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Research Article

The Impact of Government Spending on Economic Growth in D-8 Countries

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Abstract

The present paper examines the effect of government consumption expenditures on economic growth in D-8 countries during the period of 1988 to 2010 using the panel data method. Iran, Turkey, Indonesia, Bangladesh, Nigeria, Egypt, Pakistan and Malaysia are the countries that have been researched in this study. Fixed effect method is used for the model estimation that has been acquired from Lizardo and Mollick [14]. According to the obtained results; increasing the government consumption expenditures has a negative impact on economic growth in D-8 countries. On the other hand, the results indicate a negative impact of inflation and a positive impact of investment on economic growth of these countries. Also based on the results, the size of government in D-8 economies was more than optimal size confirming the existence of Armeyi phenomenon in these countries. Create a favorable environment for the reduction of government consumption expenditures and increasing investment in D-8 countries appears to be essential.

Keywords : Government spending; Economic growth; The countries of D-8; Panel regression method.

1 Introduction

Achieving favorable economic growth is considered as one of the main objectives of developing economies. Although the significant role of government is undeniable in economic growth of developing countries, studies conducted in recent years reported different results of the effect of government spending on economic growth. Due to the importance of the issue; this study examined the relationship between government consumption expenditures and economic growth in D-8 countries (Including Turkey, Iran, Indonesia, Bangladesh, Nigeria, Egypt, Pakistan, Malaysia) using the method of panel data approach. After introduction, in section 2 the research literature will be reviewed in the context of previous theoretical studies. In section 3 the methodology and research model will be discussed.

2 Literature review and theoretical framework

The relationship between economic growth and government spending as one of the most controversial topics was first introduced by Thomas Hobbes in 1965. According to Hobbes theory,

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government's performance in areas such as protection of property rights, the judicial system, development of infrastructure and sustainable monetary system can influence the economic growth. But from the perspective of economic schools there is no consensus about the role of government in economic growth.However the issue can be investigated from three neoclassical, Keynesian and Ricardian perspectives. According to the neoclassical point of view; increasing the size of government; into 3 reasonshas negative impact on economic growth. The first reason is due to the financial resources and the way the government is financed. That is, with the growth of taxation and government borrowing to financing its costs, financial resources are transferred from the private sector to the public sector and reduce private investment (substitution effect) and consequently causing the economic slowdown. According to the second reason, with the increase in government funding, the government in addition to provision of public goods, produce goods for which it doesn't have any efficiency in its production and its effect in the form of diminishing returns of government expenditure on economic growth is negative. The third factor arises from the rigidity of political mechanism in affairs by government towards the market system that this factor also has a negative impact on economic growth [5, 6, 7, 8, 9, 10, 11, 12, 13]. Keynesians believe that increasing the size of the government provides field of sustainable development by coordinating public and private interests through the development of infrastructure, provision of public goods, the provision of security and justice system as well as protection of property rights of the private sector and create a system with monetary stability. In fact, the government has considered as complementary and supporter of private sector and by increasing government spending, economic growth increases. Finally the Ricardian view which is based on the Ricardianequality premise argues that fiscal policy of government does not affect the behavior of the private sector. From this perspective, the government increasing activity has not significant effects on economic growth [3, 15, 16]. In front of these three main approaches, Wagner (1983) argues that along with increased production and economic growth government spending should increase with a higher rate which is known to the Wagner Act. On the other hand [1, 2, 3, 4] using the tax curve of Lafer argues that government spending has a nonlinear U-shaped effect on economic growth. In other words, increasing of government spending partlycontributes to economic growth and if the government size is greater than a threshold; economic growth will reduce. Different theoretical perspectives led to the formation of wide range of empirical studies in recent years. For example, Gale (2003) in his study of Tunisia investigates the effect of government financing sources on growth concerns. Based on his results, although government spending has played a major role in shaping the economic efficiency but the rise in government debt has an adversely effect on economic growth. Sheng and Chien [17, 18] have examined the effect of government size on economic growth in Taiwan using threshold nonlinear regression method. Based on the results of their study government spending at 3 levels of consumer spending, capital expenditures and general expenses has threshold effect and there is a nonlinear relationship of Armeyi curves in Taiwan. Dios (2008) in his research of human development and the optimal size of government have investigated the effect ofgovernment spending on social welfare as measured by the Human Development Index. The results of this study show that the optimal size of the government with regard to Human Development Index is larger than the GDP optimal size.Lizardo evaluate the efficiency of government consumption expenditures and economic growth in Latin American countries using Armeyi curves. Based on the results of their study, increasing the consumer spending in the studied countries has led to an economic slowdown and Armeyi doctrine is confirmed. Haras (2012) investigated the existence Armeyi curve phenomenon in Sri Lanka using quadratic regression model. Based on the results, government and economic growth in Sri Lanka has followed Armeyi curve relationship and the optimal size of government is about 27%.

