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INSTITUTIONS AND THE IMPACT OF GOVERNMENT SPENDING ON GROWTH

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Institutions and the Impact of Government Spending on Growth[‡]

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Abstract

This paper reports the results of a study of the impact of government expenditures on economic growth, emphasizing how government effectiveness in developing nations influences the productivity of government spending. The effects of categories of government spending on growth are also examined. No significant positive effects are found for defense, education and health variables**.** Consumption expenditures have negative growth effects in developed and developing nations, with a more detrimental impact in developing nations with ineffective governments. Developing nations with ineffective governments benefit from capital expenditures. To stimulate growth, developing nations should limit their governments' consumption spending and invest in infrastructure.

JEL classification: O11, O23, O50

Key Words: Government spending, Institutional Quality, Economic Growth

1. Introduction

Institutions matter. Empirical investigations into the determinants of economic growth have clearly established that good governmental institutions foster growth.[1] These effective governments establish a framework that promotes and rewards initiative and creativity in private enterprise. Countries with effective governments may also make public spending decisions that support and foster economic development. It is this latter connection between institutions and growth in developing nations that is one of the topics investigated in this paper.

The impact of government spending on growth has been investigated extensively, generally with conflicting results. This holds true for total spending, the division between capital and consumption expenditures, and various components of government spending. The effects of government spending are often found to differ between developed and developing nations, and whether a tax measure is included in the estimates.

Public spending may yield diminishing returns, just like other types of expenditures. Consider the case of road construction that may generate large, positive economic effects in a developing nation. In a developed nation a new road may have a very small marginal product.

Also, road construction in a developed country may be providing relief of congestion or anticipating future congestion, rather than capital deepening. This "constant returns to scale" investment likely has no discernable aggregate empirical growth effect, since the investment maintains the existing ratio of public to private capital.

Also, capital expenditures may be "pork barrel" expenditures; roads to nowhere. Good governmental institutions more likely constrain "pork barrel" expenditures. Weak governments may thrive on such spending. Thus, a category of government expenditure such

as road construction may have very different impacts on economic growth dependent upon a government's effectiveness.

This paper reports the results of a study investigating the growth impact of government spending. A number of different measures of government spending are used. Countries are grouped by income level and also by government effectiveness for developing nations. Two different techniques are used to estimate the models.

A particular focus of the analysis is how government effectiveness affects the growth impact of government spending in developing nations. Instead of classifying government expenditures as productive and unproductive *a priori*,[2] this study divides countries into two groups as having effective or ineffective governments based upon three recognized measures of government effectiveness used in the empirical growth literature. A hypothesis examined is whether efficient governments benefit from the various components of public expenditures differently because efficient governments benefit more from productive expenditures (or are hurt less by unproductive expenditures).

Several important results are found to be significant and consistent across specifications. The first is that government consumption expenditures (or current expenditures) have negative growth effects for certain country groupings. In particular, the negative growth effects of government consumption expenditures are clearly supported for developing nations with ineffective governments, while these expenditures generally have insignificant effects in developing nations with effective governments. A second result is that capital expenditures have positive growth effects in developing nations with ineffective governments, and possibly also in all developing nations. Combined, these two results indicate that government effectiveness is an important determinant of the growth impact of government spending for developing nations.

Another important finding is that no consistent, significant positive effects are estimated for defense, health, and education expenditures. None of these types of spending is found to have significant positive growth effects.

The next section of the paper reviews key findings in the literature about government spending and growth. The model and data are discussed in section 3. The fourth section presents the empirical results. Section 5 presents concluding observations and policy recommendations.

2. Literature Review

Many **e**mpirical studies of the determinants of growth include a measure of government spending. Initial cross-section studies by Grier and Tullock (1989) and Barro (1991) find a significant negative impact of government consumption expenditures on growth. Grier and Tullock also report that the estimated effect of government size on growth differs between different groups of countries, and estimate separate regressions for various country groups. Schaltegger and Torgler (2006) find that at the state (canton) and local level within Switzerland, government spending from operating budgets has a negative growth effect but government capital spending has no effect on growth.

In related work, Aschauer finds that public investment in "core infrastructure"[3] has a significant positive effect on total factor productivity in the United States for the period 1949-1985. Turnovsky and Fisher (1995) develop a theoretical model to examine the effects of government infrastructure and consumption expenditures. They find that infrastructure expenditures are likely more productive than consumption expenditures, but cannot rule out the possibility that consumption expenditures may be more productive under certain conditions.

Subsequent studies report divergent findings. Hansson and Henrekson (1994) find that for 14 OECD countries, government consumption spending, transfers and total spending

have a negative effect, education expenditures have a positive effect, and investment has no significant effect. Mendoza, Milesi-Ferretti and Asea (1997) find that effective tax rates have no effect on growth for a panel of 18 OECD countries. Easterly and Rebelo (1993) report a significant, positive impact for government investment in transportation and communication, but no effect on growth for other fiscal measures.

Expanding the findings of Grier and Tullock, other studies investigate whether the growth effects of government spending vary between groups of countries. Folster and Henrekson (2001) argue that the composition of government spending varies significantly between high and low income countries, and that the growth retarding effects of government expenditures and/or consumption occur only after a government attains a certain threshold size. They report estimates for panels varying between 22 and 23 OECD countries supporting the proposition that a large government sector lowers growth in high income countries.

Taking the opposite approach, Devarajan, Swaroop and Zou (1996) find that for 43 developing countries, only current government expenditures have a positive growth effect. Expenditures for infrastructure, health and education have insignificant or negative effects. They interpret these findings as indicating that developing nations spend too much on capital and not enough on current expenditures. They also conjecture that some capital expenditures many not contribute positively to private sector productivity, suggesting the need to investigate in some way the quality of government expenditures.

For the same two decades (1970 – 1990) as Devarajan, Swaroop and Zou, but using a smaller sample of 30 developing countries, Bose, Haque and Osborn (2007) find that government investment and education expenditures are growth enhancing. Bose et al. include tax revenue and the budget surplus or deficit in their estimates to control for the effects of financing government expenditures. Devarajan et al. use the share of government expenditure in GDP to control for financing effects.

In two papers Kneller, Bleaney and Gemmell (1999) and Bleaney, Gemmell and Kneller (2001) emphasize the importance of controlling for the effect of distortionary taxation. Failure to account for the effects of distortionary taxes imparts a downward bias to the estimated effects of productive expenditure. Correcting for this bias by including various tax variables in their estimated regressions, they find that government expenditures for education, health and transportation and communication are productive in a sample of OECD countries. In their data they *a priori* classify government expenditures as either productive or unproductive.

Keefer and Knack (2007) demonstrate that the level of public expenditure may be inversely related to its productivity due to the quality of government. Limited governments may spend less on public investment, but that investment may be productive. Weak and corrupt governments may have a high level of expenditures that is unproductive. Thus, the level of public investment may be a poor proxy for its productivity.

It is this last issue that is a primary the focus of this study. How does controlling for government quality affect the measured productivity of various types of government expenditure? The issue is examined in the context of recognizing that the effects of government spending may differ between developed and developing countries and also controlling for the financing of expenditures when possible.

3. Model, Data and Estimation Technique

An empirical growth model commonly used in the literature is employed to analyze the effects of government expenditures on growth. The model has the general form:

$$\gamma_{yt} = F(y_t, X_t, Z_t)$$

where γ_{yt} is a country's per capita growth rate in period t, y_t is initial GDP per capita, X_t is a vector of conditioning variables that have been found to be key determinants of growth, and the variable Z_t represents a vector of variables related to government expenditure.

Data for the growth of real GDP per capita are from the World Bank (2007) and initial GDP data are from Heston, Summers and Aten (2002). The conditioning variables in the vector X_t are those commonly used in the literature. Human capital is measured as the lagged logarithm of life expectancy. Telephone mainlines per thousand workers is the measure of the capital stock.[4] The lagged fertility rate measures population growth, and is expected to have a negative effect since the population growth rate reduces growth in the neoclassical growth model. The sum of imports and exports as a percentage of GDP measures openness, a variable frequently found to increase growth. All four of these variables are taken from the World Bank (2007).

