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The cyclicality of government expenditure in developing country: the case of Indonesia

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Abstract
This paper analyzes the cyclicality and the relationship between government expenditure and output of Indonesia, 1999-2012 using Johansen co-integration test and the error correction model. The results confirm that in the short-run the government expenditure reveals counter-cyclical but pro-cyclical in the long-run. Output and government expenditure are co-integrated and it implies the existence of long-term relationship. The value of short-run elasticity coefficient for government expenditure is relatively high. In contrast, the long-run elasticity coefficient is lower and statistically greater than unity confirming the voracity hypothesis. Furthermore, there is no significant difference of government spending in good and bad times.

Abstrak
Makalah ini menganalisis siklus dan hubungan antara pengeluaran pemerintah dan output Indonesia selama 1999-2012 dengan menggunakan teknik uji ko-integrasi Johansen dan model koreksi kesalahan. Hasil empiris mengkonfirma-sikan bahwa dalam jangka pendek pengeluaran pemerintah menunjukkan adanya counter-cyclical, tetapi dalam jangka panjang terhdap pro-cyclical. Variabel output dan belanja pemerintah terkointegrasi sehingga menyiratkan adanya hubungan jangka panjang antara keduanya. Nilai koefisien elastisitas jangka pendek untuk pengeluaran pemerintah relatif tinggi. Sebaliknya, koefi-sien elastisitas jangka panjang lebih rendah dan secara statistik lebih besar dari-pada kesatuan yang mengkonfirmasi voracity hypothesis. Selain itu, tidak ada perbedaan yang signifikan dari pengeluaran pemerintah baik pada situasi yang baik maupun buruk.

Introduction

In the last decade, the importance of government expenditure has received much attention of academicians and policy makers (see for example: IMF, 2008). Government expenditure and factors of their growth are a serious problem of many countries. The main question is whether government spending (broadly speaking fiscal policy) is really effective to stabilize macroeconomic condition in particular during global financial crisis in the late of 2008.

For academicians, the controversy arises between Keynesian and Classical schools of thought. Keynesian thought traditionally, on one hand, emphasizes on an active role in fiscal policy for economic stability throughout aggregate demand management. On the other hand, Classical economists have negative views of fiscal stabilizing policy regarding the Ricardian equivalence or even crowding out effect (Romer, 2012).

For policy makers, fiscal policy is less popular compared to monetary policy to control economic fluctuations. Besides

the longer policy lags than monetary policies, the failure of fiscal policies in Latin America during the 1980s and Japan during the 1990s gave a negative experience to authorities for controlling business cycles by fiscal policies. Moreover, the government failure to intervene economy is often far stronger and more harmful than potential market failure (Gingrich, 2007).

However, the ineffective monetary policy particularly in the case of the zero lower bound on nominal interest rate in recent years has encouraged policy makers to rely on fiscal policy (Christiano, Eichenbaum, and Rebelo, 2011) through fiscal stimulus packages. Hence, the central issue is then how optimal fiscal policy should be conducted. While fiscal policy in industrial countries is either a-cyclical or counter-cyclical, fiscal policy in developing countries is, by and large, pro-cyclical.

Knowing cyclicality of the size of fiscal multipliers is important for governments. In its most basic form, the fiscal multiplier corresponds to the change in output for a change in a fiscal policy instrument such as government spending, transfers or taxes (Chinn, 2012). Basically, if fiscal multipliers are high, fiscal policy has large effects on the real economy; it means that expansionary spending is an efficient way to boost the economy. Nevertheless, Galí (1994) and Fatás and Mihov (2007) warned that countries aggressively implementing pro-cyclical fiscal policy will have less desirable volatility and lead to lower economic growth. Similarly, Rother (2004) argued that fiscal discretion affects de-stabilization rather than the stability of the macro economy.

The existence of trade-off between growth and stabilization pushed governments to reevaluate the effectiveness of their fiscal policy. As the economy grows, the economic policies of governments should have a tendency to more heavily focus on economic stabilization rather than economic growth. In fact, the advanced economies have a priority of economic stabilization over economic growth. Conversely, the emerging economies tend to emphasize to economic growth relative to stabilization. With regard to its cyclicality, can fiscal policy (more specifically government expenditure) effectively offer a better precondition to achieve them simultaneously in the long-run?

Indonesia provides a unique opportunity to assess the nature of government spending cyclicality. Asian financial crisis in 1997/98—with all consequences—directed government expenditures to focus on the economic recovery. Then, the global financial crisis in 2008, pushed the government to attempt to revive economic activity through various fiscal stimulus measures. After that, gradually Indonesia in 2010s is one of the largest developing countries to implement various economic liberalization reforms that produce strong economic growth (Hur, *et al.*, 2010; Abdurahman, 2013). Therefore, lessons from Indonesia will be useful to develop a better stabilization or adjustment policy design for developing countries.

