

Impact of 3Ds on Economic Growth: Evidence from Selected Developed and Developing Countries

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Abstract

The purpose of the study was to explore the empirical relation between government expenditures (Defense expenditure, Development expenditures and Debt Servicing) and economic growth of selected developing and developed countries. To meet above objective data from 1995 to 2022 was collected from World Development Indicators and World Governance Indicators. Generalized Method of Moment and System Generalized Method of Moment are used to explore the effect. Gross domestic product is dependent variable of the study whereas repressors are Development expenditures, Defense expenditures, Debt servicing Expenditures and a set of controlled variables. The results showed that defense expenditures and development expenditures had negative effect on Economic Growth of both the developed and Developing countries while debt servicing expenditures had negative in Developed countries and positive in developing countries. These findings emphasized the policy makers to ascertain economic policies in different sectors of the economy for sustainable Economic Growth and development.

JEL Codes: C13, C50, H60, H63, O49, O57

Keywords: Economic Growth (EG), 3Ds (3 Debits), Government Expenditures (GE), Defense expenditure (DFE), Development expenditures (DVE) and Debt servicing expenditures (DSE), GMM

1. Introduction

Government Expenditures is the money spent by the government on the purchases of social goods, services, Social Security, protection and transfer payments. It is the final government consumption expenditures. There are two approaches in the literature of government expenditures; the first one is Wagner's Law (1883) approach which states that economic growth (EG) cause Government Expenditures (GE) and this takes the GE as an endogenous factor and hence government expenditures are the outcome. The second one is Keynesian approach (Keynes, 1936) and according to this approach GE cause EG and takes GE as an exogenous factor which is an instrument for policy to influence EG. The key difference in both approaches is the direction of unidirectional causality between GE and EG. The current study is based on Keynes hypothesis and use GE after its disintegration into 3D's Debt servicing expenditure (DSE), Development expenditure (DVE) and Defense expenditure (DFE)). The theoretical and empirical relationship between GE and EG has been the center of debate in many public finance studies. Traditionally, GE is considered as the element of the fiscal policy which influence EG.

DSE is the sum of principal repayments and it's servicing, short term and long term repayments to the IMF whereas Public debt is the amount of domestic and external debt. The reasonable level of borrowing will increase growth by enhancing capital stock and productivity growth (Chowdhury, 2001) for the reason that at initial stages countries had little capital stocks and limited opportunities of investment. When outdoor borrowing is used in industrious work, it brings stability (Burnside and Dollar, 2000) but its adverse effect is "debt overhang" (Karagol, 2002; Krugman, 1988; Sachs, 1990) and "crowding out" effect (Diaz Alejandro, 1981).

DFE is the money spent by the government to raise and maintain the armed forces. In literature, numerous studies explored that DFE increase Economic growth (McDonald and Reitano, 2016; Sheikh, 2014) while others explore DFE prevent EG (Chen, 2014; Faini et al., 1984). Negative effect of GE on EG has been shown for developed countries (Boretsky, 1975; Smith, 1977; Sivard, 1977) while in case of developing countries there is no confirmation.

The literature revealed three main channels through which DFE effect EG i.e. the first one is Keynesian Approach in which an increase in DFE will increase AD which leads to increase in output and

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employment and Hence, DFE bring positive impact on EG. Some researchers adopted this approach (Lim, 1983; Chletos & Kollias, 1995). Neoclassical Approach (supply channel) is the second that based on aggregate supply and an increase in DFE will crowd-out private investment. An increase in interest rate will definitely reduce the private saving and hence crowd out private investment but when the government will take loan to meet the DFE this will increase domestic interest rate and private investment will reduce aggregate supply and consequently decrease in employment and output. This shows the negative effects of DFE on EG. This approach is adopted by (Sezgin, 1996; Murdoch *et al.*, 1997).

The third approach is Smith Approach (security channel) which relies on the primarily role of state to ensure the protection against any foreign and domestic threats and an increase in DFE will lead the higher EG (Araujo & Shikida, 2008; Chang *et al.*, 2011). However, when increase in GE is not for valid security concerns and only for rent-seeking behaviour then the consequences might be adverse (Aizenman and Glick, 2003; Yakovlev, 2007). In short, positive relation in existence of significant external and internal threats with good governance while negative in the presence of rent-seeking behaviour.