The Kaufmann, Kraay and Mastruzzi (2007) index of the rule of law controls for institutional quality. The rule of law variable is an index ranging from -2.5 (worst) to 2.5 (best). Also included in the estimates are dummy variables for three geographic regions: Sub-Saharan Africa, Latin America and East Asia.[5]

Government expenditure and revenue data for the period 1970 -1999 are from Easterly and Sewadeh (2002). The major revision in the IMF's data compilation (2001) makes the data for the 1970-1998 period not comparable with the new series beginning in 1990. The new government expenditure and revenue data for 1990-2004 are from the World Bank (2007). For the two differing expenditure measures, two sets of estimates are reported: one for the 1970-1999 period and a second set for the 1990-2004 period.

Tax revenue as a percentage of GDP is also included in the regressions to control for the effects of financing expenditures. Government revenue data is limited to a fraction of the countries in the data set. Controlling for government financing requires truncating the sample size, which does affect the estimates in some case. Thus, results are reported for the full sample and for the smaller sample for which tax revenue data is available.

To determine the effects of government expenditures on growth, a variety of expenditure measures are used. These include total expenditures as a percentage of GDP, government consumption as a percentage of GDP, Barro's (1991) measure of government consumption which is total expenditures minus defense and education spending as a percentage of GDP, and various sub-categories of expenditures as discussed below, all as a percentage of GDP.

For each of the two government finance data sets, panels are created by averaging the data over five-year periods. For the earlier sample, there are six five-year periods, beginning with 1970-1974 and following sequentially. For the newer data series, there are three five-year periods. The first is 1990-1994 and others follow sequentially.

Over 100 developed and developing nations are included in the data set.[6] The sample size for each estimated equation is determined by data availability. Seemingly-Unrelated Regression (SUR) is the technique used to estimate the basic model. While the constant term for each five-year period varies, coefficients for other variables are constrained to have the same value for all decades. Barro and Lee (2005) recommend SUR estimates because fixed-effect and first-differenced GMM estimates eliminate time-persistent cross-section information.[7] As a robustness check, fixed-effect estimates are also reported.

4. Results

(a) Basic Results

The baseline models are estimated for two sample periods: 1970-1999 using the original government expenditures data, and 1990-2004 using the new government expenditures data.[8] The baseline specifications include the following determinants of growth of real GDP per capita: the natural logarithm of the initial level of real GDP per capita for convergence; the log of the lagged value of life expectancy for human capital; the lagged log of the fertility rate for population growth; the log of current telephone mainlines per 1000

workers for the capital stock; the current value of the sum of imports and exports as a percentage of GDP for openness; the rule of law index for institutional quality; and dummies for Latin America, East Asia, and Sub-Saharan Africa; and various government expenditures as a percentage of GDP.

As discussed above, tax revenue as a percent of GDP is included in the specifications to control for the effect of financing expenditures. However, the availability of tax revenue data reduces the number of countries in the sample. The estimated results in some cases are sensitive to the reduction in sample size necessary to include the tax revenue variable. Thus, estimates are reported without and including the tax revenue variable.

The first estimates, reported in Table 1, are for the impact of total government expenditures on growth. For this expenditure measure, the sample size is approximately the same with and without the revenue measure, so only the results including the revenue variable are reported. For the first sample period, 1970-1999, government expenditures have a significant, negative effect on growth only in developed countries. In the second sample, 1990-2004, government expenditures have a significant, negative effect on growth for the complete sample and for developed and developing countries.

The results differ for government consumption expenditures. Also, the sample size is substantially smaller when revenue is included, so both sets of estimates are reported in Table 2. In the first sample period, consumption expenditures have a significant negative effect both for all countries and for developing countries. The estimates for the effect of government consumption expenditures are sensitive to sample size in the second period. The estimates without the revenue variable obtain a significant negative effect in all countries and in developing nations, but no significant effect when the revenue variable is included. However, inclusion of the revenue variable requires a substantial reduction of sample size. Estimates for the same reduced sample without the tax revenue variable also obtain an

insignificant effect for government consumption, while the result for the larger sample is significantly negative. Thus, it appears that the change in the sample size rather than the inclusion of the revenue variable drives the results.

As the basic models obtain such divergent results, more focused estimates may provide greater insight into the effects of government consumption expenditures on growth. A worthwhile approach is to analyze whether government effectiveness matters for the growth impacts of government (consumption) expenditures. It is expected/assumed that effective governments may benefit from government expenditures or at least are not negatively affected by government expenditures. There are many studies in the literature reporting that countries with certain characteristics are more likely to have more effective governments. It is evident that countries, depending on their effectiveness levels, may choose different expenditure patterns, and are more likely to be affected differently from government expenditures. The next set of estimates is for developing nations, with nations classified according to the effectiveness of their governments.

Government effectiveness is classified using three alternative criteria. Using the Kaufmann, Kraay and Mastruzzi (2007) index of government effectiveness, countries with an index above the mean value are included in the effective government group, while those with an index value below the mean are classified as ineffective. The second classification criterion is whether a country's legal system is of British origin. La Porta, Lopez-de-Silane, Shleifer and Vishney (1999) show that the government efficiency factor is high in English common law countries and these countries are less interventionist compared to other countries.

The third criterion is ethnic homogeneity. Countries with an ethnically homogeneous population are presumed to have an effective government, while those with an ethnicity index above the mean value (ethnic diversity) are presumed to have ineffective governments. Porta

et al. show that higher ethnic fractionalization is associated with more interventionism (worse protection of property rights, more intrusive government regulation, and higher tax rates) and lower government efficiency (lower scores on bureaucratic delays and tax compliance, but not on corruption). They conclude that ethnically homogenous and common law countries have better/ more effective governments.

The number of countries classified as either effective or ineffective varies by the criterion used. There are 105 countries using the index of government effectiveness and 104 using either of the other criteria. A total of 36 countries have ineffective governments by all three effectiveness measures and only 4 are effective in all three classifications. However, 31 countries have effective governments by at least two of the criteria. The number of governments classified as effective is 20 by the index of effectiveness, 37 having a legal system with British origins, and 43 using ethnicity as the classification criterion. Given the diversity of country classifications using these alternative measures of effectiveness, obtaining consistent results across all three measures is a strong finding.

The results in Table 3 support the hypothesis that institutional quality matters in developing nations. For the earlier time period, all estimates, both with and excluding taxes, indicate a negative effect of government consumption expenditures on growth for the various classifications of ineffective government, and no significant effect of consumption expenditures on growth for countries classified as having effective governments. The estimated coefficients are remarkably similar. A 1% increase in government consumption relative to GDP reduces the annual growth rate by approximately 0.10%.

For the later sample (1990-2004) the results obtained without taxes have a similar pattern of a negative, significant effect of government consumption on growth, while the specifications including taxes obtain insignificant results (see, Table 5B).[9] For the estimates

of a significant negative effect, the estimated coefficients are also -0.10 or greater in absolute value.[10]

Since government expenditures for specific purposes may have different growth impacts, expenditures are decomposed into the various component categories. The growth effects are estimated by separating countries by income level and by government effectiveness for developing nations.

The results for all countries and separating by income levels into developed and developing nations are reported in Table 4A and Table 4B. For the earlier sample period a measure of government consumption using Barro's (1991) criteria (current expenditures minus defense and education expenditures) is computed.[11] Results for most specifications obtain significant, negative results, although the estimated effects are smaller then those reported above.

No consistent, significant, positive effect is estimated for defense expenditures in either period. Estimates for education obtain several significant negative coefficients. Similarly, the only significant coefficients estimated for health-care expenditures are negative. The most consistent results are for all countries and for developed countries, which are likely driving the results. For developed countries, a 1% increase in health care expenditures as a percentage of GDP reduces growth by one-half percent, a substantial impact. In sum, these results fail to support the hypotheses that defense, education and health-care expenditures increase growth in either time period.

Many of the results in Table 4A and Table 4B are sensitive to the inclusion of the total revenue variable. However, consistent results are obtained for some types of spending. While data are available only for the earlier sample (Table 4A), transportation and communication expenditures and capital expenditures significantly increase growth for the combined sample and for developing countries, suggesting that the results are due to the

positive effect in developing nations.[12] Also, expenditures for economic affairs and services and for fuel and energy expenses have positive estimated growth effects for two specifications including tax revenue. In contrast, expenditures for current expenditures on goods and services reduce growth in all specifications for the earlier sample. The estimated effect is larger in absolute value for developing nations.

