FOR AGENDA

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October 20, 2008

To: Members of the Executive Board

From: The Secretary

Subject: **Republic of Equatorial Guinea—Selected Issues**

This paper provides background information to the staff report on the 2008 Article IV consultation discussions with the Republic of Equatorial Guinea (SM/08/321, 10/17/08), which is tentatively scheduled for discussion on **Monday, November 3, 2008.** At the time of circulation of this paper to the Board, the Secretary's Department has not received a communication from the authorities of the Republic of Equatorial Guinea indicating whether or not they consent to the Fund's publication of this paper; such communication may be received after the authorities have had an opportunity to read the paper.

Questions may be referred to Ms. Stotsky (ext. 38541) and Mr. Milkov (ext. 30787) in AFR.

Unless the Documents Section (ext. 36760) is otherwise notified, the document will be transmitted, in accordance with the procedures approved by the Executive Board and with the appropriate deletions, to the WTO Secretariat on Tuesday, October 28, 2008; and to the African Development Bank, the European Commission, the European Investment Bank, the Food and Agriculture Organization, the Organisation for Economic Cooperation and Development, and the United Nations Development Programme, following its consideration by the Executive Board.

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EQUATORIAL GUINEA

Selected Issues

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Approved by the African Department

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Contents Page

I. Fiscal Sustainability and Capital Expenditures: The Case of Equatorial Guinea....3
A. Summary....3
B. Discussion....3
C. Conclusion....13

II. Assessment of the Real Effective Exchange Rate in Equatorial Guinea....16
A. Introduction....16
B. Previous REER Assessments....17
C. REER Developments....17
D. External Sector Developments....18
E. Macro-Balance Approach with Permanent Income Norms....20
F. Fundamental Equilibrium REER Approach....25
G. Conclusion....29

Text Tables
1.1. Medium-Term Fiscal Framework – Budget vs. Targets....7
1 2. Public Expenditure Indicators, 2005–07). 9
1.3. Regression Results from Economy-wide Production Funtion....11
1.4. Medium-Term Fiscal Framework – Budgets vs. Targets....12
2.1. Indicators of Competitiveness....20
2.2. REER Adjustment to PIH-based Current Account Norm....23
2.3. Elasticities of REER Determinants in CEMAC....26

Figures
1 1. Overall Fiscal Balance, Gross Official Foreign Reserves, 2000–08....4
1.2. Non-oil Primary Deficit, 2000–08....5
1.3. Oil Revenues, Annuity, and Asset Accumulation based on a Permanent Income Model....8
1.4. Actual non-oil GDP vs. predicted non-oil GDP. 11
2.1. Nominal and Real Exchange Rates....18
2.2 Balance of Payments Developments....19

2.3. NFA Accumulation Consistent with PIH 22
2.4. Current Account Balance 22
2.5. Actual and Equilibrium Real Effective Exchange Rate, 1996–2007 27

I. References 14
II. References 30

I. Fiscal Sustainability and Capital Expenditures: The Case of Equatorial Guinea[1]

A. Summary

1. This paper formulates a permanent income hypothesis model and estimates it using data on oil revenues from Equatorial Guinea. The first methodology is based on a standard permanent income model, using a 50 year time horizon and real rate of return of 2 percent. The annuity in each year is assessed in two different ways, the first being, keeping the annuity constant in real terms and the second, keeping the annuity constant as a percent of GDP. In the second part of the paper I extend the model to incorporate a feedback effect from capital spending to non-oil GDP growth, and I show its implications for fiscal sustainability.

B. Discussion

2. **Resource-rich countries are faced with the policy decision of how much to spend and how much to save from their non-renewable resources.** Many countries with non-renewable resources have begun to accumulate assets in the form of Sovereign Wealth Funds (SWFs). Other countries have instead channeled most of the their wealth in both current and capital spending.

3. **There is a large body of literature which points to a "resource curse" in countries with substantial hydrocarbon or mineral resources.** This literature points to two main factors for lower long-term growth in these economies. The first factor is the slower growth of the non-oil sector once the oil resources are discovered , which is also known as "Dutch disease." The second factor is the political factor from the weakened governance that usually accompanies such discoveries especially in low income countries (LICs). In this paper I focus on the first factor.

4. **The literature on growth in low-income countries has not reached a consensus on the exact set of variables which affect non-resource based growth.** However, a number of cross-country regressions have shown that institutions, geographic location and physical capital are important sources of economic growth.

5. **Recent studies have emphasized the lack of public investment in infrastructure and other physical capital as an impediment to growth**. However, the role of public investment in infrastructure and physical capital as well as human capital has been controversial. Some researchers have found evidence that public investment as a percentage of GDP in low-income countries has not been lower than in other parts of the world. However, researchers have found evidence that the stock of infrastructure does affect positively growth.

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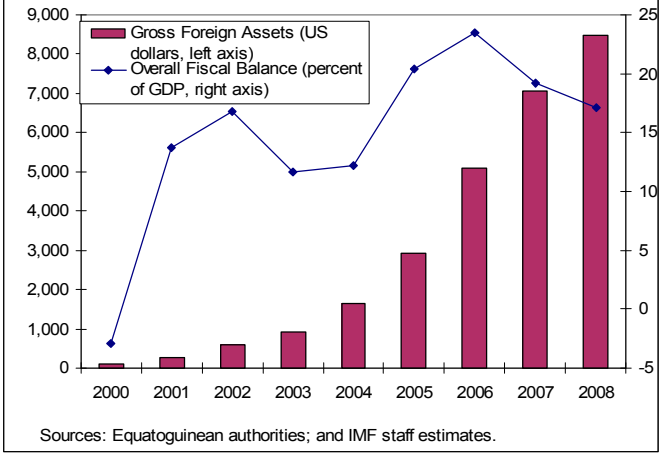
[1] Dimitre Milkov, African Department

6. **Over the last decade the "resource curse" view of growth in resource-rich countries has largely dominated the discussion.** Most papers on resource-rich countries are empirical in nature and have emphasized the slower growth in these countries, compared to non-resource rich countries. A famous paper by Sachs and Warner (1995) makes this point. However, numerous studies following their paper have found this correlation to be not as robust, though the basic puzzle of slow growth in these countries has remained. Yet, consistent explanation has not been provided though a myriad of factors abound such, political strife, voracity effects, "Dutch disease" and high volatility of resource income.

7. **Little research has focused on what has worked rather than what has not worked.** While the consensus view has been that countries need to follow a more balanced approach to spending from the oil revenues, little attention has been paid as to how this spending should relate to growth in the non-oil GDP. This paper attempts to provide a more unified model of growth based on permanent income model and capital spending induced growth.

8. **Equatorial Guinea has taken steps to manage effectively its oil reserves and the income derived from it**. Figure 1.1 shows that Equatorial Guinea has managed to save a substantial amount of its oil revenues since 2000. Its overall balance shows a surplus starting in 2001. However, as oil revenues have grown, non-oil revenues have stagnated and coupled with growing expenditures, the non-oil primary deficit has remained high, as seen in Figure 1.2.

Figure 1.1. Equatorial Guinea: Overall Fiscal Balance, Gross Official Foreign Reserves, 2000-08

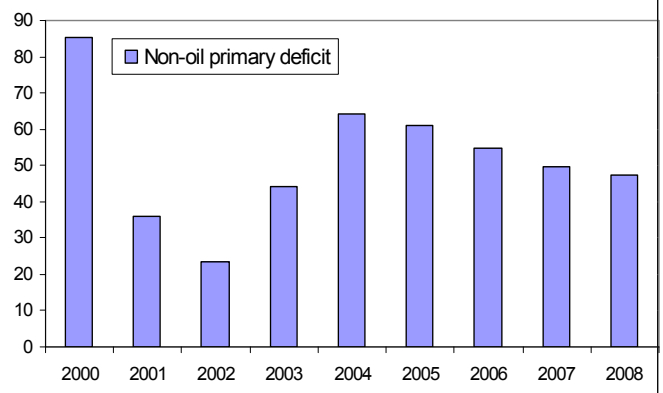


Sources: Equatoguinean authorities; and IMF staff estimates.

9. **Although the authorities' fiscal policy has saved a large part of the oil windfall in Equatorial Guinea, this has not been guided by a consistent long-term framework.** The authorities have publicly stated that their policy will follow a permanent income model based on long-term sustainability, yet short-term fiscal policy has prescribed capital expenditures which are much higher than sustainable levels. The new Public Investment Plan (PIP) for the years 2008-2010 budgets a sharp increase in public capital expenditures

10. **This paper analyzes the fiscal spending of Equatorial Guinea from its hydrocarbon revenues and attempts to provide a useful benchmark.** The main fiscal indicator is the non-oil primary balance, which is the indicator used in resource-rich countries. The main reason is that the overall fiscal balance may not tell the whole story (see Barnett and Ossowski, 2003). Overall balances may improve due to higher oil revenues, which may be misinterpreted as fiscal consolidation. Moreover, in countries in which oil production has a rapid decline profile, the oil GDP maybe very volatile while the non-oil part is relatively more stable.