3 Methodology and models

To evaluate the effect of government consumption expenditure on economic growth in D-8 countries, panel data regression approach is used. Panel data approach is able to discriminate between the states that arise because of joining of individual agents in union and groups. In fact a study of economic phenomena provides the possibility of differences and unlike methods based on cross-sectional data or time-series will not set aside individual units interactions during time. Hence in the cross-country studies the most appropriate approach is panel data regression. A simple panel regression model is specified in the form below:

$$Y_{it} = \alpha + X_{it}\beta + u_{it} \qquad (3.1)$$

So that i, indicate sections that can be households, firms, individual agents or countries and $i = 1 \cdot 2 \cdots N$ assumed that is time during period equal to T, then $i = 1 \cdot 2 \cdots T$. On the other hand, is β K-dimensional vector of estimable coefficients of the explanatory variables in the model. Also in equation 3.1, X_{it} is matrix of explanatory variables and α is the model intercept. Also:

$$u_{it} = \mu_i + \xi_{it}$$

Where μ_i equals the individual effects that assumed to be independent of time and are fixed; and ξ_{it} are equal to regression residuals with zero mean and variance is fixed. The model presented in equation 3.1 is a model considering cross-sectional effects only and it is not considered time effects. In terms of considering time effects the model is rewritten as follows:

$$Y_{it} = \alpha + X_{it}\beta + \mu_i + \lambda_t + \xi_{it}$$

In such circumstances, in addition to individual effects, time effects considered with the N number of the study section and the T number of time periods, this model is known to two way error component model. It is clear that in this model The number of estimable parameters in using the model fixed effect by increasing the sections and the length of time period will increases in the divergence form that leading to the loss of more freedom degrees and consequently reduction of efficiency and adaptability of the estimator that is considered as the major drawbacks of this model. In this study, time effects will be ignored and one way error component model is investigated; considering only the individual effects that are defining in equation 3.1. Confinement effects of sections can be considered in two forms. These effects can be considered fixed or random. In the first case it is assumed that in the equation 3.1 μ_i is fixed and should be estimated. In such condition, the number of estimable parameters with the rise of sections number increases upward and this leads to the loss of degrees of freedom. On the other hand, in the second case it is assumed that μ_i is random that makes the assumption of not considering the estimation of individual effects and therefore the number of estimable parameters considerably reduced. However, it is also possible that assuming randomness of random effects if this assumption is not correct may lead to estimators Incompatibility .

Estimation steps a panel data model is in this way that at first; existence of individual effects sections is investigated using Leamer F-tests. The null hypothesis of this test is Lack of significant effects of individual sections. In the absence of rejection of null hypothesis of leamer test, the model should be estimated using least squares fusion. In contrast, with rejection of the null hypothesis of the test, the panel data model should be estimated in terms of individual effects and sections heterogeneity with one of the fixed and random method. The most famous test to choice between fixed and random models effects is Hausman test [2]. The null hypothesis of Hausman test represents the selection of random effects model. Therefore, with the rejection of null hypothesis of Hausman test; the fixed effects model should be estimated. After estimating the model, likelihood ratio of variance anisotropy diagnostic test and serial correlation test of Valdrij (2002) is carried out on residuals of the model. In case of existence of any of the above characteristics model should be re-estimate in a way that may eliminate heterogeneous variance being and serial correlation in the residuals The Model Based on Lizardo and Molik [14] study, stipulates model of this paper to examine the impact of government spending on economic growth in D-8 countries is introduced as follows:

$$GY_{it} = \alpha + \mu_i + \beta_1 GC_{it} + \beta_2 INV_{it} + \beta_3 OPEN_{it}$$

$$+\beta 4INFit + \beta 5FER_{it} + \beta_6 ESIZE_{it} + \xi_{it}$$

GY: annual growth rate of GDP in constant prices in the year of 2000 in terms of US dollar

Gc: criteria of government size (government consumption spending as a percentage of GDP

INV: gross fixed capital formation as a percentage of GDP

OPEN: trade volume as a percentage of GDP

INF: inflation rate based on the year of 2000 price levels

FER: the total fertility rate (birth of women per capita)

Esize: index of economy size (GDP of case study countries in terms of a percentage of America GDP)

4 Data and Empirical Results

Annual data of economic growth, government consumption spending, inflation rate, gross fixed capital formation, total fertility rate, the volume of trade (index of economic openness) as well as economic size have been taken from World Bank data during the period of 1988 to 2010. In order to achieve more accurate information about the used data, In Table 1 an overview of the descriptive statistics of the variables takes place.