In the later sample (Table 4B) subsidies and transfers have significant negative effects on the growth of developed nations.[13] Interest payments have a significant negative growth effect in developing nations. [14]

The impact of categories of government expenditures in developing nations grouped by the three alternative criteria for government effectiveness is examined next, with results in Table 5A and Table 5B. For the earlier sample (Table 5A), total expenditure reduces growth in countries with effective governments, while consumption expenditures reduce growth in countries with ineffective governments. Using Barro's consumption measure, significant negative growth effects are obtained for both groups, although the results are not consistent across alternative measures of effectiveness.

Another consistent result for the first sample period is that transportation and communication expenditures and capital expenditures increase growth in developing nations with ineffective governments, and have an insignificant effect in developing nations with effective governments.[15] A possible explanation is that developing nations with effective governments, as is the case for developed nations, already have an established infrastructure, such that additions do not have a significant impact on growth. Infrastructure investment in developing nations with ineffective governments may have a much greater marginal product because there may be a much greater need. Current expenditures have negative growth effects regardless of government effectiveness. All of these results are generally consistent with respect to the inclusion or exclusion of the tax variable.

For the recent sample period with the new measures of government expenditures (Table 5B), the most consistent findings are that total expenditures and consumption expenditures reduce growth in countries with ineffective governments. The results for consumption expenditures are sensitive to the change in sample size required to include tax revenue. The significant result of a negative growth impact of consumption expenditures in countries with ineffective governments is for the larger sample of countries excluding the tax revenue variable.

(b) Robustness Check

The SUR estimation technique has been the workhorse of empirical growth studies, and the results presented above are emphasized as providing the best estimates of the growth impacts of government expenditures. Since time invariant social factors may determine government effectiveness, public policy spending and attitudes toward growth, fixed effects versions of the models are estimated to control for unobservable factors. For the both sample periods, data for the first five-year interval is lost due to first differencing.

The results reported in Table 6A are consistent for the first sample period. That is, total government expenditures have a negative growth effect for developed countries. No significant results are obtained from the fixed effects regression for the second sample period in Table 6B, contrary to the results in Table 1 indicating that government expenditures have negative effects in all countries.

The fixed effects estimates for government consumption also contradict earlier findings reported in Table 2. Now, in the first period in Table 6A, significant negative effects of government consumption spending are obtained for the full sample, for developed countries, and for developing countries when the revenue variable is excluded, but not consistently for developing nations as found above. For the second sample period in Table 6B the results are consistent with the SUR estimates, in that a significant negative result is

found for all nations and developing nations, but only for the larger sample without the tax variable.

The strongest consistent results are obtained for the effect of government consumption spending in countries with ineffective governments for the first sample period (not reported). Fixed effect estimates obtain significant negative effects for developing nations. The value of the estimated coefficients and significance levels are almost identical to the SUR estimates. This is true even though the first five-year period is lost for the fixed-effect estimates. For the later period most results are insignificant. Consumption expenditures have a significant negative effect on growth in countries without British legal origins, but only for the larger sample excluding tax revenue. Consumption expenditures have a positive, significant impact in countries with effective governments when ethnicity is the criterion determining government effectiveness, for the smaller sample that includes tax revenue in the estimate (see Table 7A). This last result may suggest that consumption spending may "buy" harmony in countries with limited ethnic diversity.

The fixed-effect estimates in Table 6A have some consistency and some disparities with the results in Table 4A for the first sample period. For both measures of consumption expenditure, significant negative effects are found for developed countries. The other consistent results are that current expenditures are found to have significant negative effects in both developed and developing nations while capital expenditures have significant positive effects in both. This last result contrasts with Table 4A results where capital expenditures are found to benefit only developing nations. No significant patterns of positive or negative results are found for defense, education or health expenditures. For the recent sample period in Table 6B interest payments have a significant negative effect for developed countries.[16] The other noteworthy result is a positive effect of secondary education expenditure for all countries.

For expenditure categories for the earlier sample (Table 7A), consumption expenditures have a significant negative growth effect for two classifications of ineffective governments, while significant negative effects are found for two classifications of effective governments in developing nations for Barro's consumption variable. Consistent with the SUR results, capital spending has significant positive effects for nations with ineffective governments. Current expenditures have significant negative effects for five of the six country groupings. No significant pattern of results is obtained for the fixed-effect estimates for the recent sample period in Table 7B.

5. Conclusion

This paper reports the results of an investigation of the growth effects of government expenditures, with emphasis on the role that government institutions have in determining the effectiveness of government spending in developing nations. Many of the results are found to be sensitive to changes sample size necessary to include a revenue variable to control for the effect of financing spending, and to estimation technique. The results also appear sensitive to the changes in data reporting, with far fewer significant results obtained for the newer measures of government expenditures.

No pattern of significant positive effects is found for defense, education and health variables, even though several different variables available from the new spending data are used. Interest payments are found to have significant negative growth effects for developed nations, while transfers and subsidies reduce growth in developed nations.

The strongest, most consistent results are obtained for consumption and capital expenditures. For the earlier sample period, negative growth effects of consumption expenditures are found for developed and developing nations. For developing nations, the results appear stronger in those nations with ineffective governments. The estimated

coefficients and significance levels obtained for developing nations with ineffective governments are very close for both SUR and fixed-effect estimates.

The other consistent result is that capital expenditures have significant positive growth effects for counties with ineffective governments in the first sample period using either estimation technique. The fixed effect estimates also obtain significant effects of capital spending for developing nations with effective governments.

The results have several policy implications. Government officials in countries with relatively less effective governments can spur growth though well-designed capital expenditures. Increasing the government's current expenditures appears universally detrimental to growth.

Aid agencies should insure that aid designations are not undermined by the fungibility of money. Aid intended for capital projects may facilitate diversion of other funds to current expenditures. The benefits of increased capital spending in developing nations may be offset by increases in current expenditures using funds freed by foreign aid.

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TABLES

Table 1: Growth Effects of Government Spending

Independent variable	GDP per capita growth rates: 1970-1999, 6 five-year periods			GDP per capita growth rates: 1990-2004, 3 five-year periods		
Variable	All Countries	Developing Countries	Developed Countries	All Countries	Developing Countries	Developed Countries
Log (Initial GDP per capita)	-3.82***	-3.71***	-8.46***	-3.83***	-0.88	-4.81
	(4.10)	(3.13)	(4.57)	(3.08)	(0.61)	(1.50)
Log (Life Expactancy, lagged)	11.27***	8.47	-6.41	0.09	-5.12	20.30
	(2.43)	(1.49)	(0.38)	(0.01)	(0.74)	(0.41)
Log (Fertility Rates, lagged)	-2.78**	-6.15***	-2.83*	-4.46***	-4.12**	-3.15
	(1.99)	(3.14)	(1.93)	(2.41)	(1.94)	(0.79)
Log (Telephone Mainlines	1.15**	1.47**	-0.89	1.51*	0.28	-6.31
per thousand)	(1.94)	(2.12)	(0.61)	(1.91)	(0.32)	(1.26)
Rule of Law	-0.03	0.30	0.20	0.51	1.69***	1.09
	(0.10)	(0.76)	(0.50)	(1.40)	(3.65)	(1.44)
Trade (% of GDP)	0.019***	0.017***	0.014***	0.007**	0.006	0.006
	(4.83)	(2.98)	(4.60)	(1.94)	(0.98)	(1.52)
Total Expenditure (% of GDP)	-0.018	-0.017	-0.074**	-0.10***	-0.073**	-0.11**
	(0.91)	(0.69)	(2.34)	(3.34)	(2.10)	(2.30)
Tax Revenue (% of GDP)	-0.018	-0.017	0.037	0.078**	0.03	0.14**
	(0.58)	(0.41)	(0.94)	(2.18)	(0.78)	(2.15)
Sub Saharan African Dummy	-1.21***	-1.34**	----	-1.03	-1.69***	-----
	(2.49)	(2.29)	----	(1.60)	(2.43)	----
Latin American Dummy	-1.18***	-1.88***	----	-0.72	-1.12**	-----
	(2.97)	(3.67)	----	(1.42)	(2.20)	-----
East Asian Dummy	0.88*	0.32	0.08	0.002	-0.48	-1.11
	(1.75)	(0.44)	(0.19)	(0.00)	(0.66)	(1.02)
For each equation, R2 (min~max)	.13,~.39	.11,~.55	-.32,~.56	.19,~.33	.18,~.47	.20,~.36
(N)	424	288	136	196	144	52

For each specification, estimation is by the SUR method. The system has 6 or 3 equations, where the dependent variables are the per capita growth rates over each decade. Each equation has a different constant term (not reported here). Other coefficients are restricted to be the same for all periods. t-statistics are in parentheses. *** Significant at the 1 percent-level. ** Significant at the 5 percent-level. * Significant at the 10 percent-level.