This paper enriches the literature on fiscal policy in the context of economic stabilization in developing countries with focus on Indonesia. The motivation for this approach associates to the fact that the size of government is relatively small so the scope for actively promoting economic growth remains limited. Moreover, based on the past experiences of external shocks, Indonesia consistently conducts some prudent macroeconomic policies to prevent their negative impacts in the short and medium terms so it would be suboptimal to cut back government expenditure to make more room for domestic instability. Therefore, implementing pro-growth, pro-job, and pro-poor fiscal measures is likely to require an increase in the size of the government spending.

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 government expenditure cyclicality and long-run and short-run relationship between output and government expenditure. In the end, we conclude with a summary of key findings.

Economic performance is greatly influenced by the level and the structure of government expenditure. The development of government expenditure lays both in the political and economic tracks. In the political context, it is often associated with voracity effect. Voracity effect occurs if a positive shock to income leads to a more than proportional increase in public expenditure even if the shock is expected to be temporary. The voracity is usually attributed to weak institutions and ethnic fractionalization, manifested in the presence of multiple interest groups seeking to secure a greater share of national wealth by demanding larger public expenditure on their behalf (Akitoby, *et al.*, 2006).

In the economics literature, the development of government expenditure could be traced back to Wagner´s law. Wagner's law states that government activity increases as economies grow. As countries become more developed, the demand for public goods raises and is consistent with the increasing ability to collect the necessary funds. It implies that the elasticity of government expenditure compared to GDP is greater than one. It seems that both Wagner's law and voracity effect support to the notion of passive role of government expenditure.

The Keynesian view, in contrast, proposes the role of discretionary fiscal policy to boost aggregate demand and support growth. The public expenditure should act as a stabilizing force implying that, ideally, the government expenditure should increase during the recession, to induce the aggregate demand. On the other hand, it should be reduced during the economic booms. Hence, the Keynesian perspective suggests an active fiscal policy and relies on the size of government expenditure multiplier in smoothing the impact of shocks.

There are several methods to estimate the government expenditure multiplier including recursive approach (Fatás and Mihov, 2003; Galí *et al.*, 2007), structural vector auto-regressions/VAR (Blanchard and Perotti, 2002), narrative approaches (Ramey and Shapiro, 1998), sign restriction (Mountford and Uhlig, 2009), DSGE model simulations (Kamps and Caldara, 2006; Coenen, *et al.*, 2012), and case studies (Romer and Romer, 2008; Ramey, 2011). In fact, they have different strengths and weaknesses in addressing the challenge of methodological issues.

The first issue is how large exactly the government expenditure multiplier. As stated by Hemming *et al.* (2002), the simulation results of some of the macroeconomic models in developed countries showed positive short-term multipliers of fiscal policy ranging from 0.1 to 3.1. Blanchard and Perotti (2002) have estimated government spending multipliers using VAR. They found that a positive shock on government spending (deficit increased by a flat tax) has a positive effect on output, although its effects tend to weak. Hall (2009) and Ramey (2011) synthesized this large and rapidly-growing literature for the US and suggest that one-year government spending multipliers are somewhere between 0.5 and 1.5.

Ilzetzki, Mendoza, and Végh (2012) assembled quarterly fiscal and national accounts data for a sample 27 emerging markets and used VAR-based identification schemes to estimate a one-year government spending multiplier equal to about 0.3. Kraay (2012a, 2012b) develops an identification strategy based on the fact that there are substantial lags between the approval and implementation of aid-financed devel-

opment projects. Isolating a component of fluctuations attributed to aid project approval decisions from previous years, they provide evidence suggesting that the government spending multiplier is somewhere between 0.4 and 0.5 on average, in a large sample of developing countries.

Along with the wide range of fiscal multiplier, the second issue is that the fiscal multipliers are not constant, but vary with country characteristics, the stance of monetary policy, and the state of the business cycle. Auerbach and Gorodnichenko (2012a) documented that this is the case empirically in the US and in a sample of OECD economies. Among developing countries, both Ilzezki, Mendoza, and Végh (2012) and Kraay (2012b) also provide evidence suggesting that multipliers are larger during recessions.

The third issue deals with its cyclicality. This interest was triggered by a work of Gavin and Perotti (1997) which found that fiscal policy is highly procyclical in Latin American countries. This finding was in contrast with the previous studies by Galí (1994) and by Fiorito and Kollintzas (1994), and Fiorito (1997), which found that for developed countries expenditures were either counter-cyclical or a-cyclical. It therefore followed that cyclicality of fiscal policy differed significantly between developed and less developed countries.

