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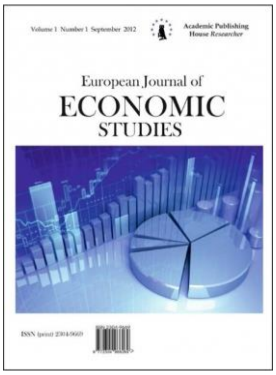

Articles and Statements

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Government Expenditure, Defense Expenditure and Economic Growth: a Causality Analysis for BRICS

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Abstract

This paper empirically examines the effects of civilian and military portions of government expenditure on economic growth of five key emerging economies Brazil, Russia, India, China and South Africa (BRICS). We ran separate Cointegration and Granger causality tests for each country using data taken from WDI and SIPRI while taking account of the limitations of time series data. We got interestingly different effects of military expenditure on economic growth across countries especially for the three nuclear powers Russia, India and China. India and Brazil showed negative, Russia and China showed positive while South Arica showed no effect on economic growth in terms of government civilian expenditure.

Keywords: government expenditure, military expenditure, economic growth, BRICS, cointegration, granger causality, unit root, emerging economies, one way causality, feedback relationship.

1. Introduction

"The single and most massive obstacle to development is the worldwide expenditure on national defense activity."*

The traditional gun-butter tradeoff claims that military spending is a non-productive expenditure. The logic behind this argument is the fact that military expenditure consumes a lot of resources thus leaving little for other economic activities, for instance, investment in public infrastructure, private consumption and investment, social security programs, etc., and thus slows down economic growth (Shieh, Lai, & Chang, 2002). Moreover, substantial military imports can also cause problems in balance of payments. On the other hand, the following quotation puts questions for researchers that need empirical answers;

"There is no way of telling from economic theory whether a greater military effort will slow down or accelerate output growth."*

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* Quote from a statement issued by a United Nations Committee for Development Planning written in the 1970s and cited in (Deger & Smith, 1983)

Nonetheless, studies like (Benoit, 1973; Benoit, 1978; Yildirim†, Sezgin, Öcal, 2005) and (Yildirim, Öcal, 2014) have proved empirically wrong the conventional belief that military expenditure negatively affects economic growth. . On the other hand, a plethora of studies do empirically support this argument (Faini, Annez, & Taylor, 1984b), (Lim, 1983b), (Abu-Bader & Abu-Qarn, 2003), (Galvin, 2003), (Klein*, 2004), and (H.-C. Chang, Huang, & Yang, 2011). Studies that found out mixed results in cross country analysis include among others, (Chowdhury, 1991), (Kusi, 1994), (Kollias, Manolas, & Paleologou, 2004), (Chang et al., 2013) and (Pan, Chang, Wolde-Rufael, 2014).

There are several channels from both supply and demand point of view that show positive effect of military expenditure on economic growth. Regarding the supply-side effect, the defense sector provides a variety of public infrastructure (e.g., dams, communication networks, roads, airports, highways, and other transportation networks), and enhances human capital through education, nutrition, medical care, and training. Moreover, military research and development experience created by arms imports positively affects private production. From the demand-side point of view, defense spending reduces unemployment and increases aggregate demand, thus promoting economic growth. Furthermore, defense spending may favor economic growth since it provides both internal and external security, and therefore enhances private investment and attracts foreign investment. This form is known as military spending growth hypothesis. Growth hypothesis is a one-way Granger causality running from military spending to economic growth. The second form is that military spending is detrimental to economic growth ('guns or butter'). This hypothesis is built upon the belief that if taxes or borrowings are used to finance military expenditure, it will crowd-out private investment. Otherwise, it takes the resources away from more productive government expenditures, for instance education and health services (Deger & Smith, 1983); (Lim, 1983a) (Dunne & Vougas, 1999). The second form is called the military spending growth detriment hypothesis. Growth detriment hypothesis is also a one-way Granger causality running from military spending to economic growth. The relationship between economic growth and military expenditure is bidirectional; that is to say, economic growth is caused by military spending and high military spendings are associated with economic growth. Furthermore, military sending is not exogenous when we consider changes in economic growth (Cappelen, Gleditsch, & Bjerkholt, 1984), (Kusi, 1994), (Kollias et al., 2004). The third form is a feedback hypothesis, which is a two-way Granger causality between military expenditure and economic growth. Finally, there is a fourth form of the relationship between military expenditure and economic growth which states that there is no relationship between military expenditure and economic growth (Biswas & Ram, 1986), (Grobar & Porter, 1989). The fourth form is called neutrality hypothesis, no causal relationship between military expenditure and economic growth. If the relationship between military spending and economic growth is either growth (detriment) hypothesis or feedback hypothesis, then reduction in (increase) military spending may lead to negative economic growth. For this reason, policy-makers need to analyze the relationship between military spending and economic growth to make an appropriate military strategy.

