Military Expenditure and Institutional Quality on Brics Countries Inclusive Growth Based on World Bank Income Classification

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Abstract: Empirical studies on military expenditure-growth nexus in individual countries and cross-national countries abound, however, to the best knowledge of the authors; there are no studies on the impact of military expenditure and Institutional quality on Inclusive growth. The objective of this paper is to fill the gap by investigate the impact of military expenditure and institutional quality on BRICS inclusive growth from 1984 to 2017. This paper adopted BRICS countries because they account for about 26.11 % of total world military expenditure. Due to the heterogeneous nature of BRICS countries, the countries were grouped into Upper Middle-Income countries and Lower Middle-Income countries using the World Bank Income Classification. In addition, corruption was adopted as the reliable proxy for institutional quality, since corruption is often a symptom of bad institution. The result of the impact of military expenditure and corruption on inclusive growth in the lower middle-income group indicates that military expenditure and corruption have positive and statistically significant effects on inclusive growth while the interactive term has negative and statistically significant effect on inclusive growth. This implies military expenditure reduces inclusive growth in the face of corruption. However, for the upper middle income, military expenditure is negative and significant as against that of lower middle income. Corruption and interactive term have negative effects on inclusive growth but both are statistically insignificant.

Keywords: Military Expenditure; Institution Quality; Inclusive Growth; BRICS countries

JEL Classification: E6; H56; 043

1.1. Introduction

The effect of military expenditure on growth is a longstanding debate in defense economics and peace literatures, dating back to empirical studies by (Benoit, 1973; Benoit, 1978) which argued that military expenditure has a positive impact on economic growth via the provision of the enabling environment (Security) for local and international investment. Furthermore, it contributes to growth via utilization of resources, particularly in employment generation, Research and Development,

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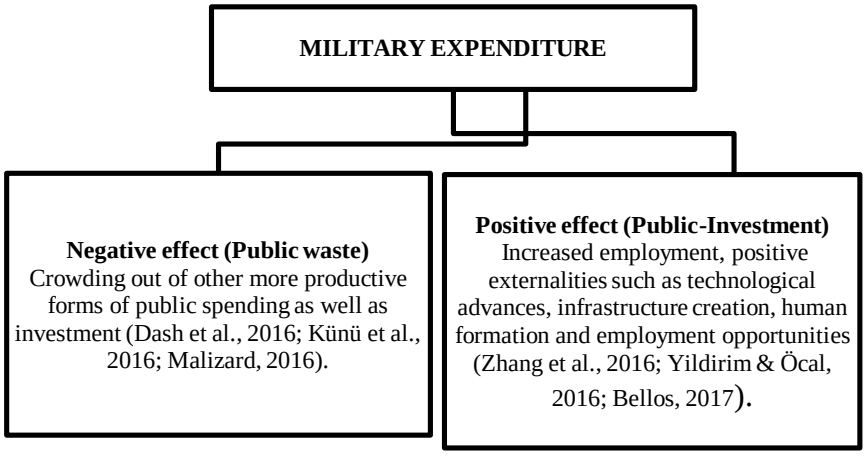
provision of vocational training (Menla Ali & Dimitraki, 2014; Meng et al., 2015; Zhao et al., 2015).

However, recent studies have identified an adverse link between military expenditure and economic growth this happens as it crowd-outs public investment, from productive activities to unproductive ones (Ward & Davis, 1992; Mintz & Stevenson, 1995; Klein, 2004; Kentor & Kick, 2008; Shahbaz & Shabbir, 2012). Therefore, impact of military expenditure on growth is mixed and inconclusive with results depending on the country or sample of countries, the time period or methodology used (Smith, 2000; Dunne et al., 2005; d'Agostino et al., 2017) has presented in Table 1. This subject matter has secured a growing attention adopting a wide–range empirical studies which made use of various methodologies and theoretical frameworks, a consensus has not been reached (Dunne et al., 2005, Alexander, 2015).

Table 1. Different views on Military expenditure



A potential link for this mixture of conclusion is the environment that military expenditure is taking place. For instance, (Aizenman & Glick, 2006, Compton & Paterson, 2016) affirms that high military expenditure in the presence of high threat environment leads to economic growth via the provision of security while high military expenditure in the presence of low threats will retard economic growth via wide spread corruption and rent seeking. (d'Agostino et al., 2012) further examined military expenditure-growth in the presence of corruption using African sample from 2003 to 2007.They found that corruption does influence the impact of military expenditure on growth. In related paper, (d'Agostino et al., 2017) re-examined the

military expenditure –growth using 1996-2007 period by employing a System GMM estimation confirms that military expenditure and corruption does retard economic growth.