Table 2: Growth Effects of Government Spending by Country Income Level

Independent variable	GDP per capita growth rates: 1970-1999, 6 five-year periods						GDP per capita growth rates: 1990-2004, 3 five-year periods					
Variable	All Countries	Developing Countries	Developed Countries	All Countries	Developing Countries	Developed Countries	All Countries	Developing Countries	Developed Countries	All Countries	Developing Countries	Developed Countries
Log (Initial GDP per capita)	-4.06***	-3.08***	-6.80***	-3.74***	-3.31***	-6.78***	-3.20***	-1.75*	-0.56	-3.79***	-1.57	-3.96
	(5.25)	(3.49)	(4.48)	(4.09)	(2.91)	(3.58)	(3.68)	(1.86)	(0.30)	(2.94)	(1.04)	(1.26)
Log (Life Expactancy, lagged)	9.06***	4.82	-8.38	9.94**	5.07	-6.66	-0.73	-5.13	-12.51	3.94	0.06	16.04
	(2.55)	(1.25)	(0.54)	(2.07)	(0.88)	(0.43)	(0.18)	(1.22)	(0.46)	(0.58)	(0.01)	(0.32)
Log (Fertility Rates, lagged)	-2.79**	-5.20***	-1.60	-2.47*	-5.76***	-5.12***	-2.08	-4.53***	3.41*	-3.46*	-5.00**	1.38
	(2.20)	(3.21)	(1.03)	(1.72)	(2.93)	(2.96)	(1.37)	(2.52)	(1.85)	(1.85)	(2.20)	(0.36)
Log (Telephone Mainlines	0.42	0.56	-1.23	1.18**	1.50**	-2.72	0.69	0.13	-6.64***	1.06	-0.03	-5.01
per thousand)	(0.82)	(0.96)	(1.01)	(1.98)	(2.18)	(1.58)	(1.14)	(0.19)	(2.61)	(1.26)	(0.03)	(0.97)
Rule of Law	0.71***	1.08***	0.51	0.16	0.50	0.57	1.09***	1.79***	0.57	0.58	1.57***	1.49*
	(2.54)	(3.25)	(0.53)	(0.53)	(1.30)	(1.46)	(3.70)	(5.10)	(1.28)	(1.52)	(3.18)	(1.95)
Trade (% of GDP)	0.018***	0.019***	0.009***	0.019***	0.019***	0.015***	0.007**	0.006	0.008***	0.006*	0.004	0.005
	(5.60)	(4.10)	(4.36)	(4.84)	(3.36)	(4.47)	(2.26)	(1.22)	(3.53)	(1.65)	(0.58)	(1.16)
Government Consumption	-0.07***	-0.098***	-0.026	-0.07**	-0.08**	0.04	-0.09***	-0.08***	-0.06	-0.05	-0.004	-0.14*
(% of GDP)	(3.28)	(3.61)	(1.11)	(2.33)	(2.18)	(1.06)	(3.07)	(2.46)	(1.55)	(1.18)	(0.09)	(1.77)
Tax Revenue (% of GDP)				-0.018	-0.011	-0.058***				0.008	-0.03	0.088
				(0.77)	(0.36)	(2.54)				(0.27)	(0.88)	(1.57)
Sub Saharan African Dummy	-1.20***	-1.24***	----	-1.15**	-1.37**	----	-1.15**	-1.52***	----	-0.77	-1.40*	-----
	(2.66)	(2.50)	----	(2.35)	(2.40)	----	(2.17)	(2.72)	----	(1.12)	(1.85)	----
Latin American Dummy	-0.88**	-1.66***	-0.99	-1.20***	-1.91***	----	-0.38	-1.07**	-2.05***	-0.56	-1.09*	----
	(2.18)	(3.32)	(1.25)	(3.07)	(3.95)	----	(0.88)	(2.21)	(2.49)	(1.02)	(1.89)	-----
East Asian Dummy	0.39	0.36	-0.20	0.74	0.05	0.11	0.83*	0.66	-0.46	1.10**	0.57	-0.14
	(0.88)	(0.58)	(0.65)	(1.50)	(0.08)	(0.28)	(1.68)	(1.03)	(1.03)	(1.98)	(0.78)	(0.16)
For each equation, R2 (min~m	-.07~.38	-.04,~.49	.11,~.58	.16,~.40	.11,~.55	-.22,~.60	.07,~.33	.12,~.4	.03,~.53	.13,~.36	.21,~.48	.06,~.43
(N)	647	484	163	430	292	138	368	281	87	208	156	52

Notes: See Table 1.

Table 3: Growth Effects of Government Spending by Government Effectiveness

Independent variable	GDP per capita growth rates: 1970-1999, 6 five-year periods						GDP per capita growth rates: 1990-2004, 3 five-year periods					
	Gov't Effectiveness		British Legal Origin		Ethnicity		Gov't Effectiveness		British Legal Origin		Ethnicity	
Variable	Effective Gov't	Ineffective Gov't	Effective Gov't	Ineffective Gov't	Effective Gov't	Ineffective Gov't	Effective Gov't	Ineffective Gov't	Effective Gov't	Ineffective Gov't	Effective Gov't	Ineffective Gov't
Log (Initial GDP per capita)	-13.48***	-2.41***	-0.42	-3.30***	-5.73***	-2.09**	-7.40*	1.44	2.42*	-2.26*	-4.01**	-0.24
	(5.47)	(2.68)	(0.24)	(3.24)	(3.22)	(2.26)	(1.96)	(1.45)	(1.73)	(1.82)	(2.33)	(0.22)
Log (Life Expactancy, lagged)	5.12	2.84	11.68*	-2.19	-5.14	8.45*	-18.47	-7.09	4.72	-11.95**	-7.74	-6.01
	(0.27)	(0.74)	(1.93)	(0.47)	(0.86)	(1.88)	(1.39)	(1.62)	(0.83)	(2.08)	(1.23)	(1.07)
Log (Fertility Rates, lagged)	-10.89***	-7.05***	-0.48	-7.76***	-10.09***	-1.68	-12.92***	-4.49**	-0.23	-5.37**	-5.72*	-0.82
	(3.09)	(3.59)	(0.17)	(3.78)	(3.72)	(0.83)	(2.79)	(2.10)	(0.10)	(1.99)	(1.85)	(0.36)
Log (Telephone Mainlines	0.43	0.61	-2.29*	1.23*	1.31	0.31	-0.69	-0.005	-3.86***	0.87	1.27	-0.08
per thousand)	(0.28)	(1.02)	(1.93)	(1.83)	(1.34)	(0.48)	(0.32)	(0.01)	(3.68)	(1.03)	(1.24)	(0.10)
Rule of Law	-0.38	0.74**	1.89***	0.68*	1.16**	1.09***	0.22	2.10***	2.07***	1.81***	1.64***	2.35***
	(0.42)	(1.97)	(3.00)	(1.88)	(2.06)	(3.07)	(0.25)	(5.03)	(4.01)	(4.10)	(3.07)	(5.37)
Trade (% of GDP)	0.018**	0.016***	0.025***	0.019***	0.029***	0.015***	0.017	0.005	0.009	0.010	0.012	0.006
	(2.05)	(2.97)	(3.50)	(2.78)	(3.69)	(2.76)	(1.60)	(1.03)	(1.60)	(1.35)	(1.45)	(1.11)
Government Consumption	-0.07	-0.10***	-0.06	-0.10***	-0.05	-0.13***	-0.10	-0.10***	0.0002	-0.11***	-0.09	-0.15***
(% of GDP)	(0.99)	(3.50)	(1.23)	(3.32)	(0.89)	(4.15)	(1.26)	(2.86)	(0.00)	(2.61)	(1.38)	(3.48)
Sub Saharan African Dummy	0.33	-0.95*	-1.54*	-1.39**	-0.16	-1.08*	-0.16	-1.59***	-1.38*	-1.87**	-1.57	-1.12
	(0.28)	(1.74)	(1.76)	(2.08)	(0.19)	(1.84)	(0.11)	(2.50)	(1.91)	(2.37)	(1.50)	(1.54)
Latin American Dummy	-0.56	-1.32***	-0.31	-1.88***	-1.45**	-1.27**	-0.70	-0.73	1.21	-1.27**	-2.10***	0.19
	(0.45)	(2.49)	(0.26)	(3.42)	(1.97)	(2.07)	(0.56)	(1.33)	(1.30)	(2.02)	(2.94)	(0.28)
East Asian Dummy	0.15	0.80	0.12	0.85	0.74	0.10	-0.38	1.40*	0.31	1.30	1.05	-0.17
	(0.12)	(1.20)	(0.11)	(1.00)	(0.86)	(0.13)	(0.24)	(1.91)	(0.35)	(1.33)	(1.19)	(0.19)
For each equation, R2 (min~max	-1.03,~.55	.03,~.51	.03,~.53	.07,~.50	.06,~.57	-.05,~.54	-.43,~.38	.16,~.48	.04,~.41	.26,~.48	.20,~.56	.06,~.52
(N)	99	385	166	316	187	292	56	225	97	181	112	163

