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Government expenditures and economic growth in developing countries: Evidence from a panel data analysis*

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Abstract

This paper re-estimates the two-sector growth model of Ram (1986), "Government Size and Economic Growth: A New Framework and Some Evidence from Cross-Section and Time-Series Data", *American Economic Review*, 7(1), 191-203, by employing panel data techniques and using a more recent data set for thirty-four developing countries. The estimation results confirm the cross-sectional findings of Ram: Government size is positively associated with the economic growth and economic performance of developing countries. The total effect of government size on economic growth is positive and quite large. In addition, the marginal externality effect of government size on non-government output is positive. Another finding of the study is that the country effects estimated for the models of Ram are positive for most of the Asian countries in the sample and negative for most of the Latin American and African countries.

1. Introduction

A vast number of empirical studies is devoted to the analysis of the determinants of long run economic growth. A variety of factors, such as population growth, initial per capita income, inflation, investment, exports,

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foreign aid, literacy rate, political stability and government size, have been incorporated into models that endeavor to explain growth rate variations across countries. Among these factors, government size is one of the most frequently employed variables, since it can be directly influenced by government policies. If the size of government can affect the growth rate of output, then it can be an important factor in explaining the observed differences in long run growth rates among countries. This has been the main motivation of many empirical growth studies focusing primarily on the relationship between long run economic growth and government size.

One can find different judgments about the impact of government size on economic growth. One point of view suggests that a larger government size is likely to be an obstacle to efficiency and economic growth because the taxes necessary to support government expenditures distort incentives to work and to invest, absorb funds that otherwise would have been used by the private sector in profitable investment opportunities, generally reduce efficient resource allocation, and hence reduce the level of output. In addition, government operations are often carried out inefficiently, and the regulatory process imposes excessive burdens and costs on the economic system. Thus, according to this view, countries with greater government expenditure as a proportion of output should experience lower economic growth. These arguments, together with the debt crises experienced have led many countries to start a mass deregulation of markets and the privatization of public enterprises.

At the other extreme, some economists assign a critical role to the government in the process of economic development. According to their point of view, a larger government size is likely to promote economic growth since the government has an important role in reconciling conflicts between private and social interests, and it can secure an increase in productive investment and provide a socially optimal path for economic growth (Ram, 1986; Ghali, 1998). Thus, trying to understand the nature of the relationship between government size and economic growth can be a test of these competing ideas. Once the direction of correlation between the size of government and economic growth is understood, it can be used in an appropriate manner to increase the growth rate of an economy.

Empirical studies draw different conclusions about the impact of government expenditures on economic growth. For example, Rubinson (1977), Ram (1986), Grossman (1990), Holmes and Hutton (1990), Levine and Renelt (1991), Karras (1993, 1996, 1997), and Ghali (1998) find a growth enhancing role of government, while others, such as Gemmel (1983), Landau (1983, 1986), Saunders (1985), Falvey and Gemmel (1988), Barro (1989, 1990, 1997), Romer (1989), Alexander (1990), Easterly and Rebelo

(1993), Guseh (1997), and Tanninen (1999) find the opposite, which is that government consumption expenditures reduce the rate of growth.

Kormendi and Meguire (1985) and Agell *et al.* (1997, 1999) do not find a significant relation between government size and economic growth. K. L. Gupta (1988) finds that the effect of government consumption expenditure on economic growth is negative for the developed and positive for the developing countries, while Devarajan *et al.* (1996) find the reverse. Grier and Tullock (1989) estimate separate equations for different groups of countries: Asia, Africa, the Americas and the OECD countries. They find that government growth is positively correlated with GDP growth for the Asian countries while it is negatively correlated with GDP growth for the other three groups. G. S. Gupta (1989) concludes that the effect of government on economic growth changes depending on the way the government expenditure variable is defined. Lin (1994) finds that government size has a positive impact on economic growth in developing countries in the short run, but not in the intermediate run. The findings of Hansson and Henrekson (1994) indicate that while government consumption spending is growth-retarding, spending on education has a positive impact on growth. A survey of this literature can be found in Barro (1997) and Levine and Renelt (1991).

In general, there is little disagreement about the impact of non-consumption government expenditures, such as government investment and transfers. Since these are considered to be the government activities that may enhance growth (at least under certain circumstances), or have no effect on growth, the government expenditure variable is embodied in most of the models primarily in the form of government consumption expenditures. As mentioned above, the empirical evidence on the relationship between government consumption expenditures and economic growth is inconclusive. However, there is a general tendency for government consumption to be negatively associated with growth, although this tendency is weaker for developing countries. In addition, there is a debate in the literature on the appropriate specification of government consumption expenditures (hereafter government expenditures) as an explanatory variable. Most of the studies listed above have attempted to regress economic growth rates on one of the following three specifications of the government expenditures: (1) the ratio of government expenditures to GDP, (2) growth of the ratio of government expenditures to GDP, and (3) the product of government expenditure growth and the ratio of government expenditures to GDP. These studies have shown that the first specification is almost always negatively associated with economic growth while the other two specifications generally yield positive associations.