Military spending is qualitatively different from other government spending in many ways. Firstly, military procurements follow more strict acquisition processes and quality requirements than non-military spending (Hartley, 2004). Secondly, military spending is generally sanctioned by the government, independently from other types of spending. Thirdly, there is comparatively little flexibility in shifting military spending to other uses, unlike other spending. Fourthly, in almost every country, there is centralized allocation of military spending, while non-military spending may be allocated by central, state or local governments. While centralization might present different oversight, decentralization can involve more middlemen (Teobaldelli, 2011). Thus, it is highly likely that military and non-military spending have different effects on the economy. There has been an ongoing debate on the relationship between government spending and economic growth. The celebrated "Wagner's law" postulates that government spending is income elastic and that the ratio of government spending to income tends to grow with economic development. Furthermore, government provides public goods and services (for non-military purposes) such as education,

[*] The authors point towards the study of Benoit (1973) that claims a positive effect of military expenditure on economic growth and argue that a single study has been used to build such a belief. They used cross country analysis and proved that military burden can slow down economic growth. (Faini, Annez, & Taylor, 1984a)

infrastructure, and laws, are often considered as important variables in economic growth. The effects of economic growth on government expenditure have been examined by a plethora of empirical studies using different testing procedures and different measures of government spending (Peacock & Scott, 2000). Since the 1990s, it has become a common practice to test Wagner's law using times-series techniques such as unit-root and co integration tests (Narayan, Nielsen, & Smyth, 2008). Using the Swedish data, (Henrekson, 1993) finds no evidence for Wagner's law; he also finds that earlier results from time-series studies may be spurious because they did not test the stationarity properties of the data. On the other hand, (Akitoby, Clements, Gupta, & Inchauste, 2006) empirically supports Wagner's law by using the co-integration method to a sample of 51 developing countries. Moreover, a number of studies have examined the effect of government spending on economic growth assuming that an inverted-U relationship exists between the scale of government and economic growth e.g. (Ram, 1986); (Dar & AmirKhalkhali, 2002). (Hansson & Henrekson, 1994) utilize disaggregated data and find that government transfers, consumption and total outlays have negative effects, while educational expenditure has a positive effect, and government investment has no effect on private productivity growth. In a framework of endogenous growth, (Barro, 1990) presented two kinds of predictions; unproductive government expenditure will have a negative effect on economic growth while the role of productive government expenditure on economic growth is unclear; it depends on how the government reacts and how much is the ratio of government spending to GDP. Later on, other studies also find support for negative effect of government spending on economic growth e.g. (Barro, 1991). The current body of literature generally suggests that developed countries may confirm Wagner's law but it is less likely to find support for it in developing countries (Akitoby et al., 2006).

