

IMF Working Paper

Today versus Tomorrow: The Sensitivity of the Non-Oil Current Account Balance to Permanent and Current Income

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Abstract

This paper applies the Permanent Income Model to the non-oil current accounts of the major oil exporters to assess the extent to which national consumption decisions in these countries are made on the basis of permanent versus current income. A test of whether the return on oil wealth and oil balance coefficients sum to unity is accepted for all specifications that adjust the return on wealth for future population changes. For oil-exporting countries outside Africa, around half of the fluctuations in the private sector non-oil balance are driven by considerations of changes in permanent income (the return on oil wealth) rather than current income. By contrast, for the public sector and African countries permanent income has little or no effect.

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I. INTRODUCTION

Recent sharp swings in the oil price have rekindled interest in the extent to which consumption decisions made by oil exporting countries are based on temporary or permanent movements in oil income and wealth. Many countries are experiencing large changes in the value of oil resources and the question is whether they have a buffer to maintain consumption in the face of these large changes.

This paper uses the permanent income model (PIM) to examine these intertemporal decisions. The PIM has a long history, the basic insight being that in a world of perfect capital markets, individuals consume the return on wealth (with or without a correction for population growth depending on whether consumption or consumption per capita is maximized). If capital markets are imperfect or some consumers choose to consume all of their disposable income, current income and future wealth play a role in determining consumption and current account behavior (for example, Campbell and Mankiw, 1990).

This paper applies the analysis of the PIM to the non-oil current accounts of the major oil exporters to assess the extent to which national consumption decisions in these countries are made on the basis of permanent versus current income. The sample contains a mix of countries likely to have strong market linkages (GCC countries) and those whose ability to borrow to smooth abrupt changes in income may be more limited (Sub-Saharan Africa countries). It finds that for oil-exporting countries outside Africa, around half of the fluctuations in the private sector non-oil balance are driven by considerations of changes in permanent wealth rather than current income. By contrast, for the public sector and for African countries the return on oil wealth has no effect—only current income matters.

The literature on analyzing current account movements among oil producers is very limited. Segura (2004) looks at the flow of income from oil wealth into the Sao Tome economy using the permanent income hypothesis but uses this analysis to postulate future spending opportunities rather than analyze historical behavior. Akram (2004) includes petroleum wealth in the calculation of a fundamental equilibrium real exchange rate (FEER) for Norway and shows that different assumptions about wealth affect the FEER estimate. While a number of papers have considered the fundamental determinants of current account balances across a wide range of countries (Calderon, Chong and Loyozza, 2002, and Chinn and Prasad, 2000), this paper's objective of associating historical movements in the non-oil current account to measures of wealth and cash flow has not previously been done.

II. THEORETICAL CONSIDERATIONS

How should we think about the current account in oil exporting countries? One approach is to view these countries as having a large store of wealth underground waiting to be pumped

at a rate that is largely determined by technology (in addition to foreign assets that are being built up as the counterpart to current account surpluses). The problem facing the country is then essentially identical to that faced by a consumer in deciding whether to save or spend a given path of income.

A well known result from the canonical forward looking consumption models is that temporary changes in income should have very little impact on consumption (the propensity to consume is basically the real interest rate) but that this effect increases as the change becomes more permanent—equaling one for rises in permanent income. Put differently, individuals smooth consumption by spending the constant returns that can be garnered from investing current and future income. Furthermore, as individuals are forward looking and take account of expected future changes in income, consumption should depend only on unexpected surprises to current income.

One empirical difficulty with this implication of the standard model is that there is strong evidence that individuals consume more out of current income than the model would predict, even when predictable changes in income are added. Macroeconomists have taken two basic approaches to incorporating this higher propensity to consume into the model. One is to assume that some proportion of consumers are “liquidity constrained” (i.e., have no access to financial markets) and hence consume all of their income (Campbell and Mankiw, 1990). The aggregate marginal propensity to consume is then a weighted average of the propensities for both groups—forward-looking consumers with a small propensity to consume and liquidity constrained individuals with a marginal propensity of one—with the weights depending on their relative importance in overall consumption (assuming the income stream is the same for both groups).

