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An empirical investigation of the relationship between government revenue, expenditure, and economic growth in selected EMEs

Anoop K Suresh[1*], Bichitrananda Seth[2], Samir Ranjan Behera[3], Deba Prasad Rath[4]

Department of Economic and Policy Research (DEPR), Reserve Bank of India (RBI), Mumbai, India
*Corresponding author: anoopksuresh@rbi.org.in

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Author's emails:
bichitranandaseth@rbi.org.in
samirrbehera@rbi.org.in
dprath@rbi.org.in

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Abstract

Purpose — This article explores the relationship between government revenue, government expenditure, and economic growth for nine emerging market economies using annual data from 1991-92 to 2019-20.

Method — This paper distinguishes itself from the existing literature through the application of co-integration tests, vector error correction, DOLS and FMOLS for an empirical investigation of a unique panel data set of select emerging economies across Asia, Africa, Europe and Latin America. A bi-directional causal long-run relationship between economic growth and government expenditure, as well as between government expenditure and government revenue, was found using standard panel co-integration tests.

Findings — The long-run elasticities computed using VECM were confirmed from DOLS as well as FMOLS estimates. A one per cent increase in expenditure and revenue, in the long run, would result in an increase in GDP by 0.94 and 0.90 per cent, respectively. Similarly, an increase in GDP by one per cent would lead to an increase in government expenditure by 1.1 per cent. On the other hand, an increase in government revenue by one per cent would cause a corresponding increase in government expenditure by nearly one per cent. The findings of this research point to a positive association between government revenue, expenditure, and economic growth, which will be valuable to policymakers.

Contribution — Our combination of country selection covering economies from different continents is a first of its kind to the best of our knowledge. Another contribution is the application of panel cointegration and panel error correction techniques to fully use the panel data set, while most previous studies utilised the typical time series modelling with individual time series data.

Keywords — Government revenue, government expenditure, economic growth, panel co-integration, panel vector error correction.

Introduction

Fiscal policy, a government's primary policy tool, aims to maximise economic growth by preserving macroeconomic stability, boosting work and investment incentives, fostering human capital accumulation, and improving total factor productivity (IMF, 2015). To achieve this, the government must take an active role in attaining economic growth, particularly for emerging and developing economies (Edame & Okoi, 2014). The two main fiscal policy instruments, government's revenue and expenditure, are critical for accomplishing this fundamental goal.

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Hence, it is important to assess the effect of government revenue and expenditure on an economy's growth (Roşoiu, 2015). An extensive amount of theoretical and empirical investigation had been conducted that examined the role of government revenue and expenditure in supporting economic growth (Gurdal et al., 2021). This, in fact, has turned out to be a widely debated issue resulting in a large body of literature on the subject. Researchers have long debated whether the changes in federal budget size are caused by expenditure modification followed by revenue adjustments or *vice versa* or both (Akpan, 2005; Baghestani & McNown, 1994).

The association between government's revenue collection and economic growth have been debated within research and academic parlance. Revenue collection by the government influences growth in the short-term, according to the neo-classical growth models but it affects economic growth in the long-term as per arguments put forth by the endogenous growth models (Karagianni et al., 2012). According to the neo-classical proponents, the government's revenue earnings have a temporary influence on growth, assisting economy in reaching full employment equilibrium. On the other hand, endogenous growth proponents argue that the government's revenue has a long-term effect on achieving the steady-state economic growth path since it impacts key growth indicators like income, output and employment. In their growth paradigm, Keynesian economists have included a role for revenue collection, notably taxation, with lower taxation leading to higher disposable income in the hands of the public, thereby encouraging consumption and, ultimately, growth of the economy.

The other important research subject that has perplexed researchers is the nature of the link between government spending and economic growth. In fact, the debate over the relationship between government spending and economic growth has a long history, and the impact of government spending on economic growth has turned out to be an issue of topical interest. Government expenditure can impact an economy's output either positively or negatively (Karagianni et al., 2019). In this context, it is also important to highlight the views of the two celebrated schools of economic thought – Keynesians and Classical stances on public expenditure. Government expenditure, according to the Keynesians, has a positive role (through the multiplier and accelerator channels) in boosting economic growth, whereas the classicals economists emphasised the market mechanism for fostering efficient resource allocation and economic growth.