Figure 1.2. Equatorial Guinea: Non-oil Primary Deficit
(percent of non-oil GDP), 2000-08



Sources: Equatoguinean authorities; and IMF staff estimates.

11. **The sustainable fiscal policy which I will focus on is the one based on the Permanent Income Hypothesis Model.** The model is based on the assumption that economic agents are averse to changes in consumption and would prefer a constant consumption profile over a volatile one, even if the net present value is the same. There are similar reasons while a country should not have a volatile spending profile. In particular, adjusting spending rapidly is costly and inefficient. Moreover, certain types of spending such as public investment need a predictable budget in order for the projects to be planned and completed. Finally, a rapid increase and decrease of spending may result in bottlenecks in the economy and drive up consumption prices, which then would have to readjust when the spending boom finishes.

12. **Previous papers have estimated permanent income models for Equatorial Guinea, keeping the annuity constant in real terms (see Franken, 2006)**. In this paper, I add two new dimensions to this analysis. First, I also estimate a version of the model in which the annuity is kept constant as a percentage of GDP, since this may be a better measure to distribute oil revenues over time, given growth in population and in real GDP. The second extension attempts to account for the fact that different patterns of spending the oil revenues will result in different public capital spending paths and therefore will have different effects on non-oil GDP.

13. **The permanent income hypothesis suggests that the government spends only the "permanent" part of its revenues and saves the rest,** which will in turn sustain the government in times of low temporarily low revenues, or when the oil resources are exhausted

14. Let's first start with the government's budget constraint. It says that the present value of the government's revenues should equal the present value of its expenditures. In other words:

$$\sum_{t-0}^{\infty} \frac{T_t^O + T_t^{NO}}{(1+r)^t} = \sum_{t}^{\infty} \frac{G_t}{(1+r)^t} \tag{1}$$

where T_t^O, T_t^{NO} are the oil and non-oil revenues for the government, and G_t is the government spending respectively and r is the interest on net government financial assets. Any sustainable fiscal policy needs to satisfy the constraint in Equation 1. However, from all the policies satisfying (1) we are interested in the fiscal policy which follows the permanent income hypothesis.

15. **The permanent income fiscal policy is such a policy which prescribes a constant annuity from the oil revenues.** In other words the fiscal policy which we are interested in is the one which assumes that there is a constant spending, i.e. "annuity", of D each period, that still satisfies the government's present value budget constraint:

$$\sum_{t-0}^{\infty} \frac{T_t^O}{(1+r)^t} = \sum_{t}^{\infty} \frac{D}{(1+r)^t} \tag{2}$$

In the first version of the model, I compute a constant annuity in real terms. The variables shown above represent the inflation-adjusted values and not the nominal terms.

16. **Previous authors have pointed out that the annuity from the oil revenues is better computed as a percent of GDP** (see Clausen, 2008). Thus, in a modified version of the model, I compute the value of the annuity, when it is constant as a percent of GDP. In this second version of our model I define the constant annuity as a percent of GDP as, $\frac{D_t}{Y_t} = d^{GDP}$. Thus, the annuity in real terms is then $D_t = d^{GDP} Y_t$ and Equation 2 becomes simply:

$$\sum_{t-0}^{\infty} \frac{T_t^O}{(1+r)^t} = \sum_{t=0}^{\infty} \frac{D_t}{(1+r)^t} = \sum_{t=0}^{\infty} \frac{Y_t d^{GDP}}{(1+r)^t} \tag{3}$$

17. **The results from the benchmark exercises show the target non-oil primary deficits and the projected non-oil primary deficits.** The projected non-oil primary deficit for 2009, as shown in Table 1.1, is 73.1 percent while the permanent income model's annuity is only 21 percent. Figure 1.3 shows the evolution of asset holdings under both scenarios, the

one with annuity constant in real terms, and the second one with annuity constant as percent of GDP.

Table 1.1. Equatorial Guinea: Medium-Term Fiscal Framework - Budgets vs. Targets

	Non-oil primary balance			Overall balance		
	2009	2012	2020	2009	2012	2020
	(percent of non-oil GDP)			(percent of GDP)		
Price of oil based on WEO (US$ per barrel)	101	103	103	101	103	103
Baseline scenario - assumes real return of 2 percent on financial investments.						
1. Fiscal balance based on staff projections for revenues[1] and current projections for expenditures.[2]	-73.1	-41.7	-24.7	3.2	4.7	-7.7
2. Fiscal balance based on staff projections for revenues and following a permanent income model for expenditures,[3] kept constant in real terms.[4]	-21.1	-16.9	-12.8	20.0	14.8	1.0
3. Fiscal balance based on staff projections for revenues [5] and following a permanent income model for expenditures, kept constant in terms of GDP. [6]	-22.5	-17.8	-9.9	19.5	14.4	3.0

[1] Petroleum revenue projections are based on staff assumptions for government intake and projected oil price from WEO.

[2] The projections for government expenditures assume capital expenditures declining as a percent of GDP after 2009 and current expenditures increasing as a percent of GDP (see Table 9b).

[3] Expenditure based on the Permanent Income Model is equal to an annuity from oil revenues plus non-oil revenue for that year (excluding interest earned).

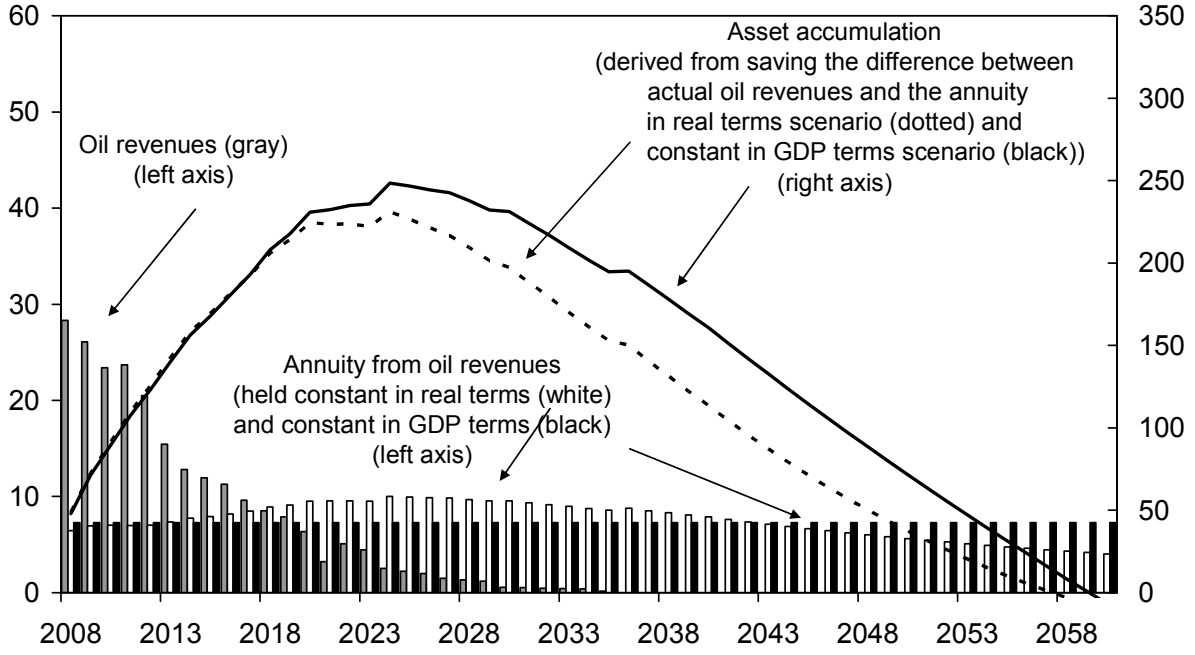
[4] The annuity is computed by distributing evenly in real terms until 2060 all the oil revenues, assuming 2 percent real return on assets.

[5] The annuity is computed by distributing evenly in terms of GDP until 2060 all the oil revenues, assuming 2 percent real return on assets. Oil GDP projection is based on oil production profile from the authorities. Non-oil GDP, which includes the manufacturing of oil derivatives, is projected to grow at an average annual rate of 3.5 percent in real terms, excluding the manufacturing of derivatives, whose projection is based on data from the authorities.

[6] The difference between the two specifications reflects the projected decline in real GDP in the long term as oil and natural gas production declines (absent a significantly improved non-oil economy), reducing future spending.

Sources: Equatoguinean authorities, WEO, and IMF staff estimates.

Figure 1.3. Equatorial Guinea: Oil Revenues, Annuity, and Asset Accumulation based on a Permanent Income Model (percent of GDP)



Source: IMF staff calculations.

