FISCAL COMPOSITION AND ECONOMIC GROWTH IN CENTRAL AMERICA UNDER GLOBAL ECONOMIC LIBERALIZATION

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Current globalization trends are expected to impact the economy of the Central American nations through changes in the composition of fiscal budgets. This paper investigates the impact of changes in the composition of public revenues and expenditures on economic growth in Central America during 1970–2000. The analysis is based on fixed effects growth models estimated using the two-stage generalized method of moments in order to correct for potential endogeneity of fiscal variables. Results indicate that reorienting public expenditures in response to global economic change toward capital expenditures may have a positive impact on economic growth. Findings also suggest that economic growth may be depressed if direct taxes are increased to finance public expenditures and compensate for declines in other revenue sources such as expected custom revenue losses due to regional integration and trade liberalization.

Keywords: *economic growth, liberalization, fiscal composition, Central America.*

Introduction

As in many other regions, globalization initiatives are taking place in Central America. These initiatives date from the signing of the General Treaty of Economic Integration in 1960 by Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua, which served as a framework to create the Central American Common Market (CACM). Panama and Belize signed as members of this Treaty in 1991 and 2000, respectively. Additionally, the first five members of the CACM implemented free trade agreements with the Dominican Republic in 1998, Chile in 1999, Panama in 2002, and the United States and Dominican Republic (CAFTA-DR) in 2004. El Salvador, Guatemala, and Honduras (the Northern Triangle) have also signed trade agreements with Mexico (2000) and Colombia (2007). Central American nations have also signed several bilateral trade agreements.[1] Currently, Central America is negotiating a regional trade agreement with the European Union, and plans to implement the Central American custom union to increase economic integration of the region (see SIECA 2009).

Current globalization trends are expected to impact the economy of the Central American nations through different channels including changes in the composition of fiscal budgets. The pressure on fiscal budgets is anticipated from the expected custom revenue losses as Central America continues to move toward regional integration and greater trade liberalization (Paunovic 2005a). As a result, financing priority spending will require raising tax revenue and reorienting public expenditures (Desruelle and Schipke 2007). Under these circumstances, the empirical analysis of the growth effects

of changes in the composition of public expenditures and revenues may help in designing and implementing growth-enhancing fiscal policies. This analysis is of vital importance to the region as globalization initiatives are being implemented to achieve higher economic growth rates that are currently lower than growth rates of other developing economies in Latin America and Asia (Desruelle and Schipke 2007; Loayza *et al.* 2005).

The empirical literature provides conflicting results regarding fiscal effects on economic growth. Mofidi and Stone (1990) and Kneller *et al.* (1999) partially attribute the lack of consensus in the empirical literature to the omission of the government budget constraint in the estimation of growth models. Miller and Russek (1997) and Bleaney *et al.* (2001) propose including all elements of the government budget constraint into growth models to reduce omitted variables bias. They also indicate that one element (usually a financing source) should be excluded from the estimation of growth models to avoid perfect collinearity among fiscal elements. The excluded element becomes the implicit financing element of public expenditures (Bose *et al.* 2007b).

This paper follows the empirical methodology proposed by Miller and Russek (1997), Kneller *et al.* (1999), and Bleany *et al.* (2001) to assess the impact of changes in the composition and financing of public expenditures on economic growth in Central America (*i.e.* Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama) based on a data set spanning the period of 1970–2000. Growth effects of changes in the tax structure and deficit financing sources are also estimated. Previous to this study, little effort was spent on examining these effects. Growth models are estimated using the two-stage generalized method of moments in order to correct for potential endogeneity of fiscal variables (Singh and Sahni 1984). Results indicate that reorienting public expenditures toward capital expenditures has a positive impact on economic growth. Findings also suggest that economic growth is depressed if direct taxes are increased to finance public expenditures and compensate for declines in other revenue sources such as expected custom revenue losses.

The remainder of this paper is organized as follows. The following section surveys the literature on the effects of fiscal composition on economic growth. Then, the paper reviews the economic growth and fiscal performance of the Central American countries over the period of 1970–2000. Next, the data and the empirical methodology used to estimate the growth effects of changes in the fiscal composition are presented. This section is followed by the results. Finally, the paper concludes with a discussion of the results and policy implications of this study.

Fiscal Composition and Economic Growth: An Overview of the Literature

From a theoretical perspective, the consensus seems to be that the level, composition and financing of public expenditures affect economic growth (*e.g.*, Barro 1990; Chen 2006; King and Rebelo 1990; Rivas 2003). In theoretical models, the government is assumed to expend on productive and nonproductive services. Nonproductive expenditures affect the utility of a representative household but do not impact the production of goods and services. In contrast, as noted by Glomm and Ravikumar (1997), productive expenditures increase the production of goods and services by providing more inputs for final output (*e.g.*, public infrastructure) and enhancing the productivity of private investments (*e.g.*, education). In general, government consumption and public investment are considered nonproductive and productive expenditures respectively (Chen 2006; Doménech 2004). Thus, switching from current expenditures to public expenditures on capital

goods may enhance growth. Bleaney *et al.* (2001), Gupta *et al.* (2005), Haque (2004), and Kneller *et al.* (1999) provide empirical evidence in support of this viewpoint.

In contrast, Ghosh and Gregoriou (2008) argue that capital expenditures may be unproductive in developing countries due to distorted incentive structures, bureaucratic inefficiencies, corruption, and low-quality public goods. In this case, current expenditures, rather than capital expenditures, promote economic growth. Using a sample of 43 developing countries, Devarajan *et al.* (1996) also provide evidence that suggests that current expenditures promote economic growth and that capital expenditures have a negative growth effect. Their explanation for this counterintuitive result is that developing countries have overspent on capital goods at the expense of current expenditures and, consequently, capital goods become unproductive. Given the lack of consensus in the empirical literature, the identification of productive and nonproductive expenditures remains to be an empirical question.