On the other hand, another strand of literature suggests that government spending could have a positive effect on economic growth if it involves public investment in infrastructure, but could have a negative effect if it involves only government consumption. Yet, previous studies have not reached a consensus on the relationship between government spending and economic growth, owing to their differences in the specification of econometric models, the measurement of government expenditures, and the selection of samples (e.g., (Agell, Lindh, & Ohlsson, 1997). As argued by (Abu-Bader & Abu-Qarn, 2003), typical regressions for explaining government spending or economic growth generally focus on the relationship between government spending and economic growth, rather than providing insight into the direction of causality. One popular approach to investigating the causal relationships between the two variables has been using the tests (Granger, 1969). Over the past decades many studies have applied the Granger causality tests to test the causal relationship between government spending and economic growth. (Halicioĝlu, 2003) applies the Granger causality tests to the Turkish data over 1960–2000 and finds neither co-integrated nor causal relationships between per capita GDP and government spending shares. In contrast, several studies find evidence on the Granger causality running from national income to government expenditure, and thus provide support for Wagner's law e.g.,(Abu-Bader & Abu-Qarn, 2003). In particular, (Dritsakis, 2004) provides evidence on such a causal relationship for Greece and Turkey. By applying the unit-root, co-integration, and the Granger causality tests to panel data, (Narayan et al., 2008) find that Wagner's law is supported by the panel of sub-national data on China's central and western provinces, but is rejected by the full panel consisting of all Chinese provinces. Using the U.S. data since 1792, (Guerrero & Parker, 2007) find evidence supporting Wagner's law but not supporting the hypothesis that the size of the public sector Granger causes economic growth.

A wave of literature concerning the BRIC countries has erupted since the term's creation in 2001 by (O'neill & Goldman, 2001) e.g. (Armijo, 2007); (Cheng, Gutierrez, Mahajan, Shachmurove, & Shahrokhi, 2007); (Cooper, 2006); (Glosny, 2010); (Macfarlane, 2006). In (Wilson, Purushothaman, & Goldman, 2003) predicted that in less that forty years, or by 2050, the BRICs' combined economies would catch up with – and could be larger than – the combined economies of the G6 (US, Japan, Germany, France, Italy and the UK). The BRICs would then become the world's principal 'engine of new demand growth and spending power' (Wilson & Purushothaman, 2003). As 'larger emerging market economies 'Brazil, Russia, India and China where taken together as an analytical category based on their potential for domestic economic growth, underpinned by their large population size (Armijo, 2007).The BRIC category carries the promise of strong domestic economic growth and, more importantly, the prospect of becoming a global power. The acronym thus provoked an ever growing body of literature, many concerning the accuracy of including one BRIC or another in the group and the feasibility for a certain country to realize its 'BRIC potential' e.g. (Cooper, 2006); (Desai, 2007); (Macfarlane, 2006); (Sotero & Armijo, 2007). Later on in 2010 South Africa was included in the group of major national economies and thus the acronym is now known as "BRICS".

The objective of this paper is to test the four hypotheses of government (military or non military) spending in case of five major emerging economies Brazil, Russia, India, China and South Africa. These four hypotheses are,

Growth hypothesis: a one-way Granger causality running from government (military or non military) spending to economic growth. (Positive)

Growth detriment hypothesis: also a one-way Granger causality running from government spending to economic growth. (Negative)

Feedback hypothesis: a two-way Granger causal relationship between government spending and economic growth.

Neutrality hypothesis : No causality between them

We believe our findings will add up to the existing body of literature in two ways. One, our Granger causality analysis will test the causality while our cointegration analysis will determine the direction as well as the nature of the relationship whether it's positive or negative. Two, our findings will help the policy makers of these rapidly growing economies identify what could be slowing down their growth.

2. Data and Methodology

Annual data ranging from 1988 to 2013 is used in our study for all the countries. All the variables are measured in million dollars and are expressed in logarithms. Data for Gross domestic product and Government consumption is taken from World Development Indicator (WDI) while Military Expenditure's data is taken from Stockholm International Peace Research Institute (SIPRI). The list and symbols of variables used in our study are as follows.

LGDP: Log of Gross domestic Product used an indicator for economic growth.

LGE: Log of Government expenditure

LME: Log of Military Expenditure

2.1 Econometric Methodology:

Our econometric methodology consists of the following steps.

2.1.1 Augmented Dickey Fuller Test:

Since our data set includes time series data, thus we have to test the properties of the time series. In order to find out whether the data is stationary or not, we use Augmented Dickey Fuller test. This test was proposed by Dickey-Fuller (1979) and is widely used in the literature. Economic time series is typically non stationary and non stationary data can give us misleading results. Therefore, such time series should be made stationary or in other words such data should be differenced d times. The time series which is made stationary after differencing is called integrated of order d. When the test value comes out to be greater than the critical value, we interpret that the time series is stationary and vice versa.