18. **There is a large literature which examines the link between government spending and more specifically capital spending and economic growth.** A number of studies have examined the link between government spending and economic growth as well as the composition of government spending and economic growth. In particular, cross-country studies, such as Easterly and Rebelo (1993), find that investment in infrastructure and communication is correlated with growth. Other studies such as Gupta et. al. (2005) find that fiscal consolidation and reduction in total government outlays is beneficial for growth in a cross-country study.

19. **Among the many challenges in answering the question of whether government spending affects GDP growth is the fact that there is heterogeneity across countries** not only in terms of spending, with some countries being more efficient at building public infrastructure and roads, but also in terms of raising revenues, or in some cases borrowing on the international markets. The differences can be large. For example, Equatorial Guinea, which has saved a significant amount of its past oil revenues, receives on average 4 percent interest rate on its deposits at BEAC. Gabon, which is a member of the CEMAC, has issued a bond, which has a yield higher than 10 percent. Clearly, the success of a public investment program, whose implicit rate of return is 4 percent is much different than one whose rate is 10 percent.

20. **In the first section of this paper, I have formulated a permanent income model for Equatorial Guinea and have compared it to the current spending policies of the government.** The model takes the level of GDP as given and compares the government expenditure policy with the policy based on a permanent income model, using the non-oil primary deficit as the main variable of comparison. A major drawback of that analysis is that it assumes that government spending, and in particular government capital expenditures, have no bearing on the growth of non-oil GDP. While, this makes it easier to compare the permanent income model to current policies, it is clearly a strong assumption. In the case of Equatorial Guinea, budget executions show that the government spent close to 50 percent of non-oil GDP on public investment in 2007 alone and it is on track to spend a similar amount for 2008. Moreover, almost all of the government capital expenditures are related to the non-oil economy, such as roads, ports, buildings, and vehicles as well as oil derivatives, which are part of the non-oil GDP. Thus, while the productivity of government capital would be hard to estimate, it is unlikely that its usefulness is zero and that it does not contribute at all to the growth in non-oil GDP.

21. **In 1999, capital expenditures were 39.1 billion CFA francs, while current expenditures were 46 billion CFA francs.** Starting in 2000, however, capital expenditures have consistently grown much faster than current expenditures and in 2007, they have reached 929 billion CFA francs, while current expenditures were 214 billion CFA francs, almost four times less. Similarly, for 2008 the current projections is for capital expenditures to reach 1,300 billions CFA francs. Equatorial Guinea is unique among the countries in the region, both in terms of the ratio between current and capital expenditures, but also the ratio f capital expenditure to its non-oil GDP (see Table 1.2).

Table 1.2. Equatorial Guinea: Public Expenditure Indicators 2005-07 (3-year average)

	Current expenditure (percent of non-oil GDP)	Capital expenditure (percent of non-oil GDP)	Non-oil GDP growth (percent change)
Cameroon	13.0	3.4	4.1
Chad	14.8	13.5	3.7
Gabon	33.3	9.0	2.6
Republic of Congo	50.6	24.1	2.3
Equatorial Guinea	18.0	60.3	33.3
Equatorial Guinea, excluding oil derivatives			27.6

Sources: Authorities of Cameroon, Chad, Equatorial Guinea, Gabon, and Republic of Congo, and IMF staff estimates.

22. **The increases for 2008 and the proposed increase for 2009 for capital expenditures have continued the trend. Equatorial Guinea has adopted a version of the above-described Permanent Income Model as a guiding benchmark for its fiscal policy** and it is therefore important to bring the capital expenditures of the government into this model. The main argument for treating capital expenditures differently from current expenditures is that they augment the capital stock and thus contribute to the increase in

GDP. Given the large amount of capital spending proposed for 2009, 2,000 billion CFA francs, equivalent to US$ 4.5 billion, it is important to evaluate whether these capital expenditure outlays bring a positive return to the country as opposed to if they were invested in some income generating assets.

23. **I follow the literature on public spending and growth which has attempted to account directly for public capital spending and its effect on economic activity.** Similarly, to Aschauer (1989) and Gramlich (1994), I take a very stylized view of the role that the public capital plays in the economy. In particular, I posit that the economy-wide production function is of the Cobb-Douglas form, though not restricted to constant returns to scale, and that the public capital and private capital are direct substitutes. The reasons for these simplifications are twofold. Firstly, the Equatoguinean economy has little private investment outside hydrocarbons, and public investment is a direct substitute for private investment. For example, public investment in Equatorial Guinea includes housing, roads, ports and airports as well as capital or subsidies for fishing, farming and transportation. Secondly, estimating a more complicated production function would not be feasible due to the small sample size.

24. **I use the same permanent income model as in the above section, augmented to include a feedback rule from capital into non-oil GDP**. I also focus on the non-oil economy and the oil economy is treated as an exogenous stream of revenues. The current expenditures are also fixed in real terms, not as a percentage of non-oil GDP, while non-oil revenues are fixed in real terms as well. In evaluating different policy outcomes, I assume that if the authorities are to follow the permanent income rule, the reduction in public spending will come entirely from capital spending. While in general these may be strong assumptions, in the case of Equatorial Guinea, these are reasonable assumptions, given the fact that current spending has grown very slowly, while the increase in public expenditures has come almost entirely from the public investment program. Moreover, most of the variation in government spending comes from variation in capital expenditures.

25. **In order to estimate a national production function, I need an estimate for the stock of capital and the stock of labor, which includes human capital.** The total public investment stock is estimated by adding up public capital expenditures starting in 1996 and assuming a real rate of depreciation of 8 percent, which is similar to the United States. Given the very small amount of public investment in 1996, which is around 3 billions CFA francs compared to 970 billions CFA francs in 2007, this seems like a reasonable approximation. The total labor stock is hard to estimate, given the poor population and employment statistics. However, I assume that the labor stock grows by 2 percent annually, which is the population growth rate for Equatorial Guinea. Finally, I assume that private investment in the non-oil economy is equal to the depreciation of the private capital stock and therefore does not add to the capital stock over the estimation period.

26. **The basic model I use is similar to Aschauer (1989).** I posit the following government production function:

$$Y_t^{NO} = A_t F(K_t^P, K_t^G, L_t) = A_t \left(K_t^P + K_t^G\right)^a \left(L_t\right)^b \quad (4)$$

where A_t is the total factor productivity at time t, and K_t^P, K_t^G and L_t are the private capital stock, public capital stock and labor input, respectively in the non-oil economy. Finally, Y_t^{NO} is the non-oil GDP. Next, I assume that net private capital stock increase in the non-oil economy is equal annually to the depreciated public capital stock. Transforming the above into natural logs, we get:

$$\ln Y_t^{NO} = \ln A_t + a \ln K_t^G + b \ln L_t \quad (5)$$

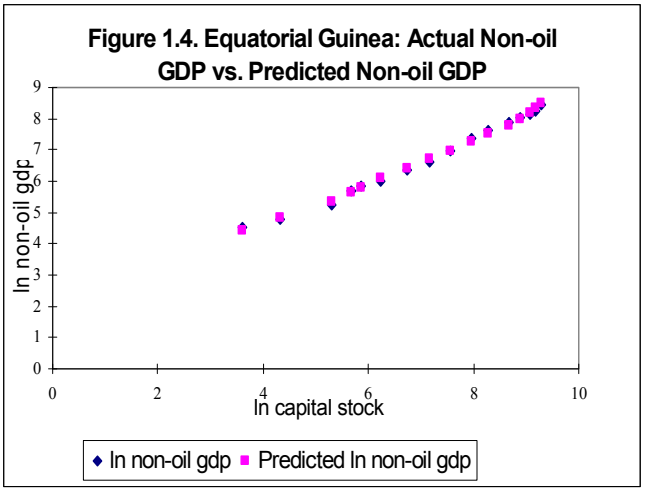
I can then now estimate the above regression, using Equatoguinean data on government capital expenditure and non-oil GDP. The results of the above regression are presented in Table 1.3.

Table 1.3. Equatorial Guinea: Regression Results From Economy-wide Production Function

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	2.785	0.295	9.433	0.000
coefficient on log capital stock	0.446	0.068	6.602	0.000
coefficient on log labor	3.520	0.862	4.082	0.001

Sources: Equatoriguinean authorities; and IMF staff estimates.

