

Exploring Patterns of Fiscal Policy Multiplier in Selected Countries

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Abstract

This study examines the evolution of fiscal spending multiplier in selected oil producing countries over the period of 1981-2015, using the structural vector autoregressive (SVAR) approach. The study found that lag-year of government consumption spending significantly affects the level of output in the countries. In addition, the results of the SVAR model show that real GDP responds positively and significantly to fiscal shocks in the concerned countries.

Keywords: Fiscal spending multiplier, Structural vector auto-regression (SVAR); Fiscal shocks

JEL Classification: H50, H11

1. Introduction

The importance of fiscal policy in fostering sustainable and inclusive growth as well as smoothing the economic cycle has been widely identified. The high level of uncertainty about futuristic fiscal policy including high levels of government debt demands a better understanding and managing of fiscal challenges.

There has been a policy debate on the role, design and efficacy of fiscal policy since the last decade. The current debate emphasizes a greater importance for fiscal policy based on three key aspects. First, fiscal policy is now considered as an effective tool for stabilizing the economy. For instance, research point out that fiscal policy can have a strong impact on output in a situation of tight monetary policy, weak financial sector, and significant economic slack (Christiano, Eichenbaum, and Rebelo, 2011; Woodford 2011; Auerbach and Gorodnichenko 2012; Jorda, 2005; and Taylor 2016). Second, fiscal policy can be used as allocation policies to foster long-term growth. The economic literature has long debated that fiscal policy poses a permanent influence on the level and even the growth rate of GDP per capita, but inconclusive results still reign about the magnitude of their growth effect (Warner, 2014). Also, there is ongoing research in understanding how tax and expenditure measures can be utilized as structural instruments to boost medium-to long-term growth. Third, fiscal policy has also been regarded as redistribution policies to promote inclusive growth. The continuous rising of income inequalities in many countries in last three decades, with social tensions arising from fiscal consolidation programs, has led to the heart of public debate on the distributional effects of governments' tax and expenditure policies (Atkinson, Piketty, and Saez, 2011; Mankiw, 2013, Alvaredo et al., 2013).

In the light of the above, this study provides new light on impact of fiscal policy on economic growth, and also helps frame policy recommendations to the concerned countries. It examines output-effect of government spending in Brazil, Indonesia, Mexico and Nigeria, with the aim of contributing to ongoing researches using the most recent data as well as a novel approach.

1.1 Stylized Facts of the Selected Countries

Oil producing countries were able to stabilize the average fiscal deficit at nearly 6 percent of GDP in 2016, because of the rebound of oil prices and the implementation of consolidation measures. This terminates the gradual deterioration of fiscal equilibriums that kicked off in 2013. For instance, Mexico reduced its fiscal deficit by more than 1 percent of GDP in 2016, through a one-off transfer of central bank profits to the budget, and strong non-oil revenues. Similarly, Brazil's total deficits fell by more than 1 percentage point to 9 percent of GDP in 2016, even with the economic recession and political tensions, but the improvement was mainly driven

by lower interest payments. However in Nigeria, the lower oil prices as well as a fall in crude oil production arising from the sabotage of infrastructure led to the deficit of 4.4 percent of GDP in 2016. The government measures put in place to boost non-oil revenue were offset by a recession. The country was out of the recession in the half year of 2017.

The high level of debt is common among commodity exporters because many banked on borrowing in order to cushion the effect of collapsing revenues. For example, Nigeria partly financed its higher fiscal deficits through issuing internal debt in 2016. The fiscal stance of these selected countries is anticipated to improve, except for the case of Nigeria where deficits would be huge because of planned rises in infrastructure projects.

2. Methodology and Contribution

The critical argument on the ongoing research on fiscal multipliers, is how to identify fiscal shocks. This puzzle arises because of two possible directions of causation. These directions are i) government spending could influence output or ii) output could influence government spending (Ilzetzki et al., 2013). Two main methods have been employed to solve this identification problem namely: the structural vector autoregression method (SVAR) first used for fiscal policy by Blanchard and Perotti (2002); and the natural experiment method that was further developed by Ramey and Shapiro (1998).

This study utilizes the SVAR approach because the underlying assumptions of the narrative or natural experiment approach is not practically relevant to the selected countries. Its assumptions are that military spending are determined only by global geopolitical factors; and that wars pose no effect on macroeconomic variables except through the rise in government spending they encouraged. These conditions are not applicable to developing countries like Brazil, Indonesia, Mexico and Nigeria. In addition, these contradict the direct impact of government consumption on output.