Another area discussed in literature has been the relationship between government's revenue and expenditure. This link is critical for an effective fiscal consolidation process, which is even more important in case of emerging and developing economies with structural fiscal deficit, raising concerns about sustainability of their economic growth. Since the commencement of the COVID-19 pandemic, the issue of high level of debt and deficit has resurfaced as countries all over the world have experienced an unprecedented contraction in revenue and unforeseen spike in expenditure as a result of actions taken to protect lives and livelihoods. Arguments and counter-arguments about the virtues and drawbacks of having fiscal deficit have long been debated in theoretical literature. Several scholars have argued that fiscal deficit could catalyse the growth process whereas it has been countered by other academicians with the argument that higher deficit would make the growth process unsustainable (Amoah & Loloh, 2008). A balance policy towards revenue and expenditure could lead to an optimal level of deficit/surplus for maximisation of a country's economic growth. Against this backdrop, it is safe to assume that a proper understanding of the nexus between government revenue and expenditure becomes essential for framing fiscal policies that would promote long-term economic growth process.

Regarding the existing empirical literature, a recent analysis covering the period from 1980 to 2016 for G7 economies, using time-domain and frequency-domain panel causality tests revealed a unidirectional causation between government revenue and expenditure, as determined via the time-domain panel causality test (Gurdal et al., 2021). Using bootstrap analysis in a panel framework for European Union economies, it was discovered that countries like Greece, France, Italy, Portugal, and Spain had unidirectional causality running from government expenditure to revenue. In contrast, the United Kingdom, Belgium, Finland, Austria, Germany, and several other European Union economies had a causality running from government revenue to expenditure (Afonso & Rault, 2009). When it comes to Asian economies, examining the revenue-expenditure

nexus for ASEAN economies revealed mixed results with the causation running from revenue to expenditure predominating in most of them (Magazzino, 2014). Using co-integration and the ECM framework, unidirectional causality from government revenue to expenditure was found in case of Gulf countries. In contrast, bi-directional causality was identified in few Gulf economies (Fasano & Wang, 2002). For petroleum exporting countries, empirical evidence supporting the revenue-spend hypothesis was discovered using the vector autoregression (VAR) paradigm (Petanlar & Sadeghi, 2012). An examination of select Asian economies (nine countries) from 1960 to 2000 yielded mixed granger causality results, with only three nations revealing a long-run co-integrating relationship (Narayan, 2005).

On the other hand, empirical results of the effects of taxation on economic growth, is inconsistent, with several studies suggesting a positive association amongst taxes and economic growth (Jalata, 2014; Ugwunta & Ugwuanyi, 2015) while others report a negative or no significant relationship (Bonu & Pedro, 2009; Saibu, 2015). Lastly, the extant empirical works analysing the association between government's spending and economic growth could be categorised into four major ones as per empirical research findings. Firstly, several works had inferred the presence of a direct association amongst government spending and economy's growth (Aschauer, 1990; Kelly, 1997). Secondly, studies have found an inverse association between government spending and economy's growth (Abrams, 1999; Bergh & Henrekson, 2011; Engen & Skinner, 1992). Thirdly, studies have also discovered a U-shaped relationship between government spending and economy's growth (Carboni & Medda, 2010; Rahn & Fox, 1996; Scully, 2003). Lastly, there are also studies which point toward the inability to infer the exact association between these two macro parameters (Gemmell & Au, 2013).

