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DOES GOVERNMENT SIZE MATTER? A Case Study of D-8 Member Countries

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Abstract. Using Musgrave (1969) specification, this study has tested the long-run relationship between government size and per capita income for D-8 member countries. Using standard cointegration technique, the study rejects the presence of long-run relationship between government size and per capita income for D-8 member countries for the period 1973-2002. Moreover, using standard Granger procedure we also find that in the short-run government size does not cause per capita income in all D-8 member countries except for Iran. We find a bi-directional short-run causality between government size and per capita income in Iran. Thus, negating the neoclassical liberalism, the study concludes that prudent policies with or without government intervention are conducive to economic growth in these economies.

I. INTRODUCTION

There has been an increased concern on the relative size of the government in developed and developing economies. Importance of Public expenditure is evident on account of public good provision, accommodating externality, merit goods, and for the pursuit of socially optimal level of investment and existence of private and public synergies. The significance of the above factors can be adequately apprehended by normative analysis of government size.

In theory the relationship between government expenditures and economic growth is ambiguous however. Certain functions of government

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such as the protection of individuals and their property and the operation of a court system to resolve disputes should enhance economic growth. On the other hand, when government intervention increases in the market economy, economic growth slows down owing to the increased bureaucratic involvement, corruption and crowding-out of productive private investment.

In traditional Keynesian macroeconomics, many kinds of public expenditures can contribute positively to economic growth. High levels of government consumption are likely to increase employment, profitability and investment via multiplier effects on aggregate demand. Thus, government spending raises aggregate demand, leading to increased output depending on the size and effectiveness of expenditure multipliers. The opposite view maintains that government consumption crowds out private investment, dampens economic stimulus in the short-run and reduces capital accumulation in the long-run. Strictly, crowding-out results from a fiscal deficit and the associated effect on interest rates, but adverse economic impacts may be due to government spending in general.

Although a number of studies have attempted to examine the robust relationship between government size and economic growth, empirical work on Developing 8 (D-8) member countries is missing. D-8, also known as developing-8, is an arrangement for development cooperation among the following member countries: Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, and Turkey. Following the "Conference on Cooperation for Development", on October 22, 1996, and after a series of preparatory meetings the establishment of D-8 was announced officially by the Summit of Heads of State/Government in Istanbul, on June 15, 1997. It is evident that the group is global in nature covering several parts of the world. In spite of the fact that Muslims are in majority in all these countries, the level of development varies sharply among these Muslim nations.[1] Bangladesh, Nigeria, and Pakistan are low-income countries with $ 400, $ 320, and $ 470 Gross National Income per capita (GNI) respectively. While Turkey, Egypt, Iran, and Indonesia belong to lower middle-income group with $ 2790, $ 1390, $ 2000, and $ 810 GNI per capita respectively. Malaysia is the exception with $ 3780 GNI per capita. The primary objective of this study is

[1]Economies are divided among income groups according to 2003 Gross National Income per capita, calculated using the World Bank Atlas method. The groups are low income (LIC), $ 765 or less, lower middle income (LMC) $ 766-3035, upper middle income (UMC) $ 3036-9385, and high income, $ 9386 or more.

to test the long-run relationship between government size and income per capita for D-8 member countries by employing standard cointegration technique.

The paper is organized as follows. Section II briefly presents theoretical and empirical literature review. Data and method are discussed in section III. Time series properties of data set and empirical results are discussed in section IV. Finally Section V concludes our findings.

II. LITERATURE REVIEW

Adolph Wagner, a German economist contends that relative importance of government activity in the national economy rises with increasing per capita income over time. As real per capita income increases in a developing economy, their public sector grows in relative importance. This growth is associated with technological and institutional changes and wider political participation (Wagner, 1883).

Earlier works on Wagner's law include Musgrave (1969), Goffman and Mahar (1971), Bird (1971) and Ganti and Kolluri (1979). These studies put emphasis on various specifications to be used to test the Wagner's hypothesis of "expanding state activity".[2] The testable hypothesis as advanced by Musgrave has been well accepted in the literary circle, though Wagner's intuition does not carry any testable hypothesis. This formulation of hypothesis implies that there is a positive correlation between the shares of public expenditure in the economy and income per capita.

The possibility of linkage between the size of government and economic growth is a major contribution of endogenous growth models. Barro (1990) examines an endogenous growth model that suggests a positive relationship between the share of government spending in GDP and the growth rate of per capita real GDP. The key feature of the model is the presence of constant returns to capital that broadly includes private capital and public services. To the extent that public services are considered as an input to production function, a possible linkage arises between the size of government and economic growth.