DVE refers to those expense which helps in EG and development. Here development means that the human development and investment or expenditures on human capital are the DVE and in human capital, we take expenditures on education and health. In which, health care goods and services are included in health expenditures whereas in education expenditure, national and international funding is included.

Various studies confirmed that human capital is positively contributed in Economic growth (like Levine & Renelt, 1992; Barro & Lee, 1993; Krueger & Lindahl, 2001; Bassanini & Scarpetta, 2001; Baldacci *et al.*, 2004 and Rehman *et al.*, 2021) whereas, some other studies unpredictably found the negative effects on Economic Growth (Bils & Klenow, 2000; Benhabib & Spiegel, 1994; Caselli *et al.*, 1996). In the existing literature of growth, human capital repeatedly restricted to only education but at the same time government invest on both the basic education and health. Therefore, the empirical evidence of growth's impact is inconclusive and mixed. Another view is that education transfer's wealth from low to highly skilled individuals but the return is negative and schooling does not enhance individuals' productivities and it reduces the social output by using its valuable resources (Lange & Topel, 2005). While in the case of health expenditures the existing literature had mixed results, most of them reported the positive effect like (Behrman, 1990; Bloom *et al.*, 1998) whereas; several authors showed the adverse effect on growth (Easterly & Rebelo, 1993; Acemoglu & Johnson, 2006).

In case of finite domestic saving Foreign Direct investment (FDI) plays the essential role in expansion of economies (Ali & Hussain, 2017) and acknowledged as a growth increasing factor especially in under developed countries (Falki, 2009). It is a major source of technology transfer, production technology and investment. It increases the exporting capacity of the host country, creates new jobs and make feasible for all to search a new job. The most important thing is that through FDI every economy can achieve high level of their Economic Growth (Dritsaki & Stiakakis, 2014).

The mixed types of result got by various economists are the motivation behind the current study. Some studies shows that there is significantly positive effect of Government Expenditures on Economic Growth (Rehman *et al.*, 2010; Pula & Elshani, 2018; Chude & Chude, 2013) whereas, other shows that GE negatively affect the EG (Devarajan *et al.*, 1996; Folster & Henrekson, 1999). In the purview of above mentioned studies, we can deduce that there is no clear cut outcome in the field of GE and its effect on EG. These outcomes inspire us to check whether this difference exists or not and when we disintegrate GE, this will support the previous studies or not. Similarly, whether the outcomes will vary from developing to developed countries or not, weather GE cause ED and vice versa. Distinguishing feature of current study is 3D along with institutional variables, FDI and comparison of developing and developed countries while the existing literature provided inconclusive results, making it necessary to explore relationship further.

2. Review of Literature

Various studies analyzed the relationship between Government Expenditures and Economic Growth. They make different conclusions depending upon selection of countries, selected sample of study and methodology. Several of them (Pula & Elshani, 2018; Lahirushan & Gunasekara, 2015; Ebong *et al.*, 2016) found that this nexus is positive. Rehman *et al.* (2010) found that the Pakistan's GDP cause its GE which goes in favour of Wagner's Law. While some authors have linked Fiscal decentralization and structural reforms proxied by structural breaks as important factors (Aslam *et al.*, 2019; Khan *et al.*, 2019).

2.1 Debt Servicing Expenditure and Economic Growth

External debt (ED) and its servicing had negative effect on EG of South Asian Countries while it has been seen the rising trend for some years (Chaudhary *et al.*, 2000; Shabbir and Yasin, 2015; Blake, 2015). By contrast, many studies found positive nexus by using different data set and estimation technique. Same results are found for Greek, Ethiopia, Nigeria, Tanzania and Pakistan (Kasidi & Said, 2013; Pegkas, 2018; Mohanty, 2017; Udeh *et al.*, 2016) while others discovered the negative effect (Akram, 2011; Ajayi & Oke, 2012). According to Ibi and Aganyi (2015), this nexus is weak in Nigeria while Ekanayake and Chatrna (2010) found the mixed outcomes in 85 developing countries. Some of the most recent studies have also explored debt and Growth nexus taking into account different aspects (Hilton, 2021; De Soyress *et al.*, 2022; Heimbürger, 2023).