It appears that several schools of thought have advanced various arguments regarding the relationship between government revenue, expenditure, and economic growth, but the debate remains unresolved. In this context, we attempt to decipher the long run association between government's revenue, expenditure, and economic growth at the general government level through an empirical investigation for select peer emerging economies. The existing literature on this topic has revealed that the empirical testing of the long run association between government revenue, expenditure, and economic growth in emerging market economies has been quite limited. Since India is an emerging market with great growth potential, we are conducting this study along with few select peer emerging economies (eight economies) from Asia, Europe, Latin America and Africa in a panel framework. From the existing empirical literature, we could only locate studies which focussed exclusively on Euro zone economies, Asian economies or those in the Latin American/African sub-continent. Thus, our combination of country selection covering economies from different continents is a first of its kind to the best of our knowledge. In fact, such a study is quite creative and interesting since despite their geographical difference, EMEs across continents share similar economic characteristics. For this study, we use data at the general government level since it provides an accurate representation of the impact of fiscal instruments such as government expenditure and revenue on economic growth and *vice versa*. Another major contribution is the application of panel cointegration and panel error correction techniques to fully use the panel data set. Even though we came across multiple cross-country studies in the literature, the majority of them utilised the typical time series modelling with individual time series data. In our panel co-integration framework, we also adopt more explicit modelling approaches such as Dynamic OLS (DOLS) and Fully modified OLS (FMOLS) for robustness check.

The reminder of the study comprises of three more sections. Section II contains the information on data used for the empirical exercise as well as specifics on the econometric methodology of our empirical exercise. The outcomes and interpretation from our empirical exercise are lucidly explained in Section III. The study's concluding observations are put forth in Section IV.

Methods

The empirical exercises undertaken in this paper are based on annual data from 1991-92 to 2019-20 sourced from the International Monetary Fund's (IMF) World Economic Outlook. Nine emerging market economies - South Africa, Russia, Malaysia, Poland, Chile, Hungary, Thailand,

Philippines and India – are chosen for their economic commonalities[1]. The data on general government revenue, general government expenditure and gross domestic product (GDP) are in real terms[2] and are used in natural logarithm form.

Unit Root Test

Using panel causality tests, panel cointegration tests and a panel error correction model, this paper investigates the relationship between governments' revenue, expenditure and GDP[3]. The long-run elasticities are also estimated using fully modified ordinary least square (FMOLS) and dynamic ordinary least square (OLS). Since the variables are at log level, they are expected to have unit root properties. Panel unit root tests are undertaken using methods proposed by Im, Pesaran, and Shin (2003) and Levin, Lin, and Chu (2002) and Fishers' ADF and PP test. The results of the unit root tests are reported in the following section.

Cointegration Test

After identifying the properties of variables, long-run relationships are examined using Pedroni Residual Cointegration Test (2004) and Kao Residual Cointegration Test (1999). Engle-Granger's (1987) two-step (residual-based) cointegration tests constitute the foundation for these cointegration tests.

Pedroni cointegration tests

This test extends the Engle-Granger (1987) cointegration test, which looks at the regression residual with I(1) variables to see if it has unit root features. If the residual obtained from the regression is I(0), the variables are cointegrated. In step 1, the following regression estimation is involved, and the residual is obtained. The test extended by Pedroni (2004) involves a panel framework. He has proposed many tests for cointegration that allow for heterogeneous intercepts and trend coefficients across cross-sections.

$$y_{it} = \sigma_i + \delta_i t + \beta_i x_{i,t} + \epsilon_{i,t} \quad (1)$$

where t = 1, …, T; and i = 1, …, N.

Here y and x are assumed to be I(1) and σ_i and δ_i are individual and trend effects that may be set to zero if desired. Under this framework, the null states that the residual is I(1). In the second step, the residual is tested for unit root, and if we reject the null, the variables are cointegrated. Eleven statistics with varying degrees of properties (size and power for different N and T) are generated.

Kao cointegration tests

The Kao test is also an extension of the Engle-Granger (1987) cointegration test. This test and Pedroni's test are similar, except the former specifies cross-section specific intercepts and homogeneous coefficients on the first-stage regressors. Like Pedroni, in step 1, the following regression is estimated with an intercept to be heterogeneous and slope to be homogeneous across cross-sections and setting all trend coefficients to be zero, and then the residual is obtained.

$$y_{it} = \sigma_i + \beta_i x_{i,t} + \epsilon_{i,t} \quad (2)$$

where t = 1, ..., T; and i = 1, ..., N.

