case when δ and ρ are insignificant, alternatively, we use Hodrick-Prescott (HP) filter procedure to identify the debt gap:

$$GF_t = \log F_t - (\log F_t)_{HP} \quad (10)$$

The components of μ_t in (7) and (9) and debt gap as (10) represent the debt rule policy credibility. They are still in logarithm. Hence, in order to be comparable to deficit rule credibility (Z_1), we then normalize them to 1 by taking anti-logarithm and denote as Z_2 ($Z_2 \in Z_2GDP, Z_2AR, \text{ and } Z_2HP$). Based on this formula, the accuracy of fiscal policy is indicated by a score of 1. If the debt realization were less than what has been targeted before, the credibility index would be indicated less than 1. Meanwhile, if the debt realization exceeds the projected figures, the index will be more than 1.

Ultimately, we can extend the inflation model as (2) that is a function of deficit rule policy credibility (Z_1), debt rule policy credibility (Z_2), and other control variables (X):

$$\Delta \log P_t = \Omega + (1 - \lambda) \log P_{t-1} + \theta \log Y + \varphi_1 Z_1 + \varphi_2 Z_2 + \phi_1 X_i + \xi_t \quad (11)$$

The vector X includes economic openness, dummy variable to accommodate the change in fiscal rules (*DFR*) since 2004, monetary rule, i.e. inflation targeting (*DIT*) since July 2005, and global financial crisis (*DGFC*) in 2008.

Log Y = real income

Z_1 = deficit rule policy credibility

Z_2 = debt rule policy credibility

DFR = dummy of fiscal rule, 2004 and so forth = 1; otherwise = 0

DIT = dummy of inflation targeting, July 2005 and so forth = 1; otherwise = 0

DGFC = dummy of global financial crisis 2008(1) and so forth = 1; otherwise = 0

The degree of economic openness is calculated from the following equation:

$$OPENNESS = (EX + IM) \div Y \quad (12)$$

where EX is export and IM is import values respectively.

The sample periods chosen for this study extend from 2001(1) to 2013(4). The total observation operationally is 52 sample points. Since we have the lagged variable in the model, the estimable sample would reduce, i.e. the first sample point would be eliminated. Most of the data are publicly available on quarterly basis. Even the debt data are published on monthly basis. Unfortunately, both the planned budget and the actual budget data are available only on annual basis. We interpolated them linearly into quarterly basis in order to fit to the other data.

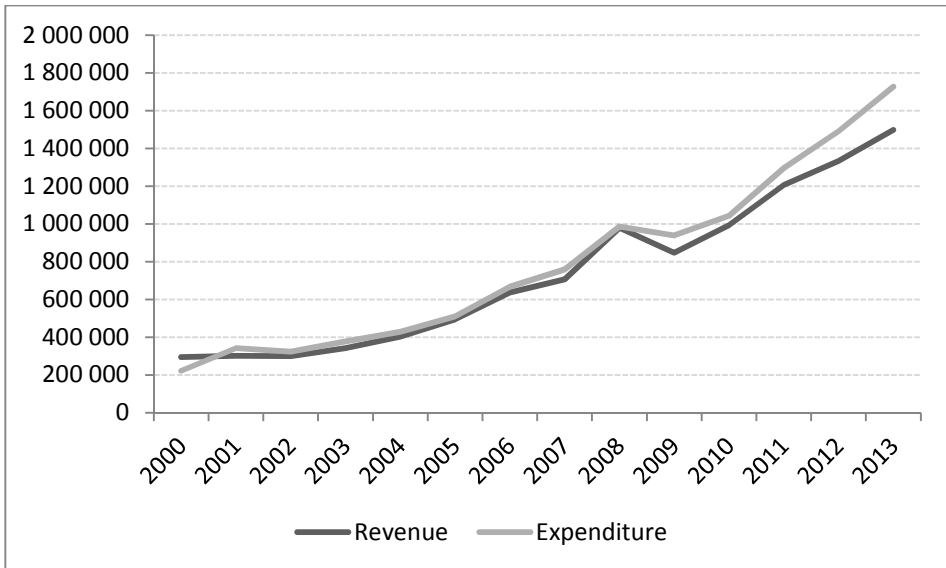
Most of the data are taken from the central bank of Indonesia (www.bi.go.id) and Central Board of Statistics (www.bps.go.id). The total debt (the summation of domestic and foreign debts) in domestic currency comes from Debt Management Office (www.djpu.kemenkeu.go.id). All of the variables are stated in 2010 base year (2010 = 1) using GDP price deflator (GDP in current price divided by GDP in constant price). The relative change in the price deflator is considered as the measurement of inflation rate. Most of the results are calculated in econometric program Eviews 8.