A more sophisticated version of this approach is that consumers discount the future at a higher rate than the risk free real interest rate, reflecting some interest rate wedge. The marginal propensity to consume then rises to reflect this higher wedge.¹ This real interest rate wedge is often modeled as a probability of death (Blanchard and Yaari, 1985). The liquidity constrained model can be thought of as an extreme version of this model—liquidity constrained consumers can be thought of as individuals who face an infinite real interest rate wedge. In addition, while individuals fully smooth consumption, death and birth imply that aggregate consumption responds to predictable changes in income.

The liquidity constrained model implies a highly tractable empirical model in which consumption should depend on current income and the permanent value of future income.

$$\Delta C = \beta \Delta Y + (1-\beta) \Delta Y_p + \varepsilon$$

¹ Let the additional wedge be θ . Then the marginal propensity to consume rises from $r/(1+r)$ to $(r+\theta)/(1+r+\theta)$.

where ΔY_p is permanent income and ε is an error term. However, as future income is generally unobservable, most empirical tests have simply assumed that the revision to permanent income is a random walk that can be captured by the error term. Hence, the equation becomes:

$$\Delta C = \beta \Delta Y + \varepsilon'$$

and the coefficient β measures the deviation from the PIM.

In the case of oil exporters, however, we have a good proxy for future income, namely the value of current oil reserves. As the oil price is essentially a random walk, these changes in future income are unpredictable, as implied by the theory. Hence, we can trace the impact of movements in both current income (proxied by the value of current oil production) and of unanticipated movements in permanent income (proxied by the permanent implied income stream from oil output). Furthermore, the model implies an easily testable hypothesis of its validity—namely, that the sum of the terms on current and permanent income should equal one. In short, the behavior of oil exporters can be seen as a (macroeconomic) test of the forward looking model of consumption:

$$C = \beta Y_c + (1 - \beta) Y_p + \varepsilon$$

where β is the propensity to consume out of current oil income (oil balance) and Y_p is the present discounted stream of future oil income (oil wealth). Moreover, imposing this restriction makes it possible to obtain coefficient estimates with more power.

One slight modification of this test is the need to aggregate the behaviors of the public and private sectors. When higher income from oil exports is received, part of it gets taxed and then spent by the government. Therefore it is important to model the linkages between movements in the oil trade balance and the non-oil fiscal balance—the underlying hypothesis is that positive movements in the oil trade balance result in higher non-oil fiscal deficits. The regression of the oil trade balance on the non-oil fiscal balance captures two effects: first, how much export revenue gets transferred into taxation receipts, and, second, how much of the taxation receipts are consumed. The oil-related coefficients in the non-oil fiscal balance equation can be expressed as follows:

$$\Delta \text{non-oil fiscal balance} = \Delta \beta_c \text{ oil balance} + \Delta \beta_p \text{ oil wealth} + \text{other variables} + \varepsilon$$

The oil-related coefficients enter in a similar fashion in the private sector equation (non-oil current account balance) with the addition of the behavior of the public sector since positive changes in the non-oil fiscal balance are likely to moderate consumption and lead to a strengthening of the non-oil current account.

Δ non-oil current account = $\gamma_c \Delta$ oil balance + $\gamma_p \Delta$ oil wealth + $\delta \Delta$ non-oil fiscal balance
+ other variables + ε

To fully capture the behaviors of the public and private sectors, the relationship between the oil trade balance and the non-oil fiscal balance (public sector response) and the oil balance and non-oil current account are estimated simultaneously to assess the combined public and private sector responses. The basic null hypothesis is that the sum of oil-related coefficients equals minus unity so that oil revenues are fully reflected in changes in the non-oil current account. The null hypothesis to be tested in the paper is therefore as follows:

$$H_0: \gamma_c + \gamma_p + \delta(\beta_c + \beta_p) = -1$$

If this holds, the constraint can be imposed and the overall extent of deviations from the permanent income model estimated as $(\gamma_c + \delta\beta_c)$. Furthermore, a comparison of the size of the γ_c and β_c coefficients gives a sense of which sector deviated most from the simple forward looking model.

III. DATA ANALYSIS

As foreshadowed in the introduction, the paper estimates the responsiveness of the non-oil current account to movements in permanent and current income using a sample of countries that are defined as major oil exporters by the WEO of the IMF.² The sample of countries is divided geographically as follows.

² The classification is based on oil being the main source of export earnings.