The empirical evidence also provides conflicting results on the relationship between financing sources of public expenditures and economic growth. Bose *et al.* (2007a) and Gupta *et al.* (2005) found that budgetary deficits negatively impact economic growth. Adam and Bevan (2005) indicate that the growth effect of budgetary deficits is negative if financed by domestic debt, and positive if financed by limited seigniorage. Clements *et al.* (2003) suggest that high levels of external debt can depress economic growth in low-income countries. However, Ghosh and Gregoriou (2008) found the growth effects of budgetary deficits to be insignificant.

Indirect taxes seem to be preferred over direct taxes to finance a given level of public expenditure given that direct taxes may have a negative impact on the supply of labor and physical capital and, in turn, on economic growth (Doménech 2004; Doménech and García 2001; Lucas 1990). Bleaney *et al.* (2001) and Kneller *et al.* (1999) present empirical evidence on the negative growth effects of direct taxes. However, Bose *et al.* (2007b) suggest that financing government expenditures with direct taxes is less distortionary than seigniorage in low-income countries. Park (2006) argues that the positive effect of productive expenditures on the productivity of private capital stocks may exceed the negative effect of direct taxes on private capital accumulation when tax rates are low. Along this line, the empirical evidence presented by Ghosh and Gregoriou (2008) based on 15 developing countries indicate that both tax and non-tax revenue have a positive effect on economic growth. However, Ghosh and Gregoriou *(Ibid.)* do not distinguish between direct and indirect taxes.

While the optimal composition and financing of public expenditures have been extensively investigated, little effort has been spent on examining the growth effects of changes in the composition of public revenue and deficit financing sources. An exception in this direction is, by Colombier (2009) who found an insignificant growth effect of direct, indirect and property taxes, based on a sample of 21 OECD countries. As a contribution to the literature, this paper provides empirical evidence from developing countries in Central America on the relationship between economic growth and changes in the composition of public revenues that may be expected from globalization initiatives.

Growth and Fiscal Performance of Central America in 1970–2000

The Central American countries seem to follow similar patterns in terms of economic growth (see Table 1). In the seventies, almost all countries experienced positive economic growth rates as measured by annual average changes in their real GDP per capita.

Nicaragua was the exception with its GDP per capita decreasing by an annual average rate of 2.7 %. The GDP per capita decreased in all countries but Panama in the eighties when Central America (and Latin America as a whole) was negatively affected by the oil and debt crises, soaring inflation, and declining prices of export goods (Franko 2007). While Honduras had a negative average growth rate in the nineties, stabilization policies were effective in spurring other Central American economies. Panama experienced the fastest economic growth in the region with an annual average of 3.2 %. However, Desruelle and Schipke (2007) show that average growth rates did not reach the records achieved in the sixties and seventies.

In addition, the growth rates of the Central American nations remained below the growth rates of other emerging economies in Latin America and Asia *(Ibid.)*. As a point of comparison, Loayza *et al.* (2005) note that South Asian economies grew at an average annual rate of 2.24 % in 1960–2000. East Asian economies grew at an average annual rate of 4.96 % in the same period. None of the Central American economies reach similar growth rates, with Panama being the closest one with an annual growth rate of about 2 %. Compared with the average growth rate of Latin America in 1960–2000 (1.78 %), only Panama and Costa Rica showed a higher growth rate, but all Central American nations had lower growth rates than Brazil (2.45 %), Chile (2.5 %), and Mexico (2.11 %). Nicaragua showed the second lowest growth rate in 1960–2000 (–0.77 %), only exceeding Haiti (–0.99 %). It is worth noting that the growth rates of Costa Rica, El Salvador, and Panama were above the Latin American average growth rate in 1991–2000 (1.75 %), a decade of recovery for Central America. Loayza *et al.* (2005) point to slow productivity growth (rather than low capital accumulation) as an important factor behind the slow economic growth of Latin America, and argue that structural and stabilization policies (*e.g.,* inflation control, exchange rate flexibility, financial depth, trade openness, among others) implemented in the nineties spurred the economy's overall productivity and, in turn, promoted the economic recovery of the region. For Central America, Desruelle and Schipke (2007) point to institutional underdevelopment as an important determinant of slow economic growth.

Table 1

Average economic growth and fiscal indicators

		70–79	**80–89**	**90–99**	**70–00**
1	2	3	4	5	6
Costa Rica	GDP Per Capita Growth Rate	3.3	–0.8	2.2	1.5
	Current Expenditures	13.0	15.4	14.1	14.2
	Capital Expenditures	3.8	3.1	1.5	2.8
	Direct Taxes	2.9	2.9	2.7	2.8
	Indirect Taxes	9.3	11.0	9.6	10.0
	Domestic Borrowing	3.2	2.6	3.0	2.9
	Foreign Borrowing	0.3	0.9	0.1	0.5
El Salvador	GDP Per Capita Growth Rate	1.4	–3.1	2.6	0.3
	Current Expenditures	9.3	13.9	11.5	11.6
	Capital Expenditures	3.4	4.4	3.0	3.6
	Direct Taxes	2.9	3.1	3.0	3.0
	Indirect Taxes	8.7	8.3	7.5	8.1
	Domestic Borrowing	–0.5	2.1	0.2	0.7
	Foreign Borrowing	0.6	4.4	1.5	2.2

1	2	3	4	5	6
Guatemala	GDP Per Capita Growth Rate	3.1	–1.5	1.4	1.0
	Current Expenditures	7.5	8.8	7.5	8.0
	Capital Expenditures	3.6	3.6	3.1	3.4
	Direct Taxes	1.4	1.4	1.9	1.6
	Indirect Taxes	7.1	5.9	6.4	6.5
	Domestic Borrowing	1.4	2.4	0.5	1.4
	Foreign Borrowing	0.3	0.9	0.6	0.6
Honduras	GDP Per Capita Growth Rate	2.6	–0.7	–0.2	0.6
	Current Expenditures	11.7	16.4	16.6	15.0
	Capital Expenditures	5.2	6.7	6.7	6.2
	Direct Taxes	3.1	3.6	4.3	3.7
	Indirect Taxes	8.6	9.2	11.3	9.8
	Domestic Borrowing	2.1	3.5	0.9	2.2
	Foreign Borrowing	1.8	5.0	4.2	3.7
Nicaragua	GDP Per Capita Growth Rate	–2.7	–3.6	0.2	–1.9
	Current Expenditures	10.3	36.0	22.7	22.9
	Capital Expenditures	5.9	8.4	8.9	8.1
	Direct Taxes	2.2	5.6	3.3	3.7
	Indirect Taxes	8.0	17.7	17.2	14.5
	Domestic Borrowing	1.8	14.4	–1.5	4.7
	Foreign Borrowing	2.9	2.1	4.9	3.5
Panama	GDP Per Capita Growth Rate	1.8	0.2	3.2	1.7
	Current Expenditures	16.3	18.8	17.2	17.5
	Capital Expenditures	6.5	4.1	2.3	4.2
	Direct Taxes	6.0	6.4	5.5	6.0
	Indirect Taxes	6.7	5.9	6.7	6.4
	Domestic Borrowing	2.2	3.8	–0.5	1.8
	Foreign Borrowing	4.3	2.1	0.8	2.4