2.1.2 Optimal Lag selection:

After testing for stationarity; if the variables are integrated of the same order, the next step is to choose optimal lag length. Different criterions have been used for lag selection in the literature but the most widely used method is to select the lag length suggested by majority of the criterion.

2.1.3 Johansen Co Integration Test:

In order to find the cointegrating relationship among the variables, we use Johansen (1988) test.

Johansen's procedure starts with VAR of order p and is given by

$$y_t = \mu + A_1 y_{t-i} + \ldots\ldots + A_p y_{t-p} + e_t$$

Where yt is an nx1 vector of variables that are integrated of order one – commonly denoted I (1) – and εt is an nx1 vector of innovations. This VAR can be re-written as

$$\Delta y_t = \mu + \prod y_{t-i} + \sum_{i=1}^{p-1} \prod_i \Delta y_{t-i} + e_t$$

Where

$$\prod = \sum_{i=1}^{p} A_i - I \quad \text{And} \quad \prod_i = -\sum_{j=i+1}^{p} A_j$$

If the coefficient matrix Π has reduced rank r<n, then there exist nxr matrices α and β each with rank r such that Π = αβ′ and β′y t is stationary. Johansen proposes two different likelihood ratio tests: the trace test and maximum eigenvalue test,

$$\Rightarrow J_{trace} = -T \sum_{i=r+1}^{n} \ln(1-\lambda_i)$$

$$\Rightarrow J_{\max} = -T \ln(1-\lambda_{r+1})$$

2.1.4 Multivariate VECM Granger Causality Test:

If cointegration exists between the variables then there is causality running between these variables in at least one direction (Granger, 1988). In order to test the causal relationships among the variables we use Granger causality test proposed by Engle and Grnager (1987).

The null hypothesis of Granger causality can be formulated as:

H0: Y does not Granger cause X

As per the definition of Granger causality, Y does not cause X if,

$$\alpha_1 = \alpha_2 + \alpha_3 + \alpha_{t-i} + \ldots\ldots.\alpha_j = 0$$

And

X does not cause Y if,

$$\beta_1 = \beta_2 + \beta_3 + \beta_{t-i} + \ldots\ldots.\beta_j = 0$$

Granger causality can be interpreted as Y is Granger caused by X if current value of Y can be forecasted with the help of past values of X.

3. Empirical Results

3.1. Augmented Dickey Fuller Test:

In the first step of our analysis, we run Augmented Dickey Fuller test so as to test stationary of our variables. In order to go further with our analysis, our variables should be integrated of the same order. Thus, we present the results of unit root test in Table 1. As evident from the table, all of the variables are non-stationary at first level and are shown stationary after differencing it once. In other words, our variables become stationary at first difference, therefore, we can apply further tests in our analysis.

Table 1. Augmented Dickey Fuller Test

Country	Variables	Trend	Intercept	Lag Length	T value/critical value	Order of Integration
Brazil	lgdp	Yes	Yes	8	-2.27 (-4.498)	Level
	Δlgdp	Yes	Yes	1	-6.34 (-4.39)***	First difference
	ge	No	Yes	5	-0.96 (-4.37)	Level
	Δlge	No	Yes	5	-5.05 (-4.39)***	First difference
	me	Yes	Yes	2	-1.60 (-3.61)	Level
	Δlme	Yes	Yes	2	-3.16 (-2.99)**	First difference