Country List

GCC countries

Kuwait
 United Arab Emirates
 Qatar
 Saudi Arabia
 Oman

WHD and Non-GCC Middle East

Iran, Islamic Republic of
 Libya
 Syrian Arab Republic
 Algeria
 Sudan
 Yemen, Republic of
 República Bolivariana de Venezuela
 Trinidad and Tobago

Eastern Europe

Azerbaijan
 Kazakhstan
 Russian Federation

Africa

Angola
 Congo, Rep. of
 Equatorial Guinea
 Gabon
 Nigeria

The theoretical section above has shown that consumption depends on the linear combination of today's oil cash flow and tomorrow's permanent income depending on the degree of habit formation/liquidity constraints in the economy. Today's oil cash flow is proxied by the current oil surplus. The calculation of permanent income is more complicated and involves the present discounted value of oil wealth, corrected for domestic consumption. Oil wealth is calculated based on oil reserves data obtained from British Petroleum and converted into U.S. dollars using the average annual oil price for Brent, Dubai and West Texas blends. Since the oil wealth measure is the sum of discounted flows, it depends on assumptions made about the period over which oil reserves are left in the ground (i.e., the extraction rate). For simplicity we assume that the extraction rate is constant based on the average ratio of production to reserves over the 1980–2007 period. The annual flow of oil resources is discounted to the present using a real rate of return of 4 percent which is in the range of assumptions used in this literature (Segura uses a real rate of return of 3 percent while Thomas and others, use 4 percent).

Since countries consume some of the oil resource, the availability of future oil wealth for non-oil consumption is reduced by this magnitude. Domestic consumption of oil is proxied

by one minus the ratio of exports to production so that netting out consumption from wealth implies multiplying the present discounted value of wealth by the ratio of exports to production. As for the extraction rate, an average estimate over the 1980–2007 period is generally used for the ratio of exports to production. Exceptions are Angola, Russia, Azerbaijan, and Kazakhstan for which averages since 2000 are used and Syria for which the average over the 2004–07 period is used. These averages are used because the countries either had very low export to production ratios over the whole period (Russia, Azerbaijan, and Kazakhstan) or the ratio was above unity (Angola, Syria).

One version of the permanent income model assumes that the economy maximizes per capita consumption. In this case individual consumption decisions take account of the fact that with population growth, wealth per capita falls over time unless individuals make decisions that take account of this development now. This choice implies consuming the return on oil wealth corrected for population growth (see Thomas, Kim and Aslam, 2008). As for the other variables, long-run population growth estimates are obtained using historical averages over the 1980–2007 except for Qatar and UAE since the historical population growth rates for these two countries are above the assumed real rate of return. For these two countries, the population growth rates are assumed to be $2\frac{1}{2}$ percent per annum, at the top end of the range of estimates for the other countries.

In this paper national consumption decisions are represented by movements in the non-oil current account (the non-oil export sector is very small so that the movements are dominated by imports). The oil-related variables are supplemented with those emphasized in the literature as current account determinants with the only difference that the net foreign asset term is interacted with domestic absorption to capture the income component of the term. This allows for the fact that investment income spent on imports should not be reflected in the non-oil current account because the income and expenditure components offset each other.