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[2]Following specifications have been frequently used to test Wagner's thesis: LE = a + b LGNP [Peacock-Wiseman (1961)], LC = a + bLGNP [Pryor (1969)], LE = a + bL (GNP/P) [Goffman (1968)], L (E/GNP) = a + bL (GNP/P) [Musgrave (1969)], L (E/P) = a + bL (GNP/P) [Gupta (1967)].

Government expenditure leads to economic growth when it engages in activities that are complementary to the market economy. Government can help in establishing market-creating institutions. Grossman (1988) underscores some of the main features of government decision-making that facilitate growth: provision of legal and social framework, defense, police services, judiciary, enforcement of property rights, correction of the inadequacies of an unrestrained marketplace, development of the economic infrastructure, regulation of externalities and transfer payments for maintaining social harmony and improving the productivity of the labour force. Taylor (1988) concluded that when public capital formation and private capital formation are truly complementary, government projects might stimulate entrepreneurs and enhance private investment and hence economic growth. It has also been shown that greater government size reduces the risk associated with more open economy (Rodrik, 1998).

A contending view, on the other hand, argues that a larger government will impede economic growth. The main reason is that many government operations are inefficient and not in line of the true public interests (Shleifer and Vishny, 1998). The crowding-out effect of profitable private investment opportunities and the distorting effect of some fiscal policies that result in lower overall productivity are regarded to be substantial. The waves towards deregulation, privatization and the transition to market economies are largely supported by the above rationale.

Both contentions are correct in their own right, but depending on the nature of the particular economy or economies in question. In countries characterized by the presence of monopolies as well as underdeveloped product and factor markets, the first view may be applicable. In others where public investments in agriculture, manufacturing, energy, banking and financial services are heavily subsidized and where inefficient state owned enterprises are abundant, the possibilities for private investment and long-run economic growth are reduced significantly, thus suggesting that large government size impede economic growth.

Some recent theoretical literature in an attempt to reconcile the two conflicting views proposes a non-linear relationship that is positive when the share of government in economic activity is low and changes sign when the relative size of government grows. This reversal of sign is found in the endogenous growth models of Barro (1989) and Easterly (1999). The Barro model postulates that when government is relatively small, economic growth increases with enlargement in government services and taxation because the positive effect of more public goods dominate, but beyond some point the

harmful effects of higher taxes on savings and investment reduce the growth rate.

The empirical literature on the relationship between government activity and economic growth remains controversial. Most studies on the relationship between public spending and economic growth assume implicitly that all government investment spending is productive (Barro, 1990). Unlike Barro (*op cit.*), Landau (1983, 1986) concludes that big government reduces growth of per capita incomes.

Ram (1986) and Grossman (1988) find a positive relationship between government spending and economic growth, regardless of the disaggregation of expenditures. Diamond (1989) observes that social expenditure exhibits a significant positive impact on growth in the short-run while infrastructure expenditure has less influence albeit positive. Moreover, he finds that capital expenditure has a negative influence on economic growth. He attributes this negative relationship to a long gestation period and inefficiency associated with the use of public funds.

Devarajan and Vinaya (1993) find a negative and insignificant relationship between productive expenditure and economic growth, while Lin (1994) observes that nonproductive spending has a negative and insignificant impact on economic growth in industrialized countries but a significant positive impact on economic growth in developing countries. Kweka and Oliver (1999) find that an increase in productive investment expenditure in Tanzania is associated with lower levels of growth, and this result is robust when specified indirectly through its impact on private consumption. Ghali's (1997) analysis shows no consistent evidence that government spending can increase Saudi Arabia's per capita output growth.

Using cross-country regression, Gwartney *et al.* (1998) in their study on OECD countries demonstrate consistent evidence that relatively large government size has been associated with the slower growth rates of GDP in the member countries. Negating Gwartney *et al.* (*op cit*) findings, using Multivariate Cointegration, Ghali (1998) finds a positive relationship between government size and economic growth in the OECD member countries.