Empirical Results

Fiscal policy stance can be represented in many aspects. Nevertheless, the overall balance is the most important indicator to evaluate the fiscal policy. We begin our discussion with this measure. Figure 1 presents the evolution of total government revenue and total spending. It is notable that the expenditure always exceeds the revenue, implying that the overall balance is deficit.

Looking at the magnitudes, the fiscal deficit was relatively stable over time. In the relative term, the fiscal deficit was successfully maintained at less than 3 percent to GDP. However, it is also notable that there was a significant difference between the amount of deficits during pre- and post-global financial crisis periods. Since 2008, the trend of deficits has been increasing remarkably. In the beginning of crisis, the central government launched fiscal stimuli amounting 73.3 trillion Rupiah allocated mostly to social welfare to minimize the adverse economic impacts of global financial crisis.

Figure 1 Government Revenue and Expenditure [billions IDR]



Our questions in mind are: what does really Figure 1 imply? Does it mean that the fiscal policy in general has been already credible? Does the fiscal policy become less credible

when the results of the government expenditure (and revenue) policy are better than the projected ones? In our view, the use of deficit to GDP ratio as the representative indicator of credibility *per se* is inappropriate. This is because both GDP and deficits tend to be cyclical even though the size of deficit in general tends to increase overtime. Consequently, the ratio tends to be overestimated. The analogy can be applied in the debt ratio. Eventually, the conclusion would be misleading.

To evaluate the credibility of deficit and debt rules policy, we refer to the planned budget. Table 1 presents the elementary statistics covering mean, median, extreme (maximum and minimum), and standard deviation values for variables of interest. The average value of deficit rule credibility (Z_1) is positive (0.0041), indicating that the actual deficit is higher than the planned one. In contrast, the mean values of debt rule credibility (Z_2) for the three measurements are respectively close to unity implying that the actual debt is almost the same with the projected value. Given those result above, we can say that the debt rule policy is more credible than that of the deficit rule policy.

Overall, each of the median values is close enough to the respective mean. The closeness of median to the mean value preliminary indicates that all of the variables of interest are distributed normally. The symmetric distribution of the seven variables is confirmed by the moderate value of skewness. Skewness measures the symmetric or normal distribution which the value is expected to be zero. The skewness value for *Log Y* is the closest to 0 contrasts to Z_1 that is far enough from 0. The negative skewness indicates that the series are skewed to the left; the upper tail of the distribution is thicker than the lower tail. Furthermore, the deficit rule policy credibility (Z_1) has the greatest value of kurtosis. The kurtosis measures the peakedness of flatness of the distribution with an expected value of 3.0. Most of the kurtosis values of the series exceed 3 (except *Log Y* and Z_2HP). They show that the tails of the distribution are thicker than the normal (*i.e.* leptokurtic).

Table 1 Descriptive Statistics

| | Z_1 | Z_2GDP | Z_2AR | Z_2HP | $\Delta \text{Log P}$ | Log Y | Openness |
|-------------|---------|----------|---------|---------|-----------------------|----------------|----------|
| Mean | 0.0041 | 1.0013 | 1.0001 | 0.9987 | 0.0223 | 13.1137 | 0.5492 |
| Median | 0.0041 | 0.9843 | 0.9994 | 0.9943 | 0.0190 | 13.1089 | 0.5482 |
| Maximum | 0.0410 | 1.4270 | 1.0449 | 1.0899 | 0.0823 | 13.4723 | 0.7810 |
| Minimum | -0.0723 | 0.8204 | 0.9315 | 0.9338 | -0.0166 | 12.7834 | 0.4375 |
| Std. Dev. | 0.0158 | 0.1441 | 0.0209 | 0.0348 | 0.0173 | 0.2065 | 0.0674 |
| Skewness | -1.9912 | 1.1335 | -0.1941 | 0.4207 | 1.1746 | 0.0869 | 0.6611 |
| Kurtosis | 12.7147 | 4.1358 | 4.2492 | 2.6828 | 5.3948 | 1.7876 | 4.1182 |
| Observation | 51 | 51 | 51 | 51 | 51 | 51 | 51 |