Here y and x are assumed to be I(1). Under this framework, the null hypothesis is that the residual is I(1). In the second step, the residual is tested for unit root, and if we reject the null, the variables are cointegrated.

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[1] For undertaking the empirical investigation, our annual data range was kept limited to the year 2019 to keep at bay the structural disruptions brought by the COVID-19 pandemic. A table depicting the key fiscal indicators of the nine emerging market economies are provided in Annex I.

[2] Nominal variables are converted into real variables using GDP deflators obtained from IMF's World Economic Outlook.

[3] Since there were data gaps in the case of a few countries under our consideration attributable to their non-availability, the empirical exercise was undertaken on an unbalanced data set.

Causality and Long-Run Elasticity

The vector error correction model (VECM), panel dynamic ordinary least square (DOLS), and fully modified OLS (FMOLS) are used to evaluate causality and long-run elasticities in this paper.

Vector error correction model

Vector error correction model facilitates estimation of short-run and long-run relationships along with the error correction process.

$$\Delta y = \alpha_i + \lambda_i ecm_{i,t-1} + \sum_{k=1}^{h} \beta_{1,i,k} \Delta y_{i,t-k} + \sum_{k=1}^{h} \beta_{2,i,k} \Delta x_{1,i,t-k} + \cdots + \sum_{k=1}^{h} \beta_{n+1,i,k} \Delta x_{n,i,t-k} + \varepsilon_{i,t} \quad (3)$$

where t = 1, 2, …, T, i = 1,2, …, N.

Here y and x are dependent and independent variables. β is the coefficients to be estimated, T is the period, N is the number of cross-section. The error correction term, *ecm*, specifies how much time it takes to adjust if a divergence from the long-run course happens.

Panel Dynamic Ordinary Least Square (DOLS) and Fully Modified OLS (FMOLS)

Long-run elasticities were evaluated using the DOLS and FMOLS methods after the direction of long-run causality was established. In comparison with the single equation methods, these robust estimators directly examine the condition on the cointegrating vector, which is essential for the existence of a strong relationship. In the panel cointegration framework, the use of FMOLS has been recommended by Pedroni (1996). Pedroni's FMOLS addresses the issue of heterogeneity. This is attained by including country-specific regression intercepts and allowing variation in serial correlation properties of the error processes across the countries in the panel data set.

On the other hand, Kao and Chiang (2001) extended the DOLS estimator to panel analysis. According to their pioneer work, the DOLS estimator is far more powerful in terms of unbiased estimation in the case of finite samples than both the OLS and FMOLS estimators. In addition, the DOLS estimator helps in controlling the model's endogeneity.

Results and Discussion

First, we'll look at a descriptive statistic for the three economic parameters that are being considered for the nine emerging market economies (Table 1).

Table 1. Descriptive Statistics

	ln(GDP)	ln(Expenditure)	ln(Revenue)
Mean	9.338	8.059	7.973
Median	9.277	7.644	7.660
Maximum	11.949	10.616	10.510
Minimum	5.771	4.476	4.533
Std. Dev.	1.731	1.752	1.744
Skewness	-0.256	-0.191	-0.162
Kurtosis	1.850	1.760	1.753
Jarque-Bera	15.376	16.341	16.120
Probability	0.001	0.0002	0.0003
Sum	2175.86	1877.91	1857.78
Sum Sq. Dev.	695.279	712.313	706.125
Observations	233	233	233
Cross Sections	9	9	9

Source: Authors' estimates.

Note: Expenditure and Revenue are pertaining to general government; and ln is natural log.

The stationarity properties of the concerned variables are tested using four methods: Im et al. (2003); Levin et al. (2002); Fishers' ADF; and PP test (Choi, 2001; Maddala & Wu, 1999). According to all tests, the variables are non-stationary in level but stationary at the first difference, indicating that the series has I(1) features (Table 2).