Recently (Compton & Paterson, 2016) consider how institutions can impact military expenditure-growth nexus. Based on 100 countries of annual data from 1988 to 2010 by employing Panel Ordinary Least Square (OLS) and system-generalized methods of moments (GMM).The authors find that military expenditure on growth is negative or zero at best and this impact is lessened in the presence of good economic and political institutions.

This paper builds on this area of work, by adapting corruption as a reliable proxy for institutional quality, since corruption is a symptom of bad/weak institution. For instance, weak institution stimulate wasteful military expenditure via lack of checks and balances leads to an irrational expenditure decision, which might retard inclusive growth.

Furthermore, the author contribute to this area of research by incorporating a newly-developed BRICS inclusive growth index[1] as proxy for growth while examining the military expenditure–growth nexus under World Bank Income classification. The empirical analysis is based on (Aizenman & Glick, 2006; Compton & Paterson, 2016) works.

The BRICS (Brazil, Russia, India, China and South Africa) countries are referred to as next World economic powerhouse characterized with high-income growth and active military industries. The rationale for investigating the BRICS countries for this study are as follows. One, BRICS countries account for about 26.11% of total world's military expenditure and devotes a huge percentage of their total government expenditure to military expenditure. According to SIPRI (Institute) affirm that average military expenditure share of government expenditure was 4.1% for Brazil, 10.8% for Russia, 10.1% for India, 9.7% for China and 4.7% for South Africa for the period 2000-2014.

Two, the intra-conflict rivalry among BRICS countries also makes this empirical investigation an interesting one to explore. For example, the India conflicts with China has been affirmed; and as two of the world's fast growing powerhouse countries, their relationship synergy plays a significant influence in the political domain. Finally, on a general note, World's military expenditure has declined due to peace dividend however; BRICS countries still assign a high percentage of their Central government budgetary allocation to military sector and industries despite witnessing harsh socio-economic inclusive growth challenges. For instance, BRICS countries are experiencing a downturned GDP growth rates coupled with high unemployment rates, crime rates, high poverty rates, high-income disparity, climate

[1] Presented in the appendix section.

change and a host of others. In Conclusion, military policy can be said to be of great important for the BRICS countries.

1.2. Institutional Failure in BRICS Countries

"If we do not kill corruption, corruption will kill us"

(Anonymously, 2018)

"You thief cent you are in prison;

You thief 10 million this patriotism.

You are given chieftaincy and national honour

You steal even bigger, this is refer to as rumour

(Wole Soyinka, 1985 literature Nobel Prize winner, Unlimited Liability Company, 1983)

Over the past 40 years corruption has become the prism through which BRICS countries is seen the world over. The most recent report (2018) on the Corruption Perception Index (CPI) published by Transparency International (TI) ranks BRICS countries has presented below. The ranking score criteria is as follows 100-50 are referred to less corrupt countries while 49 - 0 are referred to as more corrupt countries.

Table 2. CPI 2018 Ranking score and World Bank Income Classification

S/N	Countries	CPI 2018 Ranking score	2018 World Bank income Classification
1	Brazil	40	Upper Middle income
2	Russia	29	Upper Middle income
3	India	40	Lower Middle income
4	China	40	Upper Middle income
5	South Africa	45	Upper Middle income

Source: Corruption Perception Index (CPI) ranking 2018, World Bank 2018

Therefore, based on the above CPI 2018 rankings score, all BRICS countries are regarded as corrupt countries. However, four out of BRICS club countries are ranked Upper Middle income countries except India according World Bank countries classification has presented above.

1.3. Types of Corruption in BRICS Countries

In the development literature, corruption is typically defined roughly as the abuse of public office or entrusted power for private gain (Bank, 1997; International, 2009). Public office is abused for private gain when an official accepts, solicits, or extorts a bribe, or when private agents actively offer bribes to circumvent public policies and process for competitive advantage and profit. Public office can be abused for

personal benefit, even if no bribery occurs, through patronage and nepotism, the theft of state assets, or the diversion of state revenues(Bank, 1997).Corruption include bribery, extortion, influence peddling, nepotism, fraud, the use of "speed money" and embezzlement.