In this paper we investigate the relationship between government expenditures and economic growth by using the two-sector growth model of Ram (1986). The common feature of the studies listed above is that most of them estimate cross-country growth regressions using cross-section data while some of them obtain estimates based on time-series data for individual countries. Among these studies only a few use pooled cross-sectional and time-series data. However, the theoretical models employed by these studies are derived mostly through the traditional process of introducing government expenditures as an additional input in the aggregate production function. Our estimating equations, on the other hand, are based on models with a better theoretical foundation in the sense that they can convey information about the mechanisms through which government size may effect economic growth. We test our equations using a panel of cross-section and time-series data for thirty-four developing countries over the period of 1979-1997. The panel data techniques we employ allow us to control for both the country- and time-specific effects. Most of the previous studies investigating the impact of government size on economic growth were not able to control for both of these effects.

The results of our study can be summarized as follows: (1) there is a positive association between government and economic growth in developing countries; (2) the total effect of government size on economic growth is positive and quite large; (3) the marginal externality effect of government size on non-government output is positive; and (4) the country effects are positive for most of the Asian countries and negative for most of the Latin American and African countries.

The study consists of five sections. The theoretical framework and the models used are presented in Section 2. Section 3 describes the data, variables and the sample countries. The empirical analysis and results are discussed in Section 4. Section 5 is the concluding section.

2. The theoretical framework

The model we employ is the one that was used by Ram (1986: 192-194), who adapted it from a similar work by Feder (1983: 61-67), and is inspired by many other studies such as Bairam (1988, 1999), Falvey and Gemmel (1988), Grossman (1988), Carr (1989), Rao (1989), and Kweka and Morrissey (2000).[1] The model assumes that the economy consists of two distinct sectors, the government sector (*G*) and the non-government sector (*C*). The output of these sectors depends on the labor (*L*) and capital (*K*) inputs. It is also assumed that output (size) of the government sector exerts

[1] Our model equations and their derivations given below are the same as those presented by Ram (1986: 192-194). The derivations, however, are given in more detail in this study.

an externality effect on the output of the non-government sector (*C*). Then the production functions for the two sectors can be written as follows:

$$C = C(L_c, K_c, G), \tag{1}$$

$$G = G(L_g, K_g), \tag{2}$$

where subscripts denote sectoral inputs. If the total amounts of inputs are given,

$$L_c + L_g = L, \tag{3}$$

$$K_c + K_g = K. \tag{4}$$

The total output (*Y*) is the sum of outputs in the government and nongovernment sectors:

$$C + G = Y. \tag{5}$$

Suppose that the ratio of the respective marginal factor productivities in the two sectors deviates from unity by a factor, δ. That is,

$$(G_L / C_L) = (G_K / C_K) = (1 + \delta), \tag{6}$$

where the lowercase subscripts denote partial derivatives. (For example, $G_L = \partial G / \partial L$.) If δ is positive, then the government sector has higher marginal factor productivity. A negative value for δ, on the other hand, implies higher marginal factor productivities in the non-government sector. Totally differentiating Equations (1) and (2) yields

$$\dot{C} = C_L \dot{L}_c + C_K I_c + C_G \dot{G}, \tag{7}$$

$$\dot{G} = G_L \dot{L}_g + G_K I_g, \tag{8}$$

where dots over variables denote changes, $I_c (= dK_c)$ and $I_g (= dK_g)$ are respective sectoral gross investments, and $\dot{L}_c$ and $\dot{L}_g$ are sectoral changes in labor force, and C_G describes the marginal externality effect of government production on nongovernment production. Since by definition $Y = C + G$, it follows that

$$\dot{Y} = \dot{C} + \dot{G}. \tag{9}$$

Using Equations (6)-(8) in Equation (9) yields

$$\begin{aligned}\dot{Y} &= C_L\dot{L}_c + C_K I_c + C_G\dot{G} + G_L\dot{L}_g + G_K I_g \\ &= C_L\dot{L}_c + C_K I_c + C_G\dot{G} + (1+\delta)C_L\dot{L}_g + (1+\delta)C_K I_g \\ &= C_L(\dot{L}_c + \dot{L}_g) + C_K(I_c + I_g) + C_G\dot{G} + \delta(C_L\dot{L}_g + C_K I_g).\end{aligned} \tag{10}$$

Define total investment and total growth of labor force, respectively, as $I(\equiv I_c + I_g)$ and $\dot{L}(\equiv \dot{L}_c + \dot{L}_g)$. Note that Equations (6) and (8) imply

$$C_L\dot{L}_g + C_K I_g = \frac{1}{1+\delta}(G_L\dot{L}_g + G_K I_g) = \frac{\dot{G}}{1+\delta} \tag{11}$$

Substituting Equation (11) in Equation (10) yields

$$\dot{Y} = C_L\dot{L} + C_K I + (\frac{\delta}{1+\delta} + C_G)\dot{G}. \tag{12}$$