Table 2. Panel Unit Root Test Results

Method	ln(GDP)	ln(Expenditure)	ln(Revenue)
LLC-t*			
Level	0.97265	0.57145	0.27815
First Difference	-8.39625***	-6.83460***	-10.0416***
IPS W-stat			
Level	2.78260	3.91875	2.50170
First Difference	-8.41743***	-6.98578***	-9.02299***
ADF-Fischer Chi-Square			
Level	25.0174	5.78578	15.0690
First Difference	99.4933***	89.5866***	106.516***
PP-Fischer Chi-Square			
Level	30.5815	4.84413	15.7166
First Difference	75.5651***	190.173***	110.433***

Source: Authors' estimates.

Note: 1. Expenditure and Revenue are pertaining to general government; and ln is natural log.
2. LLC, IPC, ADF-Fischer and PP-Fisher examine the null hypothesis of non-stationarity. Probabilities for Fischer tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.
3. *** implies that the coefficient is significant at one per cent level.

Table 3. Pedroni's Panel Cointegration Test Results

Dependent Variable: GDP		Independent Variable: Expenditure
	Statistic	Weighted Statistic
Panel v-Statistic	0.447	0.447
Panel rho-Statistic	-2.021**	-2.021**
Panel PP-Statistic	-2.124**	-2.124**
Panel ADF-Statistic	-1.839**	-1.839**
Group rho-Statistic	-0.369	
Group PP-Statistic	-1.414*	
Group ADF-Statistic	-1.076	
Dependent Variable: GDP		Independent Variable: Revenue
	Statistic	Weighted Statistic
Panel v-Statistic	-1.650	-1.650
Panel rho-Statistic	-0.043	-0.043
Panel PP-Statistic	-1.912**	-1.912**
Panel ADF-Statistic	-6.741***	-6.741***
Group rho-Statistic	1.474	
Group PP-Statistic	-1.16	
Group ADF-Statistic	-6.894***	
Dependent Variable: Expenditure		Independent Variable: GDP
	Statistic	Weighted Statistic
Panel v-Statistic	1.945**	1.945**
Panel rho-Statistic	-1.695**	-1.695**
Panel PP-Statistic	-2.219**	-2.219**
Panel ADF-Statistic	-2.226**	-2.22**
Group rho-Statistic	-0.064	
Group PP-Statistic	-1.527*	
Group ADF-Statistic	-1.534*	
Dependent Variable: Revenue		Independent Variable: GDP
	Statistic	Weighted Statistic
Panel v-Statistic	4.309***	4.309***
Panel rho-Statistic	0.284	0.284
Panel PP-Statistic	-2.536***	-2.536***
Panel ADF-Statistic	-7.120***	-7.120***
Group rho-Statistic	1.780	
Group PP-Statistic	-1.903**	
Group ADF-Statistic	-7.344***	

Source: Authors' estimates.

Note: *, ** and *** implies that the coefficient is significant at 10 per cent, 5 per cent and 1 per cent level, correspondingly.

Given that the variables are integrated of order 1, Pedroni's panel cointegration test and Kao's residual cointegration test are used to examine the cointegration between general governments' revenue, expenditure, and GDP. Pedroni's panel cointegration test shows that GDP and government spending, and GDP and government revenue, are cointegrated. The relationship between GDP and government spending, and government spending and government revenue, was discovered to be bidirectional. Cointegration between GDP and government revenue, on the other hand, arises only when revenue is used as the dependent variable (Table 3).

Countries consider their revenue collection while framing their spending. Similarly, expenditure has an impact on economic growth, which helps to increase revenue collection. Surprisingly, the findings back this up: government spending and revenue are cointegrated regardless of which one is regarded as the dependent variable (Table 4).

Table 4. Pedroni's Panel Cointegration Test Results

Dependent Variable: Expenditure		Independent Variable: Revenue
	Statistic	Weighted Statistic
Panel v-Statistic	-1.314	-1.314
Panel rho-Statistic	-1.697**	-1.697**
Panel PP-Statistic	-2.009**	-2.009**
Panel ADF-Statistic	-6.644***	-6.644***
Group rho-Statistic	-0.067	
Group PP-Statistic	-1.277	
Group ADF-Statistic	-6.779***	
Dependent Variable: Revenue		Independent Variable: Expenditure
	Statistic	Weighted Statistic
Panel v-Statistic	4.669***	4.669***
Panel rho-Statistic	-1.735**	-1.735**
Panel PP-Statistic	-1.968**	-1.968**
Panel ADF-Statistic	-6.516***	-6.516***
Group rho-Statistic	-0.102	
Group PP-Statistic	-1.228	
Group ADF-Statistic	-6.627***	

Source: Authors' estimates.