It should be noted that corruption is not limited to the official domain and there is no suggestion in this paper that official corruption is the only important aspect. The private sector is a prone as the public sector to abuse of power of position for private gain. It is also almost implicated in government corruption as a motivator of corrupt behaviour and a repository for its proceeds. The focus of this paper on official corruption is due merely to the need to keep the scope discussion manageable. Several approaches to classifying corruption have been proposed (Kpundeh & Hors, 1998; Karklins, 2016; Vargas-Hernández, 2013). The easiest approach analytically may be to distinguish between petty, grand and political corruption, depending on the amounts of money lost and the sector where it occurs.

Petty corruption consists of small-scale embezzlement and misappropriation; bribery demand by or offered to low-level official in order to bend rules; use of licensing and inspection powers for extortion, and perpetrating minor acts of favoritisms. The typical incident of petty corruption involves a private citizen dealing with a low-level government bureaucrat in a straightforward transaction such as goods clearance or issuance of driver's license or passport. These acts of corruption can be subtle- a mere gesture or hint that a small consideration is expected. It can also be more direct, an explicit demand or a threat that the file could stop "moving" if a gift is not offered.

Grand corruption is misuse of public office at higher levels within the state (Rose-Ackerman & Palifka, 2016). It includes large scale embezzlement and misappropriation via public procurement; payment for non-existent goods or services; contrived losses in public procurement; large kickbacks in government payroll and extending economic privileges to special interests. The extreme example of grand corruption is "state capture", which is when top politicians and bureaucrats collude with private actors to turn the state into a private moneymaking machine.

Political corruption includes gross abuse of the country's mechanism of restraint: legislative and judicial processes, as well as auditing, investigatory, and oversight powers; subversion of electoral processes through vote-buying and bribery of accountable official; large-scale assignment of public property to privileged interests; politically motivated loans by banks and financial institutions; large contribution from public coffers to private causes and large political donations and bribes to parties and party official.

Without aiming to be comprehensive, some major expression of these types of corruption in BRICS are highlighted

Table 3. Types of corruption in BRICS

Type	Main Actors	Mode
Petty Corruption	Low and mid-level public official	Small scale embezzlement and misappropriation; bribes to bend rules or ignore misdemeanors; using licensing and inspection powers for extortion; minor favoritisms
Grand corruption	High level public officials; political; representatives of donor and recipient countries; bureaucratic elites; businessmen and middlemen	Large-scale embezzlement and misappropriation via public procurement; payment for non-existent goods or services; kickbacks; "ghost workers" on government payroll; economic privileges given to special interest;
Political corruption	Top-level executive; legislative and judicial officials; bureaucratic elites; politicians; big business	Abuse of legislative powers; corruption of the judicial process; abuse of auditing, investigatory, and oversight powers; Undermining electoral processes through vote-buying and bribery of accountable officials, large-scale assignment of public property to privileged interests; large contributions from public coffers to private cause; large political donations and bribes

Another survey by TI shows a perception of widespread corruption among the country's major institutions of policy ,restraint and service delivery(International, 2009).Respondent were asked questions: "Percentage of respondent who felt the following institutions in BRICS countries were corrupt or extremely corrupt" .

Table 4. Percentage of respondent who felt the following institutions in BRICS countries were corrupt or extremely corrupt

Institutions	Brazil %	Russia %	India %	China %	South Africa%
Political parties	84	77	86	N/A	77
Police	70	89	75	N/A	83
Legislature	72	83	65	N/A	70
Public officials & civil servants	46	92	65	N/A	74
Judiciary	50	84	45	N/A	50
Education systems	33	72	61	N/A	32
Military	30	70	20	N/A	11
Medical and health service	55	75	56	N/A	55
Business	35	57	50	N/A	54
Media	30	59	41	N/A	40
NGOs	35	45	30	N/A	43
Religious Organization	31	40	44	N/A	24

Source: Transparency International Global Corruption Barometer 2013 https://www.transparency.org/gcb2013/country?country=south_africa

1.4. Theoretical Framework on Military Expenditure and Growth

(Aizenman & Glick, 2006) developed a theoretical framework to analyze military expenditure-growth nexus based on (Barro and Sala-I-Martin, 1992) work. They opined that military expenditure assert negative or insignificant effect on growth in the presence of corruption because of its non-linearity and omitted variable biases. (Aizenman & Glick, 2006) postulated that threat is a key factor to determine if military expenditure will assert positive impact on growth or not.

$$\uparrow threat + \uparrow military\ exp. = \uparrow$$
$$economic\ growth\ (growth\ occur\ via\ provision\ of\ security)$$

$$\downarrow threat + \uparrow military\ exp. =$$
$$\downarrow economic\ growth\ (via\ corruption\ and\ rent\ seeking)$$

This can be written mathematically as follows

$$\frac{\partial\ growth}{\partial\ m} = \propto_1 +\ a_1 threats\ ; a_1\ < 0, \qquad a_2\ > 0$$

$$\frac{\partial\ growth}{\partial\ threat} =\ b_1 +\ b_2 m\ ; b_1\ < 0, \qquad b_2\ > 0$$

G= growth rate of real GDP per capita; m= military expenditure; threat- level of country's effective military threat.