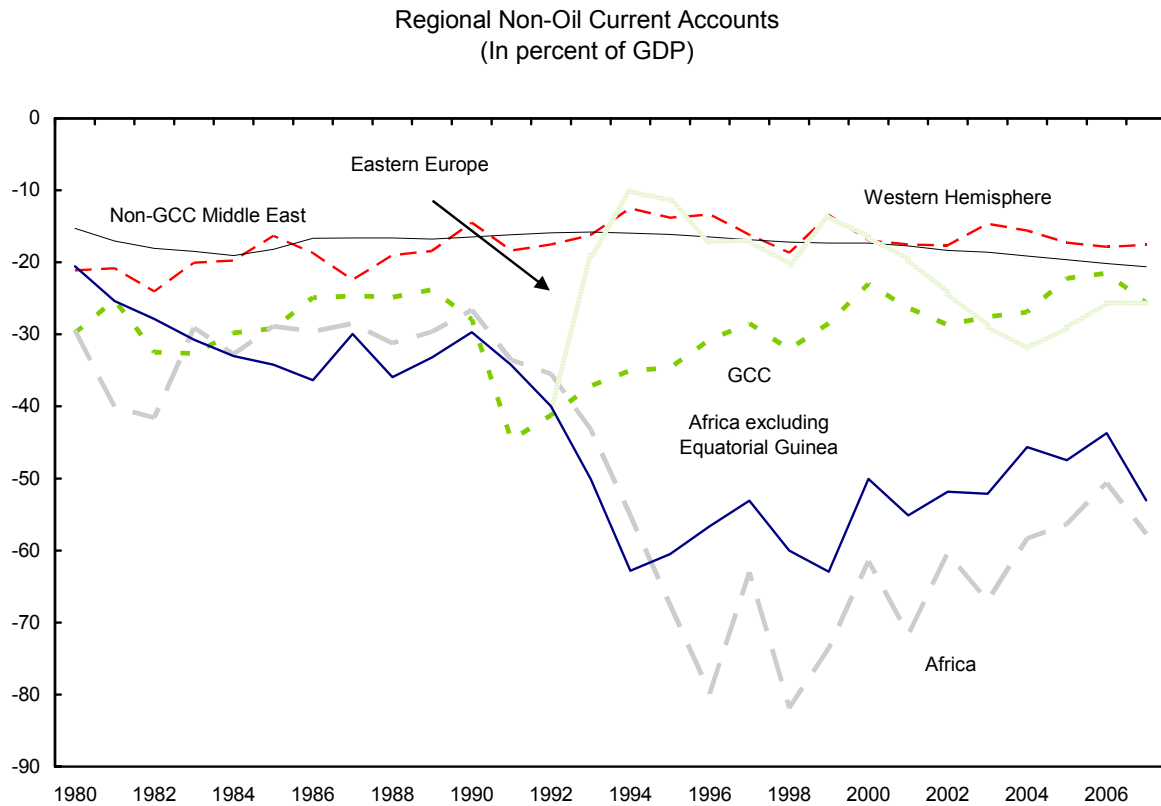
IV. ESTIMATION

A. Non-oil Current Account Balance

We start by excluding the government from the analysis, implicitly assuming a one sector economy. The profile of the non-oil balance for African countries differs considerably from that of other countries since the early 1990s, motivating a separate treatment of these countries (Figure 1). Therefore the first few columns includes all countries except for those in Africa. All equations are estimated using a panel time-series analysis with time dummies included to mop up cyclical effects.

In the first regression, no correction is made for domestic consumption in the calculation of the return on oil wealth. In this regression, the combination of the effects of the current oil

balance and the return on oil wealth add up to unity, as suggested by the theoretical section, but the coefficient on the return on oil wealth is weak and insignificant at only -0.15.



The sensitivity of the non-oil balance to changes in the return on oil wealth has a significant positive coefficient for the GCC countries but this effect is dominated by Qatar. When Qatar is excluded from the specification, there is no difference between GCC and other countries in terms of this sensitivity (column 2). Moreover, without Qatar, the coefficient on the lagged value of NFA has the appropriate positive sign since it proxies the effect of income receipts on the non-oil current account. In terms of the other variables, the variables relating to population and output growth are all insignificant while initial conditions relating to GDP per capita and NFA are significant. The significant negative coefficient on the initial NFA position suggests that countries with high initial wealth run larger non-oil current account deficits. The opposite result holds for countries with high initial levels of GDP per capita because this variable proxies different development needs for countries across the development spectrum. Countries with low initial levels of GDP per capita need large import-sensitive investments to stimulate the growth process and eventually reach GDP per capita convergence.

Table 1. Determinants of Non-oil Current Account
(In percent of GDP)