Note: *, ** and *** implies that the coefficient is significant at 10 per cent, 5 per cent and 1 per cent level, correspondingly.

Table 5. Kao's Residual Cointegration Test

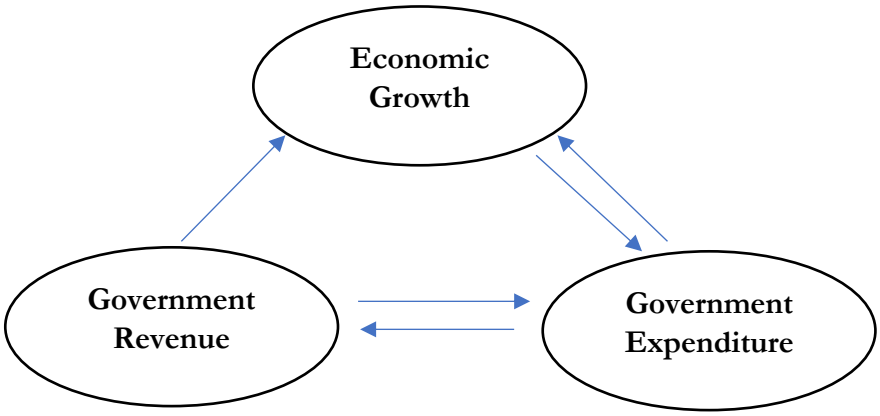
Variables		**t-Statistic**
Dependent Variable: GDP Independent Variable: Expenditure	ADF	-7.767***
Dependent Variable: GDP Independent Variable: Revenue	ADF	-1.387*
Dependent Variable: Expenditure Independent Variable: GDP	ADF	-8.607***
Dependent Variable: Revenue Independent Variable: GDP	ADF	-2.284**
Dependent Variable: Expenditure Independent Variable: Revenue	ADF	-11.224***
Dependent Variable: Revenue Independent Variable: Expenditure	ADF	-9.439***

Source: Authors' estimates.

Note: *, ** and *** implies that the coefficient is significant at 10 per cent, 5 per cent and 1 per cent level, correspondingly.

Kao's residual cointegration test is also used to confirm the long-run association between these three variables for robustness checking. Certainly, the conclusions drawn from Kao's panel cointegration test findings are the same as those in Pedroni's test results (Table 5).

The cointegrating relationship (*i.e.,* long-run association) was confirmed through the two panel cointegration tests (*viz.,* Pedroni's panel cointegration test and Kao's residual cointegration test) among the three economic variables (*viz.,* economic growth, government revenue and government expenditure) and could be summed up in Figure 1.



Note: The arrow indicates the direction of cointegration (long run association) between the variables.

Figure 1. Growth-Expenditure-Revenue Nexus for Nine Select Emerging Economies

Table 6. Panel Vector Error Correction Model (VECM) Estimation Results

Independent Variable/Equation	Dependent Variable					
	GDP	GDP	Expenditure	Expenditure	Revenue	Revenue
Long-run						
GDP	-	-	1.05**	-	1.1***	-
Expenditure	0.94**	-	-	-	-	0.99**
Revenue	-	0.90***	-	1.0**	-	-
Short-run						
Constant	0.05***	0.06***	0.07***	0.07***	0.06***	0.06***
Δ (GDP (-1))	0.01	0.38	-0.13	-	-0.08	-
Δ (GDP (-2))	-0.12	0.04	-0.02	-	-0.02	-
Δ (Expenditure (-1))	-0.11	-	0.06	0.37	-	-0.13
Δ (Expenditure (-2))	-0.13	-	-0.4	-0.34	-	-0.23
Δ (Revenue (-1))	-	-0.57	-	-0.6	-0.04	-0.02
Δ (Revenue (-2))	-	-0.23	-	-0.04	-0.21	-0.004
Error-Correction Term						
ECR	-0.37*	-0.86*	-0.07*	-0.57*	0.08*	0.03*
Diagnostic Tests						
Adjusted R-square	0.15	0.30	0.17	0.33	0.05	0.11
F-statistic	9.12	21.28	10.5	24.47	3.49	6.7
Akaike AIC	-2.78	-2.98	-2.68	-2.9	-3.02	-3.09
Schwarz SC	-2.7	-2.9	-2.6	-2.81	-2.94	-3

Source: Authors' estimates.

