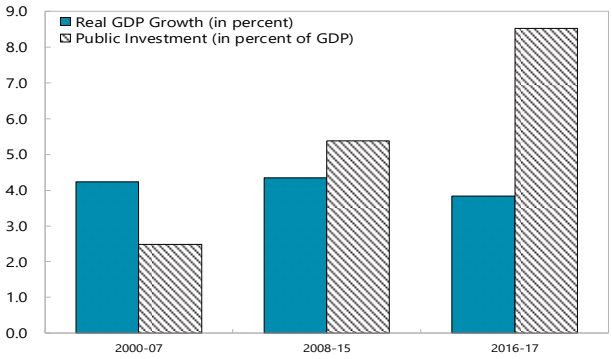
ESTIMATING THE FISCAL MULTIPLIERS FOR CAMEROON[1]

A. Introduction

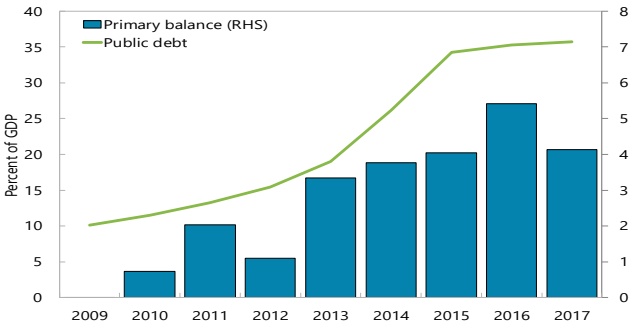
1. Cameroon, like many other countries in sub-Saharan Africa, has increased public investment over the last decade in a bid to fill its large infrastructure gap. Cameroon's infrastructure gap was sufficiently large in 2010 that, if closed to the level of its middle-income peers, it had the potential to increase growth by 3.3 percentage points (Dominguez-Torres and Foster, 2011, and IMF, 2014). This gap was significantly larger than Gabon's (2.1 percentage point growth potential), but smaller than that of other CEMAC countries (average 3.7 percentage point growth potential) (Dominguez-Torres and Foster, 2011). In a bid to close this gap, the government launched an ambitious development plan in 2009 called Vision 2035 aimed at lifting Cameroon to emerging market status in 25 years via large public investments in infrastructure. As a result, over the period 2008–15 public investment averaged 5.1 percent of GDP, more than twice the average during 2000–07. Despite the ramp up in public investment however, economic growth in real terms was lower at 4.4 percent per annum on average during the same period, (4.3 non-oil GDP growth) versus 3.1 percent previously (4.9 non-oil GDP growth). While robust, such growth rates did not allow to significantly improve the welfare of the population which has been growing at around 3 percent a year (Figure 1).

Figure 1. Cameroon: Economic Growth and Public Investment
(Period average)



Sources: Cameroonian authorities; and IMF staff calculations.

Figure 2. Cameroon: Public Debt and Primary Balance, 2009–17



Sources: Cameroonian authorities; and IMF staff calculations.

2. The increased investment has been largely financed by nonconcessional debt. Public debt went from 10 percent of GDP after debt relief under the Highly Indebted Poor Country (HIPC) Initiative in 2009 to 33 percent of GDP in 2015 (Figure 2) (of which 24.5 percent of GDP is external debt—including foreign denominated debt and debt between countries of the Central African Economic and Monetary Community—CEMAC). Notwithstanding Cameroon's need to improve its infrastructure, the rapidly shrinking fiscal space exacerbated by the recent commodity price shock, has highlighted the

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need to rationalize spending while at the same time helping create the necessary environment for higher growth. As such, the debate over the impact of fiscal policy on economic activity has been at the center of policymakers' concerns (Figure 2). Particularly, given the fiscal consolidation underway in the context of the IMF-supported economic program, the question is being asked as what would be the impact of that consolidation on growth, and how can the consolidation be calibrated so as to minimize its adverse growth impact? This chapter aims at providing an empirical underpinning to fiscal policy reforms implemented by the authorities by estimating the size of fiscal multipliers in Cameroon, using a novel long quarterly data set and looking separately at the impact of changes in revenue, and government consumption and investment.[2]