Various hypotheses have been put forward by economists to explain variations in fiscal cyclicality between advanced and developing economies. As per those hypotheses, the differential in the cyclicality in fiscal policy between advanced and developing economies arises from: (i) restrictions on access to domestic (Caballero and Khrishnamurthy, 2004) and/or international credit markets (Gavin and Perotti, 1997; Calderón and Schmidt-Hebbel, 2008); (ii) institutions or political structures (Alesina *et al.*, 2008; Thornton, 2008; Talvi and Végh, 2005); and (iii) the polarization of preferences associated with social inequality (Woo, 2009).

The fourth problem is endogeneity. The analysis of fiscal policy cyclicality proposes that the behavior of government spending is in response to output fluctuation. The output is not purely exogenous variable but it also is influenced by fiscal policy. The failure to address this problem causes simultaneity bias and consequently the cyclicality of fiscal policy could be misleading (see for example: Spilimbergo, Schindler, and Symansky, 2009). Some authors then used several strategies to handle it including instrumental variable, lagged output, auto-regression, some additional control variables, GMM (General Moment of Method), and two stages least square methods in order to allow for feedback effects.

Afonso, Agnello, and Furceri (2010) elaborated some issues above using integrative approach. They decomposed fiscal policy into three components: responsiveness, persistence, and discretion. The responsiveness of the fiscal policy can be considered as the stabilization theory. The fiscal persistence and discretion can be interpreted as the behavior of the government. For them, fiscal persistence can be considered as a measure of the degree of dependence of current fiscal behavior on its own past developments. Using a sample of 132 countries, their results point out that fiscal policy tends to be more persistent than to respond to output conditions.

In reality, evidence of pro-cyclicality in fiscal policy has been covered in a number of studies (see for example: Lane, 2003). Unfortunately, there has been no general consensus so far within and across countries. Regardless some methodological issues identified above, it seems, however, that counter-cyclicality in developed countries and pro-cyclicality of fiscal policy in developing countries have become the received wisdom (Kaminsky, Reinhardt, and Végh, 2004).

In the case of Indonesia, the empirical studies on the related topic are limited. Simorangkir and Adamanti (2010), for example, assessed the effectiveness of fiscal stimulus in accordance with the global financial crisis. Using financial computable general equilibrium approach, they found that relative to the effectiveness of fiscal expansion without monetary policy expansion or monetary expansion without fiscal expansion, the combination of those two policies is more effective. Therefore, the combination of fiscal and monetary expansion has a large multiplier effect, boosting aggregate demand.

Basri and Rahardja (2011) found that unanticipated shocks in central government spending had a little negative effect on real GDP. By using VAR models, they also found that impact multipliers for unanticipated tax shocks to real GDP are higher than that of unanticipated shocks in government spending. In the same spirit, Hur, *et al.* (2010) found the similar results. The fiscal stimulus programs have contributed substantially to developing Asia's countries (including Indonesia) faster and stronger than expected recovery from the global financial crisis.

Regarding to the cyclicality of fiscal policy, Akitoby *et al.* (2004) and Baldacci (2009) had not found any counter-cyclicality in fiscal policy, i.e. the Indonesian fiscal policy tends to be more a-cyclical or even pro-cyclical. Abdurohman (2013) investigated the practical behavior of fiscal policy in Indonesia in response to economic cycles to establish whether it follows general fiscal wisdom or amplifies the cycle. He showed that fiscal policy in Indonesia tends to be pro-cyclical.

Jha, *et al.* (2010) found the absence of cyclicality of fiscal policy in the case of developing Asian countries including Indonesia. Overall, their panel empirical results lend limited support to the popular belief that counter-cyclical fiscal policy boosted aggregate demand and output. However, in the longer perspective, Surjaningsih, *et al.* (2012) concluded that government spending is more effective to stimulate economic growth especially in times of recession, compared to taxation policies.

Methods

Most studies analyzing the cyclicality of government expenditure and output in developed and developing countries have used a yearly panel data methodology that has not fully exploited the time-series properties of the data. On the other hand, studies testing for a long-run relationship, such as Wagner's law, ignored the short-term aspects of this relationship. In the literature on cyclicality, many studies use panel data models that are not well suited to explore short-term versus long-term relationships.