	All countries except Africa	All countries except Africa and Qatar			Africa		
Output growth t-1	-0.08	-0.07	-0.04	-0.08	0.14	0.18	0.14
Change in population	0.1	-0.16	-0.15	-0.13	5.8	5.72	5.83
Net foreign assets interacted with domestic absorption t-1	-0.03 ***	0.04 ***	0.05 ***	0.04 ***	0.08	0.08	0.08
Return on oil reserves (corrected for population)	-0.15	-0.17			-0.24		
Return on oil reserves interacted with GCC dummy	0.26 *	0.19					
Return on oil reserves (corrected for population; domestic consumption netted out)			-0.39 ***			0.07	
Return on oil reserves (domestic consumption netted out)				0.06			-0.17
Oil balance	-0.74 ***	-0.8 ***	-0.76 ***	-0.81 ***	-1.03 ***	-1.04 ***	-1.02 ***
Initial Conditions							
Old-age dependency ratio	0.5	0.53	0.6	0.16	12.6	11.55	12.2
GDP per capita (relative to U.S.)	-0.06 ***	-0.04 ***	-0.04 ***	-0.04 ***	0.34	0.31	0.33
NFA	-0.02 *	-0.03 ***	-0.04 ***	-0.03 ***	-0.39	-0.35	-0.38
<u>Diagnostic statistics</u>							
F test statistic:							
return on wealth + oil balance = -1	0.77	0.08	1.25	12.6 ***	0.35	0	0.08
Number of observations	382	365	365	365	106	106	106
Number of countries	15	14	14	14	4	4	4
R squared	0.71	0.75	0.75	0.75	0.84	0.84	0.84

Notes: *** signifies significance at the 99 percent level; ** signifies significance at the 95 percent level; * signifies significance at the 90 percent level.

Netting out the effects of domestic consumption from the wealth term has limited effects on the coefficient estimates of the other variables whereas it raises the coefficient on the return on oil wealth to around 40 percent (column 3). Moreover, the null hypothesis that the return on oil wealth and the oil balance sum to unity is maintained. While calculating the return on oil wealth without adjusting for population growth has no effect on the non-oil current account (column 5) the sum of the coefficients on this return and on the oil balance are significantly less than unity. This provides strong evidence that correcting for population growth is appropriate in supporting the consumption smoothing theory of the current account.

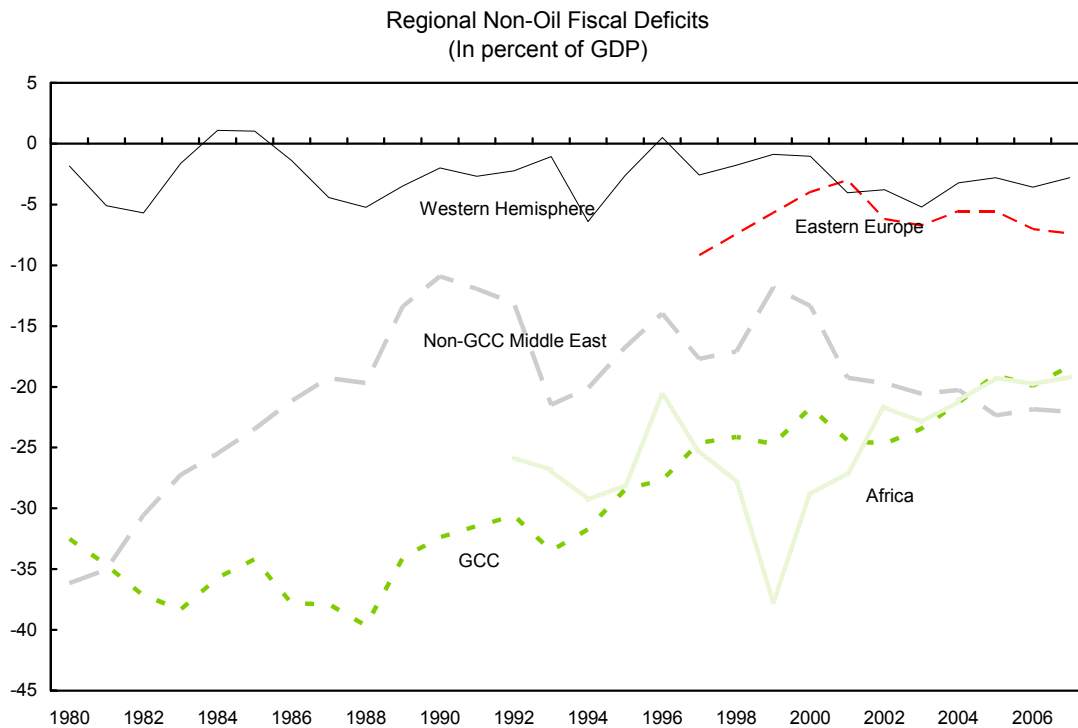
The differentiation between African and other countries is supported by the coefficient estimates in columns 5 through 7. Indeed, for these countries, the only variable that really matters is the current oil balance and it has a unit coefficient, suggesting that these countries are seriously liquidity constrained (results without Equatorial Guinea are shown). Not

surprisingly, the coefficient on the income flow from the present value of oil wealth is insignificantly different from zero.