Russia	lgdp	yes	yes	5	0.89 (4.37)	Level
	Δlgdp	yes	yes	5	4.89 (4.41)***	First difference
	ge	Yes	yes	5	0.37 (4.37)	Level
	Δlge	yes	Yes	5	4.80 (4.39)***	First difference
	me	yes	yes	5	2.76 (5.37)	Level
	Δlme	yes	yes	5	5.38 (4.39)***	First difference
India	lgdp	Yes	Yes	5	-2.26 (-4.37)	Level
	Δlgdp	yes	Yes	5	-4.63 (-4.39)***	First difference
	ge	Yes	Yes	2	-2.60 (-3.61)	Level
	Δlge	No	Yes	6	-3.44 (-2.99)**	First difference
	me	No	Yes	3	-2.33 (-3.60)	Level
	Δlme	No	Yes	3	-3.99 (-3.61)**	First difference
China	lgdp	Yes	Yes	5	2.64 (5.39)	Level
	Δlgdp	Yes	Yes	5	5.35 (4.41)***	First difference
	ge	Yes	Yes	6	3.14 (4.39)	Level
	Δlge	Yes	Yes	6	4.64 (4.41)***	First difference
	me	No	Yes	2	2.16 (3.73)	Level
	Δlme	No	Yes	2	4.07 (3.75)***	First difference
S.Africa	lgdp	Yes	Yes	5	3.00 (4.37)	Level
	Δlgdp	Yes	Yes	5	4.84 (4.39)**	First difference
	ge	Yes	Yes	5	1.33 (4.37)	Level
	Δlge	Yes	Yes	5	3.41 (3.26)*	First difference
	me	Yes	Yes	5	2.29 (4.37)	Level
	Δlme	Yes	Yes	5	3.57 (3.24)*	First difference

3.2. Optimal Lag Selection:

Since Vector Auto Regression needs to account for lag length, we run the optimal lag length test and present the findings in Table 2. Studies using VAR in their analysis have used different lag length criterion, we however, choose the lag length suggested by majority of the criterion, i.e. lag length having most number of "*" will be considered the optimal lag length. Therefore, our optimal lag length for Brzail, India and South Africa is 1 while for China and Russia is 2.

Table 2. Optimal Lag Selection

Country	Lag	LogL	LR	FPE	AIC	SC	HQ
Brazil	0	-340.5371	NA	5.44e+08	28.62809	28.77534	28.66716
	1	-325.8713	24.44294*	3.42e+08	28.15594	28.74497*	28.31221*
	2	-315.9379	14.07237	3.31e+08*	28.07815*	29.10895	28.35163
Russia	Lag	LogL	LR	FPE	AIC	SC	HQ
	0	-325.7297	NA	1.58e+08	27.39414	27.54140	27.43321
	1	-271.6568	90.12148	3737226.	23.63807	24.22710	23.79434
	2	-255.5505	22.81729*	2157727.*	23.04588*	24.07667*	23.31935*
India	Lag	LogL	LR	FPE	AIC	SC	HQ
	0	81.23805	NA	2.96e-07	-6.519838	-6.372581	-6.480770
	1	180.1608	164.8713*	1.66e-10*	-14.01340	-13.42438*	13.85713*
	2	189.5540	13.30705	1.68e-10	-14.04617*	-13.01537	-13.77270
China	Lag	LogL	LR	FPE	AIC	SC	HQ
	0	68.53548	NA	6.73e-07	-5.698737	-5.550630	-5.661489
	1	96.50269	46.20670*	1.31e-07	-7.348060	-6.755628*	-7.199065
	2	108.1699	16.23268	1.09e-07*	7.579994*	-6.543239	7.319253*
S. Africa	Lag	LogL	LR	FPE	AIC	SC	HQ
	0	-109.0955	NA	2.288299	9.341295	9.488552	9.380363
	1	-49.76022	98.89220*	0.034821*	5.146685*	5.735712*	5.302954*
	2	-43.47541	8.903489	0.045577	5.372951	6.403748	5.646421

3.3. Johansen Cointegration Test:

We present our findings of Trace statistics and Eigen Value statistics in Table 3. Furthermore, cointegration equations for all the 5 countries obtained from Vector Error Correction Model are shown in the same table. Null hypotheses of “no cointegration” among the three variables (Economic growth, Government expenditure and Military expenditure) are rejected in case of our sample countries. Thus it is inferred, there is one cointegrating vector in case of each of the trivariate system of our variables.