This paper also would be to provide an overview of issues regarding the cyclicality of government spending in the context of developing countries. We contribute to the literature in several ways. Firstly, we conduct the analysis at the single country-level instead of large number of countries and a wide time-frame. This is because some of the conventional wisdoms on the cyclicality of fiscal policy are based on aggregate (global) data even though policy makers are typically concerned with the behavior of business cycle at their own country level.

Secondly, we analyze the behavior of cyclicality of government expenditure in relation to business cycle referring to actual output gap instead of potential output gap (i.e. output is below its potential). Generally, many researchers (Lane, 2003; Fatás and Mihov, 2007; among others) used Hodrick-Prescott (HP) filter procedure to estimate the potential output. The potential output gap is then calculated by differencing between the actual output and the HP-filtered output.

The motivation for our approach relates to the fact that measuring potential output in developing countries including

Indonesia is difficult. The major reason for this is most likely due to the limited availability of reliable, long, and high frequency data quality. As a consequence, it is not easy to discuss business cycles or cyclicality per se. Therefore, we alternatively employ actual output gap (i.e. output in the current period is below its previous period by assuming that output in the previous period is the potential one).Accordingly, we focus on co-movements of government expenditure and output as a proxy for cyclicality.

As was already noted, fiscal policy is a possible automatic stabilizer. The most important fiscal policy lever in the hands of the Indonesian government is government consumption. It would be worthwhile to see how change in government consumption impacts the final output in the economy. Following methodology used by Akitoby *et al.* (2006), we suppose there is a steady-state (or long-run path) relationship between government expenditure and output given by:

$$G = A Y^{\delta} \qquad (1)$$

G represents government expenditure and *Y* means output. Equation (1) can also be written in linear form:

$$\text{Log } G = \text{Log } A + \delta \text{ Log } Y + \mu \qquad (2)$$

If the adjustment of expenditure *G* to its steady-state *G** is gradual, then the level of expenditure will respond to transitory changes in output, and *G* will move gradually toward its steady-state, or equilibrium level. To capture this gradual move, we specify a general autoregressive distributed lag specification in period *t*:

$$\text{Log } G_t = a + \alpha \text{ Log } G_{t-1} + \beta_1 \text{ Log } Y_t + \beta_2 \text{ Log } Y_{t-1} + \varepsilon_t; \ |\alpha| < 1 \qquad (3)$$

We can solve for the static, steady-state equilibrium by assuming that output is at its steady-state level *Y** and ignoring the error term:

$$\text{Log } G^* = a/(1-\alpha) + (\beta_1+\beta_2)/(1-\alpha) \text{ Log } Y^*; \ \delta = 1 - \alpha \qquad (4)$$

More generally, we could allow output to grow at rate *g*. In this case, the only difference is that the constant term becomes $[a+(\beta_1-\delta)g]/[1-\alpha]$, which depends on *g*. To reflect the steady state, (3) can be rearranged as the error correction model:

$$\text{Log } G_t = a + \beta_1 \text{ Log } Y_t + \gamma (\text{Log } G_{t-1} - \delta \text{ Log } Y_{t-1}) + \varepsilon_t \qquad (5)$$

In (5), we can interpret β_1 as the short-run elasticity of government expenditure with respect to output. It also represents the cyclicality of government expenditure in response to business cycle.

The error correction term $[\gamma (\text{Log } G_{t-1} - \delta \text{ Log } Y_{t-1})]$ captures deviations from the steady state, or long-run equilibrium, where δ is the long-run elasticity of government expenditure with respect to output, and γ is the rate at which government expenditure adjusts to past disequilibrium. Term '*a*' is constant of the model and ε_t means residual component of long-term relationship.

Moreover, (5) can be rewritten as (6) and then used to test if there is a long-run relationship between government expenditure and output. In particular, following (2), if γ is significantly different from zero in (6), then output and government expenditure are co-integrated.

$$\text{Log } G_t = a + \beta_1 \text{ Log } Y_t + \gamma \text{ Log } G_{t-1} - \varphi \text{ Log } Y_{t-1} + \varepsilon_t \qquad (6)$$

where $\varphi = \gamma\delta$. According to Engle and Granger (1987), (6) can be also re-parameterized as follows:

$$\Delta \text{ Log } G_t = a + \beta_1 \Delta \text{ Log } Y_t - \gamma \text{ ECT}_{t-1} + \varepsilon_t \qquad (7)$$

where ECT is μ as in (2).