The study basically assumes that the response of fiscal policy to news about the state of the economy requires some time. Therefore, the predictable responses of endogenous variables are addressed using the VAR, while assuming that any remaining correlation between the residual parts of government spending and output, is as a result of the output-effect of government spending. Owing to the non-availability of high-frequency data for the countries, it uses annual data with the wide scope commencing from 1981.

The recent global financial crisis in 2007-2008 has motivated the numerous studies on fiscal multiplier. The inconclusive results on size and sign of fiscal multiplier remain the concerned issue. In addition, different drivers influence the responses of output to fiscal policy shocks. Therefore, a significant number of studies examines the effect of country, time and episode-specific natures on the magnitude and direction of fiscal multiplier. This study adds to the existing ones by investigating the cyclical dynamics of fiscal multiplier in selected oil producing countries.

The main contribution of the study is expanding the scope of annual data on government spending for the four-selected countries that belong to developing countries as well as oil-producing nations. Brazil and Mexico are non-OPEC member countries, whereas Indonesia was an OPEC member before. However, Nigeria still maintains its OPEC membership up till date. Therefore to best knowledge of the author, scanty research have examined the impacts of fiscal policy on output using a time series dataset. Specifically, this is the first study to utilizes a time-series dataset and provide country-specific estimates for the countries. Future improvement in data quality, the study can apply this technique to quarterly data.

2.1 Related Literature Review

Measures used to implement fiscal policy (an increase in government spending or tax cuts or temporary shock or permanent) account for variations in fiscal multiplier. Multipliers have to be lower for tax shocks than for spending shocks, because the marginal propensity to save. This is factored in many macro-econometric studies. On the other hand, a rise in government spending occurs because of the following: 1) An automatic and immediate response to GDP and macroeconomics variations, commonly named “automatic stabilizers”, 2) a discretionary change in fiscal policy in response to the economic context; 3) An exogenous change in public

spending without relation with the economic context. The rise in government spending can be partially offset by a decline in private consumption. Conversely, a reduction in tax could pose a substantial effect on the country's consumption (GDP) if consumers anticipate an increase in their permanent income, arising from declined economic slacks.

The effectiveness of fiscal policy is widely influenced by factors such as monetary policy, government debt, openness of the economy etc. the nature of these factors has been dynamic over time. For instance, public debt has generally increased over time while the pattern of monetary policies has been moving towards more flexible stance.

The effects of fiscal policies might differ across countries of the world. This calls for the need to address the issue of time-variation of fiscal policy multiplier throughout the previous decades. For instance, empirical existing literature revealed some instability in multipliers for a sample of US data (Blanchard and Perotti, 2002; Burriel et al., 2010). In line with this, the study investigates time variation in fiscal policy multipliers for selected countries (Nigeria, Brazil, Mexico, Indonesia) using a novel technique.

Surveys of literature estimates : Blanchard and Perotti(2002) find a government purchases multiplier of nearly 1 in the United States; Perotti(2005,2007) reveals estimates ranging between -2.3 and 3.7 to five OECD countries; Mountford and Uhlig(2009) find values of 0.65 but -1 in the long run for the USA; and Fatas and Mihov, 2001 reveals greater than 1. Using a panel VAR, Beetsma et al. (2008) find a peak multiplier of 1.6, taking trade balance as a dependent variable, whereas Corsetti et al. (2012) find that fiscal multiplier is larger under fixed exchange rate regime, lower when debt is high (greater than 100% of GDP), and larger during financial crises, using annual dataset with the identification method of Perotti (1999) instead of the SVAR approach. Auerbach and Gorodnichenko (2012) employed SVAR and find that fiscal multipliers are larger in recessions than in expansions, based on semi-annual panel data.

This study also explores how the size of fiscal multipliers is influenced by the economic context. It provides estimates using annual time-series data for selected countries in order to identify individual-specific output-effect of fiscal spending.