Note: Fiscal indicators are expressed as a percentage of the GDP.

Table 1 shows the differences in the level and composition of public expenditures across Central American countries. Costa Rica, El Salvador, Guatemala and Nicaragua reached their highest average public expenditure in relation to the GDP in the eighties primarily due to increases in debt services and military expenditures (Puchet and Torres 2000).[2] These countries decreased their government expenditure in the nineties. Honduras also increased its public expenditure in the eighties but kept similar expenditure levels in the nineties. Panama had similar expenditure levels in the seventies and eighties, but lower levels in the nineties. Nicaragua shows the highest public expenditure of the region with 44.4 % of the GDP in the eighties and 31.6 % of the GDP in the nineties. Conversely, Guatemala presents the lowest expenditure over the three decades. While public expenditures increased in the region in the eighties and nineties, the percentage of total public expenditures invested in capital goods decreased. Moreover, Costa Rica, El Salvador, Guatemala and Panama decreased their capital expenditures in relation to their GDP. Capital expenditures were lower than current expenditures in all Central American countries.

Trending with its public expenditures, Costa Rica increased government revenues in the eighties and then decreased them in the nineties (see Table 1). El Salvador and

Guatemala show steady tax revenues in relation to their GDP over the three decades. On the other hand, Honduras, Nicaragua and Panama gradually increased government revenues since the seventies. Nicaragua collected approximately 28 % of the GDP in the eighties and nineties which is the highest rate in the region. In contrast, Guatemala shows the lowest average revenue rate; consistently below 10 % of the GDP over the three decades. Panama is the only country that shows a balance in using direct and indirect taxes for government revenue. Other Central American countries primarily used indirect taxes to collect public revenue.

Public revenues were insufficient to finance public expenditures which led the Central American countries to budgetary deficits particularly in the eighties when Nicaragua reached an annual average deficit of 16.5 % of the GDP. Budgetary deficits were significantly reduced (but not eliminated) in the nineties due to fiscal adjustments made to cope with the debt crisis (Puchet and Torres 2000). To finance the fiscal deficit, Costa Rica primarily used domestic borrowing. El Salvador, in contrast, mostly used foreign borrowing. Guatemala also relied on domestic borrowing to finance its budget deficit in the seventies and eighties, and balanced the use of domestic and foreign borrowing in the nineties. On the other hand, Honduras passed from a balanced use of both domestic and foreign borrowing in the seventies to foreign borrowing as the primary deficit financing source in the eighties and nineties. Nicaragua and Panama financed their deficits with foreign borrowing in the seventies, domestic borrowing in the eighties, and again foreign borrowing in the nineties. In the eighties, Nicaragua borrowed an annual average of 14.4 % of the GDP from domestic sources.

Central America is highly indebted as a result of continuous budgetary deficits. Paunovic (2005b) shows that the public debts of Honduras, Nicaragua, and Panama are above the Latin American average (58.7 % of the GDP). Costa Rica and El Salvador have a public debt above the critical value of 40 % of their GDP. Finally, Guatemala has the lowest public debt in the region (20.5 % of the GDP).[3]

Central American countries are subject to fiscal pressures due to the need for urgent increases in priority spending coupled with custom revenue losses expected from trade liberalization.[4] According to Armendáriz (2006) and Paunovic (2005b), domestic and foreign borrowing are not a sustainable option to finance public expenditures given the current debt levels in the region. Given the imbalance between indirect and direct taxes, increases in direct taxes have been proposed to raise government revenue and thus finance increases in social expenditures (*e.g.*, Puchet and Torres 2000; ICEFI 2007). However, the collection of direct taxes seems to be adversely affected by tax exemptions and the opposition of elite economic groups in the region (ICEFI 2007). Direct taxes may have a negative impact on economic growth if those elite groups respond to increases in direct taxes by reducing private investment. Thus, the assessment of growth effects of changes in the composition of public expenditures and revenues is policy-relevant for the region. Against this backdrop, this study tests the hypothesis that direct taxes have a negative impact of economic growth. The growth effect of reorienting public expenditures toward capital expenditures is also investigated and is expected to be positive. Finally, this study tests the hypothesis that indirect taxes and deficit financing sources are preferred over direct taxes to finance public expenditures in order to spur the Central American economies.

Data and Empirical Methodology

ECLAC (2001) collected a data set that includes annual macroeconomic, fiscal and monetary indicators of the Central American countries (*i.e*. Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama) over the period of 1970–2000. A unique characteristic of this data set is that all elements of the fiscal budget are included, which allows to apply the methodology proposed by Kneller *et al.* (1999) to evaluate the growth effect of changes in the composition of public revenues and expenditures. Government revenues are classified according to their sources as direct taxes, indirect taxes, and non-tax revenue. Public expenditures are divided into current and capital expenditures, where current expenditures include the wage bill, transfers, and other expenditures. Budgetary deficits are also included in the data set along with their financing sources (*i.e.* domestic and foreign borrowing). Other macroeconomic indicators associated with economic growth are private investment, population growth, trade openness, the real exchange rate, and inflation.