If a linear relationship exists between the real marginal productivity of labor in a given sector and average output per worker, we can write $C_L = \beta(Y/L)$. Then, dividing both sides of Equation (12) by Y and denoting $C_K = \alpha$, we end up with the following growth equation:

$$\dot{Y}/Y = \alpha(I/Y) + \beta(\dot{L}/L) + (\frac{\delta}{1+\delta} + C_G)\dot{G}/Y. \tag{13}$$

After some manipulation Equation (13) can be written as

$$\dot{Y}/Y = \alpha(I/Y) + \beta(\dot{L}/L) + (\frac{\delta}{1+\delta} - \theta)(\dot{G}/G)(G/Y) + \theta(\dot{G}/G), \tag{14}$$

or, writing $\tilde{\delta}$ for $\delta/(1+\delta)$ we get

$$\dot{Y}/Y = \alpha(I/Y) + \beta(\dot{L}/L) + (\tilde{\delta} - \theta)(\dot{G}/G)(G/Y) + \theta(\dot{G}/G), \tag{15}$$

where the parameter β is the elasticity of non-government output *C* with respect to *L*, α is the marginal product of *K* in the non-government sector, and $\theta = C_G(G/C)$ is the elasticity of non-government output with respect to *G*. Estimating Equation (15) yields estimates of δ and θ which indicate, respectively, inter-sectoral factor productivity differences and the marginal externality effect of government output (size) on the rest of the economy and hence on economic performance. It should be noted that C_G and θ both represent the marginal externality effect of *G*, the government size. C_G is similar to marginal product while θ is an elasticity measure (Ram, 1986: 193).

Equation (13) can be restated as

$$\dot{Y}/Y = \alpha(I/Y) + \beta(\dot{L}/L) + (\tilde{\delta} + C_G)(\dot{G}/G)(G/Y). \qquad (16)$$

As pointed out by Ram (1986: 193), the coefficient of $(\dot{G}/G)(G/Y)$ in Equation (16) is different from the coefficient of the same variable in Equation (15); the coefficient in (15) is likely to be smaller than in (16). In addition, the advantage of estimating Equation (16) is that, unlike Equation (15), the overall effect of government size can be obtained directly from the coefficient of $(\dot{G}/G)(G/Y)$. However, the disadvantage is that it is not possible to get separate estimates of the externality effect and the factor productivity differential. It should also be noted that collinearity between $\dot{G}/G$ and $(\dot{G}/G)(G/Y)$ may be a problem in the estimation of Equation (15). Equation (16), on the other hand, does not have this disadvantage. Although Ram (1986) estimates both equations, he derives his major conclusions from the estimates of Equation (16).[2]

The specification used by Landau (1983), and many other studies includes G / Y as a regressor for assessing the impact of government size on economic growth. Ram (1986: 194) notes that in none of the specifications derived from his model, nor in those based on homogeneous aggregate production functions that include G as an input, does the ratio G / Y appear as an independent variable by itself. However, he runs the specification

$$\dot{Y}/Y = \alpha_K(I/Y) + \beta_L(\dot{L}/L) + \gamma(G/Y) \qquad (17)$$

and reports some estimates that he compares with the results obtained from his own specifications.

In this study, using a panel of cross-sectional and time-series data for thirty-four developing countries over the 1979-1997 period, we estimate Equations (15), (16) and (17). Our estimations are based on panel data techniques that allow us to take into account the country- and time-specific effects.

3. Data, variables, and the sample countries

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2 Rao (1989) argues that the main problem with Ram's specifications is whether the estimation results of these specifications are valid in the face of substantial number of omitted variables such as population growth, literacy rate, political stability, foreign aid, historical and cultural factors, and so on. Ram (1989) shows, however, that the omission of any relevant variable does not cause a significant bias in the government size variables of his specifications. Even if there might be a point in what Rao argues, a panel data analysis with country-specific effects can provide a protection from a potential omitted-variable bias. Country-specific effects are expected to capture the effects of such omitted factors.

The data for this study come from the *International Financial Statistics* of the International Monetary Fund. The rate of increase of aggregate real GDP is taken as a proxy for economic growth, $\dot{Y}/Y$. Gross fixed capital formation by both public and private basis is used for *I*, and government consumption expenditures is used for *G*. These three series, real GDP, gross fixed capital formation, and government consumption expenditures are deflated by consumer price indices. As in several studies, we use the rate of population growth as a proxy for the rate of increase in labor input, $\dot{L}/L$. The means and the standard deviations of the variables employed in our estimated models (Equations 15, 16 and 17) are presented in Table 1.