B. Fiscal Multipliers: Theory, Model and Estimation

Theory

3. Theoretical channels linking fiscal policy and growth are strong, but varied. Neoclassical theory predicts two principal channels through which fiscal policy can affect output: First, by raising money via taxes, the negative wealth effects lead individuals to work more hours which, decreases real wages, and consumption and investment subsequently fall. Second, when governments increase spending, funded by future taxes, the theory suggests labor will be substituted intertemporally to the present and current output will rise. In New Keynesian models, on the other hand, government spending is propagated via increases aggregate spending and output, the extent of which depends on the marginal propensity to consumer. (Ramey, 2011) The size of the fiscal multiplier varies across these models, with the New Keynesians typically estimating multipliers, and specifically tax multipliers even smaller than spending multipliers, due to households' tendency to save a large portion of their after-tax income (Batini and others, 2014).

4. The impact of government spending and taxes depends on country characteristics and the stage of the business cycle. Multipliers tend to be larger in countries who are more industrialized, have lower levels of debt, have a fixed or pegged exchange rate regime, and have higher investment efficiency (Ilzetzki and others, 2013; Corsetti, Meier, and Müller, 2012; Furceri and Li, 2017; Born, Juessen; Müller, 2013; Abiad, Furceri, and Topalova, 2016). The impact of openness on the fiscal multiplier is, however, much more uncertain with mixed evidence in the empirical literature. Furthermore, while some evidence points to fiscal multipliers tending to be larger during periods of low or negative growth (Auerbach and Gorodnichenko, 2012; Woodford, 2011; Baum et al., 2012; Corsetti and others, 2012; Abaid and others, 2016; IMF, 2017; Chrsitian, Eichenbaum, and Rebelo, 2009; Woodford, 2011), more recent evidence suggests that multipliers may not differ by the amount of slack in the economy—at least in the US (Ramey and Zubairy, 2018). These results are captured using restricted samples, time-varying parameter models, regime switching models, and local projections methods, all of which allow model estimates to vary over time or business cycles and across country characteristics. Baum and others (2010) combine differences in both country level characteristics and over time using threshold VAR models, and find similar results.

[2] Quarterly fiscal revenue and expenditure data were provided by the Ministry of Finance of Cameroon, and were seasonally adjusted.

5. The impact of fiscal policy on growth also depends on the policy itself. The literature has found that, in general, spending multipliers tend to be larger than revenue or tax multipliers, though in emerging market some evidence points to the reverse (Batini and others, 2014; Ilzetzki, 2011). Amongst taxes themselves, in middle and high-income countries personal income taxes have a stronger negative impact on growth than corporate income taxes or property taxes, while a reduction in income taxes that coincides with an increase in value added taxes is associated with faster growth. In low income countries, however, the relationship is ambiguous. (Acosta-Ormaechea and Yoo, 2012). In terms of government spending multipliers, there is evidence that in developing countries government investment tends to have a greater impact on growth than does consumption spending (Ilzetzki et al., 2011).

6. Empirical estimates of average fiscal multipliers are wide ranging, but tend to be lower in low income countries. In developing economies, multiplier estimates are almost always below one and often negative. At a three-year horizon, Ilzetzki and others (2013) estimate the consumption multiplier in low income countries to be -0.4 and the investment multiplier to be 1.6, while Kraay (2012, 2014) estimates the spending multiplier to be between 0.4 and 0.5, and Ilzetzki and Végh (2008) estimate the consumption multiplier to be 0.63. Other studies estimate multipliers of a similar range (see Batini and others (2014) for an extensive list of studies and their estimated multiplier for low income and emerging economies). These estimates are slightly lower than those for emerging markets, which are typically estimated to be between 0.3–0.7 for government consumption and 0.6–1.1 for investment (Espinoza and Senhadji, 2011). In sub-Saharan Africa, recent estimates show that, on average, a one percent rise in public investment increases output by about 0.7 percent in the medium term, while the same rise in consumption will only increase output by about 0.5 percent, and a rise in government revenues has no significant effect on output (IMF, 2017).