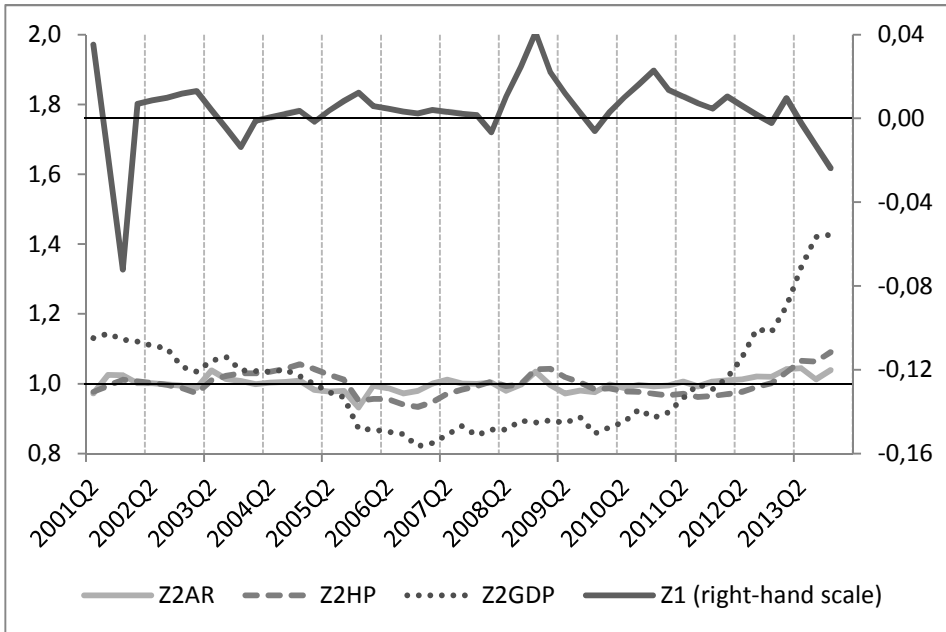
Figure 2 offers the development of deficit rule and debt rule credibility for each measurement. It seems that Z_1 is quite fluctuated (consistent with higher standard deviation compared to its mean value) and hence incredible. After some major transformations in

public finance in 2001, the deviation of actual deficit from the planned deficit was substantial. During the first half of the 2000s, it was relatively stable; the deviation tended to be narrowed. Following the global financial crisis, the actual deficit was remarkably higher than the planned one. In the 4 last years, the difference between the actual deficit and the projected deficit increased.

As far as the debt rule policy credibility is concerned, Z_2AR and Z_2HP confirm to each other. Hence, there is a synchronized pattern between the two measurements suggesting credible. In contrast, Z_2GDP has a different pattern. The actual debt was higher than the projected measure particularly in the beginning of observation and the last-third period. In the second-third, the actual debt was lower than the projected measure. Overall, both deficit rule policy and all of the three measurements of debt rule policy in the pre-significantly differ from the post-global financial crisis periods.

When we relate them to the inflation rate, inflation rate and Z_2AR are highly negatively correlated (-0.71) followed by Z_2GDP (-0.29) and Z_2HP (-0.19). Conversely, inflation rate and Z_1 has a positive correlation (0.22). Those raise a preliminary hypothesis that the deficit rule policy credibility would be a constraint for prices stabilization and debt rule policy credibility supports to the prices stabilization. We shall check it again empirically later using sophisticated econometric tools.

Figure 2 Deficit and Debt Rules Credibility



In the next section, we focus on the time series properties of each series. Many studies point out that using a 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 ADF unit roots test presents that all series do not have the same degree of stationarity³.