Table 1

Means and Standard Deviations of the Variables

Variables	Mean	Standard Deviation
$\dot{Y}/Y$	0.03715	0.06561
I/Y	0.22189	0.06908
$\dot{L}/L$	0.02145	0.01449
$(\dot{G}/G)(G/Y)$	0.00515	0.02210
$\dot{G}/G$	0.03797	0.13878
G/Y	0.12376	0.03854

The study is performed for thirty-four middle-income developing countries with a few exceptions for the period 1979-1997. The countries in our sample are Bolivia, Brazil, Cameroon, Chile, Colombia, Costa Rica, Côte d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Guatemala, Honduras, India, Indonesia, Ireland, Jamaica, Kenya, Korea, Malaysia, Morocco, Pakistan, Panama, Paraguay, Peru, Philippines, Portugal, Singapore, Sri Lanka, Thailand, Tunisia, Turkey, Uruguay, and Venezuela. The sample of countries was selected on the basis of two criteria. The first is the availability of compatible data over the sample period. Argentina, Mexico, China and many former socialist countries are excluded from the study due to this reason. The second criterion for the sample selection is being a midsize, middle-income developing country. With few exceptions, the countries are classified as middle-income countries according to the World Bank's criteria.[3]

[3] The World Bank has classified the middle-income countries into two categories based on GNP per capita in 2001 U.S. dollars: the lower- and the upper-middle-income countries. The lower-middle-income countries are those with a GNP per capita between $746 and $2975, and the upper-middle-income countries are those with a GNP per capita between $2976 and $9205.

4. Estimation results

Our panel data analysis consists of five estimations (or panel data models) for each of the three equations: The first Ram specification (Equation (15)), the second Ram specification (Equation (16)), and the Landau specification (Equation (17)). The five estimations or models performed on these equations are: (1) ordinary least squares without group dummy variables and time effects (OLS); (2) least squares with group dummy variables (LSDV) (also known as one-way fixed effects model); (3) one-way random effects model (RE1); (4) least squares with group dummy variables and time effects (LSDV&TIME) (also known as two-way fixed effects model); and (5) two-way random effects model (RE2).

The results of these five estimations for the first Ram specification (Equation (15)), the second Ram specification (Equation (16)), and the Landau specification (Equation (17)) are given in Table 2, Table 3 and Table 4, respectively.[4] It is seen from these estimations that variables containing government consumption expenditures are significant at the 1% level for each specification. Furthermore, the coefficients of $(\dot{G}/G)(G/Y)$ and $\dot{G}/G$ in Table 2 (the first Ram specification) are always negative and positive, respectively; the coefficient of $(\dot{G}/G)(G/Y)$ in Table 3 (the second Ram specification) is always positive; and the coefficient of G/Y in Table 4 (Landau specification) is always negative. These findings are consistent with those of Ram (1986), and we will turn back to this point later in this section. It is also seen from these three tables that I/Y and $\dot{L}/L$ do not perform as well as the government consumption variables. The significance of these variables varies depending on the equation specification and the five different panel data models we consider.

4 In order to save space, the country and time effects are not included in these tables. Tables 6 and 7 present these effects only for the two-way fixed effects models (LSDV&TIME).

Table 2
Estimation Results for the First Ram Specification (Equation 15)

Variables	OLS	LSDV	RE1	LSDV&TIME	RE2
I/Y	0.1718 (0.345)	0.0086 (0.142)	0.1234^{***} (6.855)	0.0485 (0.768)	0.1278^{***} (6.298)
$\dot{L}/L$	0.2333 (1.412)	0.3991^{**} (1.982)	0.1872 (1.227)	0.4588^{**} (2.231)	0.1985 (1.283)
$(\dot{G}/G)(G/Y)$	-0.8484^{***} (-3.350)	-0.7421^{***} (-2.846)	-0.8654^{***} (-3.466)	-0.8067^{***} (-3.074)	-0.9166^{***} (-3.669)
$\dot{G}/G$	0.2880^{***} (7.151)	0.2660^{***} (6.440)	0.2879^{***} (7.233)	0.2694^{***} (6.465)	0.2920^{***} (7.322)
Constant	-0.0125 (-1.393)	---	---	0.0105 (0.694)	---
R-squared	0.191	0.251	0.188	0.291	0.188
Adj.R-squared	0.186	0.205		0.224	
F	37.76	5.500		4.32	
Hausman (4df.Prob.value)		16.60 (0.0023)		14.97 (0.0048)	
Sample Size	646	646	646	646	646

Note: t-ratios are given in parentheses. *** indicates statistical significance at the 1 percent level; ** indicates statistical significance at the 5 percent level; and * indicates statistical significance at the 10 percent level.

Table 3
Estimation Results for the Second Ram Specification (Equation 16)

Variables	OLS	LSDV	RE1	LSDV&TIME	RE2
I/Y	0.2158^{***} (6.124)	0.0481 (0.771)	0.1365^{***} (7.466)	0.0786 (1.208)	0.1380^{***} (7.297)
$\dot{L}/L$	0.3269^{*} (1.912)	0.5253^{**} (2.538)	0.2039 (1.305)	0.5945^{***} (2.810)	0.2147 (1.373)
$(\dot{G}/G)(G/Y)$	0.7903^{***} (7.057)	0.7800^{***} (6.868)	0.7662^{***} (6.940)	0.7322^{***} (6.416)	0.7526^{***} (6.861)
Constant	-0.2182^{**} (-2.359)	---	---	0.0032 (0.204)	---
R-squared	0.126	0.199	0.118	0.241	0.118
Adj.R-squared	0.122	0.153		0.170	
F	30.88	4.230		3.400	
Hausman (3df.Prob.value)		12.86 (0.0049)		17.04 (0.0007)	
Sample Size	646	646	646	646	646

Note: t-ratios are given in parentheses. *** indicates statistical significance at the 1 percent level; ** indicates statistical significance at the 5 percent level; and * indicates statistical significance at the 10 percent level.