To examine the impacts of a fiscal shock on output, the study estimates the following Structural-VAR model:

$$B_0 X_t = \sum_i^p B_i X_{t-i} + \varepsilon_i \quad 1$$

The vector $X_t = (GDP_t, GEX_t)$, Where GDP_t denotes the real GDP and GEX_t stands for real government consumption spending. The source of these data is World Bank database. Conditional on the data availability, the sample covers the period 1981-2015. The reduced-version model includes a constant and two lags, which are chosen to address the issue of residual serial correlation. The identification of the fiscal shock is attained by using Cholesky approach.

3. Data

In line with the previous studies, this study utilizes data on variables such as government spending, and output. Data for real GDP and real government expenditure are obtained from World Bank World Development Indicator (WDI). Government expenditure is proxied by government final consumption spending. In addition, the study's analysis is carried out using the natural log of the concerned variables (see Fig. 1).

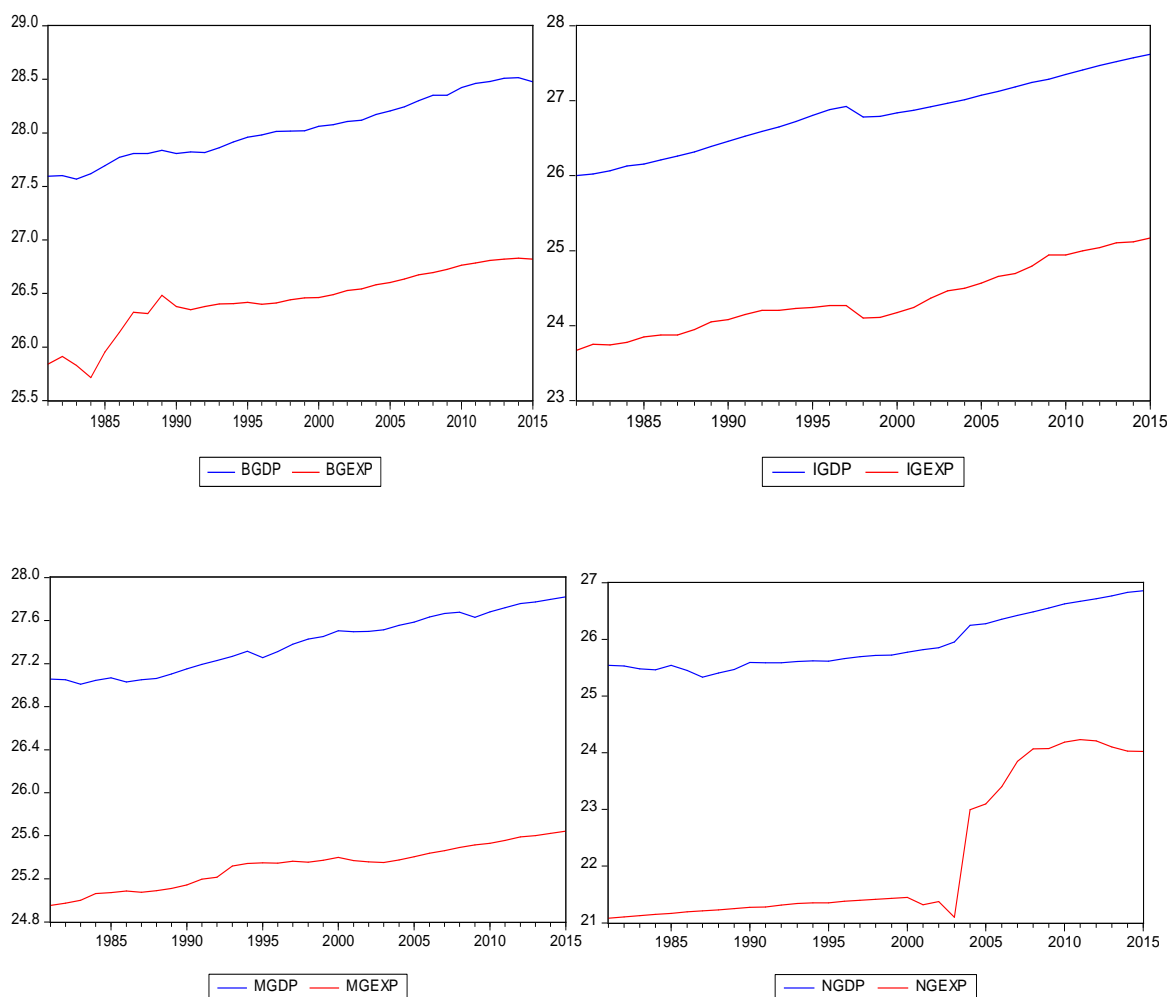


Figure 1: Natural log of GDP and Government Spending for the Selected Countries.