It appears therefore that while the non-oil current account position is dependent on the current oil balance in all countries, the sensitivity is weaker for countries outside Sub-Saharan Africa. As a corollary, the return on oil wealth is a significant determinant of the non-oil balance for these countries when corrections are made for domestic consumption and population changes, supporting these modifications in this type of model.

B. Non-oil Fiscal Balance

Section II of the paper has emphasized the importance of modeling the relationship between the oil trade balance and the non-oil fiscal balance as well as the aggregate relationship between the oil trade balance and the non-oil current account to properly account for the government sector. This involves two regression relationships and therefore the equations are estimated using the seemingly unrelated regressions (SUR) technique. The regression of the oil trade balance on the non-oil fiscal balance captures two effects: first, how much export revenue gets transferred into taxation receipts, and, second, how much of the taxation receipts are consumed. The other variables in the regression follow those used in the literature on consumption smoothing. The non-oil fiscal deficits are stationary (demonstrated by the regional non-oil fiscal deficit averages in the figure below), supporting the OLS estimation procedure. Interestingly, differences between African and other Middle East countries in terms of the non-oil fiscal deficit are much smaller than for the non-oil current account.



The estimates indicate that the return on oil wealth is largely unrelated to the non-oil fiscal balance in all regions suggesting that the behavior of the fiscal authorities is fairly myopic. Indeed, the coefficient is incorrectly signed in our preferred specification that excludes Africa and adjusts the return on oil wealth for domestic consumption and population changes. Even in the regression with a correctly signed and weakly significant coefficient (that excludes Africa and nets out domestic consumption but does not adjust for population growth), the coefficient on the return on reserves is only -0.11. The oil balance coefficient of -0.25 is fairly stable across the unrestricted specifications and indicates that a 1 percent of GDP increase would lead to an increase of -0.25 percent in the non-oil fiscal deficit. Of course, with this specification we are not able to distinguish between the tax intake from increased export receipts and the government's choice of how much of the tax intake to spend. It could be compatible with all or part of the tax intake being spent. When the nonlinear constraint that the weighted sum of the oil variables in the non-oil equation sum to minus unity is imposed, the coefficients on the oil balance in the non-oil fiscal balance equation rise to -0.35 for countries outside of Africa and -0.41 for African countries.

It is interesting to note that even in the more advanced countries, the private sector is more forward looking than the public sector. This is suggested by comparing the coefficient on the wealth term in both the non-oil current account and non-oil fiscal balance regressions in the specification that adjusts the return on oil wealth for domestic consumption and population changes. The coefficient on the wealth term in the non-oil current account regression is -0.39 whereas the coefficient on the wealth term in the non-oil fiscal balance regression is zero. For the African countries, the wealth terms have no significant bearing on the non-oil balances in either regression.

Turning to the other variables, the effect of NFA on the non-oil fiscal balance is negative and corresponds to the consumption effects from a high asset stock. The same effect applies to the initial NFA position and in reverse to the GDP per capita position.³ Countries with high initial asset stocks have larger fiscal deficits and countries with low levels of per capita income also have high deficits. Stronger output growth improves the fiscal balance through its effects on non-oil revenues and higher population growth leads to increased expenditure pressures.

³ The variable is defined as GDP per capita in the US relative to the country in question.

Table 2. Determinants of the Non-oil Fiscal Balance
(In percent of GDP)

	All countries except Africa and Qatar				Africa			
Output growth t-1	0.17 **	0.17 **	0.14 *	0.17 **				
Change in population	-0.62 ***	-0.62 ***	-0.85 ***	-0.62 ***				
Net foreign assets t-1	-0.02 **	-0.02 **	-0.04 ***	-0.01				
Return on oil reserves (corrected for population)	0.09				-0.43			
Return on oil reserves (corrected for population; domestic consumption netted out)		0.01	0.02			-0.69	-0.59	
Return on oil reserves (domestic consumption netted out)				-0.11 **				-0.29
Oil balance	-0.25 ***	-0.24 ***	-0.35 ***	-0.2 ***	-0.24 **	-0.27 **	-0.41 ***	-0.22 *
Initial Conditions								
Old-age dependency ratio	1.29 ***	1.42	-0.21	1.39 ***				
GDP per capita (relative to U.S.)	-0.03 ***	-0.03 ***	-0.03 ***	-0.03 ***				
NFA	-0.1 ***	-0.11 ***	-0.13 ***	-0.11 ***				
<u>Diagnostic statistics</u>								
F test statistic:								
return on wealth + oil balance = -1	99.4 ***	52.4 ***		150.9 ***	0.45	0.93		7.09 ***
Number of observations	278	278	278	278	72	72	72	71
Number of countries	14	14	14	14	4	4	4	4
R squared	0.45	0.44	0.38	0.45	0.28	0.28	0.17	0.29