27. **The predicted values vs. actual values is presented in Figure 1.4, which shows that the estimated Cobb-Douglas function has a relatively good fit**. Next, using these estimates, I redo the analysis of the permanent income model. There are several important caveats to be noted. First, I assume that if the government were to follow the permanent income rule, the reduction in total government expenditures comes only from capital expenditures. Therefore, current spending is taken as given in both simulations, the one with the projected government spending and the one which follows the permanent income rule. A second caveat is that, the non-oil revenues are the same regardless of the growth of the non-oil GDP. This assumption, of course, can be relaxed since non-oil revenues can be thought of as a percentage of non-oil GDP. However, for the purposes of this model, both current spending and non-oil revenues are fixed. I thus simulate the Permanent Income Model using the same assumptions



for inflation and return on assets abroad as in the previous section. I have established from our regression that in the endogenous capital model, higher capital spending will lead to higher non-oil GDP growth. Therefore in Table 1.4, I perform two simulations of the model: the first one in which the government follows the current capital spending policies (line 1) and the second one which provides the targets that the government needs to adhere to for achieving a sustainable fiscal policy (line 2). In both cases, the capital spending feeds into the non-oil GDP (unlike in Table 1.1, where the projection and the targets assume the same non-oil GDP and thus the sharp cuts implied in capital spending to achieve the target do not affect non-oil GDP). In the first case, using current capital spending, I get a slightly different non-oil GDP as compared to Table 1.1, since in this simulation the non-oil GDP point estimate is slightly higher based on the Cobb-Douglas regression and thus for 2012 we have a non-oil deficit of 38.5 percent of non-oil GDP. In the second simulation, the one which the government should follow, the non-oil GDP is lower than lines 2 and 3 in Table 1.1, reflecting lower capital spending. To achieve the target, the government must spend less and therefore non-oil GDP does not grow as fast. However, the benchmark non-oil deficit is higher than implied by the permanent income rule in Table 1.1. The capital feedback through its reduction of non-oil GDP, in effect, makes the annuity from oil revenues worth more compared to the non-oil economy, and the sustainable non-oil deficit is linked to this annuity (see Clausen, 2008, for a mathematical derivation). The actual spending is lower but it is higher relative to non-oil GDP.

Table 1.4. Equatorial Guinea: Medium-Term Fiscal Framework - Budgets vs. Targets

	Non-oil primary balance	
	2009	2012
Price of oil based on WEO (US$ per barrel)	101	103
Baseline scenario - assumes real return of 2 percent on financial investments.		
1. Fiscal balance based on staff projections for revenues[1] and current projections for expenditures.[2]	-73.1	-38.5
2. Fiscal balance based on staff projections for revenues and following a permanent income model for expenditures,[3] kept constant in real terms.[4]	-44.9	-35.5

[1] Petroleum revenue projections are based on staff assumptions for government intake and projected oil price from WEO.
[2] The projections for government expenditures assume capital expenditures declining as a percent of GDP after 2009 and current expenditures increasing as a percent of GDP.
[3] Expenditure based on the Permanent Income Model is equal to an annuity from oil revenues plus non-oil revenue for that year (excluding interest earned).
Sources: Equatoguinean authorities, WEO, and IMF staff estimates.

28. It is important to note that in the capital feedback model, the level of capital spending is allowed to affect non-oil GDP to the same extent and with the same efficiency as in the past, meaning future public investment projects are assumed to be as efficient and as growth-inducing as the past ones. While this is clearly a strong assumption, the results show that

even such a strong assumption cannot justify the current level of projected capital spending, and that such a fiscal policy if not corrected in due course is unsustainable.

C. Conclusion

29. **I have analyzed the fiscal policy of Equatorial Guinea using two versions of the Permanent Income Hypothesis model.** In the first model, I assume that fiscal policy, and more specifically capital expenditures do not affect significantly the rate of growth on non-oil GDP. In this version, the current fiscal policy is shown to have much higher non-oil primary deficits than a sustainable fiscal policy derived under a permanent income rule. In the second version of the model, I allow for government capital expenditures to affect the rate of non-oil GDP, by estimating an economy-wide Cobb-Douglas production function. My analysis indicates, however, that even if capital expenditures are as efficient and growth inducing in the future as they were in the past, when Equatorial Guinea had little public capital and infrastructure, the fiscal policy is still unsustainable and cannot be justified based on its effect on non-oil growth. Moreover, absent any corrective measures, such fiscal policies are clearly unsustainable, even if capital spending is assumed to affect non-oil GDP growth.

References

Aschauer, David Alan, 1989, "Is Public Expenditure Productive?" *Journal of Monetary Economics*, Vol. 23, pp. 177–200.

Barnett, Steven, and Rolando Ossowski, 2002, "Operational Aspects of Fiscal Policy in Oil-Producing Countries," IMF Working Paper No. 02/177 (Washington: International Monetary Fund).

Clausen, J., 2008, "Calculating Sustainable Non-mineral Balances as Benchmarks for Fiscal Policy: The Case of Botswana," IMF Working Paper 08/117 (Washington: International Monetary Fund).

Cooley, Thomas F., and Edward C. Prescott, 1995, "Economic Growth and Business Cycles," in *Frontiers of Business Cycle Research*, ed. Thomas F. Cooley (Princeton: Princeton University Press).

Easterly, William, and Sergio Rebelo, 1993, "Fiscal Policy and Economic Growth: An Empirical Investigation," NBER Working Paper No. 4499 (Cambridge, Massachusetts: National Bureau of Economic Research)

Engel, Eduardo, and Rodrigo Valdés, 2000, "Optimal Fiscal Strategy for Oil Exporting Countries," IMF Working Paper No. 00/118 (Washington: International Monetary Fund).

Gramlich, Edward M., 1994, "Infrastructure Investment: A Review Essay," Journal of Economic Literature, Vol. 32 (September), pp.1176-1196.

Gupta, Sanjeev, Benedict Clements, Emanuele Baldacci, and Carlos Mulas-Granados, 2002, "Expenditure Composition, Fiscal Adjustment, and Growth in Low-Income Countries," IMF Working Paper No. 02/77 (Washington: International Monetary Fund).

Hotelling, Harold, 1931, "The Economics of Exhaustible Resources," *The Journal of Political Economy*, Vol. 30 No. 2 pp.137–175.

Kaldor, Nicholas, 1963, "Capital Accumulation and Economic Growth," in Freidrich A. Lutz and Douglas C. Hague, eds., *Proceedings of a Conference Held by the International Economics Association*, London, Macmillan.

Khan, Mohsin S., and Manmohan S. Kumar, 1997, "Public and Private Investment and the Growth Process in Developing Countries," *Oxford Bulletin of Economics and Statistics*, Vol. 59 No. 1, pp.69–88.

Khan, Mohsin S., and Carmen M. Reinhart, 1990, "Private Investment and Economic Growth

in Developing Countries," *World Development*, Vol. 18, No. 1, pp.19–27.

Kneller, Richard, Michael Bleaney, and Norman Gemmell, 1999, "Fiscal Policy and Growth: Evidence from OECD Countries," *Journal of Public Economics*, Vol.74, pp.171–90.

———, 2000, "Testing the Endogenous Growth Model: Public Expenditure, Taxation and Growth Over the Long Run," University of Nottingham, Department of Economics Discussion Paper No. 00/25.

Lucas, Robert E., 1990, "Why Doesn't Capital Flow from Rich to Poor Countries?" *American Economic Review*, Vol. 80, No. 2, pp.92–96.

———, 2000, "Inflation and Welfare," *Econometrica*, 66(2), pp. 247–274.

———, and Nancy L. Stokey, 1983, "Optimal Fiscal and Monetary Policy in an Economy without Capital," *Journal of Monetary Economics*, Vol. 12, pp.55–93.

Miller, Nigel James, and Christopher Tsoukis, 2001, "On the Optimality of Public Capital for Long-Run Economic Growth: Evidence from Panel Data," *Applied Economics*, Vol. 33, pp. 1117–1129.

Romer, Paul M., 1986, "Cake Eating, Chattering, and Jumps: Existence Results for Variational Problems," *Econometrica*, Vol 54, Issue 4, pp. 897–908.

Sala-i-Martin, Xavier and Arvind Subramanian, 2003, "Addressing the Natural Resource Curse: An Illustration from Nigeria," IMF Working Paper No. 03/139 (Washington: International Monetary Fund).

Ueda, Kenichi, and Eric Parrado, 2003, "Public Investment and Economic Growth," in IMF Staff Country Report No. 03/9 (Washington: International Monetary Fund).

II. Assessment of the Real Effective Exchange Rate in Equatorial Guinea[1]

A. Introduction

1. **Equatorial Guinea's real exchange rate has appreciated significantly since 2000, reflecting the steady rise of the euro over this period.**[2] While the appreciation of the REER appears to be consistent with the recent run-up in oil prices, it has been accompanied by a contraction of non-petroleum exports that raises concern that the REER may be somewhat overvalued. This chapter assesses whether the exchange rate is properly valued at its current level, given the profile of Equatorial Guinea's petroleum resources and the sharp decline in oil revenues expected by 2020.

2. **Assessment of the real exchange rate in Equatorial Guinea is complicated by significant data deficiencies that make it difficult to perform a quantitative assessment of possible REER misalignment.** There have been significant structural changes in the economy since oil production began in 1992, which limits the length of the time series that can be used for analysis. In addition, data on the national accounts, balance of payments, and inflation all have significant limitations and make it difficult to get an accurate representation of the performance of the non-oil sector and domestic price developments.