7. Empirical estimates of country-specific fiscal multipliers are even more wide ranging, but tend to fall close to the average values for their respective income levels. While comparisons are difficult because of varying estimation methods, country-specific fiscal multipliers tend to be relatively small in low income and only slightly larger in emerging economies—as the average estimates indicate. Among some other sub-Saharan Africa countries, fiscal multipliers are estimated to be between 0.4–0.9 in South Africa (IMF, 2016), to be 0.15 on impact in Uganda (IMF, 2015), and to be 1 percent over a two-year horizon and 5 percent over five years in Nigeria (IMF, 2018)[3]. In other developing and emerging market regions estimates follow similar patterns: Paraguay's estimated fiscal multipliers are between 0.1–0.9 for consumption and 0.4–2.0 for investment expenditure (David, 2017); in Brazil they are estimated to be 0.5 on impact for both consumption and tax (Matheson and Pereira, 2016); in Peru, the consumption multiplier is estimated to be zero and the investment multiplier 0.5 on impact, and 1.1 in the longer term (Vtyurina and Leal, 2016); and in Algeria, the estimated cumulative expenditure multiplier is 0.3 on impact, and ranges from 0.4 to 0.6 cumulatively in the longer term (Elkhdari, Souissi, and Jewell, 2018).

[3] The shock corresponds to an increase in real public investment of 0.7 percent, public consumption of 0.6 percent, and tax revenue by 1.5 percent

Estimation Results

8. We estimate a structural vector autoregressive (SVAR) model with a vector of endogenous variables, Y_t: capital expenditure, current expenditure, total government revenue, and real GDP, in that order, using quarterly data from 1999 Q1– 2015 Q4 (See Annex 1 for model details). Figure 3 displays the impulse response function for real GDP following a one standard deviation shock to each of revenue (panel a.), capital expenditure (panel b.), and current expenditure (panel c). Table 1 displays the corresponding estimated cumulative multipliers for each fiscal variable. Our results are highly robust to changing the ordering of the endogenous macroeconomic variables and to the exclusion of the exogenous variables.

9. The impact from a positive shock to government revenues is found to be small and substantially lower than that of expenditure. We find that the cumulative revenue multiplier is not statistically different from zero at any point during the first three years following a shock. This could be explained by the low tax base and the limited power of the government to raise revenues. We note, however, that in the medium-run the cumulative revenue multiplier peaks at 0.37 after three years (Table 1). This is consistent with findings for low income countries in the literature using SVAR models.

10. We find that the current expenditure cumulative multiplier is higher than the capital expenditure one at 1.97 compared to 1.10 (Table 1). The capital expenditure multiplier is consistent with estimates in the literature (Ilzetzki, Mendoza, and Vegh 2013, Abiad, Furceri, and Topalova 2016), though slightly higher than the sub-Saharan African average (IMF, 2017). However, the higher current expenditure multiplier is uncommon and may be explained by the low productivity of public investment in Cameroon and frequent delays in capital project implementation as well as leakages through imports of capital goods. Indeed, the 2016 Public Investment Management Assessment (PIMA) found that Cameroon's relative efficiency gap with respect to the efficiency frontier—determined in relation to the best-performing countries—is around 50%, larger than the average efficiency gap of 40% for SSA countries (Box 1).

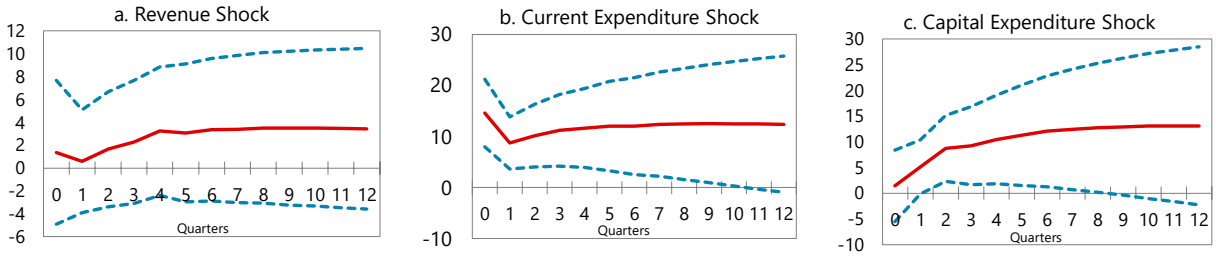
Box 1. Tax Potential and Spending Efficiency

Cameroon's tax-to-GDP ratio has averaged at around 13 percent over the last 5 years, about 3 percent below the SSA average. A cross-country empirical study found that countries with similar macroeconomic conditions and institutions than Cameroon can attain a tax-to-GDP ratio of up to 21 percent. Cameroon could boost its tax revenue by enhancing the efficiency of its tax collection and by reducing tax exemptions. Fund technical assistance has identified up to 2½ percent of GDP of potential additional revenue gains through enhanced tax administration efforts.