Table 1 presents summary statistics for the variables in the dataset. The mean value of government spending varies from US\$9.64 Billion (Nigeria) to US\$4.14 Billion (Indonesia) during the sample period. This reflects the individual-pattern of government spending in oil producing countries. With respect to volatility, real GDP is more volatile than government consumption spending.

Table 1: Summary Statistics

Statistics	BRA_ GDP	BRA_ GEXP	IND_ GDP	IND_ GEXP	MEX_ GDP	MEX_ GEXP	NGR_ GDP	NGR_ GEXP
Mean	1.57E+12	3.16E+11	4.87E+11	4.14E+10	8.16E+11	1.01E+11	2.09E+11	9.64E+09
Median	1.47E+12	3.10E+11	4.53E+11	3.37E+10	8.15E+11	1.03E+11	1.48E+11	1.92E+09
Maximum	2.42E+12	4.49E+11	9.88E+11	8.54E+10	1.21E+12	1.37E+11	4.62E+11	3.34E+10
Minimum	9.38E+11	1.47E+11	1.96E+11	1.91E+10	5.36E+11	6.88E+10	1.01E+11	1.43E+09
Std. Dev.	4.61E+11	8.44E+10	2.27E+11	1.98E+10	2.16E+11	1.95E+10	1.15E+11	1.21E+10
Skewness	0.5129	-0.2111	0.6261	0.9222	0.2463	0.0575	0.9819	1.0211
Kurtosis	2.0483	2.4123	2.4314	2.5486	1.7389	2.0579	2.4684	2.2444
J-B	2.8550	0.7636	2.7583	5.2585	2.6730	1.3135	6.0362	6.9153
Probability	0.2399	0.6826	0.2518	0.0721	0.2628	0.5185	0.0489	0.0315
Sum	5.49E+13	1.10E+13	1.71E+13	1.45E+12	2.86E+13	3.53E+12	7.33E+12	3.37E+11
Obs.	35	35	35	35	35	35	35	35

As presented in Table 2, the correlation coefficients indicate that real government consumption expenditure and real GDP are linearly and positively correlated in all the four countries. However, the highest correlation value is recorded for the case of Indonesia.

Table 2: Pairwise Correlation matrix

Statistics	BRA_ GDP	BRA_ GEXP	IND_ GDP	IND_ GEXP	MEX_ GDP	MEX_ GEXP	NGR_ GDP	NGR_ GEXP
BRA_GDP	1.00							
BRA_GEXP	0.95	1.00						
IND_GDP	0.99	0.94	1.00					
IND_GEXP	0.97	0.92	0.98	1.00				
MEX_GDP	0.98	0.93	0.97	0.93	1.00			
MEX_GEXP	0.96	0.94	0.97	0.92	0.97	1.00		
NGR_GDP	0.96	0.87	0.96	0.98	0.93	0.89	1.00	
NGR_GEXP	0.91	0.82	0.89	0.94	0.85	0.81	0.95	1.00

Source: Author's computation

In order to determine which variable influences the other, Granger causality test is carried out and its results are reported in Table 3. According to the table 3, only Brazil's real GDP granger causes its government consumption expenditure at 5% significance level, while no Granger causality is established for the remaining countries. This implies that there is uni-directional causality from real GDP to government expenditure in Brazil for the sample period.

Table 3: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
BGDP does not Granger Cause BGEXP	33	5.7047	0.0084
BGEXP does not Granger Cause BGDP		1.9145	0.1662
IGDP does not Granger Cause IGEXP	33	0.0434	0.9576
IGEXP does not Granger Cause IGDP		2.1071	0.1405
MGDP does not Granger Cause MGEXP	33	0.9884	0.3848
MGEXP does not Granger Cause MGDP		1.3663	0.2715
MGDP does not Granger Cause NGEXP	33	1.4820	0.2445
NGEXP does not Granger Cause MGDP		0.0332	0.9674

Source: Author's computation

4. Empirical Analysis of Fiscal Multipliers

The empirical analysis commences with investigating the orders of integration of each series, which is illustrated in Fig.1. Both ADF and PP unit root tests include a trend for all series. All variables are stationary after taking their first difference. The first difference series are stationary with unit roots rejected at the 99% confidence level for all variables (see Table 4).