The basic growth equation for this research adopt (Aizenman & Glick, 2006) and (Compton & Paterson, 2016) empirical approaches written as

$$Y_{it} =\ \alpha + \beta_1 M_{it} + \beta_2 I_{it} + \beta_3\ M\ .\ I_{it} + \gamma' X_{it} + \eta_i + \varepsilon_{it}$$

Where Y- is the inclusive growth index, $M\ .\ (Institution)_{it}$- is the interaction of military expenditure with institution, X_{it} – is the set of control variables – education, population and Investment variables. ϵ_{it} is the error term.

(Aizenman & Glick, 2006) postulate that the direct impact of military expenditure and external threats on growth are assumed to inverse relationship while collaborative impact is positive. The Barro style model of military expenditure-growth relationship indicate that military expenditure influenced by external threat stimulate output by increasing security whereas, military expenditure influenced by rent seeking and corruption will retard growth, by disrupting productive economic activities.

Recently (Compton & Paterson, 2016) consider how institutions can impact military expenditure-growth nexus. Based on 100 countries of annual data from 1988 to 2010 by employing Panel OLS and generalized methods of moments (GMM), the authors find that military expenditure on growth is negative or zero at best and this impact is lessened in the presence of good economic and political institutions.

Theoretical Literature on Institution

Generally, there are three dominant schools on institutional thoughts (Thoenig, 2003) namely, incentive institutionalism, cultural institutionalism and historical institutional. (Thoenig, 2003) provided four separate streams of the institutional theory, viz historical institutionalism, sociological institutionalism, new institutionalism and local order or actor institutionalism. It is along these threads that this chapter relates the theoretical propositions on institutions. Basically, the social institution is enshrined in the seminal study of (Selznick, 1949), which presents public agencies as institutional actors who create a level playing ground , and produce participatory leadership and involvement.

Public management is not limited to the art of designing formalized structures but also considers the way participants are influenced, transformed and completed by informal structures. In this setting, the populace, the have-nots as well as the poor, are considered as more important than those as the highest hierarchy of the ladder. As such, public bureaucracy must cope with the constraints and pressures applied by the populace is cultivated and the stringencies and intricacies accorded the corridors of power are often relaxed to build confidence and ensure general acceptance from the people. With this, public institutions develop in a gradual process through the support, understanding and cooperation of the people.

In social institutions, even though the need for change is often illusory, as it tends to sap ideas and delimit innovations, pressures for change could occur in two ways. It could be internal and endogenously engineered or external and exogenously influenced which sometimes, could collapse the existing fabric of the institution (Oliver, 1992). The change operates through three identified mechanism: coercive isomorphism –change results from pressures exerted by political influence or by outside organizations considered legitimate; mimet isomorphism-uncertainty and ambiguity about goals or technology increase the adoption of imitation conducts; and normative isomorphism-the influence of individuals belonging to the same profession or having followed the same educational processes.

Historical institutionalism was initiated in the eighties and it suggests that public administration remains a sub set of political life such that the state machinery cannot exist in isolation por afford to be neutral (Hall et al., 2010). Public policies are seen as an inter-governmental instrument, which influences the choices made today based on the steps taken in the past.

Empirical Studies

Military expenditure and Growth

(Stroup & Heckelman, 2001) investigated the military expenditure–growth nexus using the augmented version of Barro styled model by incorporating military labour

for the period of 1975-1989 by utilizing fixed panel estimation technique. Their result show that military expenditure, military labour and growth relationship are non-linear. Thus, low levels of military expenditure and military labour stimulate growth and vice versa.

(Aizenman & Glick, 2006) use Barro style growth model to explore the impact of military expenditure on economic growth taking cognizance of threat of 90 countries spanning 1989-1999. The empirical result revealed that military expenditure and antagonistic threat have negative effect on growth, whereas, military expenditure in the midst of threats stimulate growth. This innovative specification indicates that output is influenced by security or military expenditure depending on the presence of hostile threat.