2.2 Defense Expenditure and Economic Growth

Military spending had a positive and significant effect on EG hence it is explored that military spending is helpful to growth apart from its methods of measurements (Khalid & Noor, 2015; Sheikh & Chaudhry, 2016; Ajmair *et al.*, 2018). By contrast, it had been seen negative by (Ali & Ather, 2015; Arshad *et al.*, 2017). Moreover, DFE cause EG of Sri Lanka and EG cause GE of Pakistan (Selvanathan & Selvanathan, 2014; Anwar *et al.*, 2012)

2.3 Development Expenditure and Economic Growth

2.3.1 Education Expenditure and Economic Growth

Many studies investigate the positive relationship between education expenditures and growth for different countries and data set (Jeyhoon *et al.*, 2017; Wasti *et al.*, 2017; Qutb, 2016) while, others experienced the inverse (Kouton, 2018; Ndiyo, 2007).

2.3.2 Health Expenditure and Economic Growth

Spending on health does not reveal a considerable effect on GDP of Philippines, Kiribati, Maldives, Vanuatu, Malaysia, Pakistan and Republic of Korea (Maitra & Mukhopadhyay, 2012; Akram *et al.*, 2008; Udeorah *et al.*, 2018) whereas Piabuo and Tieguhong (2017) explored a positive nexus between health spending and GDP. It is explored that there exist a bidirectional causal relationship between health expenditures and growth in Czech Republic and Russian Federation while in Algeria, Egypt, Hungary, Korean Republic, South Africa, Philippines and G8 causality running from health expenditure to growth while in Greece, Poland, the United Arab Emirates, China, Indonesia, Iran and the Korean Republic causality running from growth to health expenditures (Boussaleem *et al.*, 2014; Bedir, 2016; Ozturk & Topcu, 2014; Nasiru & Usman, 2012).

2.4 Foreign Direct Investment and Economic Growth

A group of authors investigated that FDI and TFP have positive effect on growth for different countries and dataset using different econometric techniques. They concluded that FDI will enhance growth whatever econometric techniques are used (Khan *et al.*, 2020; Sokang, 2018; Gudaro *et al.*, 2012; Leitao & Rasekhi, 2013; Dar *et al.*, 2016; Susilo, 2018). The existence of co-integration among economic growth, FDI, trade, physical capital and human capital in Pakistan has been explored by Siddique *et al.* (2017).

2.5 Trade Openness and Economic Growth

Trade openness (TO) had positive effects on Economic Growth of various countries like African countries, Cote d'Ivoire, South Africa and Albania (Anwar *et al.*, 2020; Keho, 2017; Chang & Mendy, 2012; Malefane, 2018; Turan & Seni, 2014) while this effect seems to be negative for those countries

which specialized in low quality products (Huchet-Bourdon *et al.*, 2018). Another study showed that in long run the relation between Trade Openness and growth is valid for Pakistan while growth-driven exports hypothesis has been proved for Turkey (Klasra, 2011).

2.6 Political Stability and Economic Growth

Political stability (PS) had positive relationship with EG of Ukraine, Romania, Indonesia, Thailand, Ecuador, Nigeria, Egypt, Jordan, Lebanon, Tunisia and Brazil (Shahabad, 2014; Elbargathi & Assaf, 2019) while instability of political system had adverse effect on EG (Salahuddin & Awan, 2017).

3. Methodology

Theoretically and empirically, there are two contrasting views about the relationship between GE and EG. There are two contrasting views in the literature. First is called the Wagner law, stated that EG cause GE and according to this view GE are an endogenous factor. Various authors support this view like (Sinha, 1998; Maingi, 2017; Bagdigen & Cetintas; 2004). The second view is the Keynesian school’s view argued that Government Expenditures are an exogenous factor which used as a mechanism to manipulate the Economic growth. Based on this statement, many industrial and under developed countries used fiscal policy to promote EG through the multiplier effect (King, 2012) and current study is also based on it.