Notes: See Table 1.

Table 4A: Growth Effects of Government Spending by Category, 1970-1999

Independent variable	GDP per capita growth rates: 1970-1999, 6 five-year periods					
				Tax revenue included in the spec.		
Variable	All Countries	Developing Countries	Developed Countries	All Countries	Developing Countries	Developed Countries
Total Expenditure (% of GDP)	-0.023*	-0.019	-0.047***	-0.018	-0.017	-0.074**
	(1.70)	(1.06)	(3.64)	(0.91)	(0.69)	(2.34)
Gov't Consumption (% of GDP)	-0.07***	-0.098***	-0.026	-0.07**	-0.08**	0.04
	(3.28)	(3.61)	(1.11)	(2.33)	(2.18)	(1.06)
Gov't Consumption (% of GDP)	-0.059***	-0.062**	-0.067***	-0.070**	-0.065	-0.13***
as in Barro (1991)[#]	(2.62)	(1.97)	(3.70)	(2.13)	(1.60)	(3.29)
Defense (% of GDP)	-0.018	-0.056	-0.002	0.004	-0.04	0.028
	(0.37)	(0.64)	(0.07)	(0.08)	(0.42)	(0.88)
Education (% of GDP)	-0.053	-0.077	-0.19***	0.05	0.002	-0.068
	(0.56)	(0.62)	(2.73)	(0.47)	(0.01)	(0.73)
Health (% of GDP)	-0.075	-0.22	-0.064	-0.03	-0.16	-0.008
	(0.82)	(1.19)	(1.11)	(0.33)	(0.84)	(0.14)
Economic Affairs & Services	0.064	0.069	-0.037	0.089**	0.10*	0.001
(% of GDP)	(1.42)	(1.33)	(0.48)	(1.84)	(1.91)	(0.02)
Agri, Forestry, Fishing, & Hunting	0.057	0.029	0.19	0.078	0.088	0.070
(% of GDP)	(0.51)	(0.21)	(1.29)	(0.70)	(0.61)	(0.48)
Mining & Mineral Resources, Man.	0.065	0.13	-0.25	0.14	0.17	-0.085
& Construction (% of GDP)	(0.33)	(0.53)	(0.97)	(0.69)	(0.70)	(0.32)
Fuel & Energy (% of GDP)	0.68**	0.54	0.61	0.75***	0.63*	0.54
	(2.28)	(1.57)	(1.27)	(2.52)	(1.83)	(1.25)
Transportation & Communication	0.21**	0.24**	-0.15	0.23***	0.29***	-0.12
(% of GDP)	(2.24)	(2.13)	(0.85)	(2.52)	(2.49)	(0.72)
Curr Expenditure On Goods	-0.053**	-0.10***	-0.073***	-0.036	-0.10**	-0.049
& Services (% of GDP)	(2.00)	(2.74)	(2.57)	(1.21)	(2.25)	(1.52)
Interest Payments (% of GDP)	-0.09**	-0.11*	-0.11**	-0.070	-0.09	-0.082
	(2.02)	(1.81)	(2.39)	(1.50)	(1.51)	(1.65)
Subsidies & Oth Curr Transfers	-0.056**	-0.071	-0.043**	-0.040	-0.046	0.008
(% of GDP)	(2.16)	(1.25)	(2.34)	(1.21)	(0.74)	(0.22)
Current Expenditure (% of GDP)	-0.052***	-0.068***	-0.047***	-0.069***	-0.085***	-0.070**
	(3.29)	(2.89)	(3.67)	(2.88)	(2.76)	(2.34)
Capital Expenditure (% of GDP)	0.079**	0.075*	-0.086	0.10***	0.12***	-0.06
	(2.25)	(1.91)	(0.67)	(2.80)	(2.70)	(0.45)

[#] Gov't Consumption= Current Expenditures-Defense -Education Expenditures

Notes: See Table 1.

Table 4B: Growth Effects of Government Spending by Category, 1990-2004

Independent variable	GDP per capita growth rates: 1990-2004, 3 five-year periods					
				Tax revenue included in the spec.		
Variable	All Countries	Developing Countries	Developed Countries	All Countries	Developing Countries	Developed Countries
Total Expenditure (% of GDP)	-0.05***	-0.05**	-0.04	-0.10***	-0.073**	-0.11**
	(2.46)	(2.12)	(1.10)	(3.34)	(2.10)	(2.30)
Government Consumption	-0.09***	-0.08***	-0.06	-0.05	-0.004	-0.14*
(% of GDP)	(3.07)	(2.46)	(1.55)	(1.18)	(0.09)	(1.77)
Military expenditure	0.002	-0.014	-0.035	-0.005	-0.031	-0.34
(% of central gov't exp.)	(0.06)	(0.46)	(0.72)	(0.19)	(0.96)	(0.61)
Military expenditure	0.097	0.058	-0.10	-0.003	-0.02	-0.20
(% of GDP)	(0.91)	(0.42)	(1.15)	(0.03)	(0.16)	(1.19)
Exp. per student, primary	-0.11***	-0.071*	-0.058	-0.12***	-0.023	-0.23***
(% of GDP per capita)	(3.97)	(1.93)	(1.61)	(3.53)	(0.51)	(3.01)
Exp. per student, secondary	-0.022	-0.007	-0.16**	-0.032	0.006	-0.19***
(% of GDP per capita)	(1.47)	(0.51)	(2.55)	(1.40)	(0.27)	(2.63)
Exp. per student, tertiary	-0.002**	-0.002	-0.051**	-0.003	-0.003*	-0.060*
of GDP per capita)	(1.96)	(1.26)	(2.02)	(2.00)	(1.79)	(1.87)
Total Exp. per student,	-0.0006	0.0002	-0.033*	-0.002	-0.001	-0.032
(% of GDP per capita)	(0.47)	(0.16)	(1.82)	(0.97)	(0.62)	(1.53)
Public spending on education,	-0.084	-0.095	-0.25	0.014	0.12	-0.48
total (% of GDP)	(1.02)	(1.00)	(1.51)	(0.16)	(1.34)	(1.70)
Public spending on education,	-0.038	-0.065**	0.003	0.014	-0.021	0.21
total (% of gov't exp.)	(1.34)	(2.35)	(0.04)	(0.37)	(0.61)	(1.10)
Health exp. per capita	-0.78**	0.003	-1.37	-1.08***	-0.66	-1.26
(current US$, in logs)	(1.91)	(0.00)	(0.82)	(2.49	(1.10)	(0.68)
Public health expenditure	-0.37***	-0.15	-0.48*	-0.37**	-0.14	-0.57*
(% of GDP)	(2.50)	(0.76)	(1.79)	(2.23)	(0.54)	(1.96)
Interest payments	-0.0004	-0.021	0.060	-0.0002	-0.020	0.057
(% of expense)	(0.03)	(1.09)	(1.10)	(0.01)	(1.04)	(0.98)
Interest payments	-0.006	-0.025*	0.046	-0.006	-0.025*	0.042
(% of revenue)	(0.39)	(1.65)	(0.89)	(0.40)	(1.65)	(0.79)
Subsidies and other transfers	-0.011	0.02	-0.051***	-0.011	0.019	-0.52***
(% of expense)	(0.85)	(1.12)	(2.78)	(0.84)	(1.08)	(2.80)

Notes: See Table 1.