Table 4
Estimation Results for the Landau Specification (Equation 17)

Variables	OLS	LSDV	RE 1	LSDV&TIME	RE 2
I/Y	0.2256*** (6.203)	0.0701 (1.103)	0.2325*** (7.772)	0.0937 (1.405)	0.2326*** (7.640)
$\dot{L}/L$	0.0626 (0.361)	0.2064 (0.994)	0.1663 (0.985)	0.2545 (1.200)	0.1781 (1.052)
G/Y	-0.1685*** (-2.590)	-0.4343*** (-3.617)	-0.1511*** (-2.784)	-0.3987*** (-3.199)	-0.1548*** (-2.809)
Constant	0.0066 (0.512)	---	---	0.0602*** (2.622)	---
R-squared	0.068	0.156	0.067	0.202	0.067
Adj.R-squared	0.064	0.106		0.127	
F	15.63	3.130		2.710	
Hausman (3df.Prob.value)		14.70 (0.0021)		11.15 (0.0109)	
Sample Size	646	646	646	646	646

Note: t-ratios are given in parentheses. *** indicates statistical significance at the 1 percent level; ** indicates statistical significance at the 5 percent level; and * indicates statistical significance at the 10 percent level.

The first columns of these tables (labeled OLS) report the ordinary least squares estimations without group dummy variables and time effects. The results of estimating this basic model are given for the purpose of comparison. In the second column of each table (labeled LSDV), the least squares estimations with group dummy variables (country effects) are presented, while in the fourth column of each table (labeled LSDV&TIME) least squares estimations with both country and time effects are presented. To be able to determine the joint significance of country and time effects we calculated likelihood ratio and partial F tests (not shown in the tables). These tests indicate that for all three equations, the country effects are jointly significant in the one-way fixed effects models (i.e., the least squares models with country effects), while the time effects are jointly significant in the two-way fixed effects models (i.e., the least squares estimations with both country and time effects). In addition, the Hausman test statistics (reported in the last row of each table) indicate for all three equations that the fixed effects model is a better choice than the random effects model, for both the one-way and the two-way designs. Based on these test results, we will derive our conclusions from the two-way fixed effects model for each equation (the fourth column of each table labeled LSDV&TIME). The fourth columns of Table 2, Table 3 and Table 4 are reproduced in Table 5.

Table 5
Estimation Results under the Two-way
Fixed Effects Design for each Specification

Variables	Equation 15 (1st Ram Spec.) LSDV&TIME	Equation 16 (2nd Ram Spec.) LSDV&TIME	Equation 17 (Landau Spec.) LSDV&TIME
I/Y	0.0485 (0.768)	0.0786 (1.208)	0.0937 (1.405)
$\dot{L}/L$	0.4588** (2.231)	0.5945*** (2.810)	0.2545 (1.200)
$(\dot{G}/G)(G/Y)$	-0.8067*** (-3.074)	0.7322*** (6.416)	---
$\dot{G}/G$	0.2694*** (6.465)	---	---
G/Y	---	---	-0.3987*** (-3.199)
Constant	0.0105 (0.694)	0.0032 (0.204)	0.0602*** (2.622)
R-squared	0.291	0.241	0.202
Adj.R-squared	0.224	0.170	0.127
F	4.32	3.400	2.710
Hausman	14.97 (0.0048)	17.04 (0.0007)	11.15 (0.0109)
Sample Size	646	646	646

Note: t-ratios are given in parentheses. *** indicates statistical significance at the 1 percent level; ** indicates statistical significance at the 5 percent level; and * indicates statistical significance at the 10 percent level.

The first two variables, I/Y and $\dot{L}/L$, are common to all three specifications estimated. It can be seen from Table 5 that the coefficient of I/Y is not significant, while the coefficient of $\dot{L}/L$ is significant at least at the 5% level for the Ram specifications, but insignificant for the Landau specification. As noted in Section II, β, the coefficient of $\dot{L}/L$, reflects the elasticity of non-government output *C* with respect to *L* in the Ram specifications. It is seen from Table 5 that its estimated value is 0.4588 for Equation 15 and 0.5945 for Equation 16.