Table 2

Variables definition and descriptive statistics

Variable	Definition	Costa Rica	El Salvador	Guatemala	Honduras	Nicaragua	Panama
1	2	3	4	5	6	7	8
GDPPCGROWTH	Annual growth rate of the GDP per capita	1.48 (3.49)	0.31 (4.06)	0.97 (2.60)	0.63 (3.17)	–1.90 (6.82)	1.72 (4.78)
GDPPCINITIAL	Initial GDP per capita	3035.68 (290.80)	1599.23 (183.48)	1416.23 (106.48)	688.75 (42.01)	657.40 (224.66)	2688.51 (361.20)
FBKPRIV[a]	Private investment	15.02 (2.69)	11.17 (3.78)	12.43 (2.64)	16.57 (5.87)	16.38 (7.33)	20.77 (7.78)
POPGROWTH	Annual growth rate of the population	2.56 (0.16)	1.90 (0.70)	2.42 (0.17)	3.10 (0.21)	2.96 (0.33)	2.18 (0.39)
TRADEOPEN[a]	Imports plus exports	71.91 (12.51)	57.85 (10.40)	41.03 (6.80)	72.88 (15.39)	62.09 (14.86)	160.54 (26.22)
REALEXC	Real exchange rate index (base = 1995)	90.47 (22.97)	146.32 (43.44)	90.77 (19.02)	73.62 (18.76)	95.12 (24.20)	80.71 (15.60)
INFLATION	Annual growth rate of the consumer price index	18.12 (16.06)	12.87 (7.74)	12.01 (9.52)	11.48 (8.28)	900.11 (2903.438)	3.38 (3.98)
TAXDIRECT[a]	Government revenue from direct taxes	2.82 (0.35)	3.01 (0.36)	1.60 (0.38)	3.66 (0.62)	3.67 (1.58)	5.96 (0.82)
TAXINDIRECT[a]	Government revenue from indirect taxes	9.96 (1.13)	8.12 (1.38)	6.48 (1.01)	9.83 (1.55)	14.46 (5.23)	6.43 (0.66)
NONTAXREV[a]	Non-tax government revenue	0.66 (0.50)	0.91 (0.43)	1.11 (0.43)	1.37 (0.60)	2.12 (1.35)	5.14 (1.97)

1	2	3	4	5	6	7	8
DOMBORROW[a]	Net public domestic borrowing	2.88 (1.76)	0.65 (1.79)	1.40 (1.45)	2.20 (1.65)	4.67 (8.95)	1.76 (3.04)
FORBORROW[a]	Net public foreign borrowing	0.47 (0.82)	2.20 (2.71)	0.62 (1.00)	3.70 (2.06)	3.52 (3.21)	2.37 (3.44)
GCURRENT[a]	Current expenditures	14.18 (1.53)	11.55 (2.10)	7.95 (0.93)	14.96 (2.59)	22.92 (11.63)	17.50 (1.99)
GWAGE[a]	Government wage bill	6.12 (1.67)	6.36 (1.35)	3.74 (1.00)	8.23 (1.99)	6.11 (1.78)	7.86 (0.99)
GNOWAGE[a]	Current expenditures excluding the wage bill	8.06 (2.56)	5.47 (0.95)	4.21 (1.27)	6.74 (2.64)	16.81 (10.46)	9.63 (2.40)
GTRANSFER[a]	Government transfers	6.25 (2.02)	3.00 (0.96)	2.32 (1.03)	3.20 (1.38)	14.13 (9.93)	4.87 (2.30)
GNOWAGETR[a]	Current expenditures excluding the wage bill and transfers	1.81 (2.07)	2.47 (1.56)	1.90 (1.21)	3.54 (3.21)	2.69 (7.27)	4.76 (3.62)
GCAPITAL[a]	Government investment	2.78 (1.18)	3.56 (1.11)	3.43 (1.32)	6.22 (1.79)	8.07 (4.77)	4.20 (2.96)

Notes: Averages are presented by country for the period 1970–2000. Standard deviations are presented in parentheses.
[a)] These variables are expressed as a percentage of the GDP.

Static and dynamic growth models are estimated to investigate the growth effect of fiscal variables. The growth rate of the real GDP per capita is used to measure economic growth. The dynamic growth models are assumed to follow a first-order autoregressive form where $Y_{i,t}$ represents the economic growth rate in country i at time t, X is the vector of non-fiscal variables, Z is the vector of fiscal variables, and e is the error term. In addition, α and β are vectors of coefficients to be estimated. The parameter λ, also to be estimated, captures the potential economic growth persistence in the dynamic (or autoregressive) growth models. The lagged dependent variable (*i.e.* $Y_{i,\ t-1}$) is excluded from the static growth models given that growth persistence is ruled out. That is, the parameter λ is assumed to be initially equal to zero.

$$Y_{i,t} = \lambda\, Y_{i,t-1} + \alpha\, X_{i,t} + \beta\, Z_{i,t} + e_{i,t} \tag{1}$$

Table 2 shows the definition and descriptive statistics of the variables included in vectors X and Z. The vector X includes the non-fiscal variables GDPPCINITIAL, FBKPRIV, POPGROWTH, TRADEOPEN, REALEXC, and INFLATION. The variable GDPPCINITIAL is included to test the hypothesis of growth convergence in the Central American countries. The effects of private inputs on economic growth are estimated by including the variables FBKPRIV and POPGROWTH. The variable TRADEOPEN is included to estimate the effect of trade openness on economic growth. Changes in economic growth due to fluctuations in international and domestic prices are captured by the variables REALEXC and INFLATION respectively.

Bleany *et al.* (2001), Kneller *et al.* (1999), and Miller and Russek (1997) argue that the vector of fiscal variables (*i.e*. *Z*) should include all elements in the fiscal budget to avoid omitted variables bias and to analyze each element that can be used when implementing fiscal policies. This empirical approach is more consistent with theoretical models in which the government budget constraint is explicitly considered (*e.g*., Barro 1990; Chen 2006; Rivas 2003). Following this approach, the vector *Z* includes all expenditures (G), revenues (R), and deficit financing sources (B) such that $G = R + B$.