Table 3. Johansen Cointegration Test

Country	Hypothesized No. of CE(s)	Trace Statistic	Critical Value at 0.05	Max-Eigen Statistic	Critical Value at 0.05
Brazil	Ho: r = 0	32.51*	29.84	23.56*	21.13
	Ho: r ≤ 1	8.94	15.49	8.88	14.26
	Ho: r ≤ 2	0.05	3.84	0.05	3.84
Cointegrating equation	Lgdp = 9.66 − 2.33 lge*** (5.74) − 0.03 lme*** (-5.14) (1)				
Country	Hypothesized No. of CE(s)	Trace Statistic	Critical Value at 0.05	Max-Eigen Statistic	Critical Value at 0.05
Russia	Ho: r = 0	46.42*	29.79	37.94*	21.13
	Ho: r ≤ 1	8.48	15.49	8.38	14.26
	Ho: r ≤ 2	0.09	3.84	0.09	3.84
Cointegrating equation	Lgdp = 7.04 (-3.31) + 4.80 lge** (-5.85) − 1.07 lme* (-3.04) (2)				

Country	Hypothesized No. of CE(s)	Trace Statistic	Critical Value at 0.05	Max-Eigen Statistic	Critical Value at 0.05
India	Ho: r = 0	55.03*	29.79	43.69*	21.13
	Ho: r ≤ 1	11.34	15.49	11.32	14.26
	Ho: r ≤ 2	0.01	3.84	0.01	3.84
Cointegrating equation					
Lgdp =	-7.16	- 1.23 lge*	+ 1.07 lme**		(3)
	(-2.48)	(-2.33)	(3.09)		
Country	Hypothesized No. of CE(s)	Trace Statistic	Critical Value at 0.05	Max-Eigen Statistic	Critical Value at 0.05
China	Ho: r = 0	39.54*	24.27	32.13*	18.51
	Ho: r ≤ 1	11.80	12.32	10.90	12.20
	Ho: r ≤ 2	0.24	4.12	0.24	4.12
Cointegrating equation					
Lgdp =	5.57	+ 0.57 lge*	+ 1.50 lme		(4)
	(-3.00)	(-2.28)	(-1.90)		
Country	Hypothesized No. of CE(s)	Trace Statistic	Critical Value at 0.05	Max-Eigen Statistic	Critical Value at 0.05
S. Africa	Ho: r = 0	32.62*	29.79	24.83*	21.13
	Ho: r ≤ 1	7.79	15.49	7.66	14.26
	Ho: r ≤ 2	0.13	3.84	0.13	3.84
Cointegrating equation					
Lgdp =	-16.49	- 0.43 lge	- 3.16 lme***		(5)
	(-2.23)	(1.11)	(5.42)		

Our cointegration equation for Brazil shows statistically significant and negative relationship of military expenditure and government expenditure with the economic growth. Further, a 0.03 percent change in military expenditure will reduce the economic growth by one percent while the same decrease in the economic growth of Brazil is caused by a 2.33 percent change in the government civilian expenditure. The equation for Russia shows a positive effect of government civilian expenditure on economic growth while the defense expenditure causes the economic growth to reduce. In quantitative terms, 1.07 percent increase in defense expenditure causes the economic growth to reduce by one percent. On the other hand, economic growth is enhanced by one percent with a 4.80 increase in the government civilian expenditure. It is evident from Table 3 that the economic growth of India reduces by one percent with the increase in government expenditure by 1.23 percent while it is increased by one percent when military expenditure is increased by 1.07 percent. The cointegration results show the relationship between economic growth and military expenditure of China is statistically insignificant while a one percent increase in economic growth is observed when government civilian expenditure is increased by 0.57 percent. Finally, our cointegration equation for South Africa shows no statistically significant relationship of government expenditure with economic growth while it shows the economic growth is reduced by one percent when the military expenditure is increased by 3.16 percent.

3.4. VECM Granger causality test:

Now that cointegration has been found in the system of our variables, we apply Granger causality test to detect the direction of causality among our variables. The Granger causality test helps us to determine the weak exogeneity among variables. This test suggests us the causal relationship of one variable with the other variable. The results of VECM Granger causality test are reported in Table 4. The significant chi-square statistic shows the dependent variable is Granger caused by the independent variable. Table 4 shows bidirectional causality between economic growth and government expenditure in case of Brazil. Unidirectional causality running from government expenditure to economic growth has been found in case of Russia, China and India while no statistically significant relationship can be detected for South Africa. In our trivariate analysis, we found unidirectional causality running from growth to military expenditure for Brazil, unidirectional causality running from military expenditure to growth in case of Russia and India while no relationship was found between military expenditure and growth for China. We found bidirectional causality between growth and military expenditure in case of South Africa.