(Yakovlev, 2007) use the Barro growth model for 28 countries over the period of 1965-2000 to examine the impact of military expenditure, arm trade on economic growth. Employing random and fixed effects and GMM techniques. The cross sectional results revealed that high military expenditure coupled with net arms exports separately retards growth whereas, net arms exporting countries coupled with high military expenditure does not retards economic growth.

In summary, Barro styled model postulates that military expenditure influence by external threats stimulate output via provision of security for lives and properties whereas military expenditure gear-up via corruption and rent seeking will retard growth, thus disrupting productive economic activities.

Institution and Economic growth

The question on the actual role of institutions in growth process is not yet entirely clear beyond the belief that good development and good institution go together. However, (Acemoglu et al., 2005) clearly affirm that good institution is a key determinant of growth in any economy. Government with good institution promotes favorable business environment, which recognize and rewards creativity.

Countries with good institutions often channel their public expenditure decision in stimulating and promoting growth inclusive. Process. This latter connection between institution and inclusive growth forms the crux of the investigation in this chapter using BRICS countries as a case study.

Institution, as defined by (North, 2006), is a set of formal and informal rules that govern the behaviour of individuals and organizations. Formal rules include constitutions, laws, regulations, and political system, while informal rules refer to social norms, values and beliefs. In this context, institutions structure the incentives that affect behaviors and provide a framework for economics exchanges .Good institutions and sound policies create an environment that fosters economic development through accumulation of factors of production and efficient use of resources. More often, the conceptualization of institutions allows the view that

institutions are all rules or forms of conduct, which are intentionally devised to reduce uncertainty that result from imperfect information, control the environment and social interaction, as well as lower transaction cost (Ménard & Shirley, 2005).

(Ostrom, 2015) defined institutions as the sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided and what pay-offs will be assigned to individuals dependent on their actions.

A considerable amount of country and cross-country studies has been done on the relationship between economic growth and institution. Among the prominent ones is that of (Acemoglu et al., 2005) which emphasized the fundamental importance of institutions in causing growth and differences in the levels of development across countries. Also, while examining discussions on institutions and economic development, (Chang, 2011) suggested that more attentive institutional economists were needed to focus on the real world institutional research, rather than retelling fairy-tales. According to the author, it is on the basis of reality and not fictions, that policy-relevant theories of institutions could be developed.

In a panel study, (Valeriani & Peluso, 2011) explore the effect of institutional quality on economic growth over sixty years among countries at different stages of development, using pooled regression fixed effects model to test three institutional indicators which included civil liberties, number of veto players and quality of government. The result revealed that institutional quality impacted positively on economic growth. However, further finding from the study showed that the size of the institutional impact on growth varies between developed and developing countries considered. Thus, in conclusion, the study claimed that institution mattered for growth.

Also, (Berggren et al., 2013) investigated the impact of institutions on economic growth in the EU-27, seven other similar European countries and Israel over the period from 1984 to 2009.The result of the panel data analysis submitted that then quality of policy which included stability of government, favourable socio economic condition, strong investment environment and democratic accountability, was growth-enhancing.

According to (Bhupatiraju & Verspagen, 2013) explained differences in the levels of development across countries using a multi-faceted database to measure institutions. Findings showed that institutions ranked above other factor when GDP per capita was the regressand. However, when factors such as investment and growth were included as independent variable, institutional factors was negatively associated with development variables.

In summary, the results presented above depicts mixed relations between institution and economic growth. As institution impact varies as it effect is positive on growth in a period, it affect negatively on economic performance in another period.

Military Expenditure, Institution and Growth

(Aizenman &Glick, 2006; Compton & Paterson, 2016) affirms that high military expenditure in the presence of high threat environment leads to economic growth via the provision of security while high military expenditure in the presence of low threats will retard economic growth via wide spread corruption and rent seeking.

(d'Agostino et al., 2012) further examined military expenditure-growth in the presence of corruption using African sample from 2003 to 2007.They found that corruption does influence the impact of military expenditure on growth. In related paper, (d'Agostino et al., 2017) re-examined the military expenditure –growth using 1996-2007 period by employing a System GMM estimation confirms that military expenditure and corruption does retard economic growth.

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Data and Empirical Approach

Data

Considering the connection between military expenditure and institutions on inclusive growth in BRICS countries, (1984-2017). Inclusive growth index data that covers from 1984 to 2017 were presented in the appendix. Military expenditure data were obtained from Stockholm International Peace Research Institute extended database 1948 to 2017, which is relatively the standard in the literature.