The vector of revenue variables (*i.e*. *R*) includes TAXDIRECT, TAXINDIRECT, and NONTAXREV. The vector of deficit financing sources (*i.e. B*) includes the variables DOMBORROW and FORBORROW. Although included in the government budget constraint, the variable TAXDIRECT is excluded from the estimation of growth models to avoid perfect collinearity among fiscal variables. By excluding TAXDIRECT, direct taxes are assumed to be the implicit financing element of government expenditures (Bose *et al.* 2007b). It is important to note that the estimated coefficients do not capture the direct effect of fiscal variables on economic growth given that TAXDIRECT is excluded.[5] The estimated coefficients on TAXINDIRECT, NONTAXREV, DOMBORROW, and FORBORROW depict the growth effect of increasing these variables accompanied by a decrease of the same magnitude in TAXDIRECT for the government budget constraint to hold. According to Bose *et al.* (2007b), the growth effects of changes in the composition of other revenue and deficit-financing sources can be estimated by subtracting the coefficient of the source to be decreased from the coefficient corresponding to the source to be increased. For example, $\beta_{TAXINDIRECT} - \beta_{NONTAXREV}$ captures the growth effects of compensating non-tax revenue losses with increases in indirect taxes. Similarly, $\beta_{DOMBORROW} - \beta_{FORBORROW}$ measures the impact on economic growth of switching from foreign borrowing to domestic borrowing.

Specific elements of the public spending (*i.e*. *G*) are also included to estimate their effects on economic growth. From a theoretical perspective, public expenditures can be classified as productive and nonproductive according to their effects on economic growth (Glomm and Ravikumar 1997). However, the identification of productive and nonproductive expenditures remains to be an empirical question. In this study, public expenditures are initially divided into current and capital expenditures (*i.e.* GCURRENT and GCAPITAL, respectively). Both variables are used to estimate the Models S1 and D1 (see Table 3). The variable GCURRENT is further divided into GWAGE and GNOWAGE to estimate the Models S2 and D2 in Table 3, and thus distinguish between growth effects of the government wage bill and other current expenditures. In addition, a refined division of GCURRENT includes the variables GWAGE, GTRANSFER and GNOWAGETR, which are included in the Models S3 and D3 (also in Table 3) to capture the growth effects of the government wage bill, transfers and the rest of current expenditures, respectively. Since the variable TAXDIRECT is excluded from the estimation of growth models, it is assumed that all public expenditures are financed with direct taxes.

Given that direct taxes are not the only financing element of public expenditures, it is policy-relevant to estimate the growth effects of changes in public expenditures when financed with other revenue and deficit financing sources. Following Bose *et al.* (2007b), these effects are calculated as the sum of the estimated coefficients on public expenditures and the coefficients on financing sources. That is, $\beta_j + \beta_k$ where *j* represents

the expenditure variables (*e.g.,* GWAGE, GTRANSFER, GNOWAGETR, and GCAPITAL), and *k* represents the financing sources (*e.g.,* TAXINDIRECT, DOMBORROW, and FORBORROW). The growth effects of changes in the composition of public expenditures can also be calculated as $\beta_l - \beta_m$, where *l* and *m* represent the expenditure to be increased and decreased, respectively.

Results

According to Hausman test results, all static and dynamic growth models were initially estimated with fixed effects. However, the modified-Wald and Wooldridge tests point to the presence of heteroskedasticity and autocorrelation in those estimations, respectively. To correct for heteroskedasticy and autocorrelation, fixed effects growth models were estimated using the two-stage generalized method of moments, implemented in STATA by Schaffer (2007), as Baum *et al.* (2003) indicate that this method provides more efficient estimators in the presence of those violations. In addition, fiscal variables were tested for potential endogeneity as recommended by Singh and Sahni (1984).[6] Results indicate (at 5 % significance level) that NONTAXREV is the only fiscal variable that needs to be treated as an endogenous variable in all static and dynamic growth models.[7]

In terms of the signs and significance of the explanatory variables, the results show a considerable degree of robustness across the static and dynamic models (see Table 3). In support of the hypothesis of economic growth persistence, the estimated coefficients on the lagged dependent variable ($GDPPCGROWTH_{t-1}$) are positive and statistically significant (at 10 % significance level) in the three dynamic models. The value of the coefficients, however, suggests that the total response of economic growth to shocks occurs rapidly.[8] In addition, negative and significant coefficients on GDPPCINITIAL support the hypothesis of growth convergence among the Central American economies. That is, countries with high levels of GDP per capita have a slower economic growth than countries with low levels of GDP per capita. Bose *et al.* (2007b) and Kneller *et al.* (1999) also provide evidence in support of growth convergence for developed and developing countries.

Table 3

Economic growth models

	Static Models			Dynamic Models		
	Model S1	**Model S2**	**Model S3**	**Model D1**	**Model D2**	**Model D3**
1	2	3	4	5	6	7
$GDPPCGROWTH_{t-1}$	–	–	–	0.156 (0.080)*	0.152 (0.081)*	0.138 (0.081)*
GDPPCINITIAL	–0.008 (0.002)***	–0.008 (0.002)***	–0.009 (0.002)***	–0.009 (0.001)***	–0.009 (0.002)***	–0.009 (0.002)***
FBKPRIV	0.459 (0.084)***	0.387 (0.094)***	0.394 (0.091)***	0.426 (0.083)***	0.360 (0.093)***	0.367 (0.091)***
POPGROWTH	3.950 (1.025)***	3.657 (1.052)***	3.469 (1.055)***	3.474 (0.998)***	3.262 (1.041)***	3.162 (1.040)***
TRADEOPEN	0.008 (0.026)	0.006 (0.025)	0.002 (0.025)	0.003 (0.025)	0.002 (0.025)	–0.002 (0.025)
REALEXC	–0.024 (0.011)**	–0.033 (0.013)***	–0.036 (0.013)***	–0.016 (0.010)	–0.023 (0.012)*	–0.026 (0.012)**
INFLATION	–0.0002 (0.0007)	–0.0004 (0.0007)	0.00006 (0.0007)	0.00003 (0.0006)	–0.0001 (0.0006)	0.0002 (0.0007)