Notes: *** signifies significance at the 99 percent level; ** signifies significance at the 95 percent level; * signifies significance at the 90 percent level.

C. Public and Private Sectors

We now put the private and government sectors together in introducing the non-oil fiscal balance into the determinants of the non-oil current account. This allows us to conduct the nonlinear test introduced in section II on the effects of oil-related flows on the non-oil current account. As shown in the table below, the non-oil budget balance has a significant although small effect on the non-oil current account for the countries excluding Africa. A 1 percentage point improvement in the non-oil budget balance improves the non-oil current account by 0.15 percent. The nature of the association between movements in the non-oil fiscal balance and the non-oil current account depend on the source of changes in the non-oil fiscal balance. Suppose that changes in oil revenues were reflected in increased transfers to the public. The non-oil budget balance would behave in the same way as the oil balance since it would reflect private agents' responses to increased income and therefore its coefficient would be zero. Similarly, if all oil revenues going to the budget were spent on nontraded goods, the relation between the non-oil fiscal balance and the non-oil current account balance would be positive because the increased income would be spent on domestic goods. Moreover, the inclusion of the non-oil fiscal balance would reduce the impact of the oil balance and wealth

terms. The coefficient of 0.15 on the non-oil fiscal balance term suggests that some of the oil revenue is spent on domestic goods.

The incorporation of the private and public sectors together modifies the test of the hypothesis of the sum of the oil-related coefficients. Since the non-oil budget balance variable is affected by the return on wealth and the oil balance, the test identifies whether the interaction terms between the oil-related terms in the non-oil fiscal balance regression and the coefficient on the non-oil balance in the non-oil current account regression and the oil-related terms in the non-oil current account regression sum to minus unity. Implicitly, this is a weighted average of the influence of the private and public sectors on the non-oil current account.

The test results indicate that the null hypothesis of the oil terms summing to unity is accepted for the specifications that allow for a population correction to the wealth term. Moreover, when this constraint is imposed, the coefficient on the return on wealth rises to -0.42 compared to only -0.2 to -0.26 in the unrestricted regressions. In contrast, in the case without the correction for population growth, the oil returns are underspent with the sum of the oil-wealth coefficients estimated to be considerably less than unity ($-0.8+0.03+0.12*(-0.11-0.22)$). Again, this provides further support to the view that countries outside of Africa take account of future generations when making consumption decisions. Finally, in the case of African countries, only the oil balance matters, and its coefficient is insignificantly different from unity.

Table 3. Determinants of Non-oil Current Account
(In percent of GDP)

	All countries except Africa and Qatar				Africa			
Output growth t-1	-0.05	-0.05	-0.1	-0.06	0.04	0.04	0.3	0.04
Non-oil budget balance t-1	0.15 **	0.15 **	0.35 ***	0.12 *	0.11	0.11	0.21	0.11
Change in population	-0.2	-0.22	-0.2	-0.2	4.48	4.48	1.09	4.47 *
Net foreign assets interacted with domestic absorption t-1	0.07 ***	0.07 ***	0.04 ***	0.05 ***	0.07	0.07		0.07
Return on oil reserves (corrected for population)	-0.2 **				-0.2			
Return on oil reserves (corrected for population; domestic consumption netted out)		-0.26 **	-0.42			-0.25	0.07	
Return on oil reserves (domestic consumption netted out)				0.03				-0.1
Oil balance	-0.77 ***	-0.76 ***	-0.46 ***	-0.8 ***	-1.27 ***	-1.27 ***	-1.07 ***	-1.27 ***
Initial Conditions								
Old-age dependency ratio	0	0.09	-0.06	-0.07	9.91	9.54	13.49	9.57
GDP per capita (relative to U.S.)	-0.04 ***	-0.04 ***	-0.04 ***	-0.04 ***	-0.21	-0.2	-0.27 **	-0.2
NFA	-0.09 ***	-0.09 ***	-0.08 ***	-0.08 ***	0.06	0.05		0.05
<u>Diagnostic statistics</u>								
F test statistic:								
wealth return + oil balance+budget balance = -1	0	0.2	imposed	8.58 ***	0.82	0.76	imposed	2.6
Number of observations	278	278	278	278	72	72	72	72
Number of countries	14	14	14	14	4	4	4	4
R squared	0.61	0.61	0.51	0.61	0.9	0.9	0.75	0.9