Table 5A: Growth Effects of Government Spending
In Developing Countries by Government Effectiveness, 1970-1999

Independent variable	Developing countries only:1970-1999, 6 five-year periods					
	Government Effectiveness		British Legal Origin		Ethnicity	
Variable	Effective Government	Ineffective Government	Effective Government	Ineffective Government	Effective Government	Ineffective Government
Total Expenditure	-0.15**	-0.012	-0.15***	0.018	-0.029	-0.005
(% of GDP)	(2.40)	(0.41)	(3.61)	(0.62)	(0.66)	(0.18)
Government Consumption	-0.14	-0.10**	-0.077	-0.09**	0.023	-0.10**
(% of GDP)	(1.68)	(2.40)	(1.10)	(2.12)	(0.35)	(2.33)
Government Consumption	-0.19**	-0.082*	-0.22***	-0.032	-0.03	-0.091*
as in Barro (1991)	(2.62)	(1.74)	(3.64)	(0.71)	(0.05)	(1.93)
Defense (% of GDP)	0.10	0.015	-0.024	-0.10	0.11	-0.02
	(0.39)	(0.14)	(0.10)	(1.01)	(0.47)	(0.19)
Education (% of GDP)	-0.34*	0.07	0.47	-0.08	-0.19	-0.17
	(1.89)	(0.42)	(1.51)	(0.50)	(0.99)	(0.87)
Health (% of GDP)	-0.64***	-0.14	0.12	-0.29	-0.56**	-0.32
	(5.18)	(0.46)	(0.24	(1.36)	(2.27)	(1.07)
Econ Affairs & Services	0.42***	0.12*	-0.31**	0.17***	0.017	0.12*
(% of GDP)	(3.44)	(1.92)	(2.16)	(2.58)	(0.22)	(1.69)
Agri, Forestry, & Fishing	0.38	0.12	-0.60**	0.16	-0.015	-0.056
(% of GDP)	(1.27)	(0.72)	(2.68)	(0.85)	(0.06)	(0.29)
Mining & Mineral; Manuf &	-0.27	0.39	0.40	0.08	-1.73	0.44*
Construction (% of GDP)	(0.40)	(1.49)	(0.65)	(0.30)	(1.63)	(1.70)
Fuel & Energy (% of GDP)	2.17***	0.72*	0.99	0.93**	-0.94	1.07**
	(5.12)	(1.76)	(1.17)	(2.27)	(1.67)	(2.51)
Transportation & Comm.	0.36	0.34***	0.14	0.36***	0.006	0.63***
(% of GDP)	(1.20)	(2.70)	(0.40)	2014	(0.05)	(3.28)
Curr Expenditure On Goods	-0.31***	-0.09*	0.017	-0.15***	-0.17*	-0.09**
& Services (% of GDP)	(4.87)	(1.73)	(0.21)	(2.96)	(1.86)	(2.05)
Interest Payments	-0.053	-0.17**	-0.39***	0.019	-0.13	-0.04
(% of GDP)	(0.56)	(2.24)	(5.01)	(0.27)	(1.17)	(0.61)
Subsidies & Other Current	0.044	-0.014	-0.23	-0.05	0.077	-0.015
Transfers (% of GDP)	(0.57)	(0.17)	(1.65)	(0.66)	(0.87)	(0.19)
Current Expenditure	-0.22***	-0.09***	-0.16***	-0.08**	-0.063	-0.096***
(% of GDP)	(3.48)	(2.59)	(3.01)	(2.19)	(1.14)	(2.90)
Capital Expenditure	0.20	0.12***	-0.16	0.19***	-0.004	0.16***
(% of GDP)	(1.57)	(2.56)	(1.65)	(4.04)	(0.05)	(3.55)

Notes: See Table 1. Estimates include tax revenue.

Table 5B: Growth Effects of Government Spending
In Developing Countries by Government Effectiveness, 1990-2004

Independent variable	Developing countries only:1990-2004, 3 five-year periods					
	Government Effectiveness		British Legal Origin		Ethnicity	
Variable	Effective Government	Ineffective Government	Effective Government	Ineffective Government	Effective Government	Ineffective Government
Total Expenditure	0.11	-0.076*	0.026	-0.75*	-0.079*	-0.038
(% of GDP)	(1.20)	(1.90)	(0.43)	(1.89)	(1.70)	(0.67)
Government Con.	0.39***	-0.039	-0.015	-0.060	0.13	-0.066
(% of GDP)	(3.06)	(0.60)	(0.21)	(0.91)	(1.62)	(1.14)
Military expenditure	-0.10	0.003	0.19**	-0.040	0.019	-0.35
(% of cent. Gov. exp.)	(1.46)	(0.07)	(2.52)	(1.10)	(0.30)	(0.70)
Military expenditure	-0.43	0.21	0.77***	-0.16	0.12	-0.047
(% of GDP)	(1.43)	(1.10)	(4.70)	(0.99)	(0.32)	(0.30)
Exp. per student, primary	0.33*	-0.026	0.038	-0.11*	-0.10	-0.020
(% of GDP per capita)	(2.50)	(0.49)	(0.27)	(1.94)	(1.70)	(0.34)
Exp. per student, secondary	0.097	0.021	0.17	-0.034	0.039	-0.028
(% of GDP per capita)	(0.83)	(0.77)	(1.80)	(1.38)	(1.04)	(1.01)
Exp. per student, tertiary	0.036	-0.001	0.017	-0.009***	0.003	0.002
(% of GDP per capita)	(0.58)	(0.42)	(1.31)	(3.20)	(0.31)	(0.22)
Total Exp. Per student,	0.090	0.004	0.017	-0.009	0.005	0.001
(% of GDP per capita)	(2.29)	(0.78)	(2.37)	(1.30)	(0.80)	(0.15)
Public spending on edc.,	0.26	0.14	0.19	-0.15	0.12	0.038
total (% of GDP)	(1.10)	(1.18)	(1.51)	(0.81)	(0.79)	(0.35)
Public spending on edc.,	0.088	-0.014	0.064	-0.007	-0.021	-0.030
total (% of gov't exp.)	(0.77)	(0.30)	(0.81)	(0.16)	(0.40)	(0.78)
Health expenditure per capita	3.10	-0.94	-3.17	-0.91	0.023	-1.32
(curr. US$, in logs)	1.00)	(0.91)	(1.35)	(1.53)	(0.03)	(1.51)
Public health expenditure,	-0.64	0.071	-1.57	0.02	-0.12	-0.16
(% of GDP)	(0.50)	(0.21)	(0.94)	(0.06)	(0.28)	(0.45)
Interest payments	0.021	-0.028	-0.040	-0.11	-0.050**	0.014
(% of expense)	(0.54)	(1.18)	(1.07)	(0.47)	(2.03)	(0.48)
Interest payments	0.015	-0.035*	-0.010	-0.019	-0.029	-0.0016
(% of revenue)	(0.60)	(1.84)	(0.27)	(1.15)	(1.50)	(0.52)
Subsidies and other transfers	-0.026	0.032	0.012	0.030	0.055**	-0.031
(% of expense)	(0.74)	(1.62)	(0.29)	(1.38)	(2.31)	(1.20)

Notes: See Table 1. Estimates include tax revenue.