Focusing on variables related to government consumption expenditures, we see from Table 5 that the coefficients of $(\dot{G}/G)(G/Y)$ and $\dot{G}/G$ in Equation 15 are negative and positive, respectively, and significant at the 1% level. As explained in Section 2, θ, the coefficient of $\dot{G}/G$, represents the marginal externality effect of government output (size) and reflects the percentage increase in *C* with a one percent increase in *G*. The estimated coefficient of $\dot{G}/G$ indicate that on percent increase in government size (*G*) results in a 0.2694 percent increase in the output of the non-government sector (*C*). Using the estimated coefficients of $(\dot{G}/G)(G/Y)$ and $\dot{G}/G$ in Equation 15 it is possible to calculate the intersectoral factor productivity differential, δ. We know that in Equation 15 the coefficient of $(\dot{G}/G)(G/Y)$ is $\tilde{\delta}-\theta$ and the coefficient of $\dot{G}/G$ is θ. Since the estimated value of θ is 0.2694, and the estimated value of $\tilde{\delta}-\theta$ is -0.8067, the estimated value of $\tilde{\delta}$ is calculated as -0.5373. As we know from Section 2, $\tilde{\delta}$ equals $\delta/(1+\delta)$, and hence, the intersectoral factor productivity differential, δ, is found to be -0.3495. Because $(G_L/C_L)=(G_K/C_K)=(1+\delta)$, a negative value for the intersectoral factor productivity differential implies higher marginal factor productivities in the non-government sector.

The coefficient of $(\dot{G}/G)(G/Y)$ in Equation 16 gives the overall effect of government size on economic growth. It is seen from Table 5 that the estimate for this coefficient is 0.7322 and is statistically significant at the 1% level. This implies that the total effect of government size on economic growth is positive and quite large. This result and the above finding that the marginal externality effect of government size on the non-government output is positive are consistent with those obtained by Ram (1986) for a similar set of developing countries. Hence the results of our panel data analysis performed for the period 1979-1997 confirm the cross-section findings of Ram, which are based on the mean values of variables for the periods 1960-1970 and 1970-1980. Our main conclusion is similar to that of Ram: Government size seems to have a significant, positive association with the economic growth and economic performance of developing countries.

These findings are consistent with the World Bank's redefinition of its conception of the role of the state, which is now widely accepted. According to this new conception, the state is central to economic and social development, not as a direct provider of growth, but as its partner, catalyst, and facilitator. This has been confirmed the experience. An effective state encourages and complements the activities of private businesses and individuals, and it is vital for the provision of goods and services, as well as the rules and institutions that allow markets to flourish. Without an effective state, it is not an easy task to accomplish sustainable development, both economic and social (World Bank, 1997: 1).

This new conception of the state has been shaped primarily by the evidence of the world's development success stories, namely the development of the industrial economies in the nineteenth century and the post-war growth miracles of East Asia. A common feature of these development models is that they presuppose a developmental state. The negative consequences of the over-withdrawal of the state observed during the last two decades in Latin America, sub-Saharan Africa, Eastern Europe, and the former Soviet Union have also been important. In many countries of these regions, the creation of human capital has slowed down, the political sustainability of growth reduced, and economic development harmed (World Bank, 1997).

The experience of developing countries has shown that coping with underdevelopment calls for extensive governmental action, since mobilizing the necessary human and capital resources requires extensive central coordination (Jilberto and Mommen, 1998). There are other reasons why governments have played an important role especially in developing countries. Firstly, these countries have a greater vulnerability to all kinds of external shocks. Secondly, income distribution in developing countries is highly unequal, and poverty affects a higher percentage of the population. Thirdly, imperfect information, greater incidence of monopolistic practices and a variety of negative externalities result in unpredictable market failures in these countries. And fourthly, developing countries generally do not have appropriate incentives for the private sector to operate, in terms of competitive advantage, regulatory framework and judicial system. All these views are at odds with the view that the ideal state is the minimalist state.

As mentioned in Section 2, the specification used by Landau (1983) and followed by many other studies includes G/Y as an independent variable for assessing the impact of government size on economic growth. Ram (1986: 197) convincingly argues that the appropriate variables to investigate the effect of government size on economic growth are $(\dot{G}/G)(G/Y)$ and/or $\dot{G}/G$, and not G/Y, whether one uses conventional reasoning of neoclassical growth models or adopts the augmented models proposed by him. Ram reports some estimates for a specification similar to Landau's to compare the results from this estimation with the results obtained from estimating his own specifications. Ram finds that the Landau specification using G/Y as a regressor yields exactly the opposite results compared to the results from his specifications using $(\dot{G}/G)(G/Y)$ and/or $\dot{G}/G$ as independent variables. In most cases the coefficient of G/Y is negative and statistically significant. As seen from Table 5, the results of our panel data analysis for the Landau specification are consistent with the cross-section results of Ram: The coefficient of G/Y is negative and significant at the 1% level. However, we share the conclusion of Ram that the negative parameter estimate for the government variable in Landau's specification arises mainly due to the inappropriate use of G/Y as a regressor.[5]

Table 6 and Table 7 show the estimations of country and time effects for the two Ram specifications, Equation 15 and Equation 16, respectively. The results shown in these tables reveal that only about a third of the country-specific units have significant coefficients, meaning that the models fit quite well for most of the countries. It is seen from the same tables that the sample countries with positive country effects are mostly the Asian countries with prospering manufacturing sectors (as well as the three European countries included in our sample). Many of the remaining countries with negative country effects, on the other hand, are Latin American and African countries.