Table 4: Unit Root Test

Series	ADF		PP	
	Level	1st Difference	Level	1st Difference
None				
BGDP	1.000	0.057**	1.000	0.008***
BGEXP	0.986	0.020***	0.993	0.000***
IGDP	1.000	0.030***	1.000	0.030***
IGEXP	1.000	0.003***	0.999	0.003***
MGDP	1.000	0.000***	1.000	0.000***
MGEXP	1.000	0.003***	1.000	0.004***
NGDP	0.999	0.001***	0.998	0.001***
NGEXP	0.962	0.000***	0.963	0.000***
Constant Only				
BGDP	0.908	0.003***	0.903	0.003***
BGEXP	0.349	0.000***	0.390	0.000***
IGDP	0.937	0.002***	0.937	0.002***
IGEXP	0.985	0.002***	0.978	0.002***
MGDP	0.981	0.000***	0.986	0.000***
MGEXP	0.784	0.001***	0.788	0.001***
NGDP	0.999	0.002***	0.999	0.002***
NGEXP	0.916	0.000***	0.907	0.000***
Constant & Trend				
BGDP	0.491	0.017***	0.491	0.018***
BGEXP	0.530	0.001***	0.596	0.001***
IGDP	0.444	0.011***	0.644	0.011***
IGEXP	0.752	0.007***	0.821	0.008***
MGDP	0.053	0.022***	0.054	0.000***
MGEXP	0.700	0.005***	0.576	0.005***
NGDP	0.545	0.002***	0.545	0.002***
NGEXP	0.703	0.000***	0.665	0.000***

Note. *** indicates significant at 1%, ** indicates significant at 5% and * indicates significant at 10%.

4.1 Estimation results and Discussions

Two steps are involved in estimating the mixture VEC model. Table 5 reports the results of the VAR model. For case of Brazil, one-year and two-year lag of government consumption expenditure significantly influence the real GDP at 10% significance level, with coefficient of -0.16 and 0.10 respectively. Similarly, Indonesia's real GDP is positively significantly driven by its government consumption expenditures at 10% significance level. One-year lag of Mexico's government consumption spending poses a positive and significant impact on its real GDP at 10% significance level. However, for the case of Nigeria, one-year lag of government consumption spending adversely influences its real GDP at 5% significance level, while a positive output-effect of two-year lag of the government consumption spending is established.

The impact of real GDP on government consumption spending is also presented in the table 5. For the case of Brazil, pattern of government expenditure is mainly driven by one-year and two-year lag of real GDP as well as its one-year lag at 5% significance level. However in both Indonesia and Mexico, government expenditure is significantly determined by its lags. For the case of Nigeria, what government consumes is determined by one-year lag of real GDP and one-year lag of the government consumption spending (see Table 5).

Table 5: Vector Autoregressive Model

Brazil	BGDP	BGEXP	Indonesia	IGDP	IGEXP
C	0.52	1.51*	C	0.19	-0.21
BGDP(-1)	1.37***	1.43**	IGDP(-1)	0.97***	-0.08
BGDP(-2)	-0.33*	-1.29**	IGDP(-2)	-0.08	0.09
BGEXP(-1)	-0.16*	0.68**	IGEXP(-1)	0.17*	1.29***
BGEXP(-2)	0.10*	0.11	IGEXP(-2)	-0.04	-0.28*
Adj. R²	0.99	0.94	Adj. R²	0.99	0.98
Mexico	MGDP	MGEXP	Nigeria	NGDP	NGEXP
C	-1.32*	1.16*	C	-2.50*	-16.11*
MGDP(-1)	0.86***	0.13	NGDP(-1)	1.44***	2.14*
MGDP(-2)	0.02	-0.04	NGDP(-2)	-0.30*	-1.20
MGEXP(-1)	0.26*	1.06***	NGEXP(-1)	-0.09**	0.48**
MGEXP(-2)	-0.07	-0.20*	NGEXP(-2)	0.05*	0.15
Adj. R²	0.99	0.98	Adj. R²	0.98	0.94

Note. *** indicates significant at 1%, ** indicates significant at 5% and * indicates significant at 10%.