Table 6A: Fixed Effect Estimates of the Growth Effects of Government Spending
By Country Income Level, 1970-1999

Independent variable	GDP per capita growth rates:1975-1999, 5 five-year periods					
FIXED EFFECTS				***Tax revenue included in the spec.***		
Variable	All Countries	Developing Countries	Developed Countries	All Countries	Developing Countries	Developed Countries
Total Expenditure	-0.012	0.007	-0.12***	-0.077***	-0.054	-0.13***
(% of GDP)	(0.43)	(0.20)	(4.46)	(2.35)	(1.31)	(2.81)
Government Consumption	-0.08**	-0.071*	-0.29***	-0.10**	-0.087	-0.19**
(% of GDP)	(2.20)	(1.75)	(3.47)	(1.99)	(1.45)	(1.97)
Government Consumption	-0.056	-0.057	-0.18***	-0.11**	-0.12*	-0.19***
as in Barro (1991)	(1.20)	(0.85)	(4.44)	(2.11)	(1.67)	82.419
Defense (% of GDP)	-0.16*	-0.13	-0.22***	-0.23**	-0.14	-0.054
	(1.63)	(0.71)	(2.60	(2.18)	(0.76)	(0.43)
Education (% of GDP)	0.23	0.37	-0.33	0.19	0.26	-0.082
	(0.93)	(1.19)	(0.90)	(0.71	(0.79)	(0.23)
Health (% of GDP)	0.32	0.53	-0.001	0.28	0.30	0.15
	(1.35)	(1.28)	(0.01)	(1.10)	(0.63)	(0.86)
Econ Affairs & Services	0.098	0.13	-0.12	0.087	0.10	0.16
(% of GDP)	(1.29)	(1.50)	(0.81)	(1.08)	(1.11)	(0.96)
Agri, Forestry, & Fishing	0.007	0.17	-0.55	-0.014	0.12	-0.29
(% of GDP)	(0.04)	(0.73)	(1.21)	(0.07)	(0.51)	(0.66)
Mining & Mineral; Manuf &	-0.020	0.060	-0.22	-0.038	0.010	-0.10
Construction (% of GDP)	(0.08)	(0.20)	(0.40)	(0.15)	(0.03)	(0.19)
Fuel & Energy (% of GDP)	0.37	0.39	0.59	0.41	0.32	0.84
	(0.87)	(0.75)	(0.85)	(0.95)	(0.60)	(1.34)
Transportation & Comm.	0.19	0.22	-0.21	0.16	0.16	0.32
(% of GDP)	(1.22)	(1.26)	(0.49)	(1.01)	(0.90)	(0.74)
Curr Expenditure On Goods	-0.09**	-0.10*	-0.11**	-0.15***	-0.17***	0.014
& Services (% of GDP)	(2.03)	(1.62)	(2.05)	(2.87)	(2.53)	(0.20)
Interest Payments	-0.14**	-0.15	-0.28***	-0.16**	-0.16	-0.21***
(% of GDP)	(1.92)	(1.43)	(3.76)	(2.15)	(1.55)	(2.70)
Subsidies & Other Current	-0.03	0.04	-0.18***	-0.067	-0.002	-0.14**
Transfers (% of GDP)	(0.49)	(0.43)	(3.90)	(1.01)	(0.02)	(2.36)
Current Expenditure	-0.079***	-0.089**	-0.12***	-0.14***	-0.14***	-0.14***
(% of GDP)	(2.52)	(1.92)	(4.73)	(4.19)	(2.98)	(3.23)
Capital Expenditure	0.25***	0.23***	0.40**	0.23***	0.20***	0.32*
(% of GDP)	(4.23)	(3.42)	(2.12)	(3.71)	(2.75)	(1.74)

For each specification, estimation is done with the Fixed Effects method. The dependent variables are the per capita growth rate over each half-decade. t-statistics are in parentheses. *** Significant at the 1 percent-level. ** Significant at the 5 percent-level. * Significant at the 10 percent-level. GDP per capita, Life expectancy, Fertility rates, Telephone mainlines, Trade are also included in the estimations.

Table 6B: Fixed Effect Estimates of the Growth Effects of Government Spending
By Country Income Level, 1990-2004

Independent variable	GDP per capita growth rates: 1995-2004, 2 five-year periods					
				Tax revenue included in the spec.		
Variable	All Countries	Developing Countries	Developed Countries	All Countries	Developing Countries	Developed Countries
Total Expenditure	-0.011	-0.002	-0.15	-0.052	-0.034	-0.18
(% of GDP)	(0.15)	(0.03)	(0.98)	(0.61)	(0.33)	(0.96)
Government Con.	-0.12*	-0.13*	-0.24	0.013	0.011	0.040
(% of GDP)	(1.83)	(1.82)	(1.12)	(0.10)	(0.08)	(0.11)
Military expenditure	-0.019	-0.03	0.04	-0.02	-0.03	-0.07
(% of cent. Gov. exp.)	(0.36)	(0.50)	(0.06)	(0.34)	(0.55)	(0.09)
Military expenditure	0.014	0.041	0.13	0.13	0.091	-1.64
(% of GDP)	(0.18)	(0.14)	(0.29)	(0.29)	(0.18)	(0.76)
Exp. per student, primary	0.17	0.17	-0.26	0.33	0.53*	-0.55**
(% of GDP per capita)	(1.23)	(1.09)	(1.04)	(1.45)	(2.74)	(2.49)
Exp. per student, secondary	0.15**	0.10	0.09	0.47***	0.81*	0.024
(% of GDP per capita)	(2.37)	(1.35)	(0.41)	(5.48)	(2.62)	(0.10)
Exp. per student, tertiary	0.001	0.002	-0.06	-0.002	----	----
(% of GDP per capita)	(0.24)	(0.37)	(0.49)	(0.15)	----	----
Total Exp. Per student,	0.0004	0.003	-0.10	0.004	----	----
(% of GDP per capita)	(0.11)	(0.60)	(1.44)	(0.56)	----	----
Public spending on edc.,	-0.22	-0.20	-0.82	-0.39	-0.23	0.68
total (% of GDP)	(1.52)	(1.26)	(1.63)	(1.39)	(0.82	(0.57)
Public spending on edc.,	-0.023	-0.03	0.22	-0.09	-0.10	0.32
total (% of gov't exp.)	(0.47)	(0.59)	(1.16)	(1.11)	(1.17)	(0.52
Health expenditure per capita	---	---	---	---	---	---
(curr. US$, in logs)	---	---	---	---	---	---
Public health expenditure,	---	---	---	---	---	---
(% of GDP)	---	---	---	---	---	---
Interest payments	-0.05	-0.043	-0.27***	-0.055	-0.053	-0.32***
(% of expense)	(1.11)	(0.91)	(3.46)	(1.28)	(1.07)	(3.62)
Interest payments	-0.027	-0.024	-0.21***	-0.034	-0.031	-0.24***
(% of revenue)	(0.92)	(0.70)	(3.43)	(1.13)	(0.91)	(3.56)
Subsidies and other transfers	0.024	0.049	-0.0367	-0.027	0.05	-0.06
(% of expense)	(0.50)	(0.90)	(0.31)	(0.55)	(0.92)	(0.30)

Notes: See Table 6A

Table 7A: Fixed Effect Estimates of the Growth Effects of Government Spending
By Government Effectiveness, 1970-1999