3. **Within these constraints, our analysis integrates two of the CGER methodologies for real exchange rate assessment.** The first methodology incorporates CGER's macro balance approach, but is adapted to take into account the exhaustibility of the main export base in estimating a current account norm that links the medium-term current account path to a long-term sustainable fiscal position, calculated on the basis of the permanent income hypothesis (see Milkov, 2008). This approach has been used in a number of a non-renewable resource producing countries. The second methodology is an econometric assessment based on the standard fundamental equilibrium exchange rate approach, using recent studies for the CEMAC region in order to try and overcome Equatorial Guinea's data limitations.

4. **Our results suggest that the REER is moderately overvalued**, with the macroeconomic balance approach highlighting the need for substantially higher current savings in order to sustain imports and smooth consumption beyond the horizon of oil production.

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[1] Ali Alichi and Matthew Gaertner, African Department.

[2] The CEMAC region has a common exchange rate/monetary policy; the regional exchange rate, the CFA franc, is pegged to the euro.

B. Previous REER Assessments

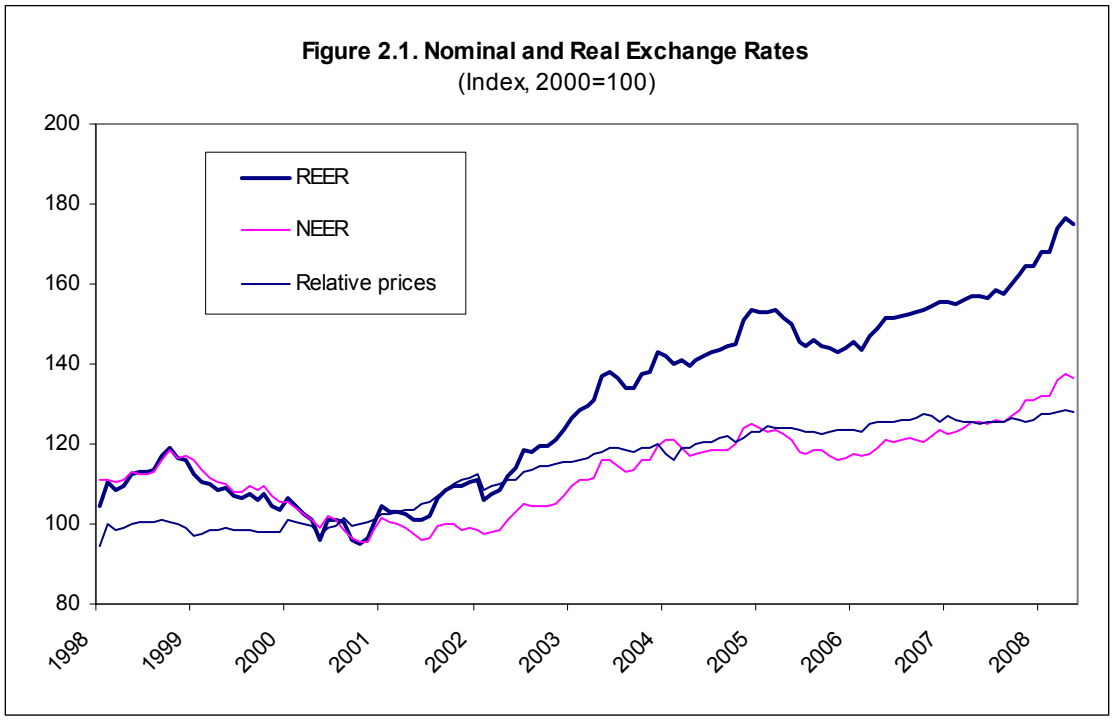
5. **There has been no prior REER assessment exclusively for Equatorial Guinea.** Although there have been several assessments of external stability and possible REER misalignment for the CEMAC region, all of these studies have excluded Equatorial Guinea from their econometric analysis on the grounds that Equatorial Guinea joined the region in 1985, outside the initial period of study, and because of the poor quality of data available on Equatorial Guinea.

6. **A number of studies have estimated the equilibrium exchange rate for the CEMAC region and concluded that there is no significant misalignment.** Deléchat (2008) and IMF (2007) both determined that an econometric estimation of the fundamental equilibrium exchange rate suggests that the CEMAC region's REER is broadly in line with its fundamentals, with the recent real appreciation consistent with an adjustment of the equilibrium exchange rate to a strengthening of the terms of trade. This is consistent with prior studies by Abdih and Tsangarides (2006) and Tsangarides (2005), which concluded there was no significant REER misalignment for 2005 and 2004.

7. **A forward-looking assessment of exchange rate stability for CEMAC, however, accounting for the exhaustibility of the region's oil resources, indicates that the long-run external position may not be sustainable.** Deléchat (2008) determined that based on this methodology, the exchange rate may not be sustainable in the long-run, and suggested that the region would need to run higher current account surpluses than currently projected in order to sustain imports and consumption beyond the horizon of oil production.

C. REER Developments

8. **The CPI-based REER has steadily appreciated in recent years and is now about 75 percent above its 2000 level.** Although in recent years this appreciation has mostly resulted from an increase in the nominal exchange rate as the euro has strengthened, there has also been a steady increase in the inflation differential relative to trading partners since 2000 (Figure 2.1). The relative price differential was 28 percent above its 2000 level by mid-2008, mostly reflecting higher domestic inflation during 2001-2004. However, official data are likely to have substantially understated consumer price inflation in Equatorial Guinea during 2006-07, and perhaps earlier years as well, suggesting that the actual real appreciation during this period has been even larger.



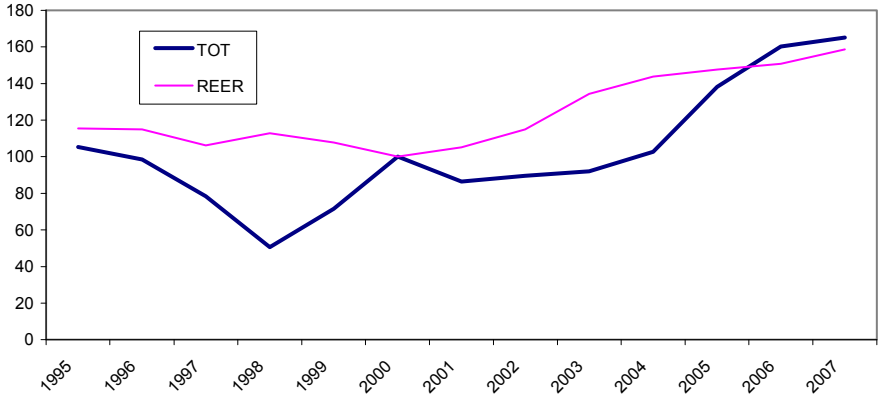
D. External Sector Developments

9. **Equatorial Guinea's immediate external position remains favorable, with large balance of payments surpluses from 2004-2007 allowing for a sizable accumulation of foreign assets (Figure 2.2)**. The overall balance of payments surplus was US$0.4 billion in 2007, or 3.3 percent of GDP, with government deposits outside BEAC accounting for an additional $1.8 billion. This boosted official foreign assets (including those deposited in foreign accounts outside of BEAC) to $7.1 billion, or 21 months of non-oil related imports of goods and services by end-2007 from $0.9 billion at end-2003. The main risk to the current account remains the vulnerability to a terms-of-trade shock in the event of a sustained oil price decline: in 2007, hydrocarbon-related exports represented 98 percent of total exports of goods and services and 91 percent of GDP.

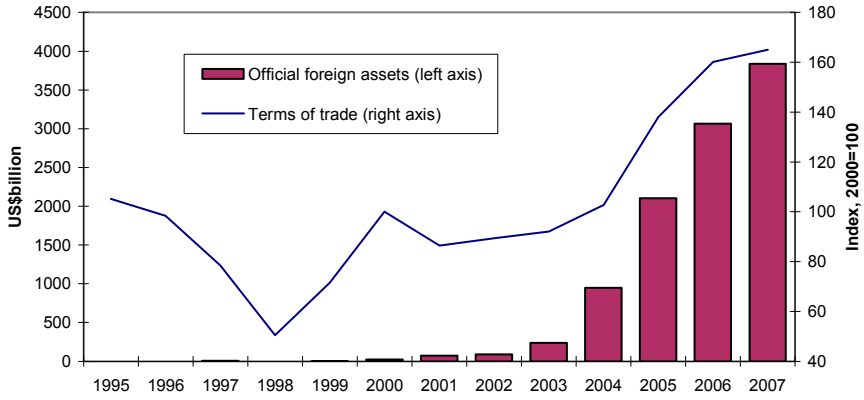
10. **There appear to be no significant balance sheet vulnerabilities stemming from the capital and financial account,** with private capital flows negligible outside of foreign direct investment related to the hydrocarbons sector. These FDI inflows averaged 27 percent of GDP during 2003-2007. The only other significant financial account transactions remain investment outflows by the government, reflecting deposits of accumulated fiscal savings with banks offshore, rather than BEAC. These outflows amounted to 15 percent of GDP in both 2006 and 2007. In early 2008, the government also purchased the equity stake held by a foreign oil company in one of Equatorial Guinea's main oil fields for a reported $2.2 billion. This transaction is expected to more than offset likely FDI inflows during 2008, resulting in a decline in FDI in Equatorial Guinea in 2008 of roughly 3 percent of GDP.