Note: *, ** and *** implies that the coefficient is significant at 10 per cent, 5 per cent and 1 per cent level, correspondingly.

A bi-variate panel vector error correction model (PVECM) is then used to estimate elasticities of GDP in relation to general government revenue and expenditure, as well as revenue and expenditure elasticities in relation to GDP. The derived coefficients can directly be read as elasticities because the variables are in a natural logarithm. According to the findings, a 1 per cent increase in expenditure and revenue would result in an increase in GDP by 0.94 and 0.90 per cent, respectively, in the long run. Similarly, an increase in GDP of 1 per cent would lead to increase in

government expenditure by around 1.1 per cent. On the other hand, an increase in government revenue by one per cent would cause a correspondent increase in government expenditure by nearly one per cent. The elasticities of revenue with respect to GDP and expenditure are found to be statistically significant; however, the error correction terms, which explain possible corrections of deviations from the long run path, are found to be insignificant. Therefore, we are ignoring the results of these elasticities (Table 6).

Following the panel VECM approach for predicting long-run elasticities, our work used both the FMOLS and DOLS methodologies for calculating long-run elasticities for robustness checks. Estimating using FMOLS and DOLS has several advantages, as discussed in the methodology section. All the coefficients of the dependent variables evaluated within the bivariate framework turn out to be significant in the case of both the FMOLS and DOLS approaches, which is consistent with the estimation of long run elasticities using the VECM approach (Table 7). With marginal deviations, the elasticities are also of equal magnitude. Higher GDP leads to higher government spending. Spending has an impact on GDP as well as on revenue collected by the government. Because capital spending has a greater multiplier, effective capital project investment would result in a rise in the future income, which would help the government to repay its existing debt and incur additional capex. The results are reflected in both DOLS and FMOLS.

Table 7. Panel Fully Modified Ordinary Least Square (FMOLS) and Panel Dynamic Ordinary Least Square (DOLS) Results

FMOLS	
Variables	**Coefficient**
Dependent Variable: GDP Independent Variable: Expenditure	0.85***
Dependent Variable: Expenditure Independent Variable: GDP	1.16***
Dependent Variable: Revenue Independent Variable: GDP	1.14***
Dependent Variable: Expenditure Independent Variable: Revenue	1.02***
Dependent Variable: Revenue Independent Variable: Expenditure	0.98***
DOLS	
Dependent Variable: GDP Independent Variable: Expenditure	0.86***
Dependent Variable: Expenditure Independent Variable: GDP	1.13***
Dependent Variable: Revenue Independent Variable: GDP	1.11***
Dependent Variable: Expenditure Independent Variable: Revenue	1.01***
Dependent Variable: Revenue Independent Variable: Expenditure	0.97***

Source: Authors' estimates.
Note: *, ** and *** implies that the coefficient is significant at 10 per cent, 5 per cent and 1 per cent level, correspondingly.

To sum up, the empirical investigation was undertaken for determining the long-term relationship between government revenue, expenditure and economic growth. The confirmation of the long-run economic relationship between these variables could help policy makers enhance their foresight. Interestingly, our empirical investigation confirms the existence of such a relationship between these variables in the nine emerging market economies under consideration. From the empirical exercise, a bi-directional causal long-run association between economic growth and government expenditure, as well as between government expenditure and government revenue, was found using the standard panel cointegration tests. However, in the case of

government revenue and economic growth, we could only find a one-way causality (*i.e.,* a long-run association running from government revenue to economic growth and not otherwise). Our findings are consistent with numerous other studies on the subject. We also estimated the long-run elasticities using three distinct methods after demonstrating the existence and direction of causality in the long-run, for a better understanding of the impact of each of these economic variables on one another These estimates also pointed towards a strong nexus between government revenue, government expenditure and economic growth.