It is well known in the literary circle that economic time series often tend to move together and conflicts with the classical assumptions on linear regression. Advancement in time series econometrics enticed researcher to undertake further research by exploring time series properties of the data set and using cointegration technique to determine the long-run relationship

between the share of public expenditure in an economy and the income per capita. Ansari *et al.* (1997), Butt *et al.* (1997), Courakis *et al.* (1993), and Chletsos and Kollias (1997) all tested this long-run relationship. Using both Granger and Holmes-Hutton statistical procedures, Ansari *et al.* (*op cit.*) concluded that there exist no long-run relationship between government expenditure and national income for three African countries – Ghana, Kenya and South Africa. Butt *et al.* (*op cit.*) find similar results in case of Pakistan. Recently, studies on the long-run relationship between government size and economic growth have increasingly shifted towards testing long-run relationship between different components of public expenditures and economic growth. For example, Courakis *et al.* (1993) find that the relationship holds in case of transfer expenditures in Greece and in case of consumption expenditures in Portugal for the period 1958-85. Chletsos and Kollias (1997) demonstrate that only military expenditures in Greece for the period 1958-1993 observe this relationship while it is rejected in the case of transfer payments.

The empirical literature to the best of our knowledge has not attempted to test the important relationship between government size and per capita income for D-8 member countries. The basic purpose of this study is therefore to fill this gap by investigating the long-run relationship between government size and GDP per capita for the D-8 member countries.

III. DATA AND METHOD

The data on share of general government final consumption expenditure in GDP and GDP per capita in local currency for the period 1973-2003 are taken from World Development Indicators (2005). General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation. The paucity of time series data on total government expenditures forced us to use general government final consumption expenditure instead. Nevertheless we did use total government expenditures where possible and found that there is no long-run relationship between total government expenditures in GDP and national income in local currency. The results are not reported here because of the space constraint.

Empirical work based on time series data often assumes that the series are stationary in their levels. We often obtain very high value of R^2 in excess

of 0.9 when we regress one time series variable on another time series variable even though there is no meaningful relationship between the two variables. This situation gives us a spurious regression. It is, therefore, imperative to find out if the relationship between economic variables is spurious or nonsensical.

One way to approach the problem of spurious regression is to apply Augmented Dickey Fuller (ADF) test on the variables to check for the presence of a unit root (Dickey and Fuller, 1979, 1981). If we cannot reject the null hypothesis of a unit root at a reasonable confidence level, we may conclude that the series are non-stationary in levels. We then take first difference and follow the same ADF test. If we reject the null hypothesis of a unit root, we conclude that the series are stationary in first difference or integrated of order one, I (1).

After exploring the order of integration of individual series we can proceed by testing whether the series are jointly cointegrated (Engle and Granger, 1987). This is done by regressing one series on another and then applying the ADF test to the residuals. If the ADF result allows rejection of the null hypothesis of a unit root in the estimated residuals, then we can say that the two series are co-integrated. In other words if the estimated residuals are stationary, there exists a long-run relationship between the two variables. Under these conditions, an error correction model can be formulated to test the short-run relationship between government size and GDP per capita. Using Error Correction Model and Wald test we can determine the causality between the two series.

In this study, we test the long-run relationship between government expenditures and income per capita by using Musgrave (1969) specification to each individual D-8 member countries separately. Next section explores the time series properties of the data set.

VI. TIME SERIES PROPERTIES OF THE SERIES
Stationarity and Unit Root Tests

Testing for the Order of Integration

In order to establish the order of integration of the variables in our data set, we employ ADF test. The ADF test for unit roots indicates whether an individual series, say y_i, is stationary by running an OLS regression. All these tests are based on regression equation presented below. The general form of ADF test can be written as follows:

$$\Delta y_t = \alpha + \rho y_{t-1} + \beta T + \sum d, \Delta y_{t-1} + \varepsilon_t$$

Where Δy_t are the first differences of the series y_t.

Empirical Results of Engle and Granger Cointegration Tests

Table 1 presents the result for the unit root test. It is evident that government expenditures and income per capita for all member countries are non-stationary in their levels. However, all series included in this study become stationary when the difference filter is applied once. The finding illustrates that government expenditures and income per capita are integrated of order one, *i.e.* I (1).

TABLE 1

Augmented Dickey-Fuller Tests for Unit Roots

Country	*G*	*Y*	Δ*G*	Δ*Y*
Bangladesh	–3.02	0.37	–6.18*	–9.65*
Egypt	–3.26	–1.74	–9.51*	–4.65*
Indonesia	–2.03	–1.64	–6.39*	–4.12**
Iran	–1.429	–0.85	–8.12*	–3.27***
Malaysia	–2.57	–1.84	–5.94*	–4.72*
Nigeria	–1.96	–1.27	–4.94*	–6.26*
Pakistan	–1.422	–0.61	–4.94*	–4.75*
Turkey	–1.53	–3.02	–6.83*	–4.13**

Note: *1% level of significance, **5% level of significance, ***10% level of significance.
G is share of general government final consumption expenditure in GDP and Y is GDP per capita in local currency. Δ represents difference operator.