Figure 2.2. Balance of Payments Developments

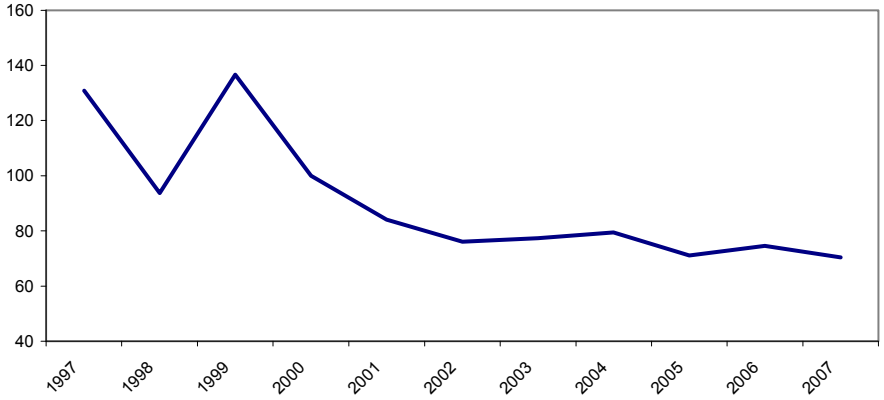
Terms of trade and REER
(Index, 2000=100)



Gross Official Foreign Assets and Terms of Trade



Non-Hydrocarbons Export Volumes
(Index, 2000=100)



11. **The real appreciation has mirrored the terms of trade gains underlying the strong current account, but has also been accompanied by a contraction in non-hydrocarbon-related exports.** Exports outside of hydrocarbons and derivative products accounted for less than 6 percent of non-oil GDP in 2007 (Table 2.1), with indications that traditional export sectors such as cocoa and forestry have contracted substantially, raising concerns about long-term sustainability given the comparatively short-term profile of Equatorial Guinea's oil production. Non-hydrocarbon-related export volumes in 2007 were roughly half of their level in 1999.

Table 2.1. Indicators of Competitiveness

	1997	2000	2005	2006	2007
Terms of trade, (2000=100)	51.3	100.0	137.2	159.9	165.5
Volume of non-oil exports, including derivatives (2000=100)	98.8	100.0	539.1	584.5	1,116.5
Volume of non-oil exports, excluding derivatives, (2000=100)	130.9	100.0	71.1	74.5	79.5
Non-oil exports, including derivatives, as percent of non-oil GDP [1]	56.5	42.1	39.6	38.4	51.2
Non-oil exports, excluding derivatives, as percent of non-oil GDP [1]	56.5	38.5	8.4	5.7	5.8
REER, CPI-based (2000=100)	106.2	100.0	147.7	150.8	161.5

Sources: Equatoguinean authorities, WEO, and IMF staff estimates.
[1] Non-oil GDP includes hydrocarbon derivatives.

E. Macro-Balance Approach with Permanent Income Norms

12. **The macro-economic balance approach to REER assessment consists of calculating the long-run equilibrium current account and estimating the real exchange rate adjustment required to close the gap between this equilibrium current account and the underlying current account balance.** In CGER, this is done in three steps. The first step is to estimate an equilibrium relationship between the current account balance and a set of macroeconomic fundamentals. The second step consists of using the coefficients and the medium-term values of the fundamentals to compute the current account norm. The final step is to calculate the real exchange rate adjustment needed, other things being equal, to close the gap between the estimated and the underlying current account balance. This adjustment is computed using the elasticity of the current account: *(export elasticity)x(export to GDP ratio)-(import elasticity)x(import to GDP ratio)*.

13. **There are several constraints in applying this approach directly to Equatorial Guinea.** As a developing economy in the process of significant structural change, it is far from a steady state, making it difficult to identify the long-run level of key macroeconomic variables needed to make a meaningful estimate of the equilibrium current account balance. In addition, the expected exhaustion of Equatorial Guinea's oil resources by 2030 suggests a need to run larger current account surpluses in the short-term during the period of peak oil production in order to generate sufficient savings to smooth consumption as oil revenues decline over the long-term.

14. **As a result, our analysis modifies the macroeconomic balance approach to estimate a more forward-looking current account norm.** The current account norm is calculated based on a path of reserve accumulation consistent with the sustainable long-run fiscal position identified in the permanent income hypothesis (PIH). Given the expected deterioration in the external position as non-renewable oil resources are exhausted, the REER is assumed to be in long-run equilibrium when the medium-term current account path reflects the accumulation of financial and physical assets required to smooth future consumption. This approach was also used in the external stability and exchange rate assessment for the CEMAC region, and variations have also been used in several other countries that are heavily reliant on nonrenewable resources, including Botswana (WP/08/117), Algeria (SM/08/15) and Gabon (SM/08/233).

15. We first compare the projected external path, based on current macroeconomic policies, with the current account norm, and then estimate the required REER adjustment to close this gap.

16. **The current account norm is estimated in the same manner as the sustainable fiscal balance computed in a related paper** (Milkov, 2008). The permanent income hypothesis suggests that to ensure long-run fiscal sustainability, the government should spend only the 'permanent' part of fiscal revenues and save the remainder. The 'permanent' share of revenues is defined as non-oil revenues, plus a share of the savings from oil-related revenues, calculated on the basis of an annuity that converts the projected stream of oil revenues into an implied stream of fixed payments over a certain period of time. The sustainable fiscal balance is then calculated as the difference between total revenue and permanent income, equal to the difference between oil revenue and the annuity.

17. **In the same way, our sustainable external position is derived as the difference between net oil revenues and the annuity on oil wealth** calculated according to the permanent income hypothesis, interpreted as the required current account surplus to produce sufficient savings to allow consumption to be smoothed over time (Figure 2.3). (This annuity can be computed to keep the payments either constant as a share of GDP or constant in real terms; in our calculations, we have used the annuity as a constant share of GDP, but the difference in the estimated current account norm is relatively small.) Net oil revenue is derived as the portion of oil export revenues accruing for domestic consumption after the share paid to foreign oil companies, while the projected current account surplus is adjusted for investment-related imports of goods and services that are self-financed through FDI inflows.

18. **Our calculations suggest a need for larger current account surpluses than currently projected over the medium-term to sustain the required level of reserve accumulation** (Figure 2.4), indicating that domestic savings based on current economic policies are likely to be insufficient and that there is a possible overvaluation of the exchange rate.

Figure 2.3. NFA accumulation consistent with PIH
(Percent of GDP)

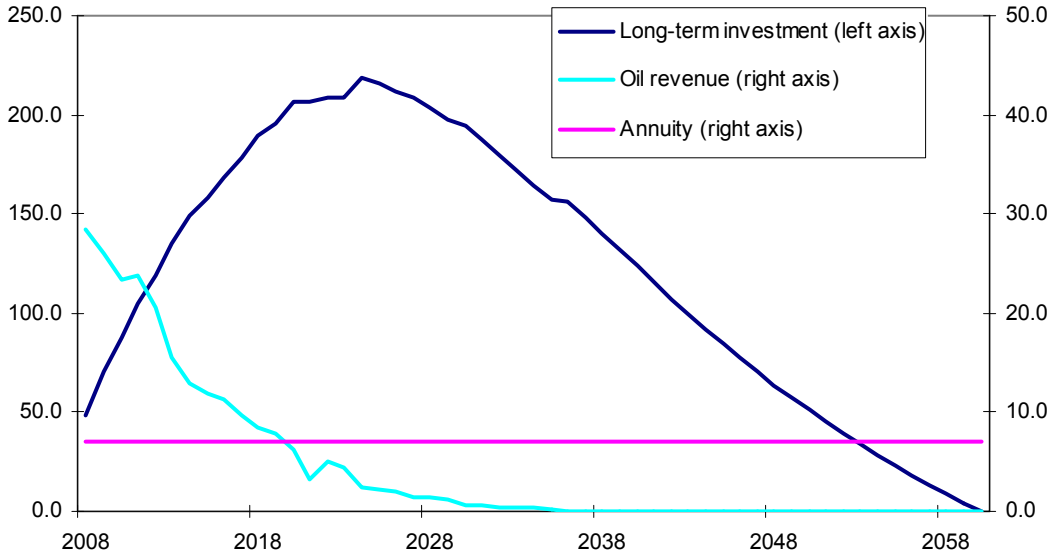
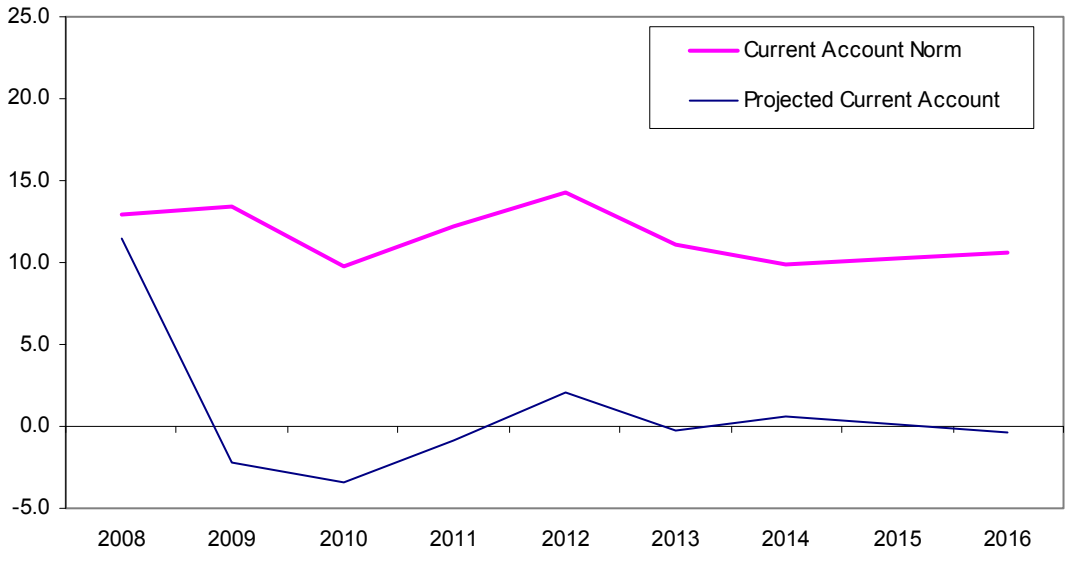