Another variable of concern is institutional quality variables. Here, the proxy for institutional quality is corruption. The institutional quality proxy variable is source from IRIS/International Country Risk Guide (ICRG) database. Each of the ICRG measures range of 0 to 6, with higher values representing less corruption. In other words, higher scores indicate better institutions.

Other variables were obtained from World Bank Development Indicators (WDI).

Study period

The study period is 1984 to 2017. Due to the heterogeneous nature of BRICS countries, the countries were grouped according to World Bank income classification

of Upper Middle Income countries (UMIC) and Lower Middle Income countries (LMIC).Data source for military expenditure at share of GDP were obtained from SIPRI database because it has more complete data series.

Description of Variables and data source

Variables	Definition	Sources
Key variables		
I.G	Inclusive growth Index	Author computation[1]
ME	Military expenditure (Share of GDP)	World Bank and Stockholm International Peace Research Institute new extended database 1984-2017
External Threat	External threats are classified as wars involving two independent countries	International Country Risk Guide (ICRG) database 1984 -2017
Internal threat	Internal threats includes Civil war, insurgency crisis and communal clashes	
Institutional quality	Corruption as proxy for institutional quality	
POP	BRICS Population growth rate	World Bank Development Database 2018 **(WDI)**
Security Web	BRICS Security Web measured by averaging of the ratio of military expenditure to GDP of BRICS neighboring countries	
INV.	Investment	
EDU	BRICS Education	

[1] The authors employed Z-sum score technique in this study. In this approach, equation for the normalized value according to KotharI, C.R. 2004. *Research methodology: Methods and techniques*, New Age International, Ullah, S. & KianI, A.K. 2017. Maqasid-al-Shariah-based socio-economic development index (SCECDI): The case of some selected Islamic economies. *Journal of Emerging Economies & Islamic Research,* 5..After finding the Z-sum score, the authors evaluate the average of the area under the curves already normalized. These values are considered as inclusive growth index by the following: Inclusive Growth Index (I.G.I.) = Average of Z score is divided by number of observation that is I.G.I.= 50% of Social Growth indicators + 50% of Economic Growth Indicators ($IGI=\frac{\sum x}{n}$) 0<IGI<1.

The values of the IGI index vary between 0 and 1; if values close to 0 indicates that BRICS countries has very low level of inclusive Economic growth. On the other hand, values close to 1 indicates that the BRICS countries has a very high level of inclusive Economic growth.

Empirical Approach

For the empirical analysis, times series panel approach was adopted. The panel growth equation for this research adopt (Aizenman & Glick, 2006) and (Compton & Paterson, 2016) empirical approaches written as

$$Y_{it} = \alpha + \beta_1 M_{it} + \beta_2 I_{it} + \beta_3 M \,.\, I_{it} + \gamma' X_{it} + \eta_i + \varepsilon_{it}$$

Where Y- is the inclusive growth index, $M \,.\, (Institution)_{it}$- is the interaction of military expenditure with institution, X_{it} – is the set of control variables – education, population and Investment variables. ϵ_{it} is the error term. The panel model is estimated using panel OLS rather than other estimation technique because their no presence of endogeneity while possibility of heterogeneity is taking care by using the World Bank Income classification.

Data Estimation and Interpretation

The study begins the analysis of the impact of military expenditure and institutional quality on inclusive growth in BRICS countries with descriptive analysis. Results of the descriptive statistics are reported in Table 5. Summary of the descriptive results shows that all the series show a high level of consistency as their means and medians fall within the maximum and minimum values of these series. Results of standard deviation, which measures the level of variation or degree of dispersion of the variables from their means, reveal that the actual deviation of the data from their means are very small as all the standard deviations are very low. Also, the most volatile is the variable of interaction between military expenditure and corruption (4.15%) while the least volatile is the GDP (0.18%) follow by population growth (0.41%).