3.1 Empirical Model

The general form of the model used for study is as follows;

$$GDP = f(DFE, DVE, DSE, Z) \tag{1}$$

Whereas the econometric form of model is as:

$$GDP_{it} = \beta_0 + \beta_1 DFE_{it} + \beta_2 DVE_{it} + \beta_3 DSE_{it} + \beta_4 Z_{it} + \varepsilon_{it} \tag{2}$$

Where;

- GDP* = Gross Domestic Product
- DFE* = Defense Expenditure
- DVE* = Development Expenditure
- DSE* = Debt Servicing Expenditure
- Z* = Control variables (Foreign Direct Investment, Political Stability and Trade Openness)
- ε_{it} = Error term of country *i* in time *t*
- i* = number of countries (1, 2, 3 44) *t* = time period (1995 to 2018)

Table 1: Description of variables and data sources

Variables	Measurable Form	Scale	Data Source
Gross Domestic product	per capita	(constant LCU)	WDI
Defense Expenditure	Percentage of GDP	Percentage	WDI
Debt Servicing Expenditure	Percentage of GNI	Percentage	WDI
Development Expenditure	Health+ Education expenditure	Percentage	WDI
Foreign Direct Investment	Net Inflow % of GDP	Percentage	WDI
Trade Openness	Percentage of GDP	Percentage	WDI
Political Stability	Range -2.5 to 2.5	Range	WGI

Source: Authors calibrations from Literature, World Bank dataset.

3.2 Sample Selection

Total 65 countries were selected in the present study. The sample selection criteria was just availability of data. Out of 65, 09 countries (Algeria, Botswana, China, Ecuador, Jordan, Nigeria, Uganda, Turkey and Zimbabwe) were excluded due to unavailability of data (on two variables, health and education expenditure), Serbia, Saudi Arabia, Qatar, Somalia and Montenegro due to trade openness, Lithuania and Poland due to Gross Domestic Product, Cuba and Dominica due to Defense Expenditure, Eswatini and Fiji due to Political Stability and Monaco due to unavailability of data on Foreign Direct Investment. Now, 44 countries were selected in which 29 are developing and fifteen are developed. World Bank classified the countries into four income groups as high income, upper middle income, lower middle income and low income but current study classifieds into developed and developing countries. High income and upper

middle income countries are considered as developed countries while lower middle income and low income countries are developing countries.

3.3 Empirical Estimation Strategy

3.3.1 Correlation Analysis

The degree of association between two variables is identified by a statistical technique known as correlation analysis. There may be positive, negative or zero correlation between variables. The hypothesis of correlation is as follows;

H_0 : There is no correlation between variables

H_1 : There exists a correlation between variables

3.3.2 Panel Unit Root Test

Stationarity of all the variables is examined by using the Levin, Lin and Chu (2002). Test basic specification is as;

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{j=1}^{p_j} \beta_{ij} \Delta y_{it-1} + X'_{it} \delta + \varepsilon_{it} \dots \dots \dots (3)$$

Assuming that $\alpha = \rho - 1$, this method derives the estimates of α by proxies used for Δy_{it} and y_{it} . These are standardized, deterministic component and free from auto correlation.

The Hypothesis of LLC panel unit root test is as follows;

$H_0: \alpha = 0$

$H_1: \alpha < 0$

Significance of this test is at 10%, 5% and 1% level of significance but here we use 5% level of significance as a bench mark.

3.3.3 Heterogeneity

Heterogeneity is the unobserved effect presented in the data. FE and RE models are used to analyze the unobserved effect. Here we make the assumption that there exists zero correlation between unobserved variables and regressor. The use of the RE is the best way to examine the unobserved effect. But when our explanatory variables will correlate with omitted variable then we can only use the fixed effect model for the biasness due to the omitted variables. Therefore, we use Hausman Test for the selection of best methodology for elimination of unobserved effect.