Dealing with the difference level of data stationary, we conduct the co-integration test. Using Johansen's maximum likelihood approach, we test the bi-variate among the five variables with 1 lag in all cases and no deterministic trend. The trace statistics together with maximum eigen-value (λ_{max}) for testing the rank of co-integration are shown in Table 2. The three tests perform the presence of the co-integrating equations (at most 2 or even 4) 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.

Table 2 Co-integration Test

| Hypothesized No. of CE(s) | Eigen-value | Trace Statistic | 0.05 Critical Value | Prob.** |
|--|-------------|--------------------|------------------------|---------|
| Unrestricted Co-integration Rank Test (Trace): Δ Log P Z ₁ Z ₂ GDP Log Y Openness | | | | |
| None * | 0.4822 | 93.8864 | 60.0614 | 0.0000 |
| At most 1 * | 0.4751 | 61.6378 | 40.1749 | 0.0001 |
| At most 2 * | 0.3604 | 30.0529 | 24.2760 | 0.0084 |
| At most 3 | 0.1524 | 8.1537 | 12.3209 | 0.2250 |
| At most 4 | 0.0011 | 0.0517 | 4.1299 | 0.8522 |
| Unrestricted Co-integration Rank Test (Trace): Δ Log P Z ₁ Z ₂ AR Log Y Openness | | | | |
| None * | 0.4585 | 88.7173 | 60.0614 | 0.0000 |
| At most 1 * | 0.4416 | 58.6563 | 40.1749 | 0.0003 |
| At most 2 * | 0.2820 | 30.1041 | 24.2760 | 0.0083 |
| At most 3 * | 0.1415 | 13.8707 | 12.3209 | 0.0273 |
| At most 4 * | 0.1224 | 6.3976 | 4.1299 | 0.0136 |
| Unrestricted Co-integration Rank Test (Trace): Δ Log P Z ₁ Z ₂ HP Log Y Openness | | | | |
| None * | 0.4927 | 88.0541 | 60.0614 | 0.0000 |
| At most 1 * | 0.4520 | 54.7992 | 40.1749 | 0.0009 |
| At most 2 * | 0.2395 | 25.3251 | 24.2760 | 0.0368 |
| At most 3 | 0.1473 | 11.9130 | 12.3209 | 0.0584 |
| At most 4 | 0.0804 | 4.1043 | 4.1299 | 0.0508 |

* denotes rejection of the hypothesis at the 0.05 level
** MacKinnon-Haug-Michelis (1999) p -values

After ensuring that all of the variables of interest are co-integrated, we move on the analysis of the magnitude of influence for each independent variable on the inflation rate. Table 3 reports the OLS estimation results of three regression models as specified in equation (11) in the previous section. The inflation rate equation is generally in line with the existing literature. Most of the hypothesized variables are found to be statisti-

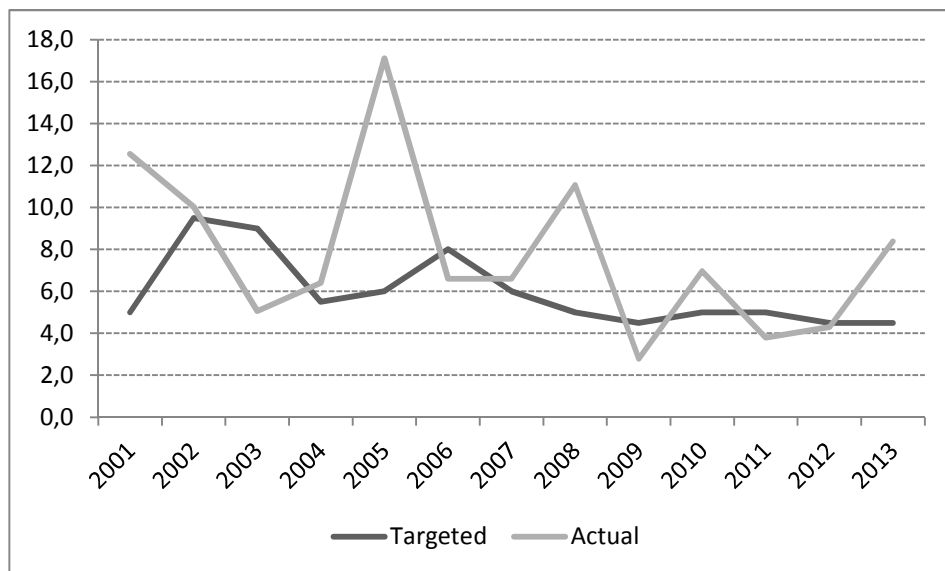
³ We do not report the unit roots test because of lack of space. The complete result can be obtained from the author upon request.