Figure 2.4. Current Account Balance
(Percent of GDP)



19. **We then calculate the real exchange rate adjustment necessary to close this gap, as an indication of the extent of misalignment of the REER with its equilibrium level.** For this calculation, we use the average deviation of the projected current account balance from the estimated current account norm during the period from 2008-2015. The next step is to calculate the elasticity of the current account to the REER based on volume elasticities of imports and exports to REER and the size of imports and exports.

20. **The export elasticity for Equatorial Guinea is almost equal to zero**, because about 98 percent of exports are from the oil sector. We calculate the point elasticity of exports for 2006-07, and find that indeed the elasticity of exports is less than 0.1 percent. This number is then used in all of the calculations that follow.

21. **To calculate the import elasticity, we run the following regression by OLS, corrected for heteroskedasticity, on the historical data of Equatorial Guinea over 1996-2007.** The estimates are reported below the coefficient (t-stats in parentheses, R-squared=0.94).

Ln (Volume of imports) = β_0 + β_1 *Ln (REER) + β_2 *ln (Real GDP)+ error

-1.99	1.49	0.51
(-2.70)	(2.52)	(5.14)

22. Using these results, we will assume an import elasticity of 1.49 in our main scenario calculations. In an alternative scenario, we use elasticities from prior studies (Senhadji, 1997) for developing countries.

23. **Both scenarios indicate a moderate overvaluation of the REER** (Table 2.2). The main scenario shows an overvaluation of about 12 percent, while the alternative scenario estimates a much larger misalignment of close to 25 percent. The alternative scenario might be somewhat less representative for Equatorial Guinea, given that they result from a large panel of developing countries and are unlikely to exactly reflect Equatorial Guinea's specific situation as an oil-exporting country.

Table 2.2. REER Adjustment to PIH-based Current Account Norm

Step1: Calculate the required current account adjustment (percent of GDP)	
Current account norm, 2008-2015 (average)	11.7
Projected current account, 2008-2015 (average)	0.9
Required current account adjustment	10.8
Step 2: Calculate the necessary REER Adjustment (percent)	
Main Scenario: Assume framework elasticities	
Elasticity of imports' volume	1.5
Elasticity of exports' volume	-0.1
Computed current account elasticity	-0.9
REER adjustment required	**-11.6**
Alternative Scenario: Assume Senhaji's import elasticity	
Elasticity of imports' volume	0.7
Elasticity of exports' volume	-0.1
Computed current account elasticity	-0.4
REER adjustment required	**-24.6**
Memorandum items (share of GDP)	
Imports	0.3
Exports	0.9

F. Fundamental Equilibrium REER Approach

24. **The reduced-form fundamental equilibrium real exchange rate (FEER) is another widely used approach to assess REER.** It consists of 3 steps: (a) estimating an equilibrium relationship between the real exchange rate and a set of determinants, the so-called "fundamentals;" then (b) using the coefficients and the medium term values of the fundamentals to compute the equilibrium exchange rate; and finally (c) computing the exchange rate misalignment as the difference between the actual real exchange rate and the equilibrium value.

25. **No prior study has applied the FEER approach exclusively to Equatorial Guinea, but some studies have done so for the CEMAC region, which includes Equatorial Guinea**. Deléchat (2008), IMF (2007), and Abdih and Charalambos (2006) estimate long-run elasticities of the REER with respect to macroeconomic fundamentals in the CEMAC region. All of these studies adopt a time series approach, while Deléchat (2008) also includes an additional panel data approach. These studies have concluded that the CEMAC region's REER is broadly in line with its fundamentals, but have not analyzed REERs of individual member countries.

26. **Data limitations make it difficult to estimate a meaningful equilibrium relationship between REER and its fundamental determinants for Equatorial Guinea**. The available data has a short span, low frequency, and poor quality. Following the discovery of oil in the mid 1990s, the economy of Equatorial Guinea was fundamentally transformed, making the pre-oil economic data uninformative for analysis of recent fluctuations in REER. Furthermore, the economic data is not available at frequencies higher than annual, while the quality of that is available is very poor, especially as one delves in the past. For these reasons, it is not possible to use Equatoguinean data to estimate a meaningful equilibrium REER in a typical regression model as is usually done in the first step of FEER.

27. **Alternatively, we apply the long-run elasticities of the REER with respect to macroeconomic fundamentals, obtained from FEER studies of the CEMAC region, to Equatoguinean data to obtain estimates of the equilibrium REER for the period 1996-2007**. The underlying econometric model includes the following standard fundamentals as determinants of REER: terms of trade, government consumption as a share of GDP, investment as a share of GDP, technological progress (ln of real per capita GDP relative to main trade partners) to account for the Balassa-Samuelson effect, and trade openness (imports plus exports as a share of GDP).

28. **The equilibrium REER estimation results are very different for different CEMAC studies** (Table 2.3). Deléchat (2008) finds only technological progress and openness explain the REER in CEMAC, other studies. IMF (2007) finds all variables but

investment are significant, while the other two studies find all of the variables significant. The estimated elasticities for each variable are also very different across these studies.

Table 2.3. Elasticities of REER Determinants in CEMAC

	Abdih and Tsangarides (2006)	Article IV, 2007	Article IV, 2007 update	Article IV, 2008
Terms of Trade	0.70***	0.35***	0.63***	-0.05
	(9.04)	(3.48)	(5.14)	(-0.86)
Government Consumption	0.41***	0.33**	-0.59***	0.01
	(2.71)	(2.18)	(-3.30)	(0.61)
Technological Progress	0.59***	0.32***	0.64***	0.79***
	(15.60)	(8.13)	(6.98)	(9.04)
Investment	-0.21**	-0.07	-0.74***	0.03
	(2.50)	(0.56)	(3.56)	(-0.21)
Openness	-0.24**	-0.30**	-0.80***	-0.31***
	(2.36)	(2.48)	(4.59)	(4.82)
Constant	1.57	3.30	8.56	N.A.

Notes:
1. All variables are in natural logarithm.
2. Three, two, and one asterisks denote statistical significance at 0.01, 0.05, and 0.10 confidence levels, respectively.
T-statistics are shown in parentheses.
Sources: Deléchat (2008), IMF (2007), and Abdih and Tsangarides (2006).

29. **We use the elasticity estimates of Deléchat (2008), of the REER analysis of the CEMAC region, to assess Equatorial Guinea's REER, as well as the results of older CEMAC studies.** Deléchat (2008) suggests that (at the CEMAC level) changes in neither terms of trade nor government spending significantly explain movements in REER (Table 2.3). This is less plausible for Equatorial Guinea, in which we can observe a close relationship between the REER and terms of trade, and between the REER and hydrocarbon revenues (Figure 2.2), which in turn is highly correlated with government spending. Therefore, we also apply the elasticity estimates of other CEMAC studies to Equatorial Guinea, for comparison purposes.