1	2	3	4	5	6	7
TAXINDIRECT	0.796 (0.427)*	1.250 (0.516)**	1.325 (0.504)***	0.879 (0.412)**	1.198 (0.093)***	1.239 (0.483)**
NONTAXREV	0.955 (0.422)**	1.335 (0.543)**	1.279 (0.533)**	1.021 (0.419)**	1.284 (0.523)**	1.218 (0.512)**
DOMBORROW	0.835 (0.385)**	1.280 (0.496)**	1.271 (0.483)***	0.948 (0.378)**	1.273 (0.477)***	1.249 (0.465)***
FORBORROW	0.959 (0.352)***	1.352 (0.477)***	1.340 (0.466)***	1.046 (0.342)***	1.327 (0.456)***	1.301 (0.444)***
GCURRENT	–0.985 (0.355)***	–	–	–1.049 (0.344)***	–	–
GWAGE	–	–1.825 (0.480)***	–1.853 (0.469)***	–	–1.713 (0.463)***	–1.729 (0.451)***
GNOWAGE	–	–1.327 (0.442)***	–	–	–1.285 (0.424)***	–
GTRANSFER	–	–	–1.408 (0.431)***	–	–	–1.336 (0.413)***
GNOWAGETR	–	–	–1.300 (0.435)***	–	–	–1.256 (0.418)***
GCAPITAL	–0.417 (0.351)	–0.816 (0.451)*	–0.824 (0.439)*	–0.533 (0.346)	–0.822 (0.434)*	–0.806 (0.422)*
Observations	156	154	154	156	154	154
R^2	0.53	0.52	0.53	0.54	0.52	0.53
Median Lag	–	–	–	0.374 (0.103)***	0.367 (0.105)***	0.349 (0.104)***
Mean Lag	–	–	–	0.186 (0.112)*	0.179 (0.114)	0.159 (0.109)

Notes: Standard errors reported in parentheses are robust to heteroskedasticity and autocorrelation. ***, **, * imply significance at 1 %, 5 %, and 10 % levels, respectively.

In support of the theory and consistent with previous studies (*e.g.,* Gupta *et al.* 2005), private investment and population growth have a positive impact on economic growth. The estimated coefficients on TRADEOPEN are positive but insignificant across all models. That is, no evidence was found to support the hypothesis that trade openness spurs economic growth. The insignificance of INFLATION across all models suggests that changes in domestic prices have no effect on economic growth. In contrast, changes in the real exchange rate seem to negatively impact economic growth given that the coefficients on REALEXC are negative and statistically significant in five of the six growth models.

Given that the fiscal variable TAXDIRECT is excluded from the estimation of growth models, it is assumed that direct taxes are the implicit element used to balance the government budget (Bose *et al.* 2007b).[9] Under this assumption, the estimated coefficients on government revenues and deficit financing sources capture the growth effect of increasing those variables while decreasing direct taxes by the same magnitude. The estimated coefficients on TAXINDIRECT, NONTAXREV, DOMBORROW, and FORBORROW are positive and statistically significant across all models (see Table 3). These results suggest that economic growth positively (negatively) responds to increases (decreases) in indirect taxes, non-tax revenue, and domestic and foreign borrowing accompanied by decreases (increases) in direct taxes of the same magnitude.

For comparison purposes, these results are repeated in Table 4 in which the growth effects of changes in the composition of revenue and financing sources are presented. More specifically, the coefficients in Table 4 capture the growth effect of increasing the revenue sources in rows (*i.e.* direct taxes, indirect taxes, non-tax revenue, and domestic borrowing) accompanied by a decrease of the same magnitude in the revenue sources in

columns (*i.e*. indirect taxes, non-tax revenue, domestic borrowing, and foreign borrowing). Negative growth effects are observed when direct taxes are increased to compensate for reductions of indirect taxes, non-tax revenue, domestic borrowing and foreign borrowing. This result indicates that economic growth may be depressed if direct taxes are increased to compensate for custom revenue losses expected from globalization initiatives. In contrast, the other estimated coefficients are statistically insignificant (see Table 4). That is, economic growth seems to be responsive to changes in direct taxes, but unresponsive to changes in the composition of other revenue and deficit-financing sources (*i.e*. indirect taxes, non-tax revenue, domestic borrowing, and foreign borrowing). This result contrasts with the evidence from OECD countries presented by Colombier (2009) that suggests that direct taxes do not impact economic growth.

Table 4

Growth effects of changes in the composition of government revenue

	TAXINDIREC	NONTAXREV	DOMBORROW	FORBORROW
Model S3-Short Run				
TAXDIRECT	–1.325	–1.279	–1.271	–1.340
	(0.504)***	(0.533)**	(0.483)***	(0.466)***
TAXINDIRECT	–	0.047	0.055	–0.015
		(0.274)	(0.174)	(0.175)
NONTAXREV	–	–	0.008	–0.062
			(0.179)	(0.177)
DOMBORROW	–	–	–	–0.070
				(0.101)
Model D3-Short Run				
TAXDIRECT	–1.239	–1.218	–1.249	–1.301
	(0.483)**	(0.512)**	(0.465)***	(0.444)***
TAXINDIRECT	–	0.021	–0.010	–0.062
		(0.274)	(0.176)	(0.173)
NONTAXREV	–	–	–0.031	–0.083
			(0.178)	(0.180)
DOMBORROW	–	–	–	–0.052
				(0.107)
Model D3-Long Run				
TAXDIRECT	–1.437	–1.412	–1.448	–1.508
	(0.582)**	(0.619)**	(0.567)**	(0.543)***
TAXINDIRECT	–	0.025	–0.012	–0.072
		(0.317)	(0.204)	(0.201)
NONTAXREV	–	–	–0.036	–0.096
			(0.206)	(0.208)
DOMBORROW	–	–	–	–0.060
				(0.123)

Notes: Robust standard errors are reported in parentheses. ***, **, * imply significance at 1 %, 5 %, and 10 % levels, respectively.