The positive country effects for the Asian countries and the negative country effects for the Latin American and African countries reflect mainly the developments experienced by these countries in our sample period. Between 1965 and 1980 the Latin American as well as the sub-Saharan African economies grew very fast, at a rate not far below that of the East Asian countries. However, in the 1980s, economic growth collapsed and a severe downturn was experienced in Latin America and Africa. Most of the Asian countries, on the other hand, continued to prosper.

The Latin American and African failures were mainly due to the debt crisis, which was caused by both external shocks and internal factors. At the end of 1980s, the Latin American countries adopted orthodox policies to bring about economic growth and stabilization. As a result of these policies they experienced huge capital inflows that served to greatly improve their balance of payments. This revived economic growth in Latin America in the 1990s, and helped achieve price stabilization. However, the rates of economic growth in the 1990s were never as high as those of the pre-1980 period. Frequent crises led by huge capital flows, unfavorable external environment, and insufficient depth of reforms are the main reasons why the orthodox policies did not succeed in restoring fast long-term growth during the 1990s in Latin American economies. The African economies, on the other hand, were not able to attract international investors in the same period. For most of the African countries, growth rates in the 1990s could not improve upon the growth rates of the 1980s (Singh, 1993, 2000). In contrast to the experience of many of the Latin American economies, many African countries failed to

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5 The country and time effects for the Landau specification (Equation 17) are not presented since it is not one of our preferred models for the reason explained above.

reform their economies mainly because of the weakness of their regimes (Jilberto and Mommen, 1998).

Table 6
Country and Time Effects for the First Ram Specification (Eq. 15)

	COUNTRY EFFECTS			TIME EFFECTS		
	Countries	**Coefficient**	**t-ratio**	**Years**	**Coefficient**	**t-ratio**
1	**Bolivia**	-0.013	-0.949	**1979**	0.024	2.504
2	**Brazil**	-0.003	-0.276	**1980**	-0.010	-1.002
3	**Cameroon**	-0.014	-1.110	**1981**	-0.021	-2.157
4	**Chile**	0.019	1.481	**1982**	-0.026	-2.712
5	**Colombia**	0.0001	0.012	**1983**	-0.101	-1.021
6	**Costa Rica**	-0.027	-0.204	**1984**	0.021	2.135
7	**Côte d'Ivoire**	0.030	-2.111	**1985**	0.010	1.054
8	**Dominican Republic**	-0.012	-0.876	**1986**	-0.002	-0.248
9	**Ecuador**	-0.004	-0.296	**1987**	0.010	1.079
10	**Egypt**	0.002	0.163	**1988**	0.004	0.480
11	**El Salvador**	-0.031	-2.187	**1989**	-0.015	-1.526
12	**Guatemala**	-0.006	-0.411	**1990**	0.001	0.054
13	**Honduras**	-0.013	-0.962	**1991**	-0.006	-0.678
14	**India**	0.014	1.073	**1992**	-0.006	-0.619
15	**Indonesia**	0.046	3.458	**1993**	0.001	0.068
16	**Ireland**	0.015	1.109	**1994**	0.016	1.678
17	**Jamaica**	-0.016	-1.191	**1995**	0.006	0.681
18	**Kenya**	-0.025	-1.807	**1996**	0.005	0.511
19	**Korea**	0.032	2.162	**1997**	-0.002	-0.275
20	**Malaysia**	0.025	1.672			
21	**Morocco**	-0.002	-0.019			
22	**Pakistan**	0.011	0.843			
23	**Panama**	0.010	0.765			
24	**Paraguay**	-0.005	-0.395			
25	**Peru**	-0.032	-2.438			
26	**Philippines**	-0.017	-1.264			
27	**Portugal**	0.012	0.862			
28	**Singapore**	0.032	1.974			
29	**Sri Lanka**	0.005	0.392			
30	**Thailand**	0.022	1.477			
31	**Tunisia**	0.004	0.335			
32	**Turkey**	0.0005	0.038			
33	**Uruguay**	-0.012	-0.788			
34	**Venezuela**	-0.013	-0.996			

Table 7
Country and Time Effects for the Second Ram Specification (Eq. 16)