Notes: *** signifies significance at the 99 percent level; ** signifies significance at the 95 percent level; * signifies significance at the 90 percent level.

V. CONCLUSION

This paper has shown that long-term wealth considerations can provide significant explanatory power in an analysis of the non-oil current account for major oil producing countries. For oil-exporting countries outside Africa, changes in the return on oil wealth have significant explanatory power. Moreover, the null hypothesis that the sum of coefficients on current and permanent income sum to minus unity is supported in the regressions that correct the return on wealth for changes in population. When this condition is imposed, the coefficient on the return on wealth (-0.42) is almost identical to that on the oil balance (-0.46, the other 12 cents in the dollar being the fiscal effect, which is entirely myopic). In other words, slightly less than half of the fluctuations in the private sector non-oil balance in these countries are driven by considerations of changes in permanent wealth rather than current income. This is a similar coefficient to that found for Canadian consumers (Bayoumi and Klein, 1997). It is also in the middle of the results in Asdrubali and Kim (2007), which are 74 percent for the United States, but only 34 percent for the European Union and 28 percent for the OECD as a whole. For African countries, movements in the oil balance have a one to one impact on the non-oil current account and the return on oil wealth has no effect—only current income matters.

The paper also finds that the oil trade balance has significant negative effects on the non-oil fiscal balance with a fairly stable coefficient across all countries of between -0.25 and -0.41. On the other hand the effects of changes in oil wealth on the non-oil fiscal deficit are largely absent. This suggests that (outside of sub-Saharan Africa) the private sector is considerably more forward looking than the public sector in these economies. These results underscore the importance of taking account of intertemporal decisions in analyzing movements in macroeconomic aggregates of most major oil exporting countries.

References

- Akram, Q., "Oil Wealth and Real Exchange Rates: The FEER for Norway," Norges Bank Working Paper No. 04/16.
- Asdrubali, P., and S. Kim, 2007, "Incomplete Intertemporal Consumption Smoothing and Incomplete Risk Sharing," mimeo.
- Bayoumi, T., and M. Klein, 1997, "A Provincial View of Economic Integration," *IMF Staff Papers*, International Monetary Fund, Vol. 44:4 (December), pp. 534–556.
- Bayoumi, T., and S. Sgherri, 2006, "Mr. Ricardo's Great Adventure: Estimating Fiscal Multipliers in a Truly Intertemporal Model," IMF Working Paper No. 06/168 (Washington: International Monetary Fund).
- Blanchard, O., 1985, "Debt, Deficits, and Finite Horizons," *Journal of Political Economy*, Vol. 93, 2 (April), pp. 223–247
- Calderon, C.A., Chong, A., and N.V. Loyozza, 2002, "Determinants of Current Account Deficits in Developing Countries," *Contributions to Macroeconomics* 2, pp. 1–31.
- Campbell, J., and G. Mankiw, 1990, "Permanent Income, Current Income, and Consumption," *Journal of Business and Economic Statistics*, Vol. 8, pp. 265–80
- Chinn, M., and E. Prasad, 2000, "Medium-Term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration," NBER Working Paper No. 7581 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Segura, A., 2006, "Management of Oil Wealth under the Permanent Income Hypothesis: The Case of Sao Tome and Principe," IMF Working Paper No. 06/183 (Washington: International Monetary Fund).
- Thomas, A., J. Kim, and A. Aslam, 2008, "Equilibrium Non-Oil Current Account Assessment for Oil Producing Countries," IMF Working Paper No. 08/198 (Washington: International Monetary Fund).