Table 5. Summary of Descriptive Statistics

	Growth	Military	Corrupt.	Mil*Corr	Education	Pop.	Invest.
Mean	0.560548	1.675531	1.888973	3.961608	1.997633	8.234231	1.350123
Median	0.530000	1.512503	2.000000	3.344052	1.627790	8.160083	0.777008
Maximum	0.920000	5.503756	5.330000	20.78054	6.371640	9.097859	6.186882
Minimum	0.000000	0.000000	0.000000	0.000000	0.000000	7.546916	-0.178437
Std. Dev.	0.182348	1.390113	1.618897	4.151119	2.268775	0.412856	1.581964
Observation	146	146	146	146	146	146	146

Table 6 presents the correlation matrix of the exogenous variables used to achieve the second objectives. Correlation matrix shows the degree of association and direction of relationship among the variables. Results in Table 7 show that the degree of association that exists among the independent variables. It can be deduced that that all independent variables can be included in the same model without the fear of multicollinearity. Furthermore, result shows that while all other independent

variables and the interactive variable have negative relationship with inclusive growth, population growth is the only variable that has positive relationship with inclusive growth.

Table 6. Correlation Matrix

	Corruption	Education	Growth	Investment	Military	Mil*Cor.	Pop
Corruption	1.000000						
Education	0.442204	1.000000					
Growth	-0.409220	-0.389133	1.000000				
Investment	0.310443	0.311967	-0.186814	1.000000			
Military	0.356456	0.006495	-0.539541	0.237188	1.000000		
Mil*cor	0.774648	0.203598	-0.497215	0.166961	0.700897	1.000000	
POP	-0.194754	-0.279060	0.283095	0.132430	-0.260201	-0.243763	1.000000

The next step is to examine whether long-run relationship exists among the variables. To achieve this, Pedroni Panel cointegration test was carried out. The major condition for using Pedroni approach to panel cointegration is that the number of variables must not be more than seven. The test conducted shows within group and between group coefficients. After satisfying this condition, cointegration test was carried out and result is presented in table 7. Results show that out of the four statistic in the within group section, two are significant while the other two are not significant. In addition, one out of the three statistic in the between group section is significant. This implies the null hypothesis of cointegration is rejected. Therefore, the study concludes that long run relationship exists among the variables.

Table 7. Pedroni Panel Cointegration Test Results

	t- Statistic	Prob.
Within Group		
Panel v-Statistic	-1.317433	0.9062
Panel rho-Statistic	2.330635	0.9901
Panel PP-Statistic	2.392952	0.0016**
Panel ADF-Statistic	0.090380	0.0060**
Between Group		
Group rho-Statistic	2.049197	0.9798
Group PP-Statistic	0.565818	0.7142
Group ADF-Statistic	-1.693105	0.0452**

Finally, theory suggests that corruption plays an important role in the military expenditure-growth nexus. The line of argument in the literature is that corruption raises the desired level of military spending and that military expenditure, in the presence of corruption, reduces growth. In order to confirm the validity or otherwise of this hypotheses, this study presents empirical evidence concerning the relationship among military spending, institutional quality, and growth in BRICS countries.

Table 8. Impact of Military Expenditure and Corruption on Inclusive Growth in the Lower Middle Income and Upper Middle Income Countries

Dependent Variable: Inclusive Growth		
Variable	LMI	UMI
Military Exp	0.412 (0.01)*	-0.067 (0.00)*
Corruption	0.380 (0.03)*	-0.007 (0.58)
Mil*Cor	-0.129 (0.02)*	-0.0007 (0.91)
Ledu	-0.013 (0.34)	-0.029 (0.00)
Gpop	0.325 (0.57)	0.008 (0.78)
Inv/gdp	-0.009 (0.79)	0.008 (0.35)
Constant	-3.77 (0.48)	0.666 (0.01)
R^2	0.37	0.44
Adjusted R^2	0.26	0.42
F-statistic	3.63(0.00)	18.86 (0.00)
Breusch-Pagan LM Test	3.42(0.00)	14.31(0.02)

Results of the impact of military expenditure and corruption on inclusive growth in the lower middle income and upper middle income are presented in table 8. For the lower middle income, military expenditure and corruption have positive and statistically significant effects on inclusive growth while the interactive term has negative and statistically significant effect on inclusive growth. This implies military expenditure reduces inclusive growth in the face of corruption. Investment in the lower middle income during the period under study is negative and not significant. For the upper middle income, military expenditure is negative and significant as against that of lower middle income. Corruption and interactive term have negative effects on inclusive growth but both are statistically insignificant. Investment in the upper middle income has positive effect but insignificant.