FIXED EFFECTS	Developing countries only:1975-1999, 5 five-year periods					
	Government Effectiveness		British Legal Origin		Ethnicity	
Variable	Effective Government	Ineffective Government	Effective Government	Ineffective Government	Effective Government	Ineffective Government
Total Expenditure	-0.35***	-0.018	-0.08	-0.07	-0.069	-0.051
(% of GDP)	(2.73)	(0.41)	(1.10)	(1.33)	(0.72)	(1.21)
Government Consumption	0.039	-0.081	0.10	-0.20***	0.068	-0.14**
(% of GDP)	(0.18)	(1.30)	(1.10)	(2.59)	(0.53)	(1.93)
Government Consumption	-0.36***	-0.078	-0.26**	-0.12	-0.18	-0.063
as in Barro (1991)	(2.56)	(0.99)	(2.08)	(1.37)	(1.42)	(0.71)
Defense (% of GDP)	-0.73	0.026	0.29	-0.39*	-0.050	-0.29
	(0.79)	(0.14)	(0.52)	(1.85)	(0.12)	(1.29)
Education (% of GDP)	-0.89	0.62*	0.78	-0.070	0.73	0.089
	(0.94)	(1.79)	(1.34)	(0.17)	(1.27)	(0.21)
Health (% of GDP)	-0.37	0.16	0.35	0.45	-0.082	0.32
	(0.47)	(0.26)	(0.36)	(0.74)	(0.12)	(0.41)
Econ Affairs & Services	0.48	0.048	-0.34	0.14	0.22	0.017
(% of GDP)	(1.28)	(0.49)	(0.18)	(1.08)	(1.45)	(0.13)
Agri, Forestry, & Fishing	1.17	-0.16	-0.081	0.44	0.11	0.11
(% of GDP)	(1.51)	(0.64)	(0.24)	(0.84)	(0.26)	(0.30)
Mining & Mineral; Manuf &	-2.90	0.25	0.49	0.048	-0.82	0.069
Construction (% of GDP)	(1.65)	(0.85)	(0.61)	(0.14)	(1.16)	(0.19)
Fuel & Energy (% of GDP)	4.04**	-0.13	0.96	0.48	-0.15	0.40
	(2.32)	(0.23)	(0.60)	(0.74)	(0.10)	(0.63)
Transportation & Commun.	0.33	0.14	0.04	0.15	0.26	-0.18
(% of GDP)	(0.36)	(0.77)	(0.05)	(0.76)	(1.29)	(0.47)
Curr Expenditure On Goods	-0.25*	-0.15**	-0.007	-0.25***	-0.18	-0.13
& Services (% of GDP)	(1.81)	(2.00)	(0.06)	(2.81)	(1.21)	(1.58)
Interest Payments	-0.40**	-0.094	-0.21	-0.19	-0.49**	-0.12
(% of GDP)	(2.15)	(0.79)	(1.24)	(1.39)	(2.05)	(1.05)
Subsidies & Other Current	-0.03	0.01	-0.10	0.04	0.04	-0.008
Transfers (% of GDP)	(0.18)	(0.09)	(0.59)	(0.29)	(0.31)	(0.05)
Current Expenditure	-0.32***	-0.10**	-0.12	-0.16***	-0.19*	-0.12**
(% of GDP)	(3.03)	(1.91)	(1.29)	(2.70)	(1.80)	(2.14)
Capital Expenditure	0.52	0.19***	-0.037	0.25***	0.13	0.19**
(% of GDP)	(1.62)	(2.64)	(0.31)	(2.67)	(0.90)	(2.16)

Notes: See Table 6A, estimates in this table include tax revenue.

Table 7B: Fixed Effect Estimates of the Growth Effects of Government Spending
By Country Income Level, 1990-2004

Fixed Effects	Developing countries only: 1995-2004, 2 five-year periods					
	Government Effectiveness		British Legal Origin		Ethnicity	
Variable	Effective Government	Ineffective Government	Effective Government	Ineffective Government	Effective Government	Ineffective Government
Total Expenditure	-0.06	-0.05	0.05	-0.045	0.13	-0.16
(% of GDP)	(0.19)	(0.38)	(0.19)	(0.45)	(1.08)	(0.86)
Government Con.	-0.15	0.019	0.42	-0.14	0.73***	-0.21
(% of GDP)	(0.36)	(0.12)	(1.22)	(0.91)	(3.26)	(0.97)
Military expenditure	-0.035	-0.037	-0.068	-0.056	-0.05	0.093
(% of cent. Gov. exp.)	(0.18)	(0.49)	(0.34)	(0.75)	(0.26)	(1.11)
Military expenditure	0.40	0.080	0.35	-0.12	0.94	0.02
(% of GDP)	(0.46)	(0.13)	(0.27)	(0.21)	(1.34)	(0.02)
Exp. per student, primary	0.96	0.10	-0.026	-0.029	0.07	0.26
(% of GDP per capita)	(0.76)	(0.63)	(0.08)	(0.13)	(0.38	(0.95)
Exp. per student, secondary	0.40	0.17**	0.11	0.18	0.082	0.45***
(% of GDP per capita)	(0.59)	(2.50)	(2.59)	(1.31)	(1.33)	(3.53)
Exp. per student, tertiary	-0.04	-0.0004	---	---	-0.002	-0.006
(% of GDP per capita)	(1.97)	(0.07)	---	---	(0.24)	(0.34)
Total Exp. Per student,	--0.042	-0.0001	---	---	-0.001	-0.006
(% of GDP per capita)	(1.67)	(0.02)	---	---	(0.20)	(0.17)
Public spending on edc.,	-0.21	-0.22	-0.23	-0.36	0.17	-0.48
total (% of GDP)	(0.27)	(0.62)	(0.67)	(0.59)	(0.47)	(0.63)
Public spending on edc.,	-0.09	-0.020*	0.02	-0.16	0.18*	-0.34***
total (% of gov't exp.)	(0.44)	(1.94)	(0.09)	(1.28)	(2.17)	(2.66)
Health expenditure per capita	---	---	---	---	---	---
(curr. US$, in logs)	---	---	---	---	---	---
Public health expenditure,	---	---	---	---	---	---
(% of GDP)	---	---	---	---	---	---
Interest payments	0.36***	0.04	-0.05	0.10*	0.10	-0.06
(% of expense)	(3.00)	(0.60)	(0.29)	(1.77)	(1.08)	(0.56)
Interest payments	-0.15	-0.05	-0.28	-0.006	0.006	-0.007
(% of revenue)	(1.14)	(0.86)	(1.55)	(0.13)	(0.06)	(0.09)
Subsidies and other transfers	-0.18	-0.028	-0.27*	-0.001	0.04	-0.02
(% of expense)	(1.39)	(0.70)	(1.68)	(0.04)	(0.75)	(0.41)

Notes: See Table 6A, estimates in this table include tax revenue.

[1] A few selected studies include Olsen (1982), North (1990) Hall and Jones (1999), Acemoglu, Johnson and Robinson (2005), Butkiewicz and Yanikkaya (2007), Keefer and Knack (2007) and Rodrik (2008).
[2] Kneller, Bleaney, and Gemmell (1999) and Bleaney, Gemmell, and Kneller (2001) use *a priori* classifications of government expenditures in their analyses.
[3] Aschauer (1989, p. 193) defines public investment in" core infrastructure" to include expenditures for streets and highways, airports, electrical and gas facilities mass transit and water and sewer systems.
[4] Easterly and Levine (1997) use this variable as a measure of infrastructure. This variable is widely available for a large number of countries on an annual basis. While, telephone mainlines and gross domestic investment are positively correlated the former variable is a stock variable, while gross investment is a flow and is subject to endogeneity concerns.
[5] The rule of law and geographic variables are the same for all time periods, and thus are not included in the fixed-effects estimates discussed below.
[6] A list of countries is available from the authors upon request.
[7] Fixed-effect estimates also obtain very large convergence coefficients.
[8] For the interval 1995-1999 in the first sample, government expenditures data are averages for the years 1995-1998, the last four years of the old government expenditures data. All other data for that interval are five-year averages.
[9] The reduced samples have 60% or fewer observations than the samples without the revenue variable. Estimates for the reduced sample excluding the revenue variable also obtain insignificant effects of government consumption spending on growth.
[10] Rice and Stewart (2008) have developed an index of weak states for developing countries. Dividing developing countries at the mean of the index and estimating the models for effective (above mean) and ineffective (below mean) governments obtains results very similar to the other measures of effective and ineffective governments, especially for the earlier sample. The estimated growth impact of government consumption expenditures in ineffective (below mean) states for 1970-1999 is -0.093 and statistically significant at the 10% level. This result is comparable to the estimated results for other measures of ineffective governments during the same sample period.
[11] Data limitations preclude computation of this measure for the later sample period.
[12] Transportation and Communication expenditures average 4% of GDP for developing nations and 5% for developed nations, suggestion underdevelopment of infrastructure in developing nations.
[13] Subsidies and transfer average 17.7% of GDP in developed nations and only 5% of GDP in developing nations.
[14] Interestingly, average interest payments are higher for developed nations, 3.3%, than for developing nations. 2.6%.
[15] Average levels of capital expenditures are higher for ineffective governments for two measures of effectiveness, but are higher for countries with effective governments using British legal systems as the classification criteria. Average levels of transportation and communication expenditure are approximately 2% of GDP for effective and ineffective governments for two effectiveness measures. The difference is again for British legal systems where effective governments' expenditures for transportation and communication are 2.6% of GDP, and 1.7% for ineffective governments.
[16] Increases in interest payments can result from larger deficits which lower national saving, decreasing the current account balance.