The above derivation makes clear the underlying assumption that there is an elasticity relationship between output and expenditure, while the transitory deviations are random. In cases where γ is insignificant, there is no steady-state relationship

between fiscal variable and output, and β_1 is best estimated by omitting the error-correction term such that:

$$\Delta \text{Log } G_t = a + \beta_1 \, \Delta \text{Log } Y_t + \varepsilon_t \qquad (8)$$

Equation (8) is the base-line regression. It will be further extended by splitting $\Delta \text{Log } Y_t$ into positive actual output gap ($\Delta \text{Log } Y_t +$) as well as negative actual output gap ($\Delta \text{Log } Y_t -$). This is done to identify asymmetric response of government expenditure to good and bad periods:

$$\Delta \text{Log } G_t = a + \pi_1 \, (\Delta \text{Log } Y_t +) + \pi_2 \, (\Delta \text{Log } Y_t -) + \varepsilon_t \qquad (9)$$

In relation to economic stabilization goal, we expect that the coefficient of π_2 is positive and statistically lower than the negative value of π_1.

Since we concern with cyclicality, we need reliable and long span time series data on government expenditure and GDP. The GDP data are available in quarter basis. Unfortunately, the quarterly data of government budget are publicly unavailable. Data on monthly cash disbursement of functional government budget has never been released by Ministry of Finance to the public. In addition, the quality of interpolated annual data into quarterly data that was used by some researchers is quite questionable. Regarding to the limitation, we analyzed quarterly data on government expenditure derived from the national income standard account based on expenditure approach. This is intended that our study will be comparable to similar studies in other countries.

The sample periods chosen for this study extend from 1999(1) to 2012(4). The total observation is 56 sample points. The term government expenditure used in this study is central government general consumption or recurrent expenditure realization (mostly allocated onto wage/salary and goods/services purchase) excluding interest payment of government debts. The recurrent expenditure dominates (almost 90 percent)

to the capital expenditure of the total government spending. Therefore, the earlier is representative for analyzing fiscal policy. The general government spending and output are presented in 2000 constant price. All of the data are taken from the central bank of Indonesia (www.bi.go.id). Most of the results are calculated in econometric program Eviews 8.

Results and Discussion

Government expenditure helps overcoming the inefficiencies of the market system in the allocation of economic resources. It also helps smoothing out cyclical fluctuations in the economy and influences a level of employment and price stability. Thus, government expenditure plays a crucial role in the economic growth of a country. Figure 1 presents the two variables of interest, the rate of change of output and the rate of change of public expenditures.

The trend of output growth dropped significantly in 1997/98 corresponding to the subsequent impact of Asian financial crisis. In line with economic recovery programs, the annual output growth was very low but still positive. Coincidently, the huge government expenditure increased due to food and energy subsidies in order to secure the lower-layer income receiver households. In the proceeding four years the growth rates of government spending and output fluctuated and hence there was a little synchronized pattern along with economic reformation programs. In contrast, since 2002 there was a large similarity between the two rates of growth in the opposite direction.

When we divide the sample period into pre- and post-global financial crisis, the conclusion does not substantially change. In the pre-period of global financial crisis (starting from 2008(3)), the correlation coefficients are -0.42 and -0.31 respectively. The statistical evaluation above confirms the weak co-movement between output and expenditure growth rates. This,

of course, creates a negative correlation in the long-run. As Figure 1 shows, the long-run correlation between output growth and expenditures growth is moderate and might dominate the short-run correlation. We therefore need to control for this long-run correlation in order to derive a more accurate estimate of cyclicality of fiscal policy.
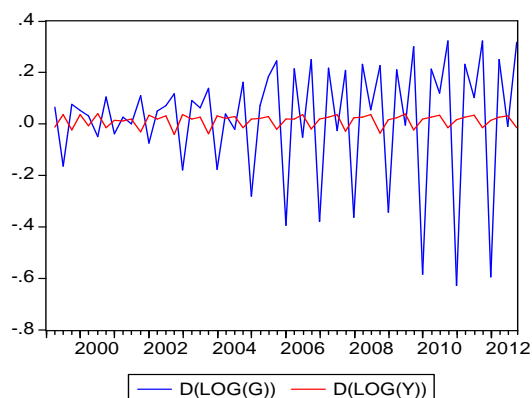

Figure 1: Growth Rates of Output and Government Expenditure

In the proceeding section, we focus on the time series properties of each series. Many studies point out that using non-stationary macroeconomic variable in time series analysis causes superiority problems. It is well known in literature that applying regression on a set of non-stationary series is likely to produce a spurious estimation. Thus, a unit roots test should precede any empirical study employing such variables. We decided to make the decision on the existence of a unit roots through Augmented Dickey-Fuller (ADF) test and Phillip-Perron (PP) tests.

The test is conducted 4 times for the level and first difference data respectively. The results of ADF and PP tests are reported in Table 1. The tests confirm the stationary of all-time series on the first difference. Both tests are concluded that all the va-

riables are non-stationary in their level. Hence, the ADF and PP tests were applied to the transformed series of each variable to check for the possibility of stationary in first differences. In the first difference forms, all the variables are become stationary.