With reference to Table 6, the response of real GDP to fiscal shock is statistically significant and positive for all the concerned countries. In addition, Mexico's real GDP response to its fiscal shock is the highest, followed by Indonesia, while Nigeria's real GDP response to government spending shock is the lowest. The positive responses of real GDP to fiscal shocks indicate the pro-cyclical nature of the countries. This implies that any positive (negative) shock to government consumption spending translates to a positive (negative) output-effect in these countries.

Table 6: Structural VAR Estimates

Coefficients	Brazil	Indonesia	Mexico	Nigeria
C(1)	0.0644***	0.0551***	0.0240***	0.3258***
C(2)	0.1855***	0.4267***	0.4605**	0.1129***
C(3)	0.0263***	0.0264***	0.0298***	0.0513***

Note. *** indicates significant at 1%, ** indicates significant at 5% and * indicates significant at 10%.

Model: $Ae = Bu$ where $E[uu'] = I$ Restriction Type: short-run text form: $@e1 = C(1)*@u1$; $@e2 = C(2)*@e1 + C(3)*@u2$; where $@e1$ represents Δ GEXP residuals, and $@e2$ represents Δ GDP residuals

5. Conclusions

An average fall in oil prices of above 50 percent from the mid-year 2014, has triggered the focus of oil producing countries in identifying the sustainable debt as the key priority. For instance, Nigeria considers an up-front fiscal

adjustment centered on non-oil revenue mobilization as a critical measure, while Mexico has to remain firm with its ongoing fiscal consolidation in order to maintain investor confidence in a volatile financial market environment. This study employs structural VAR (SVAR) approach to examine the evolution of fiscal multipliers in Brazil, Mexico, Indonesia and Nigeria. Based on a sample of thirty-five years of data from 1981 to 2015, its results suggest the following:

- One-year and two-year lag of government consumption expenditure in Brazil determine the level of its output, with coefficient of -0.16 and 0.10 respectively. On the other hand, pattern of government expenditure is mainly driven by one-year and two-year lag of real GDP as well as its one-year lag at 5% significance level.
- Indonesia's real GDP is positively significantly driven by its government consumption expenditures. The lags of government expenditure drive the pattern of current government consumption spending in Indonesia.
- One-year lag of Mexico's government consumption spending has a positive and significant impact on its real GDP. In addition, its government expenditure is significantly determined by its lags.
- However, one-year lag of Nigeria's government consumption spending adversely influences its real GDP at 5% significance level, while a positive output effect of two-year lag of the government consumption spending is established. Furthermore, what government consumes is determined by one-year lag of real GDP and one-year lag of the government consumption spending.
- The sensitivity of real GDP to government spending shock is statistically significant and positive for all the concerned countries. Mexico's real GDP response to its fiscal shock is the highest, followed by Indonesia, while Nigeria's real GDP response to government spending shock is the lowest. The positive responses of real GDP to fiscal shocks reflect the pro-cyclical pattern of the countries. This implies that any positive (negative) shock to government consumption spending leads to a positive (negative) output-effect in these countries.

Based on the findings, the policy implications are as follows:

- Mexico in 2013 came up with a multi-year fiscal consolidation plan with the aim of reducing the budget deficits by 2 percentage points of GDP over four years. In addition, efforts have been in the country to further strengthen social spending and mitigate abject poverty through curbing tax evasion and reducing tax avoidance. Linking these government measures if well implemented with the results in the table 5, suggests that government consumption spending would increase in future as government revenue rises, thus leading to a robust output growth for Mexican economy.
- Brazil's current debt constitutes about 72% of GDP, complemented with fiscal deficit of more than 9 percent of GDP. The country's recent weakness of revenues is partly due to the cyclical nature. However, with the further permanent adjustment, the country could experience a future decline in its public debts. The issue of interest payments on public debt needs to be well addressed as it accounts for 19 percent of public spending. Thus, this would translate more government spending as the Brazilian government revenue increases in the future.
- Indonesia's revenue experiences a drastic fall because commodities account for a bigger share of revenues. This makes its revenue highly volatile, as the number of oil lifting reduces in the first quarter of 2017. However, with the continuing structural reforms, the Indonesian government can combat the challenge of increased exposure to volatility from global commodity prices.
- Nigeria's government revenue and exports are mainly dominated by oil receipts. The low oil prices with falling oil production adversely hit its economy, which led to more than a full-year recession. In addition, this makes its interest payments account for a significant percent of the government revenue. With reference to the study's findings, Nigerian government needs to stimulate output level in the country by purchasing local-made items instead of increasing its consumption spending in the favour of imported items. With a rise in government purchases of local-made items, would lead to a more robust and sustainable economic growth in the country.