Based on Table 1, average economic growth of D-8 countries during the years 1988 to 2010 was equal to 4.89 percent with the average deviation from the mean value of 3.47. On the other hand the average of consumer spending in these countries during the above mentioned period is equal to about 10 percent of GDP in these countries with the average deviation from the mean value of 9.98. Descriptive statistics show that the average of inflation rate for the D-8 countries during the years 1988 to 2010 was equal to 17.25 percent and significant deviations from the mean value was 39.21 percent. On the other hand the average value of the variable of fixed capital formation was equal to 20.57 percent of GDP in D-8 group. Deviation from the mean of the gross fixed capital formation variable is 8.22 percent. Meanwhile the trade volume of the D-8 economies has average value of 65.04% of the GDP in these countries. Also the average size of the GDP in D-8 economies in the study period is equal to 1.20% of U.S. GDP.

4.1 Empirical analysis

In Table 2 panel data unit root test results are presented.

In which panel unit root tests of Aim, Pesaran and Sheen (IPS), Panel unit root tests of Lovin, Lin and chou (LLC) [12] and Dickey Fuller Generalized test (ADF fisher) and Phillips Perron Fisher (fisher PP) is used, respectively. Based on the results variables of economic growth, inflation, investment and total fertility rate was steady and other variables will be stable with once difference measuring. Hence it is necessary to performed co-integration test to ensure the long-term relationship between the variables. In this study Pedroni Panel co-integration test results is used. Based on the results long-term relationship between the variables may be approved. This test in Table 3 has been reported.

To estimate the model, first; the limer F test for significance testing of individual sections effect has been used. The results show that the test statistic is equal to 11.01 and its statistical probability value is equal to 00/0. Then the null hypothesis of Limr F test can be denied based on the lack of significant effects of individual sections [2, 19, 20, 21].

In order to choose between fixed and random effects models; Hausman's X^2 tests was used. The null hypothesis of this test indicates the randomness of Individual sections. The results show that the test statistic for this study is equal to 19.63 and with the probability value equal to 0.003. Therefore, the null hypothesis of Hausman test is rejects. So the model is estimated using fixed effects.

Estimation results of fixed effect model are reported in Table 4. Based on the results;the likelihood ratio of X^2 statistics variance anisotropy is equal to 0.00 with the probability value of 1.00. Therefore, the null hypothesis of this test based on disturbing components variance sameness cannot be rejected. However,

Table 1: Descriptive statistics.

variables	*Mean*	*SD*	*Minimum*	*Maximum*
GY	4.89	3.47	-13.13	13.69
GC	9.98	9.98	3.71	16.78
INF	17.25	21.39	-5.99	137.96
INV	20.57	8.22	5.31	43.64
FER	3.57	1.31	1.67	6.53
OPEN	65.04	48.33	18.33	220.41
ESIZE	1.20	0.75	0.40	3.37

Table 2: Panel unit root tests results.

variables	*IPS*	*LLC*	*ADFfisher*	*PPfisher*er
GY	-4.85(0.000)	-4.21(0.000)	53.8(0.000)	70.5(0.000)
GC	-1.48(0.07)	-0.94(0.17)	22.4(0.13)	28.9(0.02)
*D*GC*	-5.56(0.000)	-4.30(0.000)	61.12(0.000)	170.53(0.000)
INF	-2.86(0.000)	-3.30(0.000)	35.7(0.000)	65.6(0.000)
INV	-2.55(0.000)	-1.87(0.03)	35.45(0.000)	34.8(0.000)
OPEN	-1.30(0.000)	-1.53(0.06)	20.9(0.18)	27.91(0.03)
D(OPEN)	-5.78(0.000)	-6.47(0.000)	63.30(0.000)	108.5(0.000)
FER	-4.76(0.000)	-9.43(0.000)	88.7(0.000)	288.0(0.000)
ESIZE	4.36(1.000)	3.88(0.99)	2.53(0.99)	1.43(1.000)
D(ESIZE)	-2.32(0.01)	-2.57(0.000)	30.4(0.02)	45.54(0.000)

Table 3: Pedroni Panel co-integration test results.

test	Panel statistics	test	Group statistics
Z_ν	0.42(0.33)	-	-
Z_ρ	1.90(0.97)	$\tilde{Z}_\rho$	2.73(0.99)
$Z_{\rho\rho}$	-4.33(0.000)	$\tilde{Z}_{\rho\rho}$	-6.90(0.000)
Z_t	-4.54(0.000)	$\tilde{Z}_t$	-4.29(0.000)