Testing the stationary is the essential assumption for implementation of co-integration approach. Co-integration is an important concept to analyze the long-run behavior of the data. It is necessary to confirm that time series are non-stationary at level data but stationary at first difference. Using Johansen's maximum likelihood approach (Johansen, 1988; 1991), we test the bi-variate between the two variables. The trace statistics together with maximum eigen value (λ *max*) for testing the rank of co-integration are shown in Table 2.

The null hypotheses of non-stationary can be rejected at 5 percent or even 1 percent significance level. It implies that the series data have a unit roots and does not demonstrate the existence of a common trend in those series. It also implies that the behavior of the variables varies around to the mean value and invariant overtime (Enders, 2004). The occurrence of unit roots in the series gives a preliminary indication of shocks having permanent or long lasting effect, thus making it very difficult for traditional stabilization policies to survive.

Furthermore, both tests suggest the presence of two co-integrating equations at 5 percent level or even 1 percent significance level 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 1: Unit Roots Test

Variable to be Tested	Level		First Difference	
	ADF	PP	ADF	PP
Log (G)	-1.421622	-3.211597*	-3.998373*	-40.28619*
Log (Y)	2.190905	1.620373	-3.257697*	22.83643*

(*) denotes significant at 1 percent level

Table 2: Co-integration Test

Series: Log (G) Log (Y)				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.6803	70.1209	18.17	23.46
At most 1 **	0.1463	8.5444	3.74	6.40

* (**) denotes rejection of the hypothesis at the 5% (1%) level

Trace test indicates 2 co-integrating equation(s) at both 5% and 1% levels

Table 3: Estimation Results

Model Dep. Var: Δ(Log (G))	(A)	(B)	(C)	(D)	(E) Dep. Var: Log (G)	
C	0.0652 (0.0592)	2.5379 (0.0091)	5.4858 (0.0000)	0.0525 (0.0036)	C	-9.3075 (0.0000)
Δ(Log (Y))	-3.4926 (0.0078)	-3.3391 (0.0075)	-	-2.7995 (0.0001)	Log (Y)	-2.8039 (0.0001)
Δ(Log (Y))+	-	-	0.8514 (0.8985)	-	Log (G(-1))	-0.2396 (0.0000)
Δ(Log (Y))−	-	-	-18.1262 (0.0311)	-	Log (Y(-1))	4.5163 (0.0216)
Log (G(-1))	-	-0.2371 (0.0109)	-0.5380 (0.0000)	-		-
ECT(-1)	-	-	-	-1.2421 (0.0000)		-
DGFC	-	-	0.2824 (0.0008)	-		-
R^2	0.1260	0.2295	0.4068	0.7781		0.8856
R^2-adj	0.1095	0.1998	0.3594	0.7695		0.8789
SEE	0.2206	0.2091	0.1871	0.1122		0.1129
F	7.6399	7.7423	8.5725	91.1488		131.6038
DW	2.7953	2.3861	2.0373	1.7059		1.7200

Figures in parentheses are *p*-value

The diagnostic tests can be obtained from the author on request

Table 3 reports the OLS estimation results of five models specified in the previous section. We start with the simplest model connecting directly the growth rates of government spending and output (Model A). Surprisingly, the corresponding coefficient is negative, -3.49, and statistically significant. It suggests that the government decreases 3.49 percent as a response of 1 percent increase in output growth. Unfortunately, this result suffers some econometric problems, i.e. normality of residuals and serial correlation.

Estimation of the model with lag of dependent variable, as is actually done by Afonso, Agnello, and Furceri (2010) to avoid endogeneity, offers a better and con-sistent result. Model B yields a lower coefficient, -3.34. The problems of normality of residuals and serial correlation are not experienced anymore. This means that according to this test government expenditure in Indonesia is moderately counter-cyclical.

As proposed by Afonso, Agnello, and Furceri (2010), fiscal persistence can be considered as a measure of the degree of dependence of current fiscal behavior on its own past developments. The coefficient of persistence is 0.24 implying that only 24 percent partial adjustment to respond to the desired expenditure. Consequently, the government spending tends to be less persistent than to respond to output conditions.

Modifying their model by splitting into positive and negative output growth rates provides the same conclusion of counter-cyclicality. Model (C) offers that the short run coefficient of elasticity with respect to positive growth shocks is 0.85; statistically insignificant. On the other hand, the short-run elasticity coefficient of negative output growth shocks is much higher than the original model, -18.13. It seems that government expenditure tends to increase faster in the recession periods. It suggests that stabilization—instead of economic growth—has already become the primary objective in Indonesian economic development.