Under the assumption that direct taxes are the implicit element used to balance the government budget, the estimated coefficients on GCURRENT, GWAGE, GNOWAGE, GTRANSFER, GNOWAGETR, and GCAPITAL capture the growth effects of increases in government expenditures financed with similar increases in direct taxes. The esti-

mated coefficients on all current expenditure variables are negative and statistically significant across all models. This suggests that all elements of current expenditures (*i.e.* the government wage bill, transfers, and other current expenditures) have a negative impact on economic growth when they are financed with direct taxes. Similarly, the estimated coefficients on GCAPITAL are negative in all models and significant (at 10 % significance level) in four of the six growth models. This result suggests that the positive growth effects expected from capital expenditures may be offset and surpassed by the negative growth effects of direct taxes.

Table 5 shows the growth effects of government expenditures financed with tax and non-tax revenues, as well as public borrowing.[10] These effects are estimated basing on Models S3 and D3 in which a more detailed decomposition of government expenditures is presented. For comparison purposes, the second column (under the heading TAXDIRECT) repeats the estimated short-run coefficients on public expenditures presented in Table 3 in which direct taxes are considered as the implicit financing element. Other columns present the growth effects of public expenditures (in rows) financed with indirect taxes (TAXINDIRECT), non-tax revenue (NONTAXREV), domestic borrowing (DOMBORROW) and foreign borrowing (FORBORROW) respectively.

Table 5

Growth effects of public expenditures under different financing sources

	TAXDIRECT	TAXINDIRECT	NONTAXREV	DOMBORROW	FORBORROW
Model S3-Short Run					
GWAGE	–1.853	–0.527	–0.574	–0.582	–0.512
	(0.469)***	(0.248)**	(0.260)**	(0.199)***	(0.213)**
GTRANSFER	–1.408	–0.083	–0.129	–0.137	–0.068
	(0.431)***	(0.144)	(0.240)	(0.117)	(0.148)
GNOWAGETR	–1.300	0.025	–0.022	–0.030	0.040
	(0.435)***	()0.155)	(0.224)	(0.097)	(0.140)
GCAPITAL	–0.824	0.501	0.455	0.447	0.517
	(0.439)*	(0.191)***	(0.224)**	(0.172)**	(0.172)***
Model D3-Short Run					
GWAGE	–1.729	–0.490	–0.511	–0.480	–0.428
	(0.451)***	(0.246)**	(0.261)**	(0.194)**	(0.212)**
GTRANSFER	–1.336	–0.097	–0.118	–0.087	–0.035
	(0.413)***	(0.146)	(0.238)	(0.117)	(0.147)
GNOWAGETR	–1.256	–0.017	–0.038	–0.007	0.045
	(0.418)***	(0.155)	(0.224)	(0.101)	(0.141)
GCAPITAL	–0.806	0.433	0.412	0.443	0.495
	(0.422)*	(0.198)**	(0.226)*	(0.174)**	(0.134)***
Model D3-Long Run					
GWAGE	–2.005	–0.568	–0.593	–0.557	–0.497
	(0.565)***	(0.291)*	(0.304)*	(0.226)**	(0.250)**
GTRANSFER	–1.549	–0.112	–0.137	–0.101	–0.041
	(0.505)***	(0.169)	(0.275)	(0.134)	(0.170)
GNOWAGETR	–1.456	–0.019	–0.044	–0.008	0.052
	(0.509)***	(0.179)	(0.259)	(0.117)	(0.164)
GCAPITAL	–0.934	0.503	0.478	0.514	0.574
	(0.511)*	(0.223)**	(0.261)*	(0.200)**	(0.149)***

Notes: Standard errors reported in parentheses are robust to heteroskedasticity and autocorrelation. ***, **, * imply significance at 1 %, 5 %, and 10 % levels, respectively.

The negative and significant coefficients on GWAGE across all financing sources indicate that increases in the government wage bill adversely impact economic growth regardless of the financing source (*i.e.* direct taxes, indirect taxes, non-tax revenue, domestic borrowing, and foreign borrowing). The negative impact of the wage bill on economic growth is greater when direct taxes are used as the financing element. Gupta *et al.* (2005) also found that countries where public spending is concentrated in wages tend to have lower growth. When financed with direct taxes, transfers and other current expenditures also have a negative effect on economic growth. However, this effect is insignificant when transfers and other current expenditures are financed with indirect taxes, non-tax revenue, and deficit financing sources.

Interestingly, the estimated coefficients on GCAPITAL suggest that the negative growth effects of direct taxes surpass the positive growth effects expected from capital expenditures. According to Park (2006), this may happen when tax rates are high. On the other hand, capital expenditures spur the economy when financed with sources other than direct taxes (*i.e.* indirect taxes, non-tax revenue, domestic borrowing, and foreign borrowing). This result is consistent with previous studies that suggest that direct taxes have a negative impact on economic growth (*e.g.*, Bleaney *et. al.* 2001; Doménech 2004; Doménech and García 2001).

Table 6

Growth effects of changes in the composition of public expenditures

	GWAGE	GTRANSFER	GNOWAGETR
Model S3-Short Run			
GTRANSFER	0.445 (0.205)**	–	–
GNOWAGETR	0.553 (0.199)***	0.108 (0.071)	–
GCAPITAL	1.029 (0.231)***	0.584 (0.189)***	0.476 (0.193)**
Model D3-Short Run			
GTRANSFER	0.393 (0.200)**	–	–
GNOWAGETR	0.474 (0.192)**	0.080 (0.071)	–
GCAPITAL	0.924 (0.240)***	0.530 (0.197)***	0.450 (0.198)**
Model D3-Long Run			
GTRANSFER	0.456 (0.238)*	–	–
GNOWAGETR	0.549 (0.230)**	0.093 (0.083)	–
GCAPITAL	1.071 (0.278)***	0.615 (219)***	0.522 (0.221)**

Notes: Standard errors reported in parentheses are robust to heteroskedasticity and autocorrelation. ***, **, * imply significance at 1 %, 5 %, and 10 % levels respectively.