3.3.4 Hausman Test

Hausman test is used to decide whether FE or RE is appropriate. By seeing its p-value we will decide that which test we can use in our model. If p-value is above the five percent then we have weak evidence to reject H_0 and if this value is below five percent then we have strong evidence to reject H_0 . The hypothesis of this test is as follows;

H_0 : Random Effects

H_1 : Fixed Effects

3.3.5 Fixed Effect Model

“The unobserved variables in a fixed effects model are allowed to have any associations whatsoever with the observed variables. Fixed effects models control the effects of time-invariant variables with time-invariant effects”.

$$Y_{it} = \alpha_i + \beta_1 X_{it} + U_{it} \quad (4)$$

Where;

α_i is the known intercept for each cross section ($i= 1, \dots, n$)

Y_{it} is dependent variable

X_{it} represents the independent variable

β_1 is coefficient of independent variable

U_{it} represents the error term

t represents the time and i represents the cross section

3.3.6 Random Effect Model

Granger causality test is used to test and investigate the causal relationship among variables. Here we use this test to find out the causal relationship among GDP, DFE, DVE, DSE, FDI, PS and TO. The most important thing is that it tells us the direction of causality. This test had basically three possibilities of outcomes of any nexus; it may unidirectional, bidirectional and neutral relationship.

4. Results and Discussion

This section provides the empirical discussion on impact of 3D's on EG of selected developed and developing countries and also provides the empirical outcomes of earlier described model.

4.1 Correlation Analysis

The study performs the correlation to see the association between variables. In correlation analysis r is used as a coefficient of correlation ranging between -1 and +1. Zero r is the indication of no association and away from it either positive or negative direction represents greater association between variables.

Table 2: Correlation Matrix of Developing Countries

Variables	GDP	DFE	DSE	DVE	FDI	PS	TO
GDP	1.000						
DFE	-0.193***	1.000					
DSE	-0.080**	-0.125***	1.000				
DVE	0.061	0.312***	-0.011	1.000			
FDI	0.087**	-0.044	0.090**	-0.040	1.000		
PS	-0.006	-0.031	0.129***	0.005	0.052	1.000	
TO	-0.132**	-0.140**	0.217***	-0.143***	0.255***	0.112***	1.000

Note: *** Sig at 1% , ** Sig at 5% and * Sig at 10%

Table 2 shows the correlation analysis of developing countries in which GDP had negative correlation with DFE, DSE, PS and TO while positive with DVE and FDI. DFE had negative correlation with DSE, FDI, PS and TO positive with DVE. DSE had positive association with FDI, PS and TO while negative with DVE. Similarly, DVE had positive association with PS while negative with FDI and TO. FDI had positive association with PS and TO whereas, PS with TO.

Table 3: Correlation matrix of developed countries

Variables	GDP	DFE	DSE	DVE	FDI	PS	TO
GDP	1.000						
DFE	0.432***	1.000					
DSE	0.251***	0.360***	1.000				
DVE	0.547***	0.350***	0.865***	1.000			
FDI	0.089*	0.340***	0.310***	0.281***	1.000		
PS	-0.555***	-0.249***	-0.121**	-0.352***	0.093*	1.000	
TO	0.091*	0.053	0.344***	0.292***	0.219***	0.087*	1.000

Note: *** Sig at 01% , ** Sig at 05% and * Sig at 10%

Table 3 shows the outcomes of correlation in case of developed countries. GDP had positive association with DFE, DSE, DVE, FDI and TO but negative with PS. DFE had positive correlation with DSE, DVE, FDI and TO while negative with PS. Similarly, DSE had positive association with DVE, FDI and PS but negative with PS. DVE had positive with FDI and TO while negative with PS. FDI ha positive with PS and TO while TO had positive with TO

Comparing correlation coefficients across two group of countries reveals interesting features. Correlation coefficient between GDP and PS turn out to be negative for both group of countries while GDP, DFE and DES are negatively correlated in case of developing countries and positive for developed countries. TO, GDP, DFE and DVE are negatively correlated while TO, DSE, FDI and PS are positively correlated. In case of developed countries, TO is positively correlated with all the variables of the study. Therefore, PS, TO, DFE and DSE appears to contribute to lowering growth while in case of developed countries PS appears to be responsible for growth slowdowns.

4.2 Stationarity Test

Usually panel data has a problem of non-stationary of the series and due to this non stationarity problem regression generates spurious results. Therefore, it considered a good step to check the stationary first. Five types of tests are used for panel unit root testing like, “Levin, Lin and Chu (2002), Fisher-type tests using ADF and PP tests (Maddala and Wu (1999) and Choi (2001)), Hadri (2000), Breitung (2001) and Im, Pesaran and Shin (2003)”. This study used the LLC panel unit root testing.