This finding confirms to Ilzezki, Mendoza, and Végh (2012) and Kraay (2012b) which provide evidence suggesting that multipliers are larger during recessions among developing countries. It implies that in the economic downturns the government remains inducing her expenditure in the higher rate of growth relying on foreign and domestic government debts as a consequence of decrease in tax revenues. Hence, we infer that promoting government expenditure is effective even in the short-run to stimulate aggregate demand as Surjaningsih et al. (2012) pointed out. It also suggests that fiscal policy is responsibly also directed to perform economic stabilization through coordination with monetary policy especially in the downswing periods.

The asymmetric test to identify whether the characteristics of responsiveness indicated that government spending is typically the same between in good times and bad times. Implementing analysis of variance (F) and goodness of fit (χ^2) tests performs that the null hypothesis could be accepted in 95 percent confidence level. Given that, we can say that the government expenditure decreases (increases) at the same growth rates in response to macroeconomic circumstances either in upward or downward growths. As a result, this finding does agree with Basri and Rahardja (2012)

that tax cut also remains being effective to stimulate short-term economic growth particularly in the recession periods.

The counter-cyclicality of government spending during recessions is supported by significance of global financial crisis dummy (DGFC). The coefficient of DGFC is positive and statistically significant suggesting that there are substantial differences characteristics of the government expenditure. To minimize the adverse economic impacts of global financial crisis, the central government launched fiscal stimuli amounting 73.3 trillion Rupiah allocated mostly to social welfare. Meanwhile, in the Asian financial crisis periods, hundreds trillion Rupiah were directed to restructure the financial intermediations.

Compared to the previous studies, the evidence of short-run elasticity of government expenditure with respect to output is relatively higher. We next show that the specific dynamics of Indonesian economic growth and fiscal policy during this period tend to bias this estimate upward significantly. Model (D) presents the results of error correction model to capture the short-run dynamics without loosing the long-run information.

Model (D) delivers the Engle-Granger (1987) error correction model which produces the lower short-run elasticity coefficient, -2.80 compared to the yield of models (A) and (C). It seems that the dynamic model is systematically better to explain the behavior of government expenditure indicated by higher coefficient of determination ($R^2 = 0.78$) and lower standard error of estimate (SEE = 0.11). In addition, this model technically also passes most of the diagnostic tests.

However, the coefficient of ECT unexpectedly is statistically higher than unity (-1.24). The adjustment coefficient indicates dynamic instability. If the associated coefficient is less than 1, it represents the stable rate at which government expenditure adjusts to past disequilibrium. It seems

that Engle-Granger error correction model is unsuccessful to explain the dynamics of adjustment in the case of Indonesia. Hence, we move on to the estimation of unrestrictive error correction model (equation 6) as reported in model E.

Even though we cannot compare them (regarding R^2 and SEE) due to the difference of dependent variable, the short-run coefficient of government expenditure with respect to output fluctuation (β_1) is -2.80; quite similar with model D. Again, the adjustment coefficient (γ) is almost the same with the result of model (C) – -0.24 – which the earlier merely takes into account the lag of dependent variable. The adjustment in the model E considers not only the lag of dependent variable but also the lag of independent variable. The later is also used by many authors (see: Lane, 2003) to avoid endogeneity problem.

As model (D), model (E) also produces a significant ECT with similar adjustment coefficient. We can conclude that there is a co-integrating relationship between government expenditure and national output as found from Johansen test. The implication of a significant ECT is in fact that there is a long-term relationship between government spending and real GDP which is consistent with Wagner's law. But it is suitable to point out that the existence of co-integration does not imply causality, which is consistent with Wagner's view that there is not necessarily a cause and effect relationship between the two variables of interest.

Overall, the five models above confirm to each other that is the existence of short term counter-cyclicality of government expenditure. The counter-cyclical pattern of government expenditure behavior in Indonesia could be probably related to the absence of discretionary fiscal policy made by the government of Indonesia as found in Surjaningsih *et al.* (2012). The State Budget deficit of Indonesia during last four decades was relatively manageable at below 3 percent level of GDP implying the absence of discretionary fiscal policy either in expenditure or revenue sides.