References

- Alvaredo, F., Atkinson, A., Piketty, T. & E. Saez, E. (2013). The Top 1 Percent in International and Historical Perspective. *Journal of Economic Perspectives* 27 (3), 3–20. DOI: 10.1257/jep.27.3.3
- Atkinson, A. B., Piketty, T., & Saez, E. (2011). Top Incomes in the Long Run of History. *Journal of Economic Literature* 49 (1), 3–71. DOI: 10.1257/jel.49.1.3
- Auerbach, A., & Gorodnichenko, Y. (2012). Fiscal Multipliers in Recession and Expansion. In *Fiscal Policy after the Financial Crisis*, edited by A. Alesina and F. Giavazzi, 63–98. Cambridge, MA: National Bureau of Economic Research. <http://www.nber.org/chapters/c12634>
- Beetsma, R., Giuliodori, M., Klaassen, F., (2006). Trade spillovers of fiscal policy in the European Union: a panel analysis. *Economic Policy* 21 (48), 639–687. <https://doi.org/10.1111/j.1468-0327.2006.00168.x>
- Blanchard, O., & Perotti, R. (2002). An empirical characterization of the dynamic effects of changes in government spending and taxes on output. *Quarterly Journal of Economics* 117 (4), 1329–1368. <https://doi.org/10.1162/003355302320935043>
- Burriel, P., de Castro, F., Garrote, D., Gordo, E., Paredes, J., & PTrez, J.J. (2010). Fiscal policy shocks in the euro area and the US: an empirical assessment. *Fiscal Studies* 31 (2), 251–285. <https://doi.org/10.1111/j.1475-5890.2010.00114.x>
- Christiano, L., Eichenbaum, M & Rebelo, S. (2011). When Is the Government Spending Multiplier Large? *Journal of Political Economy* 119 (1, February): 78–121. <http://www.jstor.org/stable/10.1086/659312>
- Corsetti, G., Meier, A. & Müller, G.J. (2012). What determines government spending multipliers? *Economic Policy* 27, No.72: 521-565.
- Fatas, A., & Mihov, I. (2001). The effects of fiscal policy on consumption and employment: theory and evidence. CEPR Discussion Paper, No. 2760.
- Ilzetzki, E., Mendoza, E.G., & Végh, C.A. (2013). How big (small?) are fiscal multipliers. *Journal of Monetary Economics* 60, 239–254. <https://doi.org/10.1016/j.jmoneco.2012.10.011>
- Jorda, O. (2005). Estimation and Inference of Impulse Responses by Local Projections. *American Economic Review* 95 (1): 161–82. <https://doi.org/10.1257/0002828053828518>
- Jorda, O., & Taylor, A. (2016). The Time for Austerity: Estimating the Average Treatment Effect of Fiscal Policy. *Economic Journal* 126 (590): 219–55. DOI: 10.1111/eoj.12332
- Mankiw, N. G. (2013). Defending the One Percent, *Journal of Economic Perspectives* 27 (3): 21–34. DOI: 10.1257/jep.27.3.21
- Mountford, A., & Uhlig, H. (2009). What are the effects of fiscal policy shocks? *Journal of Applied Economics*. 24, 960–992. DOI: 10.1002/jae.1079
- Perotti, R. (2005). Estimating the effects of fiscal policy in OECD countries. In: CEPR Discussion Paper 4842. C.E.P.R. Discussion Papers.
- Perotti, R. (2007). In Search of the Transmission Mechanism of Fiscal Policy. *National Bureau of Economic Research*, Working Paper 13143. <http://www.nber.org/papers/w13143>
- Ramey, V.A., & Shapiro, M.D. (1998). Costly capital reallocation and the effects of government spending. *Carnegie Rochester Conf. Public Policy* 48(1), 145–194.
- Warner, A. (2014). Public Investment as an Engine of Growth. IMF Working Paper 14/148, International Monetary Fund, Washington, DC.
- Woodford, M. (2011). Simple Analytics of the Government Expenditure Multiplier. *American Economic Journal: Macroeconomics* 3 (1): 1–35. DOI: 10.1257/mac.3.1.1
- World Bank (2017) World Development Indicator