cally significant at the 5 percent or least at the 10 percent confidence level. In some cases, the significance is at the 1 percent confidence level. They are confirmed by the relatively high coefficient of determination (R^2) and F statistic values.

The results show that the deficit rule policy credibility is statistically insignificant in all of the three model specifications. Moreover, the magnitude is inconsistent, i.e. positive in GDP and HP models but becoming negative in AR model. These results inform us that the incredible deficit rule policy, in the form of large deviation from the planned budget, has no impact on the prices stabilization. This supports the result of correlation analysis as explained previously. What is particularly interesting about those results above is that there is coincidence between incredibility of monetary policy rule and deficit rule policy.

Figure 3 probably can explain why. Since the central Bank of Indonesia announced the target of inflation rate for the first time in 2000, the implementation of inflation targeting has been rarely satisfied either in decreasing inflation rate or in directing the actual inflation rate to its target. There are two possible explanations. First, the central bank targets the inflation rate too low in order to control public expectation about formation of inflation. Second, the central bank cannot perfectly predict the actual inflation rate due to the change in the actual deficit rate.

Figure 3 Comparison of the Inflation Targeted and Actual Inflation Rates



Source: Bank Indonesia (www.bi.go.id accessed on March, 11, 2014)

It seems that the latter is more suitable. As previously noted by ADB (2010), the narrow band is not only changed from year to year but also highly influenced by the budget assumptions set by the Ministry of Finance in particular the world oil price. The unpre-

dictable increase in the world oil price induces the large amount of oil subsidy to maintain domestic oil price. As a result, the budget deficit decreases after the government reduced subsidy through increases the domestic oil prices. The unpredictability of the world oil prices and subsidy and hence deficit generates uncertainty in the inflation rates which are difficult for the central bank to anticipate. In short, it seems that there is a weak policy coordination between monetary and fiscal authorities.

The debt rule policy credibility – as previously hypothesized – successfully reduces the inflation rate particularly in AR and HP model specifications. It implies that the narrow gap between the actual debt level and its target reduces substantial uncertainty in the current period than is transformed into lower risk in the prices level. Eventually, the behavior of inflation rate tends to be stable or even decline in the long-run with respect to the increase in credibility of debt rule.

Table 3 Estimation Results of Inflation Rate

| | Coeff. | Prob. | Coeff. | Prob. | Coeff. | Prob. |
|----------------------|---------|--------|---------|---------|---------|--------|
| Constant | -3.4726 | 0.0087 | -1.7647 | 0.0157 | -2.5057 | 0.0093 |
| Z ₁ | 0.0373 | 0.7763 | -0.0186 | 0.8489 | 0.0650 | 0.6009 |
| Z ₂ GDP | -0.0440 | 0.1366 | - | - | - | - |
| Z ₂ AR | - | - | -0.4846 | 0.0000 | - | - |
| Z ₂ HP | - | - | - | - | -0.1165 | 0.0994 |
| Log Y | 0.2728 | 0.0097 | 0.1735 | 0.0031 | 0.2036 | 0.0090 |
| Openness | 0.1236 | 0.0054 | 0.1075 | 0.0013 | 0.1005 | 0.0160 |
| Log P _{t-1} | -0.2199 | 0.0013 | -0.1367 | 0.0038 | -0.2021 | 0.0012 |
| DFR | 0.0116 | 0.2002 | 0.0089 | 0.1382 | 0.0240 | 0.0026 |
| DIT | 0.0256 | 0.0212 | 0.0165 | 0.0489 | 0.0260 | 0.0165 |
| DGFC | 0.0348 | 0.0026 | 0.0239 | 0.0082 | 0.0399 | 0.0011 |
| R ² | | 0.5561 | | 0.7312 | | 0.5614 |
| R ² -adj | | 0.4716 | | 0.6800 | | 0.4779 |
| SEE | | 0.0126 | | 0.0098 | | 0.0125 |
| F | | 6.5778 | | 14.2839 | | 6.7209 |
| DW | | 2.5178 | | 1.6462 | | 2.3735 |
| N | | 51 | | 51 | | 51 |