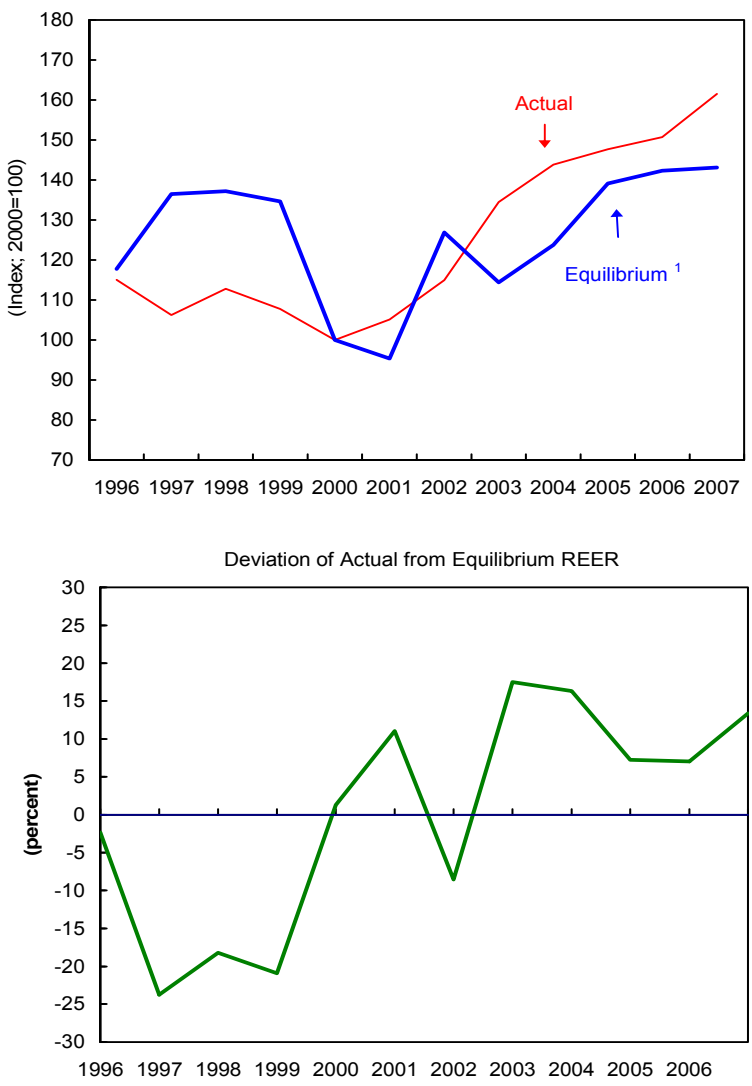
30. **We apply the CEMAC elasticity estimates to the Equatoguinean data to obtain estimates of the equilibrium REER of Equatorial Guinea for the period 1996-2007, and compare these with actual REER data**. The data and sources are described in Appendix I. For each year in the sample, we multiply the realizations of the explanatory variables by their respective long-run coefficients from each study. To ensure that the thus obtained estimates of the equilibrium REER have the same sample mean as the actual REER in Equatorial Guinea (which must be the case for any estimate of the equilibrium REER series), we add to the estimates of the equilibrium REER in each sample year the difference between the sample mean of the actual REER and the sum of the products of the sample means of all explanatory variables with their respective long-run coefficients. This is equivalent to estimating the regression model in each study by OLS with Equatoguinean data, while

constraining the coefficients of all explanatory variables, except the intercept, to be equal to their estimates in each study.

31. **The results of this approach suggest overvaluation or undervaluation depending on the data used** (Table 2.3)**.** Using CEMAC results from Deléchat (2008) we find that the REER is undervalued by about 33 percent. Using the CEMAC elasticity estimates from the update of IMF (2007) results, reported in Deléchat (2008), shows an undervaluation of about 128 percent. However, using the IMF (2007) CEMAC results, reported in Deléchat (2008), showed an overvaluation of about 13 percent. Finally, using the Abdih and Tsangarides (2006) elasticities, we found an undervaluation of about 88 percent. These results are significantly different from each other and would need to be reconciled.

32. **The overvaluation result of 13 percent, using IMF (2007), seems to be closest to the result of our macro-balance methodology**, which suggests an overvaluation of 12 percent. It is also consistent with different CEMAC studies, including Deléchat (2008), which have suggested that the regional REER is broadly in line with fundamentals. This result is presented in Figure 2.5.

Figure 2.5. Equatorial Guinea: Actual and Equilibrium Real Effective Exchange Rate, 1996-2007



Source: Staff estimates.

[1] The Equilibrium REER is estimated by constraining the coefficients of all explanatory variables (except the country-specific intercept) to be the same as in the fundamental equilibrium exchange rate (FEER) model for the CFA Franc in the Staff Report for the 2007 Article IV consultation for the CEMAC region.

33. **In conclusion, we find the FEER approach inconclusive about REER assessment in Equatorial Guinea**. While the overvaluation result of 13 percent seems the most plausible of all, the FEER approach produces significantly different results about REER alignment in Equatorial Guinea, depending on elasticities from which study are used. On the other hand the macro-balance approach developed in this paper is more sound because it connects

external sustainability to the fiscal position, which is very plausible for a highly resource abundant country, such as Equatorial Guinea.

G. Conclusion

34. **Our analysis indicates that the marked appreciation of the real exchange rate since 2000 has resulted in a modest overvaluation.** Although the balance of payments position remains favorable in the short term, a more forward-looking assessment to the REER based on the need to smooth consumption over the long-term as oil resources decline, suggests a need for an increase in domestic saving and larger current account surpluses than current policies would indicate. The decline in more traditional export sectors also raises concern that the recent real appreciation has left these sectors increasingly uncompetitive.

35. **As a member of CEMAC and the common monetary policy area, the main policy tool available to Equatorial Guinea to achieve this type of adjustment is through fiscal and structural policies.** This highlights the need to carefully consider the fiscal expansion planned for 2009-2010, to ensure that domestic savings are consistent with a sustainable long-term fiscal position, and that planned capital investment will contribute to long-run productivity gains that will improve the competitiveness of the non-oil sector as a viable alternative to oil production as oil revenues decline. This type of productivity-enhancing investment also includes much needed investment in human capital, in the form of health care and education. Given domestic supply constraints, especially with regard to skilled labor, fiscal expansion also risks exacerbating domestic inflationary pressures and rising wage costs that have contributed to the real appreciation in recent years.

References

Abdih, Y., and C. Tsangarides, 2006, "FEER for the CFA Franc," IMF Working Paper 06/236, (Washington, DC: IMF).

Clausen, J., 2008, "Calculating Sustainable Non-mineral Balances as Benchmarks for Fiscal Policy: The Case of Botswana," IMF Working Paper 08/117 (Washington: International Monetary Fund).

Deléchat, C. and A. Kireyev, 2008, "CEMAC: External Stability and Exchange Rate Assessment in an Oil-Dependent Region." IMF Selected Issues Paper SM/08/254 (Washington: International Monetary Fund).

Di Bella, G., M. Lewis, and A. Martin, 2007, "Assessing Competitiveness and Real Exchange Rate Misalignment in Low-Income Countries," IMF Working Paper 07/201 (Washington: International Monetary Fund).

Edwards, S., 1991, *Real Exchange Rates, Devaluation and Adjustment* (Cambridge, Mass.: MIT Press).

Franken, H., 2006, "Fiscal Rules as a Means of Guiding Policy Decisions in a Resource-Rich Country: Some Options for Equatorial Guinea," IMF Country Report 06/237 (Washington: International Monetary Fund).

International Monetary Fund, 2007, "Central African Economic and Monetary Community—Staff Report on Common Policies of Member Countries," IMF Country Report SM/07/211 (Washington: International Monetary Fund).

International Monetary Fund, 2008, "External Competitiveness and Diversification in Gabon," IMF Selected Issues Paper SM/08/233 (Washington: International Monetary Fund).

Lee, J., G. Milesi-Ferretti, J. Ostry, A. Prati, and L. Ricci, 2008, "Exchange Rate Assessments: CGER Methodologies," IMF Occasional Paper 261 (Washington: International Monetary Fund).

Loko, B., 2008, "Estimating the Equilibrium Real Exchange Rate in Algeria," IMF Selected Issues Paper SM/08/15 (Washington: International Monetary Fund).

Milkov, D., 2008, "Fiscal Sustainability and Capital Spending: The Case of Equatorial Guinea," (forthcoming).

Senhadji, A., 1997, "Time-Series Estimation of Structural Import Demand Equations: A Cross-Country Analysis," IMF Working Paper 97/132 (Washington: International Monetary Fund).

Tsangarides, C., 2005, "The Evolution of Actual and Equilibrium Real Effective Exchange Rates in the CEMAC Region," IMF Country Report 05/390 (Washington: International Monetary Fund).

Appendix I. Data and Variable Definitions

REER = Real effective exchange rate;[3]
TOT = Terms of trade of goods;
CGR = Government consumption as a share of GDP;
INV = Investment as a share of GDP;
PROD = Technological progress index; and
OPEN = Openness.

The source of the data for Equatorial Guinea is IMF staff calculations and the source of data for the CEMAC region is IMF (2008).

[3] Following the IMF convention, an increase in the REER is defined as an appreciation.