According to technical assistance by the IMF (IMF 2018) and a World Bank study (World Bank 2018), Cameroon's current and capital spending, including goods and services are burdened by high administrative costs (16 percent and 29 percent respectively of total current and capital expenditure. Furthermore, public investment is characterized by low efficiency as only two thirds of the investment spending contribute to the formation of the capital stock. The 2016 PIMA found an efficiency gap of 51 percent or almost double the average gap in low-income and emerging market countries.

Note: Red line is the estimated response, blue dotted lines are 90 percent confidence bands.

Figure 3. Baseline Model: Response of GDP to Fiscal Shocks



Source: IMF staff estimates.

Table 1. Baseline Model: Cumulative Fiscal Multipliers

Quarters ahead	Revenue Shock		Current Expenditure Shock		Capital Expenditure Shock	
	Estimate	90% CI	Estimate	90% CI	Estimate	90% CI
0	0.08	(-0.13 , 0.25)	0.82	(0.53 , 1.04)	0.07	(-0.32 , 0.36)
1	0.09	(-0.19 , 0.28)	0.98	(0.63 , 1.22)	0.16	(-0.28 , 0.47)
2	0.11	(-0.22 , 0.33)	1.09	(0.69 , 1.34)	0.27	(-0.22 , 0.60)
3	0.13	(-0.25 , 0.38)	1.20	(0.76 , 1.47)	0.38	(-0.17 , 0.71)
4	0.15	(-0.28 , 0.43)	1.29	(0.81 , 1.57)	0.47	(-0.12 , 0.82)
5	0.18	(-0.31 , 0.48)	1.39	(0.87 , 1.67)	0.56	(-0.09 , 0.92)
6	0.21	(-0.34 , 0.53)	1.48	(0.92 , 1.77)	0.65	(-0.06 , 1.02)
7	0.23	(-0.37 , 0.58)	1.57	(0.97 , 1.86)	0.74	(-0.03 , 1.12)
8	0.26	(-0.4 0 , 0.63)	1.65	(1.02 , 1.95)	0.82	(-0.02 , 1.20)
9	0.29	(-0.43 , 0.68)	1.74	(1.07 , 2.03)	0.89	(-0.003 , 1.29)
10	0.32	(-0.47 , 0.73)	1.82	(1.11 , 2.12)	0.97	(0.004 , 1.37)
11	0.34	(-0.51 , 0.78)	1.89	(1.14 , 2.20)	1.04	(0.01 , 1.44)
12	0.37	(-0.55 , 0.82)	1.97	(1.18 , 2.27)	1.10	(0.00 , 1.51)

Source: IMF staff estimates.

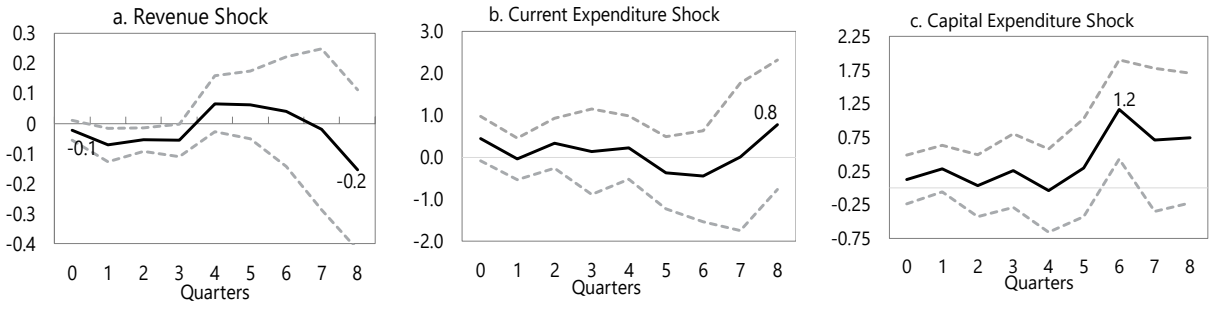
Robustness Checks

11. We find our results to be robust to alternative specifications. Specifically, we try alternative definitions of fiscal expenditure and revenue variables as well as reversing the order of the fiscal variables and find broadly similar multiplier estimates. To further test the robustness of our results, we use a local projections model in addition to the SVAR.[4] The cumulative multipliers are plotted in Figure 4—noting that these figures are not impulse response variables, but the estimated cumulative multiplier directly. Results are broadly robust to those estimated in the SVAR model. In this case, the cumulative total revenue multiplier is significant for approximately the first year after the shock, but over the medium-term horizon becomes statistically insignificant. The estimated capital expenditure fiscal multiplier is roughly equal to that of the SVAR model, peaking at 1.2 six quarters after the shock.