Since the AR model provides a better result, we move our analysis focusing merely on it. Overall, the adoption of fiscal rules cannot make a difference of the inflation rate behavior. This conclusion is obtained from the coefficient of fiscal rule adoption dummy (*DFR*). It seems that institutional factors remain the obstacles for the fiscal authority to support the prices stabilization. This finding is basically in line with Combes *et al.* (2014). Therefore, this result suggests the feasibility to establish the fiscal council with independent powers to conduct the credible fiscal policy.

Conversely, the coefficient of dummy of inflation targeting (*DIT*) has a positive sign and statistically significant at the 5 percent confidence level, strongly suggesting that

the behavior of the central bank of Indonesia toward inflation has been changed after inflation targeting period. At this period, the central bank of Indonesia seems to be more responsive and concerns to the inflation rate as found by Artha (2007). Having compared the significance of dummy coefficients of fiscal rule and inflation targeting adoption, we can infer that there is no reaction between fiscal and monetary policy.

Furthermore, looking at the other control variables, the estimated coefficient of output growth is statistically significant, suggesting that inflation rate is on average procyclical in our sample. When the actual output is above the previous one, the inflation rates will be higher. In such a case, the output growth which represents the cyclical situation in economy plays an important role in determining prices level fluctuation. It seems that prices stabilization requires the economic stabilization. In addition, the positive and significant effect of degree of economic openness points to the sensitivity of inflation rates to external shocks.

The estimation of the coefficients of lagged dependent variable is highly significant for all of the models specification. The associated coefficient displays persistence. The inflation rates persistence can be considered as a measure of the degree of dependence of current inflation rates volatility behavior on its own past developments. The coefficient of lagged dependent variable is 0.14, suggesting that a change in the inflation rates between quarter $t-1$ and t drives up the inflation rate process in quarter t only 14 percent partial adjustments to respond to the desired/targeted inflation rate. Consequently, the inflation rate tends to be less persistent than to respond to economic conditions in the short-run.

As expected, there is a significant difference of inflation rates between pre- and post global financial crisis. This is verified by the coefficient of *DGFC* which is statistically significant at the 1 percent confidence level. The inflation rates tend to be higher in the post-global financial crisis. As a result, the real value of debt stock consistently declines. In contrast, the high inflation rates in the corresponding period enforce the government to increase various subsidies resulting higher deficits. Thus, this makes the debt rule policy credibility is higher compared to the deficit rule.

Concluding Remarks

This paper aims at analyzing the co-movement between fiscal policy and monetary policy in the case of Indonesia. More specifically, we observe the potential impact of fiscal policy credibility on the possibility of price stabilization in the inflation targeting framework. Motivated by the fact that empirical studies concerning this aspect are still limited, we take the case in Indonesia over the period 2001-2013. We quantify the fiscal rules credibility measure using the deviation of actual budget from the projected one.

Based on the ordinary least squares method applied on the quarterly data analysis, we conclude that credibility matters although it typically depends on characteristics of fiscal rule commitment. On one hand, credibility of debt rule policy reduces the inflation rate. In contrast, the deficit rule policy – which is incredible – does not have any impact on the inflation rate and therefore does not support to inflation targeting. Accordingly, those findings suggest strengthening the coordination between monetary and fiscal

policies to maintain fiscal sustainability in the long-term in accordance with prices stabilization policy.

This paper considers mainly fiscal factors to analyze the prices stabilization. Further studies are advisable to integrate monetary policy, fiscal policy, and international economic policy frameworks. Using the higher frequency data (hopefully monthly fiscal data, if any), the future research can re-check the effectiveness of monetary policy and fiscal policy relative to international economic policy credibility in order to stabilize either prices level or exchange rates in the long-run. Indeed, the prices stability is one of the hottest issues in most developing countries and Indonesia is not an exception.

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