Table 4. Multivariate Granger Causality Test

Country			Independent Variables	
Brazil	Dependent		Independent	
		lgdp	lge	lme
	lgdp	---	5.22*	3.04
	lge	14.80***	---	0.79
	lme	5.77*	2.02	---
Russia	Dependent		Independent	
		lgdp	lge	lme
	lgdp	---	12.55*	14.83**
	lge	9.28	---	13.47**
	lme	8.79	16.29***	---
India	Dependent		Independent	
		lgdp	lge	lme
	lgdp	---	7.31**	12.02***
	lge	0.14	---	1.89
	lme	1.44	11.94***	---
China	Dependent		Independent	
		lgdp	lge	lme
	lgdp	---	5.45**	0.77
	lge	0.16	---	0.38
	lme	0.08	0.30	---
S. Africa	Dependent		Independent	
		lgdp	lge	lme
	lgdp	---	0.88	11.95***
	lge	1.28	---	0.026
	lme	3.01*	1.92	---

4. Results

We will sum up our findings from the statistical analysis for all the five countries in this section. Our trivariate analysis for Brazil reveals there is a negative long run causality running from government civilian expenditure to economic growth which means our growth detriment hypothesis holds true for Brazil. Furthermore, two ways causality between government expenditure and economic growth was also found in case of Brazil, thus accepting our feedback hypothesis. To abridge our findings for Russia, one way positive causality from government expenditure to economic growth while negative causality from military expenditure to growth is detected. Therefore, growth hypothesis is accepted for government civilian expenditure and growth detrimental hypothesis is accepted for government military expenditure. Our findings for India affirm growth detrimental hypothesis for government civilian expenditure, i.e. unidirectional negative causality running from government spending to economic growth. These findings further affirm growth hypothesis for government military expenditure, i.e. unidirectional positive causality running from government spending to economic growth. We found government civilian expenditure to positively affect economic growth in case of China, thus proving growth hypothesis true. No statistically significant relationship was found between military spending and economic growth for Chinese data. Summarizing our findings for South Africa, bidirectional causality between military spending and economic growth is detected which confirms feedback hypothesis.

5. Conclusion

Our aim in this study was to find out whether there is any causal relationship between economic growth and both civilian and military portions of government expenditure in five emerging economies recently known as BRICS, i.e. Brazil, Russia, India, China and South Africa. Since it is generally believed that military expenditure can slow down economic growth, we examined the effects of military expenditure on economic growth of these five major emerging economies of the world. Our results for the 3 nuclear powers in our analysis, i.e. Russia, India and China were interestingly different from each other. Russian data showed negative effect of military spending on economic growth, Indian data showed positive effect while Chinese data suggested insignificant impact of military spending on economic growth for our sample period. The implications for these findings are straightforward; our sample period starts from 1988 and ends on 2015 which was a particularly rough period for Russia. The Afghan war and the separation of 6 central Asian states from USSR forced Russia to spend serious money on military which shook its economy. Chinese economy has been boosting for the last few decades and our findings might imply that Chinese economy is too strong for its military expenditure to affect it. The implication for positive impact of military spending on Indian economy might be the investment on public infrastructure, hospitals, education and etc. by military organizations. Our findings for Brazil and South Africa indicate that military spending slow down economic growth of both the countries.

Government civilian expenditure of India and Brazil showed negative effect on economic growth, therefore we suggest the policy makers of these countries to reduce their government spending and/or reallocate it to productive projects. In case of Brazil, shifting resources from military to civilian spending may not enhance economic growth since government civilian expenditure itself is reducing economic growth. Thus, the government should look for civilian productive activities to foster economic growth. Russian and Chinese data gave positive response to economic growth for our sample period. Therefore, we conclude that only the military portion of government spending has been a burden on Russian economy while Chinese economy was being neutral to military spending. Our analysis for South Africa suggested statistically insignificant relationship of government civilian expenditure with economic growth, hence we conclude by suggesting reduction in its military spending which is causing its economy to slow down.

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