Discretionary fiscal policy is defined as a change or a reaction to fiscal policy that does not reflect a reaction to the current economic conditions (Fatás and Mihov, 2003). Fiscal policy theoretically is categorized into three groups: (1) automatic stabilizers; (2) discretionary fiscal policy as a response to economic conditions, and (3) discretionary policy conducted for reasons other than the current macroeconomic conditions. Empirically, there are many ways to measure discretionary fiscal policy. According to Blanchard and Perotti (2002), components of ECT or μ in (2) and ε_t in equation (6) are a quantitative estimate of the discretionary policy shock in government spending. Our study confirms to both studies. Our ADF and PP tests proved that both ECT and ε_t are stationary suggesting there is no discretionary spending policy.

Refer to Talvi and Végh (2005) and Alesina *et al.* (2008), the absence of discretionary spending policy cyclicality could be attributed to financial resource constraints and institutional problems. In the case of Indonesia, they are represented particularly by the weak budget executions timing, which often internally indicated by the high gap between the planned budget and its realization (actual budget). As stated by Abdurohman (2013), a weak capacity to execute the budget undermines the effectiveness of fiscal policy to manage aggregate demand. Arguably, the large gap between what is planned and its realization also reflects a weak budget financing capacity (Baldacci, 2009). As a result, as shown by Figure 1, the low increase in government expenditure occurs in the first quarter of fiscal year coincidently when the output growth is getting upturn. In contrast, the high increase in budget execution of government expenditure takes places heavily in the fourth quarter of each year at the time when the output growth tends seasonally to decline.

Table 4: Long-Run Coefficient and Voracity Tests

Coefficient	Short-Run	Long-Run	Long-Run Voracity Test Model (E)		
			Test Statistic	Value	Prob.
a	-9.3075	-7.5082	F	42.0036	0.0000
β_1	-2.8039	1.3813	χ^2	42.0036	0.0000
γ	-0.2396	-	Conclusion	Ho (Long-Run $\beta_1 = 1$) not accepted	
φ	4.5163	-			

Source: Table 3

So far, we have discussed the cyclicality and the relationship between government expenditure and output in the short run perspective. Table 4 summarizes the results about the long-run elasticity of expenditure with respect to output which are derived from Table 3. It could be calculated by dividing the short-run elasticity by the corresponding coefficient of adjustment in the absolute form. Since the unrestricted error correction model provides better results, we refer them to further analysis.

The long-run elasticity coefficient is positive (1.3813) and much higher than that in the short-run. A positive value of the elasticity is consistent with a wider interpretation of Wagner's law, as it implies that government expenditure rises with national income. If the elasticity is higher than one then this would be consistent with a narrow interpretation of Wagner's law, where government expenditure rises faster than national income.

The statistical evaluation confirms to the narrow interpretation of Wagner's law. Implementing again F and χ^2 conventional tests convincingly (*p*-value is quite low) proved that the null hypotheses cannot be accepted. Hence, the coefficient value statistically exceed one is consistent with the voracity hypothesis, as it suggests that in response to a given shock to real GDP, government expenditure rises by even more in percentage points. Since the characteristic of government expenditure responsiveness is typically equal, this evidently applies both in the case of positive and negative output growths.

Conclusion

The aim of this paper was to provide direct empirical evidence on cyclicality and the short term and long-term relationship between government expenditure and output in Indonesia over the period of 1999–2012. We analyzed quarterly data on government expenditure according to national income and product account based on expenditure approach standard.

The motivation behind this paper is although the theory and empirics imply that government expenditure is counter-cyclical, our research does prove that in the short run. In the long-run, the results confirm pro-cyclical development of government expenditure on real GDP, Wagner's law, and voracity effect. To the best our knowledge, this study is the first that found the counter-cyclicality of fiscal policy in the case of Indonesia.

We used Johansen co-integration test and the error correction models. Because unrestrictive error correction model provided a better result, our main conclusion is based on it. The empirical study affirms that output and government expenditure are co-integrated and it implies a long-term relationship between government expenditure and output. The government expenditure is moderately counter-cyclical and robust in all of the specified models. The value of long-run elasticity coefficients is higher than unity. This is consistent with the interpretation of Wagner's law and indicates that the public sector is increasing in relative importance. As a result, the voracity hypothesis exists particularly in the long-term. Meanwhile, the fiscal responsiveness

is indifferent either in the upward or downward output conditions.

Those findings provide some important economic implications. Firstly, they suggest that political and institutional factors are the main obstacle in the short-run for government to effectively play an important role to the economy. Secondly, the prudent fiscal policy management in the long-term is necessary to avoid possible crowding out effect induced by voracity hypothesis existence. Thirdly, as a consequence, discretionary government expenditure should be given widely as preliminary stage to reach sustainable counter-cyclical fiscal policy frame works toward effective macroeconomic stabilization. Further studies are advisable to break down the government expenditure to re-check the possible counter-cyclicality in the long-run.

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