Dependent Variable Inclusive Growth

Variable	Coefficient	Prob.
Military Exp	-0.012	0.8201
Constant	0.529	0.0000
R^2	0.000218	
Adjusted R^2	-0.003983	
F-statistic	0.05(0.82)	
Breusch-Pagan LM Test	79.08(0.00)	

Conclusion

Corruption during this period has negative impact on inclusive growth and the result is statistically significant. Investment during this period has positive effect on inclusive growth and is statistically significant. This follows economic theory, as government will invest more in order to mitigate the negative effect of war on the economy. This implies military expenditure reduces inclusive growth in the face of corruption. Investment in the lower middle income during the period under study is negative and not significant.

In conclusion, for the upper middle income, military expenditure is negative and significant as against that of lower middle income.

Recommendation

This section also highlight some recommendations for BRICS countries on how to achieve optimum inclusive growth:

I. To achieve a positive optimum budgetary allocation to defence there is need for a more transparent and accountability processes in all military contracts and related agencies;

II. Military manufacturing industries must be established with the mandated to produce all their nation hardware needs and thereafter export to other members of the BRICS club;

III. There is need for the government to strengthen constitutional anticorruption institutions and civil societies to ensure that corrupt tendencies within military sector are reduced to the barest minimum.

IV. Aggressive public education to change the mind set of BRICS citizens to make them see corruption as evil and a common enemy.

V. Establishment of special courts to deal with corruption cases separately and strengthen the weak legal system

VI. The punishment meted out to corruption convicts, so far, is not enough to deter anyone from indulging in the evil practice. Therefore, it is recommended that death penalty for convicts. Such stringent punishment can root out corruption in the BRICS countries.

VII. Anti-graft bodies agencies should ignore primordial sentiment and go ahead to jail whosoever is involved in corruption.

Appendix

BRICS inclusive growth index from 1970 to 2017

Year	Brazil IGI	Russia IGI	India IGI	China IGI	South Africa IGI
1970	0	0.92	0.98	0.75	0.58
1971	0.58	0.91	0.43	0.72	0.46
1972	0.62	0.91	0.44	0.45	0.52
1973	0.63	0.9	0.4	0.48	0.51
1974	0.58	0.9	0.37	0.49	0.52
1975	0.65	0.88	0.37	0.48	0.53
1976	0.52	0.89	0.27	0.5	0.45
1977	0.59	0.86	0.31	0.51	0.43
1978	0.65	0.86	0.4	0.56	0.38
1979	0.56	0.79	0.37	0.55	0.38
1980	0.38	0.83	0.46	0.72	0.43
1981	0.55	0.83	0.56	0.82	0.39
1982	0.43	0.84	0.57	0.85	0.43
1983	0.38	0.82	0.66	0.65	0.32
1984	0.52	0.8	0.65	0.88	0.26
1985	0.53	0.83	0.32	0.87	0.23
1986	0.36	0.85	0.37	0.87	0.24
1987	0.47	0.84	0.35	0.51	0.28
1988	0.58	0.84	0.3	0.27	0.36
1989	0.61	0.78	0.25	0.75	0.19
1990	0.38	0.7	0.36	0.68	0.35
1991	0.5	0.71	0.38	0.75	0.27
1992	0.61	0.41	0.33	0.74	0.24
1993	0.68	0.48	0.34	0.61	0.39
1994	0.7	0.5	0.36	0.4	0.33
1995	0.61	0.48	0.38	0.56	0.41
1996	0.65	0.4	0.32	0.49	0.45
1997	0.67	0.4	0.33	0.49	0.35
1998	0.64	0.4	0.31	0.4	0.32
1999	0.61	0.4	0.24	0.52	0.4
2000	0.57	0.41	0.37	0.45	0.53
2001	0.61	0.43	0.36	0.37	0.39
2002	0.59	0.41	0.36	0.52	0.37
2003	0.55	0.42	0.37	0.39	0.3
2004	0.58	0.43	0.41	0.41	0.43
2005	0.51	0.47	0.35	0.44	0.38
2006	0.53	0.47	0.35	0.41	0.52
2007	0.53	0.43	0.37	0.4	0.39
2008	0.53	0.46	0.35	0.47	0.53
2009	0.59	0.51	0.3	0.4	0.38
2010	0.54	0.51	0.21	0.52	0.38
2011	0.56	0.44	0.32	0.42	0.52
2012	0.56	0.47	0.23	0.47	0.4
2013	0.56	0.47	0.25	0.42	0.39

2014	0.61	0.44	0.23	0.46	0.41
2015	0.6	0.57	0.25	0.54	0.26
2016	0.66	0.72	0.35	0.87	0.24
2017	0.91	0	0.2	0.87	0.09

Source: Author Computation

Reference

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