COUNTRY EFFECTS				TIME EFFECTS		
	Countries	**Coefficient**	**t-ratio**	**Years**	**Coefficient**	**t-ratio**
1	**Bolivia**	-0.027	-1.847	**1979**	0.025	2.525
2	**Brazil**	-0.0009	-0.068	**1980**	-0.008	-0.849
3	**Cameroon**	-0.018	-1.315	**1981**	-0.020	-2.040
4	**Chile**	0.022	1.643	**1982**	-0.027	-2.651
5	**Colombia**	0.005	0.356	**1983**	-0.013	-1.329
6	**Costa Rica**	-0.005	-0.378	**1984**	0.015	1.481
7	**Côte d'Ivoire**	-0.033	-2.229	**1985**	0.010	0.984
8	**Dominican Republic**	-0.001	-0.105	**1986**	-0.001	-0.116
9	**Ecuador**	-0.004	-0.313	**1987**	0.011	1.115
10	**Egypt**	-0.001	-0.106	**1988**	0.003	0.331
11	**El Salvador**	-0.032	-2.191	**1989**	-0.018	-1.809
12	**Guatemala**	-0.005	-0.370	**1990**	-0.002	-0.253
13	**Honduras**	-0.016	-1.181	**1991**	-0.008	-0.865
14	**India**	0.019	1.392	**1992**	-0.002	-0.293
15	**Indonesia**	0.050	3.616	**1993**	0.004	0.401
16	**Ireland**	0.016	1.140	**1994**	0.013	1.340
17	**Jamaica**	-0.017	-1.276	**1995**	0.013	1.334
18	**Kenya**	-0.030	-2.127	**1996**	0.005	0.521
19	**Korea**	0.037	2.412	**1997**	0.002	0.197
20	**Malaysia**	0.021	1.953			
21	**Morocco**	-0.004	-0.319			
22	**Pakistan**	0.014	0.985			
23	**Panama**	0.008	0.624			
24	**Paraguay**	-0.0001	-0.012			
25	**Peru**	-0.036	-2.659			
26	**Philippines**	-0.015	-1.101			
27	**Portugal**	0.012	0.865			
28	**Singapore**	0.033	1.990			
29	**Sri Lanka**	0.009	0.665			
30	**Thailand**	0.023	1.522			
31	**Tunisia**	0.001	0.125			
32	**Turkey**	0.003	0.230			
33	**Uruguay**	-0.008	-0.528			
34	**Venezuela**	-0.019	-1.379			

The experience of the fast growing Asian economies during the 1980s and 1990s, but prior to the financial crisis of 1997, stands in striking contrast to that of the Latin American and African countries. Although there is no single East Asian model of development, the high-performing East Asian countries can be identified by several common characteristics that include high rates of growth of manufactured exports, superior accumulation of human capital and physical capital supported by high rates of domestic savings, appropriate allocation of physical and human resources, macroeconomic stability, inflows of foreign capital, and a rapid growth of output and productivity in agriculture. In addition to these, the strong and efficient governments of the East Asian countries played a crucial role in establishing economic stability. In a majority of these countries, in some form, the government intervened systematically and through multiple channels to promote economic development, and in some cases the development of specific industries. A variety of non-economic factors including culture, politics, and history, are also important in understanding the East Asian success story (World Bank, 1993; Jilberto and Mommen, 1998).

Tables 6 and 7 also show the estimated time-effect parameters. Although the parameter estimates for the early 1980s are negative and significant, the results are generally mixed and do not have a recognizable pattern.

5. Conclusion

This paper re-estimates the two-sector growth model of Ram (1986) by employing panel data techniques and using a more recent data set for thirty-four developing countries. The results of our panel data estimations confirm the cross-sectional findings of Ram: government size seems to be an important factor influencing the economic growth and economic performance of developing countries. The total effect of government size on economic growth is positive and quite large. In addition, the marginal externality effect of government size on the non-government output is positive. These results are consistent with the view that the government is central to economic and social development, not as a direct promoter of growth but as a partner, catalyst, and facilitator.

The results also show that the estimated country effects are positive for most of the Asian countries in the sample, which can be attributed to several factors influencing the high performance of these countries that include the rapid growth of highly competitive export industries, higher accumulation and better allocation of physical and human resources, and more efficient governance accomplishing sustained macroeconomic stability, and government guiding firms and intervening in markets in a coherent fashion. The positive country effects for the Asian countries may also reflect the effect of some non-economic factors such as culture, politics, and history, which also appear to be important in explaining the success of these countries.

On the other hand, most of the Latin American and African countries in the sample have negative country effects. These effects seem to reflect primarily the developments experienced by these countries in the 1980s. During this period, economic growth collapsed in Latin America and Africa; this collapse was primarily the result of the debt crisis caused by external shocks and internal factors. Insufficient depth of reforms, political instabilities, and weakness of the regimes in these groups of countries may also be the factors producing negative country effects.

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Özet

Gelişmekte olan ülkelerde devlet harcamaları ve ekonomik büyüme: Bir panel veri seti analizi

Bu çalışma panel veri seti tekniklerini kullanarak 34 gelişmekte olan ülke için daha yeni verilerle Ram'in (1986), "Government Size and Economic Growth: A New Framework and Some Evidence from Cross-Section and Time-Series Data", *American Economic Review*, 7(1), 191-203, iki sektörlü büyüme modelini yeniden tahmin etmektedir. Tahmin sonuçları Ram'in yatay kesit analizi bulgularını doğrulamaktadır: Devlet büyüklüğü ile gelişmekte olan ülkelerin ekonomik büyüme ve performansı arasında pozitif yönlü bir ilişki vardır. Ekonomik büyüme üzerinde devlet büyüklüğünün toplam etkisi pozitif ve oldukça büyüktür. Ayrıca, devlet büyüklüğünün devlet dışı sektörün çıktısı üzerinde yarattığı marjinal dışsallık etkisi yine pozitiftir. Çalışmanın bir diğer bulgusu ise, Ram'in modelleri için tahmin edilen ülke etkilerinin, Asya ülkelerinin çoğu için pozitif, Latin Amerika ve Afrika ülkelerinin çoğu için ise negatif olduğudur.