Table 4: Estimation results of fixed effect model with AR(1) in residuals.

variables	$Co-efficient$	*SD*	$t-statistics$	$P-value$	$Confidenceinterval$
GC	-0.45	0.19	-2.35	0.02	$-0.83, -0.07$
INF	-0.06	.016	-3.63	0.00	$-0.09, -0.03$
INV	0.39	0.07	5.84	0.00	$0.26, 0.52$
FER	1.48	0.59	2.52	0.01	$0.32, 2.64$
OPEN	-0.04	0.03	-1.37	0.17	$-0.09, 0.02$
ESIZE	5.29	2.18	2.42	0.02	$0.98, 9.60$
constant	-6.83	3.52	-1.94	0.054	$-13.78, 0.12$

the value of Valdrij serial correlation test statistic (2002) is equal to 13.51 with the probability value of 0.01. Therefore, the null hypothesis of this test based on series Incoherence between components of disturbing estimated model is rejected at the confidence level of 95%. So the model specified in equation 3.1 With regard to serial correlation in disturbance components and with the fixed effects method should be estimated.

$$R^2 = 0.31, F(6, 162) = 12.28, P-VALUE = 0.00,$$

$$\sigma\_u = 4.00, \sigma\_e = 2.82, \rho = 0.67,$$

$$\rho\_ar = 0.29, Ftest(7, 162) = 2.12,$$

$$p - value = 0.04.$$

Based on the results shown in Table 3 the overall meaningfulness of F statistics regression is equal to 12.28 and is significant at the 5% level and implying an overall meaningfulness of estimated regression. On the other hand, the coefficient of determination or R2 is equal to 0.31. Government consumption expenditures index is negative and equal to the -0.45 which is significant at the 5% level. This means that on averages every 1% increase in government spending in the economies of the D-8 resulted in an average reduction of 0.45% of the economic growth of these countries. Therefore, based on the results, government consumption expenditures variable has negative effect on economic growth in the economies of the D-8 group over the period 1988 to 2010. This results show that the size of government in the economies of D-8 Group is larger than its optimal value. So we can accept the hypothesis of efficiency of government spending or Armeyi phenomena in economics of D-8Group [14]. Therefore, policy makers and economic planners of these countries should have sought measures to reduce governments consumption spending. Variable rate inflation based on expectations is negative and significant at the 1% level. However, given that the coefficient is equal -0.06, impact of inflation on economic growth is low; so that a 100 percent increase in the price level in the economies of D-8 group leads to a decrease of 6 percent in economic growth of these countries. The negative effects of inflation on economic growth proves necessity to plan and implement anti-inflationary programs in order to stimulate the real economy and achieving higher economic growth for the economies of D-8 group. On the other hand variable rate investments in accordance with the theoretical expectations for economic growth are obtained positive and equal to 0.39. The coefficient on this variable is statistically significant at the 1% level. In fact, based on the results;each 1% increase in investment lead to an increase of 0.39% of economic growth in economies of D-8 Group. On the other hand, the total fertility rate variable influencing factor; is obtained positive, meaningful, and equal to 1.48. Results show that the total fertility rate variable increases the economic growth in D-8 countries. This result applying incentives policy to increase fertility and increasing the total fertility rate sees helpful.Economic openness variable coefficients are obtained with minimal value of -0.04. Also based on t-statistics these coefficients at none of 1, 5, and 10 percent levels are significant. The coefficient of economy size index variables is obtained equal to 5.29. This coefficient is significant at the 5% level. Therefore, the economy size index has positive and tangible effect on economic growth in D-8 countries. This result suggests that in case of relative increase in GDP of D-8 countries compared to GDP of United States; economic growth of these countries will increase, that of course, this result is inconsistent with the convergence theory of economic growth of less developed countries with more developed countries [3].

5 Conclusion

This article using panel data regression examines the impact of government spending on economic growth in D-8 countries. The results of the estimation and interpretation of the estimated model indicates that the variable of government consumption spending (as a percent of GDP) has significant negative effect on economic growth in D-8 countries. Also the results indicate that the size of the economies in D-8 group was too much optimized and the existence of Armeyi [1] hypothesis phenomenon is confirmed in this group of economies. The explanatory variables effect of investment and inflation on economic growth is consistent with theoretical expectations. But the positive impact of the total fertility rate variable was unexpected and the impact on the size of economy is not consistent with theoretical expectations of the long-term economic growth convergence hypothesis. Based on the results, trade volumes variable has no impact on economic growth of D-8 group. The obtained results emphasizes on reduction in government consumption spending in order to increase economic growth in the economies of D-8 group.

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