From the point of macroeconomic stability, the government's revenue, which is the key source of funding for its expenditure, is critical. On the other hand, large government spending would have a multiplier effect on the economy, resulting in higher revenue collections for the government. In this context, it is recommended that the government's plans for increasing tax collection needs to be consistent with its spending objectives. This would ensure that the purchasing power of the public remains unaffected. Adequate capital spending, and targeted, high quality revenue spending by the government would benefit the economy by increasing demand and ultimately resulting in higher economic growth. Higher economic growth would set a virtuous cycle of increased government spending and revenue collection. As a result, emerging and developing economies must devote sufficient attention to spending, particularly capital spending, which has a considerable impact on economic growth. Nonetheless, as a word of caution, countries must exercise prudence while incurring expenditure financed through borrowing, as excessive borrowing could lead to a vicious cycle of unsustainable debt and, eventually, decrease economic growth.

Conclusion

The main goal of this study was to determine the long-term relationship between government spending, revenue, and economic growth at the general government level in nine emerging economies (South Africa, Russia, Malaysia, Poland, Chile, Hungary, Thailand, Philippines, and India) from 1991 to 2019. The findings of our paper point toward a strong relationship between government revenue, government expenditure and economic growth in the nine select emerging economies. The key take away from our analysis for policy makers is that adequate attention needs to be paid to fiscal policy decisions such as revenue collections and expenditure incurrence by the authorities, apart from channelising the benefits accrued from economic growth. This would lead to unleashing the virtuous cycle between higher economic growth, government expenditure and revenue collections.

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Annex I: Key Fiscal Variables of the Nine EMEs

	1991	2000	2005	2010	2015	2019
General Government Revenue (per cent of GDP)						
Chile	22.2	21.5	24.2	22.7	22.9	23.7
Hungary	-	44.1	41.6	44.5	48.4	43.6
India	19.0	17.4	19.1	18.8	19.9	19.9
Malaysia	29.0	19.6	21.7	22.3	22.2	21.6
Philippines	17.8	17.5	17.1	16.1	18.5	20.0
Poland	-	39.0	40.3	38.4	39.1	41.0
Russia	-	33.8	37.1	32.3	31.9	35.7
South Africa	-	21.3	25.0	23.8	25.8	26.8
Thailand	-	17.6	21.8	20.9	22.3	21.0
General Government Expenditure (per cent of GDP)						
Chile	20.7	22.2	19.7	23.1	25.0	26.5
Hungary	-	47.2	49.4	48.9	50.4	45.7
India	26.8	25.6	26.4	27.4	27.1	27.4
Malaysia	27.4	25.6	24.5	26.6	24.7	23.6
Philippines	18.0	20.8	18.7	18.3	17.9	21.7
Poland	-	43.0	44.2	45.8	41.7	41.8
Russia	-	30.7	29.5	35.5	35.3	33.8
South Africa	-	22.6	25.1	28.3	30.2	31.5
Thailand	-	19.3	19.6	22.0	22.2	21.8
General Government Fiscal Balance (per cent of GDP)						
Chile	1.5	-0.7	4.5	-0.4	-2.1	-2.7
Hungary	-	-3.0	-7.8	-4.4	-2.0	-2.1
India	-7.8	-8.3	-7.4	-8.6	-7.2	-7.5
Malaysia	1.6	-6.1	-2.8	-4.3	-2.5	-2.0
Philippines	-0.3	-3.3	-1.6	-2.3	0.6	-1.7
Poland	-	-4.0	-3.9	-7.4	-2.6	-0.7
Russia	-	3.1	7.6	-3.2	-3.4	1.9
South Africa	-	-1.4	-0.1	-4.5	-4.4	-4.7
Thailand	-	-1.8	2.2	-1.1	0.1	-0.8

Source: World Economic Outlook, IMF.
Note: '-' implies Not Available.