The stationary series enable us to employ the Engle and Granger (1987) two-step procedure. First step involved estimating Musgrave testable hypothesis through Ordinary Least Squares method; this is called the cointegrating regression. Next, the residuals from this regression are retained and the ADF test is applied to the residuals to determine the Stationarity of the residuals.

TABLE 2

Residual Based Cointegration Analysis
(Engle and Granger Results, 1987)

Country	ADF	MacKinnon (Critical Values)	
Bangladesh	–2.18	–3.57	Not Cointegrated
Egypt	–1.76	–3.57	Not Cointegrated
Indonesia	–2.25	–3.57	Not Cointegrated
Iran	–1.79	–3.57	Not Cointegrated
Malaysia	–2.66	–3.57	Not Cointegrated
Nigeria	–0.98	–3.57	Not Cointegrated
Pakistan	–2.26	–3.57	Not Cointegrated
Turkey	–2.12	–3.57	Not Cointegrated

*5% level of significance

ADF is Augmented Dickey-Fuller Test Statistic.

Table 2 shows that the residuals are non-stationary with 5% level of significance in all member states. Thus we can conclude that the relationship between government expenditures and income per capita follow random walk. Our results are consistent with that of Butt *et al.* (1997) for Pakistan in which they found no long-run relationship between real government share in GDP and real income per capita.

Since the variables are not co-integrated, the standard Granger procedure is employed to test the short-run causality between the two variables. Table 3 shows the result of the Granger causality test based on the F-statistics and the p-values.

From Table 3, it is evident that there is no bi-directional causality between government expenditures and per capita income in Bangladesh, Egypt, Nigeria, and Pakistan whereas in Indonesia, Malaysia, and Turkey we find that per capita income causes government consumption. Contrarily, the results show a bi-directional causality in Iran. The results clearly demonstrate that government size does not cause per capita income in the short-run even with different levels of economic development.

TABLE 3

Pairwise Granger Causality Tests

Countries	Lags	F-Statistic	Probability
Bangladesh			
GDP does not Granger Cause Government Expenditures	2	0.20547	0.81569
Government Expenditures does not Granger Cause GDP		0.15121	0.86048
Egypt			
GDP does not Granger Cause Government Expenditures	2	0.15308	0.85889
Government Expenditures does not Granger Cause GDP		2.06460	0.14882
Indonesia			
GDP does not Granger Cause Government Expenditures	2	5.97230	0.00785
Government Expenditures does not Granger Cause GDP		0.09447	0.91019
Iran			
GDP does not Granger Cause Government Expenditures	2	8.20538	0.00204
Government Expenditures does not Granger Cause GDP		5.68024	0.00989
Malaysia			
GDP does not Granger Cause Government Expenditures	2	2.66548	0.09008
Government Expenditures does not Granger Cause GDP		0.02427	0.97605
Nigeria			
GDP does not Granger Cause Government Expenditures	2	0.16033	0.85276
Government Expenditures does not Granger Cause GDP		0.08050	0.92290
Pakistan			
GDP does not Granger Cause Government Expenditures	2	1.64856	0.21337
Government Expenditures does not Granger Cause GDP		0.42772	0.65686
Turkey			
GDP does not Granger Cause Government Expenditures	2	2.52834	0.10083
Government Expenditures does not Granger Cause GDP		1.26720	0.29979

V. CONCLUSIONS

The paper tests the long-run relationship between government size and income per capita using Musgrave (1969) specification for the D-8 member countries. We explore time series properties of the data set and discover that government expenditures and income per capita in local currency are non-stationary in their levels but become stationary after applying differencing

filter once. Furthermore, there is no evidence of long-run relationship between the size of the government and income per capita. The study further suggests that government size is not a determinant of economic growth in the long run. Moreover, based on standard Granger procedure we find that there is no bi-directional short-run causality between government size and per capita income in Bangladesh, Egypt, Nigeria and Pakistan. However, the study finds that per capita income causes government consumption in the short-run in Indonesia, Malaysia, and Turkey. The results demonstrate that the government size does not cause per capita income in the short-run in countries with different levels of economic development. The study concludes that prudent policies with or without government intervention are more conducive to economic growth.

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