Table 4: Panel unit root test results

Variables	Developing Countries		Developed Countries	
	Level	Conclusion	Level	Conclusion
GDP _{it}	2.722	I (1)	-1.147	I (1)
DFE _{it}	3.993***	I (0)	-4.472***	I (0)
DSE _{it}	4.951***	I (0)	-3.731***	I (0)
DVE _{it}	4.304***	I (0)	-3.734***	I (0)
FDI _{it}	6.471***	I (0)	-5.872***	I (0)
PS _{it}	3.360***	I (0)	-0.142	I (1)
TO _{it}	2.865***	I (0)	-22.451***	I (0)

Note: *** Sig at 1% , ** Sig at 5% and * Sig at 10%

Table 4 provides the LLC stationary test for both the developing and developed countries. The dependent variable (GDP) of both the models and PS of developed countries are non-stationary or stationary at first difference. The study cannot reject the null hypothesis and the null hypothesis of LLC is that all series have unit root. Whereas, in the case of DFE, DSE, DVE, FDI, TO and PS in developing countries, we have enough evidence to reject the null hypothesis so we will accept the alternative hypothesis which is, all series have no unit root.

4.3 Hausman Test

After testing the unit root of all the variables, we apply Hausman test for the selection of suitable model. The test statistics is 5.989 with its probability value as 0.424 which clearly indicated that we have no evidence to reject the null hypothesis. Therefore, we will accept H_0 of Hausman test, indicating that the random effect (RE) model is appropriate for developing countries. Whereas, in case of developed countries the value of Hausman test is 44.837 with its probability value as 0.000. The test statistics indicated that we have enough evidence to reject H_0 . Therefore, we use Fixed Effect (FE) Model for developed countries.

Table 5: Estimated result of GMM

Variables	Developing Countries		Developed Countries	
	Random Effect	GMM	Fixed Effect	GMM
GDP(-1)	--	1.002***	--	--
DFE	-0.027***	-0.007***	-0.226***	-0.338***
DSE	0.004*	-0.002***	-0.058***	0.069***
DVE	0.003***	-0.007	-0.062***	-0.080***
FDI	0.004***	0.001*	0.012***	0.015***
PS	-0.004	0.005**	0.153***	0.169***
TO	1.921***	0.007***	0.005 ***	0.009***

Note: *** Sig at 1%, ** Sig at 5% and * Sig at 10%

Table 5 shows the outcomes of RE, FE and GMM. Due to the existence of endogeneity problem, we used Generalized Method of Moment technique and here we will only focus on the results of GMM. Our estimated results for the developing countries revealed that the lag value of GDP had positive and statistically significant effect on current level GDP. The test statistics is 67.351 and its significance level is 0.000. The coefficient of lag dependent variable shows that Gross Domestic product in developing countries is persistent.

Our estimated results for both the developing and developed countries indicated that DFE has negative and significant impact on EG and it is significant at one percent. The result is in line with the outcomes of (Arshad et al., 2017; Ali & Ather, 2015). This negative effect may due to creation of new resources considered as indirect effect and reallocation of resources which is known as direct effect. The available literature proved that the presence of rent seeking behaviour, DFE inversely related to EG

Results also show that Debt servicing expenditure had negative and significant effect on EG of selected developing countries. This negative relationship may be due to the “Debt Overhang. Debt overhang is the condition in which existing debt become so high and it cannot borrow more money, even when that new borrowing is actually a good investment that would more than pay for itself”. This is in line with the outcomes of (Afonso & Alves, 2014; Akram, 2014; Pegkas, 2018; Blake, 2015). Whereas, for developed countries this effect is positive. The result is in line with the outcomes of (Pegkas, 2018; Udeh et al., 2016; Kasidi & Said, 2013).

Development Expenditure had negative and statistically significant effect on EG of both the developing and developed countries. In the literature of growth and development, human capital repeatedly restricted to only education but in same time government played a central role in the investment of both the basic level of education and health. Therefore, the empirical evidence of growth impact is inconclusive and mixed. Our finding is in line with the outcomes of (Bils & Klenow, 2000; Caselli et al., 1996; Benhabib & Spiegel, 1994; Knight et al., 1993).