Economic growth also responds to changes in the composition of government expenditures. Table 6 shows the growth effects of increases in government expenditures in

the rows (*i.e*. GTRANSFER, GNOWAGETR, and GCAPITAL) combined with a decrease of the same magnitude in the expenditures in the columns *(i.e*. GWAGE, GTRANSFER, GNOWAGETR). The coefficients in the second column (under the heading GWAGE) indicate that the growth rate would increase if public expenditures are reoriented from the wage bill to transfers, other current expenditures, and capital expenditures. The growth effect is more significant when the wage bill is reduced to increase capital expenditures. Reorienting current expenditures (*i.e*. transfers and other expenditures) toward capital expenditures may also help in boosting the economy. However, reducing government transfers to increase other current expenditures has no impact on economic growth. This contradicts the results of Devarajan *et al.* (1996) and Ghosh and Gregoriou (2008) who found that current expenditures are growth-enhancing and capital expenditures are growth-depressing.

Conclusion and Policy Implications

In Central America, changes in the composition of fiscal budgets are expected given that those countries continue implementing globalization initiatives such as regional integration and trade liberalization (Paunovic 2005a). Using static and dynamic models, this paper investigated the growth effects of changes in the composition and financing of public expenditures. Following Miller and Russek (1997) and Kneller *et al.* (1999), all fiscal elements were included as explanatory variables in the growth models to reduce omitted variables bias. Based on the results, it may be speculated that globalization initiatives are more likely to affect economic growth through changes in the composition of fiscal budgets than through trade openness. Findings suggest that economic growth may be depressed if direct taxes are increased to finance public expenditures and to compensate for falling revenue from other sources such as custom revenue losses that are expected from globalization initiatives. Results also indicate that reorienting public expenditures toward capital expenditures may have a positive impact on economic growth.

While the results suggest that indirect taxes and deficit financing sources are preferred over direct taxes to finance public expenditures in order to boost the economy, the implementation of such fiscal policies may be subject to multiple restrictions. Budgetary deficits seem not to be a sustainable option given that many Central American countries are highly indebted (Armendáriz 2006; Paunovic 2005b). Conversely, Clements *et al.* (2003) and Gupta *et al.* (2005) recommend reducing public debt in developing countries given that high levels of debt can depress economic growth. In addition, it may be difficult to further raise indirect taxes given that current public revenues rely primarily on this source. Consequently, increases in direct taxes have been proposed to raise public revenues (*e.g*., Puchet and Torres 2000), and could also be proposed to compensate for expected custom revenue losses. However, as shown in this paper, direct taxes may have a negative impact on the economic growth of the Central American nations.

Given the multiple restrictions to raise public revenue, it is necessary to further investigate the channels through which tax increases affect economic growth. For instance, ICEFI (2007) suggest that the collection of direct taxes has been adversely affected by the opposition of elite economic groups in the region. Economic growth may be depressed if these elite groups reduce private investment in response to increases in direct taxes. In this case, fiscal agreements between governments and economic groups may be needed to reduce the potential negative effects of raising public revenues.

Alternatively, public expenditures may be reoriented toward capital expenditures to boost economic growth. Similar to Gupta *et al.* (2005), findings suggest that significant increases in the growth rate may be achieved by reducing the wage bill to increase capital expenditures. Positive growth effects are also expected from reducing transfers and other current expenditures to finance capital expenditures. Therefore, reorienting government spending toward public investment can be a growth-enhancing policy that the Central American countries could implement in response to changes in the composition of fiscal budgets caused by globalization initiatives.

Due to data limitations, it was not possible to identify sectoral expenditures that may potentially boost the economy such as expenditures on health and education (Baldacci *et al.* 2008; Bleaney *et al.* 2001; Bose *et al.* 2007a). In that case, the growth effects of reducing those current expenditures to increase capital expenditures may be ambiguous. Thus, it is important to improve the fiscal statistics in the region so as to provide more detail on specific expenditures and revenues.

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NOTES

[1] Costa Rica also signed free trade agreements with Mexico (1994), Canada (2001), and the Caribbean Community (2004), and more recently with China and Singapore although these are to be implemented yet. El Salvador signed free trade agreements with Honduras and Taiwan (2007). Guatemala and Taiwan have also implemented a trade agreement (2005). Nicaragua signed trade agreements with Mexico (1997) and Taiwan (2006). Panama has done the same with Taiwan (2003), Chile (2006) and Singapore (2006). See the website of the Secretariat of Economic Integration of Central America at www.sieca.int and the Foreign Trade Information System of the Organization of American States at www.sice.oas.org for more information about commercial agreements signed by the Central American nations.

[2] El Salvador, Guatemala, and Nicaragua had significant military expenditures in response to internal conflicts.

[3] Honduras and Nicaragua have significantly decreased their public debt in the last years as a result of the Highly Indebted Poor Countries (HIPC) program.

[4] See Paunovic (2005a) for an estimation of revenue losses expected in the region from the free trade agreement between Central America and the United States (CAFTA).

[5] Estimated coefficients would capture the direct growth effect of TAXINDIRECT, OTHERGREV, DOMBORROW and FORBORROW only if the growth effect of the excluded variable TAXDIRECT is statistically insignificant.

[6] The endogeneity test implemented in Schaffer (2007) is defined as the difference of two Sargan-Hansen statistics: one for the equation where the suspect regressors are treated as endogenous, and one where the suspect regressors are treated as exogenous.

[7] Similarly to Gupta *et al.* (2005), the exogenous variables included in the growth models, the lagged values of fiscal variables, and the total public revenue are used as instruments to correct for the potential endogeneity of NONTAXREV. These instruments were found to be valid according to the Hansen J test. Additionally, the Kleibergen-Paap test indicates that estimated growth models are identified.

[8] The estimated values of the median lag, calculated as $-\log 2 / \log \lambda$, suggest that 50 % of the total response of the economic growth rate occurs over four to five months.

[9] Growth models were estimated excluding other fiscal elements. Results are robust to the selection of other fiscal variables as the implicit element used to balance the government budget.

[10] The long-run growth effects are calculated as the estimated coefficients times the multiplier $1/(1 - \lambda)$.

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