[4] See Jorda, 2005 and IMF, 2017 for a detailed description of the local projections method and implementation and interpretation of the cumulative impulse response functions.

The main difference from the SVAR model is that the current expenditure shock is estimated to have a non-significant impact on output.

Figure 4. Local Projections Revenue Model: Response of GDP to Fiscal Shocks



Source: IMF staff estimates.

Note: Solid line is the estimated response, dotted lines are 90 percent confidence bands.

C. Conclusion and Policy Implications

12. Our analysis shows that revenue and capital expenditure multipliers in Cameroon are small and comparable to those of other sub-Saharan African and low-income countries. The revenue multiplier is close to nil which implies that revenue-based fiscal consolidation would be less harmful to growth in the medium term. Compared to its peers in sub-Saharan Africa, Cameroon's revenue multiplier is smaller as is its tax burden relative to the regional average. Conversely, government expenditure can more significantly affect output in the medium term, although the consumption multiplier is unexpectedly much higher than the investment one. In fact, the capital expenditure multiplier in Cameroon is comparable to that of other SSA countries but the current expenditure one is much higher.

13. Fiscal consolidation through increased revenue would have the least negative impact on economic growth. To address its rapidly increasing public debt and rebuild fiscal and external buffers depleted by the double shock of lower commodity prices and higher security spending, Cameroon is engaging in fiscal adjustment. In order to limit the negative growth impact, the consolidation should be biased towards increasing government revenue. In the short-term, as revenue measures take time to yield results, some rationalizing of capital and current expenditure would be necessary, however. In that vein, it will be important to improve the efficiency of public investment to allow for greater productivity at lower levels and limit the rationalization of government consumption while preserving current spending in social sectors. Efforts to widen the tax base and increase domestic revenue to better align it with potential should also be strengthened and accelerated.

Annex I. Methodology

To study the impact of fiscal policy we use a structural vector autoregressive (SVAR) model with a recursive (Cholesky) identification scheme. We use quarterly data from 1999 Q1– 2015 Q4. Following Blanchard and Perotti (2002), we estimate the following model:

$$A_0 Y_t = \beta_0 + \sum_{l=1}^{T} A_{1,l} Y_{t-l} + \mathrm{A}_{2,1} X_t + \varepsilon_t \quad (1)$$

Where A_0 and A_l are matrices of structural parameters and ε_t a vector of structural shocks with $E(\varepsilon_t|\mathrm{Y}, \ldots, Y_{t-1}) = 0$ and $E(\varepsilon_t \varepsilon_t{}'|Y_1, \ldots, Y_{t-1}) = I_n$. To identify these parameters, we draw upon a Cholesky decomposition. To that effect, we must establish the recursive ordering of our vector of endogenous variables, Y_t. We assume the following causal relationship for our main specification: expenditure, revenue, and GDP. That is, we assume GDP cannot affect government spending contemporaneously, which is reasonable given lags in fiscal policy implementation and consistent with existing literature (see, for example, Ilzetzki, Mendoza, and Vegh (2013) and Blanchard and Perotti (2002)).

The impact multiplier $k_0 = (\Delta Y_0)/(\Delta F_0)$ measures the response of output (ΔY_0) to a fiscal shock (ΔF_0) at the initial period (t=0), i.e. when the fiscal shock occurs. The cumulative impact of fiscal policy shocks over the medium-term of horizon *T* is computed as the sum of the changes in output from the current period until the period *T* divided by the sum of changes in the fiscal policy variable over the same period, $k_T^{LT} = \sum_{t=0}^{T} \Delta Y_t / \sum_{t=0}^{T} \Delta F_t$.

For the main model, the current period trade balance (as a ratio to nominal GDP), the real effective exchange rate, and the interest rate are included as exogenous variables, X_t. The model is estimated in levels and with two lags, as indicated by the Akaike information criterion (AIC) and likelihood ratio tests.

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