The results prove that FDI had positive effect on EG of both the developing and developed countries. The value of test statistics is 0.001 with its probability value as 0.220. This is similar to the findings of (Sokang, 2018; Susilo, 2018; Gudaro et al., 2012).

In set of selected countries, political stability had positive and significant effect on EG. This positive relation is also proved by (Shahabad, 2014; Elbargathi and Al-Assaf, 2019).

Trade Openness had positive and significant effect on Economic growth of selected developing and developed countries. The positive relation showed by test statistics as 0.006 and significance is by probability value as 0.000. The result is in line with the outcomes of (Keho, 2017; Chang and Mendy, 2012). Here the null hypothesis of Sargan and Hansen J-test is not rejected, indication of no correlation instrumental variables are not correlated with error term (Khalid and Noor, 2015; Das, 2016).

4.5 Causality Testing

Current study used Granger’s test for causality testing. In current analysis, there exist unidirectional causality among various variables and test is natural for remaining pairs of variables.

Table 6: Causality testing of developing countries

Variables	Obs.	Causing Variables
GDP	637	DSE (3.059**)
DFE	637	GDP (5.208***) TO (3.930**)
DSE	637	PS (4.540**) TO (2.980*)
DVE	637	GDP (7.492***)
FDI	637	GDP (5.741***) DSE (5.690***)
TO	637	GDP (5.518***)

Source: Extracted from causality test results

The estimated results of table 6 shows the existence of unidirectional relation among various variables like DFE cause GDP, DVE cause GDP, Foreign Direct investment cause GDP, Trade openness cause GDP, Defense expenditure cause Trade openness, GDP cause Debt Servicing expenditures, Defense expenditures cause Development expenditures, FDI cause Debt Servicing expenditures, Debt servicing expenditures cause Political stability and Debt Servicing expenditures cause Trade Openness.

Table 7: Causality testing of developed countries

Variables	Obs.	Causing Variables
GDP	330	FDI (3.433**)
DFE	330	DSE (7.645***) DVE (4.132**) FDI (7.140***)
DSE	330	PS (3.684**)
DVE	330	PS (3.647**)
FDI	330	TO (3.569**) DSE (3.584**)
TO	330	DFE (4.094**)

Source: Extracted from causality test results

Table 7 revealed that GDP cause FDI, Defense expenditures cause Debt Servicing expenditures, Defense expenditures cause FDI, Trade Openness cause Defense Expenditures, FDI cause Debt Servicing Expenditures, Debt servicing expenditures cause Political stability, Development expenditures cause Political Stability and FDI cause Trade Openness.

5. Conclusion and Recommendations

Current study analyzed the effect of 3D's on Economic Growth of selected developed and developing countries. To meet the objective of the study, we have used panel data from period 1995 - 2022 while to examine the nature of data LLC test is used and revealed the mix order of integration as I (1) and I (0).

The estimated results show that DFE and DVE had negative impact on EG of both the developed and developing countries while FDI, PS and TO had positive effect on EG of developed as well as developing countries. Whereas, Debt Servicing expenditure had positive effect in case of developed countries and negative in developing countries. All these effects are analyzed by using GMM estimation technique.

Granger Causality test for developing countries reveal that there exists a unidirectional causality between various variables like DFE cause GDP, DVE cause GDP, FDI cause GDP, TO cause GDP, DFE cause TO, GDP cause DSE, DFE cause DVE, FDI cause DSE, DSE cause PS and DSE cause TO. While in developed countries unidirectional causality goes from GDP to FDI, DFE to DSE, DFE to DVE, DFE to FDI, TO to DFE, FDI to DSE, DSE to PS, DVE to PS and from FDI to TO. Therefore, study suggests following points to be considered;

- For developed countries to increase the DSE as per the requirements of government and government should maintain a high GDP growth by increasing the pace of development. However, for DC countries the study recommended that they should avoid using all foreign capital into debt servicing. They should divert funds from servicing to development.
- DFE had negative effect on EG of DVDC and DC countries. As per the findings of current analysis it is recommended that there is a need to avoid the rent-seeking behaviour regarding defense expenditures.
- As DVE had negative effect on EG of both the DVDC and DC countries. Therefore, there is a need to redesign the policy towards health care and education expenditures and put in place devices to monitor the policy for its effectiveness.

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